

**INFERENCE GENERATION IN THE READING OF EXPOSITORY TEXTS  
BY UNIVERSITY STUDENTS**

by

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## Abstract

The continued underperformance of many L2 students at primary, secondary and tertiary level is a cause for grave concern in South Africa. In an attempt to better understand the cognitive-linguistic conditions and processes that underlie academic performance and underperformance, this study looks at the problem of differential academic performance by focussing on the inferential ability of undergraduate L2 students during the reading of expository texts. The study works within a constructivist theory of reading, where the successful understanding of a text is seen to involve the construction of a mental representation of what the text is about. Inferencing plays an important role in constructing meaning during reading because it enables the reader to link incoming information with already given information, and it enables the reader to construct a mental representation of the meaning of a text by converting the linear input into a hierarchical mental representation of interrelated information. The main finding showed that the ability to make inferences during the reading of expository texts was strongly related to academic performance: the more inferences students made during the reading of expository texts, the better they performed academically. This relationship held across the making of various inferences, such as anaphoric inferences, vocabulary inferences, inferences about various semantic relations, and thematic inferences. In particular, the ability to make anaphoric, contrastive and causal inferences emerged as the strongest predictors of academic performance. The study provides strong empirical evidence that the ability to make inferences during reading enables a reader to construct meaning and thereby also to acquire new knowledge. Reading is not only a tool for independently accessing information in an information-driven society, it is fundamentally a tool for constructing meaning. Reading and inferencing are not additional tools that students need to master in the learning context- they constitute the very process whereby learning occurs.

Key words: Reading, L2 readers, meaning construction, L2 proficiency, learning context, academic performance, the Matthew effect, inferencing, anaphoric inferencing, vocabulary inferencing, text-semantic relations, thematic inferences,

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# CHAPTER 1

## READING, INFERENCING AND ACADEMIC PERFORMANCE

### 1.0 Introduction

The purpose of this chapter is to identify the research problem that forms the focus of enquiry in this study, to situate this research problem within a broader theoretical, methodological and real-world framework, to state the aims and objectives of the study and to indicate, at the end of the chapter, how the rest of the thesis is structured.

### 1.1 The focus of enquiry

The persistent and pervasive problem of the poor academic performance of many of our students at secondary and tertiary level in South Africa, particularly those who study through the medium of a language which is not their primary language, is one that concerns us all. The entry of underprepared students into tertiary education and their continued underperformance during their tertiary studies is not a short-term issue that is conveniently going to disappear within a few years, in spite of political liberation. Instead, this is an issue that urgently needs on-going attention from educational policy makers, planners, management and teachers, and from researchers in various disciplines and from various theoretical and methodological perspectives. Although many of the contributory factors to this problem have their origins specifically in the deleterious educational practices under apartheid, there are also many aspects of the problem that are common amongst students all over the world who study through the medium of a second language, and there are also common features shared by students in developing countries as opposed to those in developed countries. The problem of poor academic performance is thus a complex and multi-layered one that needs to be studied from a host of different perspectives, including educational, linguistic, cognitive, psychological, socio-political, historical and cultural angles. Each of these domains contribute valuable insights into the problems that struggling students experience, and their findings confirm the view that both short- and long-term solutions to the problem require a multi-perspectival approach.

This study offers a fresh perspective on the problem of differential academic performance by second language (henceforth L2)<sup>1</sup> students by looking at the inferential skills of undergraduate

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<sup>1</sup> For many students, the medium of instruction may not, literally, be their second language; it may be their third or fourth language. For convenience, however, the term L2 will henceforth be used throughout this study to refer to students who are not studying in their first or primary language (the L1).

students during the reading of expository texts. In the study, the role that inferencing plays during reading comprehension is discussed, different types of inferences that are made during reading are identified and analysed, and the relationship between language proficiency, inferential skills and academic performance is examined.

But, one may wonder, why study inferences in the first place? Isn't inferencing some esoteric and obscure exercise in deductive logic that philosophers and semanticists engage in? We are familiar with the deductive inferences of introductory first-year philosophy courses of the order:

- [1] All men are mortal.  
 Aristotle is a man.  
 . . Aristotle is mortal.

These are logical inferences which are associated with the traditional school of Aristotelian syllogistic reasoning and there are specific rules of logic that govern their operation. Such inferences are context-free, because the premises entail the conclusion. But consider now the following short text:

- [2] Hector burnt his mouth yesterday evening. The venison pie was very hot ...

There are no rules of logic governing these two adjoining sentences, but based on our knowledge of the world, we can infer that it must have been his tongue that Hector burnt, that he had venison pie for supper, and that it was the venison pie that caused the burn. None of this information is explicitly stated in the text but, based on what *is* stated in the text, combined with our knowledge of how texts work, how the world works and how humans behave, we perceive the two sentences as being meaningful, we use inferences to link them up, and in so doing we create a coherent representation in our minds of what the two sentences are about.

But, one may ask, what about inferences in expository texts? Consider the following paragraph, taken from a Sociology textbook:

- [3] Carceral organizations were rare in medieval times. Jails and dungeons sometimes existed, but they were few and far between, and were not places where convicted criminals served fixed sentences. People were kept in them as a means of stifling political opposition, to be tortured in order to extract information, or to await trial. The mentally ill either lived within the community, or were forced to roam the countryside. There were no asylums or mental hospitals. The situation has changed considerably in the intervening eight centuries. Carceral institutions have been built in great numbers since the turn of the nineteenth century. (Giddens 1994)

Even if we have never seen the term *carceral organisation* before, based on our expectations that when two or more sentences follow each other in a text, they are somehow linked, we can infer that *Jails and dungeons* are somehow linked to carceral organisations. Based too on the fact that things that are mentioned in the same paragraph are usually about the same topic, we can further infer that because reference to *mental hospitals* occurs in the same paragraph as reference to *jails and dungeons*, that *jails, dungeons* and *mental hospitals* are instances of *carceral organisations*. Based too on our general knowledge of how the world works and what people do, we can generalise further by inferring that *carceral organisations* must therefore be organisations that restrict the freedom of certain people, such as criminals and the mentally disturbed. Furthermore, even if we don't know what or when *medieval times* refers to, from the reference to the situation having "*changed considerably in the intervening eight centuries*" we can risk the guess that *medieval times* refers to a period of time 800 years ago.

These are just some of the inferences that we can make when reading this paragraph, and making such connections helps us understand the text in the way that the author intended us to understand it. The kinds of inferences we made in these examples are called pragmatic or probable inferences, and they are context dependent. The inferences we made here may or may not be the right ones, but their 'rightness' is not necessarily determined by rules of logic but by the context and by norms of likelihood or possibility. It may turn out on further reading of the text that we need to revise our inferences.

As the above example shows, much of the information we derive from texts is not always stated explicitly but is deduced - via the making of connections, either through probability and/or logic - from elements in the text and from our background knowledge of how the world, and texts, work. The information that we derive from a text cannot all be explicitly mentioned; it would make texts too tedious, repetitive and long. Ironically then, meaning in a text is derived from information that is explicit and from information that is implicit. What is implied is just as important as what is explicitly stated. Understanding a text must perforce go beyond the sum of the sentences in the text. This going beyond the sum of the sentences, filling in the gaps between text elements, linking information across textual units, is referred to as inferencing. Inferences perform text-connecting functions during reading. The ability to make connections, to perceive possible relationships, to see likely links between entities is a cornerstone of language processing, whether it is the processing of spoken or written language. In fact, the making of inferences is fundamental not just to language processing but to our making sense of the world in general - fundamental in fact to human cognition and the human condition. In his novel *The Inheritors* William Golding skilfully and subtly portrays the differences in perception that an absence of inferencing ability, specifically causal inferencing, brings about. In the excerpt below, the reader is afforded a view

of the world through the eyes of Lok, a Neanderthal man who comes into contact with a hostile man from a more advanced group of people than the Neanderthals. The man tries to kill Lok by shooting an arrow at him from across the river.

*The bushes twitched again. Lok steadied by the tree and gazed. A head and a chest faced him, half-hidden. ... The man turned sideways in the bushes and looked at Lok along his shoulder. A stick rose upright and there was a lump of bone in the middle. ... Suddenly Lok understood that the man was holding the stick out to him, but neither he nor Lok could reach out across the river. He would have laughed if it were not for the echo of screaming in his head. The stick began to grow shorter at both ends. Then it shot out to full length again.*

*The dead tree by Lok's ear acquired a voice.*

*"Clop!" His ears twitched and he turned to the tree. By his face there had grown a twig: a twig that smelt of ocher, and of goose, and of the bitter berries that Lok's stomach told him that he must not eat. (Golding 1989:106)*

By adopting this style, Golding offers us an intriguing window into the mind of a man who responds to his environment instinctively and who perceives temporal sequences of events in a literal, animate physical world, but for whom the more complex cognitive processes of inferring relationships between states of affairs, events, and motives are but dimly perceived. Lok cannot connect the things that he sees happening about him. His limited ability to make inferences dooms his prospects for survival in the world. Our ability to make sense of the events at the river where Lok failed to, underscores the crucial role that inferencing plays in everyday thinking and reasoning. Being able to make inferences from elements in a text contributes to our understanding of a text in much the same way that making links between states and events in our environment helps ensure our survival in the real world.

The focus in this study, then, is on inferences, specifically on some of the logical and possible inferences that readers make to 'knit' a text together so that information across clause and sentence boundaries is integrated and the text is perceived as meaningful and coherent. The texts that provide the stimuli for the inferences are expository texts, for these are the kinds of texts that students must make sense of in order to learn from them.

The reasons for selecting this area for doctoral research had their origins in various interrelated factors, all of which had leads converging on a common denominator, that of inferencing. One strand of influence that led to an interest in inferencing derived from my earlier research into the role of causality in expository text comprehension from both a text linguistic and psycholinguistic perspective. The text linguistic analysis of the way in which causal connections are signalled in narrative, history and science textbooks used at Grade 5 level (then Standard 3) indicated that



many of the causal connections were implicit rather than explicit. In fact, there were more implicit causal connections in the textbooks written for L2 readers than in those written for L1 readers (Pretorius 1994). My work with 10-year-olds in the reading and recall of history and science texts confirmed the findings of many other studies, namely that the ability to perceive causal connections is significantly related to reading comprehension. In this earlier study, the children's ability to perceive causal connections was significantly related to the length of recall protocols (a standard indirect measure of reading comprehension), as well as to overall scores in English generally (Pretorius 1993; 1996). Many of the causal connections that the children made were causal *inferences*, and this naturally led me into the field of inference research.

Another strand of influence derived from my interest in **reading comprehension** and **individual differences** in reading ability. Current models of reading invoke the notions of interaction and construction to explain what happens during the reading process. It is assumed that during the comprehension process readers construct a mental representation of the meaning of the text - a conceptual map of what the text is about. Inferencing is seen by many researchers to be central to the construction of coherent text representations. More than a quarter of a century ago Roger Schank, working in the field of artificial intelligence and cognitive modelling, stated that inferences are "the core of the understanding process" (1976:168). But, as so often happens when something is central to a phenomenon, it tends to be taken for granted and ignored. As Singer (1988:178) remarks, "[i]nference is so pervasive in language comprehension that it is easy to overlook its role". This study thus attempts to bring a pervasive language process under the spotlight and to examine in greater detail the role it plays in reading comprehension and academic performance.

A further strand of influence that directed me into the field of inferencing stemmed from my interest in the occurrence and consequences of a phenomenon documented in reading research by Stanovich (1986) and corroborated by others (e.g. Daneman 1988; Vauras, Kinnunen & Kuusela 1994), namely the **Matthew effect**. Although this phenomenon will be discussed in greater detail in §1.2.2.1 below, it suffices at this point to describe it as a situation in reading whereby 'the rich get richer and the poor get poorer'. In other words, good readers get better whereas poor readers tend to remain weak readers. What is it, linguistically and cognitively, that poor readers are *not* doing in comparison to good readers that hamstrings them in improving their performance? Some of the findings in reading research indicate that, inter alia, poor readers generate fewer inferences during reading than good readers (e.g. Masson & Miller 1983; Oakhill & Yuill 1986; Oakhill 1994 - these research findings will be discussed in greater detail in Chapter 3). Thus, the phenomenon of the Matthew effect also had leads pointing to inferencing.

Accordingly, in my previous research and in related fields of interest, there were several leads

pointing in the direction of the role that inferencing plays in language processing, specifically the processing of language during reading. Yet, surprisingly, there did not seem to be much in the literature on inferencing in L2 reading or on the role of inferencing in the learning context. The notion of inferencing and its role in the learning context thus seemed to merit further investigation, especially since there seemed to be little attention being given to this issue in the South African context.

An examination of inferential abilities during reading naturally raises a host of questions such as: *What exactly are inferences? How do we make them? When do we make them? How does inferential processing develop in humans? How are inferences and text genres related? Do we make different kinds of inferences depending on the different kinds of discourse we are attempting to understand? What happens if we don't make inferences? Does inferencing impact on academic performance? If so, in what way? Can students be taught to make inferences?*

This study attempts to provide some answers, or at least partial answers, to some of the questions raised above by focussing specifically on inferential processes during expository reading. There are basically four main research questions which the study addresses:

- \* *To what extent do L2 students make inferences while they read expository texts? Are there differences in the **number of inferences** generated during the reading of expository texts by L2 undergraduate students in different academic groups?*
- \* *Are there differences in terms of **different kinds of inferences** generated during the reading of expository texts by L2 undergraduate students?*
- \* *What is the **relationship between language proficiency, inferencing and academic performance** amongst L2 undergraduate students?*
- \* *Which inferences **best predict** academic performance amongst L2 undergraduate students?*

These research questions will be explained and discussed more fully in §1.3 below, and again in the relevant chapters, viz. Chapters 4, 5, 6 and 7.

Although the notion of **inference** will be dealt with more fully in Chapter 3, for the time being an inference is defined as a linking operation, a process of making connections between textual entities or of filling in implied information in discourse.

In order to address the problem of poor academic performance at tertiary level, and in order to bring about effective changes in our teaching and learning programmes, we need to have a deeper understanding of what the comprehension of information in written texts entails, particularly when

it is done through the medium of a second language. It is hoped that an investigation into inference generation during the reading of expository texts by L2 readers will shed some light on this issue. However, in order to understand inferences, we also need to understand reading because, in this study, reading provides the context within which the making of inferences are tested. Although Chapter 2 will focus in greater detail on reading and the issues attendant on it, the following section briefly discusses the relationship between reading and academic success. This section will serve to situate the process of inferencing within the broader framework of reading in the learning context, and will introduce some of the arguments and themes that underpin this study. It is argued below that the relationship between reading and academic performance is not a trivial one: poor scholastic achievers are generally also poor readers, and in order to help these students more effectively we need to have a better understanding of the nature of their problem.

## **1.2 Reading in the learning context**

Because this study examines differences in inferential activity, and the implications of such differences within the context of understanding information from written texts, it is important to consider more closely reading in the learning context. Reading plays a central role in schooling and studying in the modern world because it is typically the medium through which learning occurs. Although a lot of information and new knowledge is conveyed orally in classrooms, texts - and hence reading - play an increasingly important role in a learner's life from middle primary school upwards. However, before discussing further the role of reading in the learning context, it is expedient at this point to draw attention to a distinction made in reading between two main types of reading process, namely decoding and comprehension, since this distinction underlies the rest of the discussion. Both these processes are important in reading, but their importance changes qualitatively in response to the demands of reading at different maturational and educational levels.

### **1.2.1 Decoding and comprehension in reading**

At the turn of the century the medical educator and philosopher, Sir William Osler, humorously remarked that it's "easier to buy books than to read them, and easier to read them than to absorb them" (cited in Daneman 1991:532). The distinction that Osler makes between *reading* and *absorbing* books corresponds to some extent to the present-day distinction that is commonly made between two main types of process that occur during reading, viz. *decoding* and *comprehension*. **Decoding** involves the oculomotor, perceptual and parsing aspects of reading activity whereby written signs and symbols are translated into language (Carpenter & Just 1986). When children start learning to read, emphasis is placed on the acquisition of decoding skills, and the short and simple readers that children use in the early grades are designed to provide maximum practice of

decoding skills such as letter-sound relationships, word recognition and lexical access, and the syntactic parsing of simple sentences. **Comprehension**, on the other hand, refers to the overall understanding process whereby meaning is constructed and assigned to the whole text. Once readers have learned to 'crack the written code', they start honing their comprehension skills in a more focussed and meaningful way, first at the micro level (constructing meaning within sentence units), then at the local level (constructing meaning between adjacent sentences) and finally at the global level, constructing meaning across increasingly larger units of text to the meaning of the text as a whole. The interaction between decoding and comprehending processes in skilled readers happens rapidly and simultaneously, in a parallel processing mode.

Most researchers and practitioners of reading agree that comprehension cannot effectively occur unless decoding skills have been mastered (Just & Carpenter 1987; Perfetti 1988; Vauras et al. 1994). However, skill in decoding does not necessarily imply skill in comprehension. Many readers may decode texts quite readily but still have difficulty understanding what it is that they have decoded (Daneman 1991; Perkins 1991; Yuill & Oakhill 1991). Although both decoding and comprehension are necessary for reading, it is comprehension that is the *sine qua non* of reading. Decoding is necessary for comprehension, but it does not guarantee comprehension. Whether we read for entertainment, relaxation, study or work purposes, we are not going to be entertained, relax, study nor do our work properly if we do not understand what it is we are reading. It is this that a theory of reading must essentially account for. In addition, a theory of reading should also be able to provide explanations as to how and why some people comprehend texts better than others and are hence better processors of written information, and in what ways good and poor readers differ from one another, including how they differ in terms of inferential activity. Such accounts are very necessary if we want to understand why and how things go wrong for readers in the learning context. The terms **good** and **poor readers**, as used in this study, are henceforth used in the sense of good and poor comprehenders, irrespective of their fluency in oral reading (i.e. reading aloud). These terms also exclude from consideration readers who have specific decoding problems, such as students suffering from dyslexia, or learners who are still in the early stages of learning to read.

Inferential activity occurs in both decoding and comprehending processes. For instance, if one comes across the sentence *This study looks at the inferential pocesses of undergraduate students*, one can infer that the *r* was omitted in *pocesses*. This is an inference one makes at the level of word recognition and orthography, and is thus a decoding inference. Decoding inferences play an important part in computing letter-sound relationships, in recognising unfamiliar words and in computing syntactic relationships. In contrast, the earlier examples in the Sociology passage are typical comprehension inferences one makes during reading. In this study attention is given to inferences that occur at the level of **comprehension** rather than at the decoding level.

Obviously, even at tertiary level there may be students with decoding problems, but the reason for delimiting the study to inferences at the comprehension level is that it is assumed that by the time students reach tertiary level after a minimum of 12 years of schooling, their decoding skills have already been established to a greater or less degree, and that the problems they experience during reading are at the comprehension rather than at the decoding level (cf. Perkins 1991).

### **1.2.2 The relationship between reading and academic success**

Research findings in related fields such as psycholinguistics, developmental and cognitive psychology, applied linguistics, reading research and education consistently show a strong correlation between reading proficiency and scholastic or academic success at all ages, from the primary school right through to tertiary level: students who read a lot and who understand what they read are usually students who obtain good grades. In fact, the relationship between reading and learning begins even earlier, in the pre-primary school years - children who are exposed to storybook reading before they go to school tend to have larger vocabularies, greater background knowledge, and better conceptual development than their peers who have not been exposed to books and storybook reading, and in addition they also learn to read and write more easily and quickly (Heath 1982; Ninio 1983; Snow 1983; Wells 1986; Elley 1991; Feitelson et al. 1993). The correlation between reading proficiency and academic performance obtains for both L1 learners and for L2 learners. In fact, several teachers and researchers argue that reading is probably the most important skill for L2 students in academic or learning contexts (Saville-Troike 1984; Carrell 1989; Hafiz & Tudor 1989; Mbise 1993; Fasheh 1995).

Why is there such a strong dependency between reading and scholastic success? In order to understand this relationship better one needs to consider the kinds of abilities and skills that reading promotes on the one hand, and the kinds of things that reading gives one access to on the other hand. One of the reasons for the robust relationship between reading and scholastic success lies in the nature of reading and the kinds of linguistic-cognitive processes necessary for skilful and meaningful reading (discussed in §1.2.2.1 below), and the other reason lies in the role that reading materials (i.e. story books, textbooks, notebooks, summarised notes, etc.) play in school learning in the contemporary world (discussed in §1.2.2.2 below). These two issues are analytically interrelated but for the sake of practicality they are discussed under separate subheadings below.

#### **1.2.2.1 Reading as a linguistic-cognitive process**

The first crucial reason underlying the strong relationship between reading ability and academic performance has to do with the growth of language and cognitive information-processing abilities

that promote the construction of meaning during the reading process. Reading obviously involves the processing of linguistic data. However, as the distinction between decoding and comprehension indicates, reading also involves several component knowledge structures and processes that interact rapidly and simultaneously during the reading process. Although language is the medium through which reading occurs, language is a necessary though not a sufficient condition for skilful reading. Reading also involves the processing of textual knowledge and general background knowledge, which entail massive amounts of cognitive processing involving inferring, understanding, integrating, evaluating information within and across texts, recognising inconsistencies in text information, monitoring the comprehension process and applying repair strategies when comprehension breaks down, adding new knowledge gained from texts to existing knowledge bases in memory, and modifying existing knowledge bases in memory in response to information acquired from texts. Reading is thus a distinct skill which develops in specific ways, and it promotes the development of meaning making and information processing abilities that are valued in the learning context and that are indeed necessary for success in the technological and information age in which we live. Some of these skills will be identified and examined more fully in Chapter 2.

The greater exposure learners have to print, the more easily and quickly these processes become automatised and effective and the more opportunities the reader has for building up new knowledge structures derived from the information in the text. But what happens to students who, for various reasons, do not develop their reading skills? Differences in reading ability create what has been called the **Matthew effect**<sup>2</sup> (Stanovich 1986), whereby ‘the rich get richer and the poor get poorer’. The phenomenon arises as follows: Students with difficulties in reading read less than good readers. Because they read less, the processing mechanisms are exercised less, and subsequently the cognitive-linguistic process and skills that support comprehension are not as well developed as good readers. Because reading is a frustrating and effortful task, they lose the motivation for reading, which in turn affects the amount of reading practice they get. Their teachers and parents also tend to have lower expectations for these pupils. Lowered expectations, lowered motivation, lowered self-esteem and lowered levels of practice and exposure to print aggravate reading problems. And so the negative cycle continues. As Spear-Swerling & Sternberg (1996:9) put it, “... children who start off poorly in reading rapidly become even more disadvantaged relative to other readers, whereas the reverse happens for children who have a successful start in reading”. There are various reasons why some children start off poorly in

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<sup>2</sup> The term comes from the book of Matthew in the New Testament, 25:29: *For unto everyone that hath shall be given, and he shall have in abundance, but from him that hath not shall be taken away even that which he hath.*

reading. Some of the causal determinants of reading problems<sup>3</sup> will be discussed in greater detail in Chapter 2 (§2.3.2). At this point it suffices to point out that one such reason is lack of exposure to books and minimal opportunities to properly develop reading skills, which is often typical of disadvantaged educational systems. Whatever the causes, the outcomes are similar - poor scholastic performance. In the learning context, skilled readers become 'rich' students - advanced schooling relies heavily on knowledge being acquired via more textbooks, and these textbooks also get longer and more dense, in terms of contents and concepts. Skilled readers can cope with these text demands and in the process they increase their knowledge bases as well as their cognitive-academic and literacy skills; unskilled readers cannot cope with the reading demands, their access to information is impaired, their knowledge accumulates slowly and in a fragmented manner, and they fall more and more behind, in terms of linguistic, cognitive, academic and literacy skills.

Unless there is active intervention to help unskilled readers, the Matthew effect will continue throughout these students' scholastic careers. Reading problems do not simply disappear as children get older. In fact, some research seems to suggest that individual differences between readers in terms of reading comprehension ability tend to become more pronounced with more years of schooling. Just & Carpenter (1987) report that in the USA the differences between skilled and unskilled readers at twelfth grade are greater than such differences at first grade. As Chall, Jacobs & Baldwin (1990:3) put it, "the gaps become greater with increasing age". Perfetti (1985, in Daneman 1991:512) reports on large individual differences in reading skills between university students.

Matthew effects in reading resonate at a wider level in the learning context. Based on experience and anecdotal observations, many teachers and lecturers in South Africa find that when changes in course contents, methods and materials are effected, the better students usually tend to benefit while the weaker students often continue to perform poorly. In this study it is suggested that many academically underachieving L2 students may exhibit Matthew effects in their academic performance. In other words, Matthew effects in reading may spill over into academic performance in general. Many students continue to perform poorly and never really 'grow rich', linguistically, cognitively, textually, or in terms of subject-related knowledge, in spite of their perseverance in their studies. One of the major reasons for this, as I hope to show from my research, is that many students are poor readers and hence poor processors of information, and this

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<sup>3</sup> It is important at this point to make a distinction between reading *disability* and reading *problems*. The former refers to disabilities that arise from organic failures that result in specific cognitive dysfunctions, such as dyslexia, where readers have particular problems with phonological processing. In this thesis, I shall focus on reading *problems*, i.e. on students who for various reasons operate at a suboptimal level of reading, although they do not have any disabilities.

inhibits academic success. Does the amount of inferential activity they engage in during reading relate to this situation? This is one of the central questions that the study sets out to explore.

The problem of suboptimal reading skill is particularly acute in the South African context. It is instructive to consider how the two main categories of reading skills, decoding and comprehension, develop in the South African schooling context. In our schools, as in most schools worldwide, reading skills are developed in the first four years (Grades 1-4) through the medium of mother-tongue basal readers which are primarily short narrative texts. During these years there is generally a strong emphasis on the development of decoding skills. Once children have been taught to read (i.e. decode) in the early grades, reading as a language and information-processing skill is thereafter largely taken for granted, the assumption being that once children have 'cracked the code', they can use their decoding knowledge to make sense of the information they read. For example, Taylor & Taylor (1990:287) state that "[o]nce a child has learned to read, he can read to learn". There is of course a certain truth to this. However, the automatising of decoding skills and the development of meaningful comprehension skills, the transition from 'learning to read' to 'reading to learn', does not automatically take place with all children. Furthermore, the nature of the texts that pupils are required to read changes from primarily narrative to more expository types of text which are often conceptually dense and, unlike narrative texts, tend to deal with topics and issues that are unfamiliar to the readers' frames of reference (Chall et al. 1990; Macdonald 1990).

After children have been taught to read in the early grades, reading is then largely a taken-for-granted skill and hence easily overlooked. Little intensive and sustained effort goes into developing comprehension skills, and children are not exposed to a wide variety of texts on which to hone their comprehending skills (Spingies 1993). Schools that do emphasise reading skills beyond the early grades are the exception rather than the rule, even in the more privileged schools. Although many teachers will readily state that reading is important, the actual attention given to reading after about Grade 4 is apparent rather than real. Reading is often regarded by many teachers as a leisure-time activity and if periods are assigned as a free reading period, then it is usually used as a homework period<sup>4</sup>. Consequently, for many children reading develops at a suboptimal level and they have problems accessing, understanding and integrating information from written texts. These pupils thus have difficulty reading to learn and this handicap accompanies them through an uncertain scholastic career in primary and secondary school, and even up to tertiary level.

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<sup>4</sup> This information is derived from assignment-based research done by honours students in the Department of Linguistics, Unisa.



In South Africa, these problems are doubly acute for learners who are studying through the medium of an L2 for they have to acquire language, reading and textual skills in a second language in order to read to learn. The majority of these students come from a largely oral culture, not a reading culture. This means that they are seldom exposed to storybook reading as children, and they have very little experience of the printed word and of storybooks before they start school. Because books are not an integral part of their lives from the kindergarten age upwards, they often have difficulty learning to read. When they start their schooling, they typically start to read in their primary language, but once they can decode the words, very little sustained effort goes into helping them make the transition from decoding to reading with comprehension, and from the simple and familiar narrative texts to the more complicated and unfamiliar expository texts. Very few basal readers are printed in the African languages, and resources are sparse and often poorly managed, so very few schools have adequate collections of even narrative texts with which to 'hook' children into the pleasures of reading and to ensure that the decoding-comprehension interaction is accomplished. Furthermore, the genre of expository text hardly exists in the African languages. After Grade 4 black children thus move from a sparse L1 narrative text base to an extensive L2 expository text base. Both Macdonald (1990a) and Strauss (1995) report that there is a tendency for children in historically disadvantaged (i.e. black) schools to become what Devine (1988) calls "sound-centred readers", where the pedagogic focus is on getting readers to decode printed information with little attention paid to the meaning of the passage. Strauss (1995) reports that the black Grade 6 students that she tested had good decoding skills but very poor comprehension skills (less than 30% comprehension levels).

When the change to English as a medium of instruction occurs, many black pupils have barely mastered reading comprehension skills in their primary language. As a result, they have decoding skills but few comprehension reading skills to transfer to English. They then proceed through a disadvantaged educational system which did not and still, to a large extent, does not promote reading skills and does not provide adequate amounts of textbooks to the schools, and which was and still is characterised by a strong reliance on oral modes of information transmission, on rote learning and the verbatim recall of information that is often imperfectly understood. The deleterious effects of this system at primary school level are amply documented in the Threshold Project Reports (Macdonald 1990a and 1990b) and the effects are evident at tertiary level too. For example, the 1989 results of reading tests at the University of Natal, Pietermaritzburg, indicated that black L2 students had average reading rates of 174 words per minute and a 62% level of comprehension, while white L. students had average reading rates of 246 wpm and a 76% level of comprehension (Blacquiere 1989). The picture is even bleaker at the historically disadvantaged universities. Perkins reports that the 1989 intake of students at the Student Orientation Programme at the University of Transkei were given the Stanford Diagnostic Reading Test: "Results indicated that only 13,8% of the students had the reading skills necessary to comprehend

textbooks for first-year students. Twenty-six per cent were found to be unable to cope without assistance” (Perkins 1991:232). If we wish to help students who are unskilled readers then we need to further explore the nature of their reading problems and how this impacts on their academic performance.

Reading research is only starting to uncover the powerful feedback effects from print exposure on the development of cognitive-linguistic abilities that underpin language comprehension in particular and academic performance in general. Some of these abilities will be discussed later when the developmental aspects of reading are dealt with in §2.3 in the following chapter. The cognitive-linguistic skills that develop as a result of exposure to written language are the kinds of skills that are crucial in the learning context because they enable learners to access and understand print information autonomously, rapidly and effectively. Yet there are many students, particularly those who have to study through the medium of an L2, who struggle through their undergraduate and graduate courses, one of the major reasons being that they cannot cope with all the reading that success at university entails. Furthermore, they seem to have problems understanding the texts they do manage to read.

#### **1.2.2.2 The role of reading materials in the learning context**

In the previous section, the relationship between reading and scholastic success was discussed in terms of the kinds of abilities and skills that reading promotes. In this section, the second reason for the strong dependency between reading and scholastic success is discussed in terms of the role that the printed word plays in the learning context. We live in a technological and information age which is dominated by information management and dissemination. As Stanovich et al. (1996:19) point out, most of the world’s storehouse of knowledge is stored in print - either paper print or, increasingly, electronic print - and retrieved through reading. Reading thus gives us access to information, and in today’s world, information is power. Because printed information is a permanent visual representation, it allows the user to reflect on form and content and refer back to them continuously in a way that oral transmissions of information do not (Hron, Kurbjuhn, Mandl & Schnotz 1985). Due to memory demands imposed by the ephemeral linear processing of oral discourse and the fact that acoustic information is only available for a short period, much of this information cannot as effectively be held in memory from oral face-to-face interactions, or from radio or TV transmissions as it can from print. Reading is thus a durable, effective and powerful means of accessing information in printed form. Furthermore, because reading is a means of accessing information, it is a mechanism for building, modifying and consolidating declarative and procedural knowledge structures, including general background knowledge, domain specific knowledge, knowledge of language, knowledge of the conventions underlying different genres of print information, as well as knowledge of reading. These knowledge

structures and the processes that integrate them form the basis of comprehension and learning.

The importance of being able to read to learn is particularly imperative when seen in light of the role that textbooks and other text material play in the learning context. As Grabe (1991:389) points out, “literacy in academic settings in developed countries exist within the context of massive amounts of print information”. Yet even in developing countries textbooks, specifically expository texts, constitute the main medium whereby new information and knowledge is acquired in the educational context, particularly in the more advanced years of schooling and study. It is only through reading that one can independently access these knowledge bases. It has been estimated that about 75% of the information that senior secondary students need to acquire is accessed via textbooks (Hugo 1991) rather than transmitted by teachers in the classrooms. It is physically impossible for teachers to impart all the information covered in the syllabus during class periods alone. Texts not only help to reinforce those aspects of knowledge dealt with during class periods, but they also provide learners with access to information outside the classroom. Textbooks are therefore rich sources of formal knowledge. The ability to access and understand print information independently is an important component of being literate; the student can then read in order to learn and thereby gain personal autonomy. Academic success at tertiary level is particularly reliant on accessing information from texts in an efficient and meaningful manner. Texts at this level contain low-frequency words not do not usually occur in ordinary conversational discourse, the texts are conceptually complex and often present multiple viewpoints and conflicting theoretical paradigms. Not only do students have to read, understand and critically evaluate numerous such texts, they also have to systematically accumulate information from various sources and integrate the often conflicting information into coherent knowledge bases or schemas on content-related topics.

Obviously, students who have problems reading, especially the reading of expository texts, are also going to have problems with reading to learn, for they have ineffective and limited access to rich print sources of knowledge. If they cannot access information autonomously, and if they rely largely on oral transmissions for accessing and learning new information, they can never become independent learners. They are thus faced with a tremendous handicap in a technological and information-driven age. This problem is exacerbated in the Distance and Open learning modes. It is therefore important for tertiary institutions to attend to the reading needs of their students.

### **1.2.2.3 Reading, inferencing and academic performance: a summary**

As the above discussion indicates, the relationship between reading and scholastic success is not a trivial one. It is no coincidence that reading skills and academic performance correlate. Successful learning is, essentially, the ability to integrate new information with existing

knowledge structures or with newly given information in the text - and that is what effective reading comprehension entails. Scholastic success relies on successful learning; successful learning relies on the ability to read in order to learn; and successful reading is driven to a large extent by inferential processes.

### 1.3 Aims and objectives of the study

The main aim of this study was to examine various aspects of inference generation amongst undergraduate students during the reading of expository texts, particularly the generation of text-based inferences. The term 'text-based inferences', as used in this study, refers to inferences that can be prompted from information derived from the text itself rather than from a reader's background knowledge. The reasons for focusing on text-based inferences are as follows: It is a well-established fact that background knowledge affects inferencing positively - the more knowledge one has about a topic, the easier it is to perceive connections between elements and to fill in gaps. However, background knowledge is a very broad and ubiquitous variable that is difficult to control in test situations and could skew results: if students do not make inferences, their low levels of inference generation could be attributed to lack of background knowledge on the selected topic *per se* rather than to low levels of engagement with the text. One cannot avoid this problem entirely, and the distinction between information in the text and information that derives from background knowledge is not always watertight, but in order to reduce the effects of background knowledge in relation to inference generation, it was decided to focus on certain elements in a text that provide explicit or partially explicit clues from which a reader can draw inferences. This is what is meant by text-based inferences. Given the number of students that were tested during the course of the study, it would have been difficult to select topics with which all the students were familiar. Furthermore, given the fact that expository texts typically deal with topics about which the students initially have little intimate knowledge, the interesting question in reading to learn is not *what* the students know before they learn a subject, but *how* they come to acquire new knowledge during reading. Focusing on text-based inferences is one way of exploring this latter question more deeply in the hope of gaining more insight into Matthew effects in the learning context.

As stated in §1.1, the first aim was to determine differences in the number of inferences generated by students during the reading of expository texts, particularly students in different academic achievement groups. To this end, a taxonomy of text-based inferences needed to be drawn up that could serve as a basis for measuring 'amount' of inferences generated by students during reading. This taxonomy is discussed in Chapter 3 (§3.7.2). A second aim of the study was to see whether there were differences in the *kinds* of inferences that were made during the reading of expository texts. To this end, concepts that are used in text linguistics to account for coherence in texts served

as a source for setting up different categories of inference in the inference taxonomy, for example inferences based on referential and lexical cohesive devices that establish co-reference between antecedents and anaphoric items, and inferences relating to text-semantic relations such as cause-effect, exemplification, contrast and whole-part relations. In addition, attention was also given to vocabulary inferences - situations where texts provided clues to the meanings of words. More detailed descriptions of these different categories are provided in the relevant chapters, specifically Chapters 4-7. The third and fourth aims of the research study were to explore the relationship between inference generation during the reading of expository texts and other related variables such as language proficiency and academic performance, as well as to see which of the different categories of inference best predicted academic performance.

Prompted by a conviction that different research paradigms should be adopted as complementary rather than oppositional modes of description and interpretation, it was decided to investigate inference generation amongst undergraduate students by means of a two-pronged approach, the first being of a quantitative nature, and the second a qualitative one. The **quantitative approach**, favouring the experimental research paradigm, applied formal tests to various groups of students in order to obtain data on inferential activity during the reading of extracts from expository texts. Descriptive and inferential statistical techniques were then applied to the data in order to uncover and examine the patterns of inference generation that emerged. A **qualitative approach** was also used to examine, at a more detailed and personal level, the reading attitudes, behaviours and patterns of inference generation amongst a small group of five students who served as case studies. It was hoped that both approaches would provide insights into the inferencing abilities of undergraduate students.

To explore the relationship between inferential ability and academic performance, the test subjects were categorised into four different academic achievement groups, based on their final examination results in a specific first-year content subject, such as Psychology. These academic groups are: **Fail**, **At-risk**, **Pass** and **Distinction** groups:

- |                    |   |
|--------------------|---|
| <b>Fail</b>        | This group attained 49% or less for an academic subject in the final examination;   |
| <b>At Risk</b>     | This group attained between 50-59% for an academic subject in the final examination (they are often considered to be 'borderline' students);                      |
| <b>Pass</b>        | This group attained between 60-72% for an academic subject in the final examination;  |
| <b>Distinction</b> | This group attained from 73% upwards for an academic subject in the final examination (at Unisa students who obtain 73% or 74% have their mark adjusted upwards). |

### 1.3.1 Quantitative component of the study

As stated earlier in §1.1, there are basically four main research questions which the study addresses, viz. are there differences in the *number* of inferences generated between students, are there differences in the *kinds* of inferences generated, what is the *relationship between language proficiency, inference generation and academic performance*, and which kinds of inference *best predict* academic performance? These questions are stated as exploratory research questions, answers to which are derived from the results of specially designed inference tests based on expository texts. These main questions also gave rise to several subquestions that explore aspects of the main questions. To avoid reader overload at this point, these subquestions will be identified later in each of the relevant chapters.

The first objective of the study was to establish the **overall or mean level of inference generation** by different groups of undergraduate students during the reading of expository texts. The different groups of students consisted of first-year Sociology, Psychology, Medical and Occupational Therapy students. To this end the following exploratory research question was posed:

1. *How successful are undergraduate students at making text-based inferences during the reading of expository texts?*

The second objective was to explore the **relationship between inferential ability and academic performance**, where inferential ability serves as the **independent variable** and academic performance the **dependent variable**. Inferential ability was measured in terms of the total mean score that each test subject obtained in the inference tests, while academic performance was measured in terms of the percentage that each test subject obtained in the subject-related examination (e.g. in Psychology or Sociology) written at the end of the academic year. To this end the following question was posed:

- 2a *Is there a significant relationship between inferential ability and academic performance?*

This question examines the assumption that greater text understanding occurs when subjects can make inferences about the way in which textual elements are integrated during the reading process. This integrated construction of meaning leads to a better understanding of the information in the text. In turn, if text information is properly understood, then subjects are more likely to score higher grades in assignments and examinations. This hypothesis therefore predicts that the more inferences a subject generates during the reading of subject-related expository texts, as

measured by a mean inference score, the higher the examination score of the subject. In other words, students who obtain higher results, as measured by their final year examination score, are predicted to generate more inferences during reading than students who obtain lower results.

To further explore the relationship between inferential ability and academic performance, the test subjects were categorised into four different academic achievement groups, derived from their content subject examination marks, viz. **Fail, At-risk, Pass and Distinction**. A further question exploring the relationship between inferential ability and academic performance was posed:

- 2b *Are there significant differences in the number of inferences generated during the reading of expository texts between the different academic achievement groups? In other words, do the mean inference scores of subjects increase the higher the academic group?*

The third objective of the study was to focus on the **different kinds of inferences** and their **relation to academic performance**. Specific research questions were posed to determine the relative ease/difficulty in making different kinds of inferences during the reading of expository texts. These research questions basically examine differences in inference generation between the different academic achievement groups in terms of the different kinds of text-based inference categories that were used in the taxonomy. The purpose was to see whether certain kinds of inferences are more difficult to make than other kinds in the reading of expository texts, and whether certain inferences are important determinants of academic performance.

- 3a *What is the overall pattern of response to the different inference categories in terms of relative ease/difficulty?*
- 3b *Are there differences in terms of the kinds of inference generated during the reading of expository texts between the different academic achievement groups of Fail, At risk, Pass and Distinction students?*

Finally, the fourth objective was to explore the **relationship between the independent variables**, viz. **inference generation** and **L2 proficiency**, on the one hand, and **the dependent variable, academic performance**, on the other hand, and to see which of the **different inference categories** related most strongly to academic performance. To this end the following research questions were posed:

- 4a *Which independent variable, viz. language proficiency or inferential ability, best predicts academic performance amongst undergraduate students?*
- 4b *Which inference categories in expository texts best predict academic performance?*

The relationship between language proficiency, inferential ability and academic performance is complex and closely intertwined. It is generally assumed that there is some linguistic proficiency threshold, below which inference generation cannot effectively occur due to a lack of linguistic resources with which to access and compute the meaning of a printed message (Grabe 1991; Nation 1990). If a student's L2 proficiency is low, as measured by a mean score in a standardised L2 proficiency test, and if this hampers inference generation, as measured by a mean inference score obtained from an inference test, then the student is not likely to do well academically. This position thus assumes that the higher the L2 proficiency level of a student, the greater the extent to which a student will generate inferences during the reading of subject-related expository texts, and the more likely the student will perform well academically. This position thus predicts that L2 proficiency will be a stronger predictor of academic performance than inferential ability. However, an alternative position is that inferential ability influences both L2 proficiency and academic performance: the ability to perceive connections between linguistic entities in the L2 fosters L2 learning in the same way that the ability to perceive connections between textual entities during reading fosters text comprehension. This latter position thus predicts that inferential ability will be a stronger predictor of academic performance than L2 proficiency. The purpose of this research question is to test the direction of these relationships.

Although the main thrust of the above research questions have been dealt with here, it must be pointed out that there are also more specific research questions that follow from these ones and that are related more directly to specific types of inferences that were tested, such as anaphoric inferences, vocabulary inferences, inferences relating to text-semantic relations, and thematic inferences. In order to avoid reader fatigue at this point, these more specific research questions will be dealt with in greater detail in Chapters 4, 5, 6 and 7 respectively.

### **1.3.2 Qualitative component of the study**

A group of first-year psychology students was approached and asked if five volunteers would be willing to participate in a study of their reading attitudes and practices. The five students each attended ten hour-long sessions on a one-to-one basis with the researcher over a three month period. The overall aim was to probe their reading attitudes and behaviours in order to build up a more detailed and personal profile of their reading comprehension abilities, their inferencing tendencies, the reading strategies they adopted and the problems they experienced when they read their prescribed psychology textbook for study purposes. A mixture of procedures was used, mainly question probes during the reading of sections of text and eliciting the unfolding of personal histories. The five case-study students also completed the formal L2 proficiency test and all the inference tests that were administered in the quantitative component of the study. The details of the case studies are discussed in Chapter 8.



## 1.4 Overview of methodological framework

Because the study was spread over three years and involved different groups of students, and to some extent, different inferential tests with different foci, the purpose of this section is to give a brief outline of the different subjects and procedures. Details about the different inference tests will be provided in Chapter 3, after the concept of inferencing has been discussed.

### 1.4.1 Subjects

Four different groups of students were tested in all, two from Unisa and two from Medunsa. Unisa is a distance teaching university, and after the age of 23 students do not need any entrance qualifications (e.g. matriculation exemption) to enrol at the university, except for a school leaving certificate. Historically, the university has always been open to everyone, irrespective of race, creed or qualification. Consequently, many of the students who are enrolled are not necessarily adequately prepared in terms of language and literacy skills for studies at tertiary level. Medunsa, on the other hand, is historically a black medical university and as such has strict entrance qualification requirements that necessitate a matriculation exemption and a pass in subjects such as Mathematics, Biology and Science. The students who enrol at Medunsa are thus regarded as strong academic achievers, especially in the natural sciences. It was hoped that by eliciting data on inferential reading ability from students from two different universities, one with an 'open' entrance policy and one with a 'restricted' entrance policy, an interesting spread of inferential ability across diverse student populations could be obtained. These four groups of students were as follows:

1. A group of between 23-47 **Sociology I** students who attended tutorial lectures at the Thuthong Centre, Unisa Sunnyside campus, presented and supervised by two lecturers from the Sociology Department. These tutorials dealt mainly with the course contents and with general study tips. No attention was given to reading or language skills. The students were tested on four different occasions by the researcher, in co-operation with the Sociology lecturers. Each test session involved a period of about 80 minutes. The four test sessions involved:
  - 1) A norm-referenced L2 language proficiency test developed by the Human Sciences Research Council (HSRC);
  - 2) A test on anaphoric inferencing;
  - 3) A reading comprehension test that comprised inferential questions dealing mainly with text-semantic relations but also other inference categories;
  - 4) A vocabulary inferencing test;
  - 5) A short reading questionnaire (done together with the anaphoric inference test);

- 6) A speed reading test (only some of the students were tested, on separate occasions).

The original idea was to administer the first four tests in sequence, on a fortnightly basis, to the same group of students over an 8-week period so that a fairly in-depth 'inference profile' of the students could be built up and relations between language proficiency, academic performance and the various inference categories could be investigated. In reality, this did not work out. The student population at Thuthong proved to be a somewhat fluctuating one, for not all the same students attended the Sociology tutorials every week, and attendance ranged from 80 students to 23 during the course of the eight weeks. The researcher had only been allocated four of these tutorials and could therefore not repeat the tests for previously absent students. As a result, only 17 students remained constant and completed all the tests. Furthermore, the results also showed, not unexpectedly, that many of the students who attend the Thuthong centre tend to be academically weaker students. In other words, the weaker students were over-represented in this sample, and this reflected in the results. The academic performance of the students was based on their performance in their Sociology examination.

2. A group of 52 first-year **Medical (MbChB) students** and 30 first-year **Occupational Therapy** students at Medunsa were tested during four test sessions, with the co-operation of the English lecturers (English language and communication at first-year level is a compulsory subject for all these students). Each test session occupied a 2-hour slot. In all, five different tests and one questionnaire were administered, involving:
- 1) The norm-referenced L2 language proficiency test developed by the HSRC;
  - 2-3) Two separate reading comprehension tests that comprised inferential questions dealing with text-semantic relations and thematic relations, but also including other inference categories plus literal questions;
  - 4) The test on anaphoric inferencing;
  - 5) The vocabulary inference test;
  - 6) The reading questionnaire.

This group involved a more stable, 'captive' group of students compared to the Sociology students, although the numbers fluctuated between 68-84 students, depending on class attendance. In the case of the Medunsa students the results tended more to the other end of the academic spectrum, because they represent the 'cream of the academic crop'. The lecturers who made their classes available were very co-operative and helpful and in all, assigned the researcher four two-hour sessions per Medical/OT class over a two-month period for the administration and completion of all the tests. The academic performance

of the Medical students was based on their performance in their Psychology and Anatomy examinations, while that of the Occupational Therapy students was based on their performance in their Psychology and Physiology examinations (both groups did Psychology as a compulsory subject in their first year, while the Occupational Therapy students did Physiology instead of Anatomy).

3. A group of 1,240 **Psychology I** students at Unisa responded to a reading comprehension test that was sent out by the Psychology Department to all first-year Psychology students as an extra credit-bearing assignment (to be discussed in detail in Chapter 7). In addition to the reading comprehension test, this 'assignment' also included a questionnaire that taps information about the students' personal details, study habits, attitudes to self, reading, etc. Unlike the other inferential tests, this reading comprehension test was a 'one-off' comprehension test in which all the items were inferential questions. Unlike the other inference tests, this one was also not administered in person by a lecturer or the researcher, and there were no controls regarding the time it took the students to complete the test nor the sources they used to help them answer the questions. What the test lacks in depth it makes up in the possibility of broader generalisability, for it hopefully reflects responses from a wider, more representative group of Unisa students than the Sociology students at the Thuthong Centre. The academic performance of these students was based on their performance in their Psychology examination.
4. Five Psychology I students who comprised the case studies. They were studying full time at Unisa and attended Psychology I tutorial classes at the Thuthong Centre on Saturday mornings. They were tracked over a period of three months during their studies. The purpose of these case studies was to establish how the students went about their studies, what reading problems they experienced, what reading strategies they used and, on the basis of these observations, to compare the insights gained from the qualitative approach to that of the quantitative approach, and to see what insights this qualitative approach yielded into reading problems in general.
5. Finally, a small, informal 'control group' of readers was used for some of the tests so that their performance on the tests and the time they took to complete them could be used as some kind of yardstick. This control group consisted of 7 skilled readers who were either L1 speakers of English or bilingual proficient L2 users of English and who were familiar with the kind of expository academic texts on which the tests were based. They were all student assistants or junior lecturers in the Department of Linguistics.

#### **1.4.2 Ethical considerations in the research context**

Ethical issues are invariably an integral part of research, especially when the research is conducted within the learning context. The tests that were used in the current study to elicit data on inferential ability were time-consuming, required fairly large groups of students to be tested on several occasions, and needed to be administered during periods when the students could otherwise have been gainfully engaged in meaningful learning enterprises. Furthermore, trustworthy and accurate responses to the tests depended crucially on the co-operation and goodwill of the subjects and their lecturers.

Working on the assumption that “research has value in contributing to knowledge and, ultimately, to human betterment” Tuckman (1988:14-15) identifies four considerations that need to be taken into account when dealing with educational research, viz. (i) the right of subjects to privacy or nonparticipation, (ii) the right of subjects to remain anonymous, (iii) the right of subjects to confidentiality, and (iv) the right of subjects and the academic community to expect experimenter responsibility.

Every attempt was made during the course of the research to respect these rights. The rationale for the research and an outline of the reasons for each test were always explained both to the lecturers concerned and the students (cf. Appendix A). None of the students was ever forced to write the tests, the individual students’ performance in the tests remain anonymous, and the scores obtained from individuals are “pooled or grouped together and reported as averages” (Tuckman 1988:15). Furthermore, the data remains confidential in that the scores of individual students are assigned numbers and not names, and the data elicited from them cannot be used against them in the academic context.

None of the students seemed to object to the nature of the research or to the fact that they were participating in the tests. In fact, several students expressed interest in the tests and some even expressed satisfaction that their reading problems were being given attention. Students were repeatedly told before and after each test that they could contact the researcher individually and their test results would be discussed with them. Several students did so.

All the students were informed that the results of the research would feed back, directly or indirectly, into teaching and course material design at tertiary level. Direct feedback to each of the specific departments was given on different occasions. For example, a seminar was held in the Sociology department in which the researcher reported on the findings and discussed the implications with members of the department. The findings on tests that the Psychology students did was presented in a paper at a one-day seminar held by the Unisa 16 June 2000 department of

Psychology on the changes they had implemented in their new first-year course materials. The lecturers at Medunsa who made their students available for testing were highly motivated and very keen to obtain feedback as to how they could improve the reading skills of their first-year students, as this was an area they had identified as problematic. Arrangements were made for the researcher to give a feedback workshop in the English Department at Medunsa, and to highlight specifically the pedagogical implications that follow from the findings. The findings will also be written up in article form and submitted for publication so that relevant information can be made available to interested parties in the wider academic community.

## 1.5 Structure of the thesis

Having identified the research problems, contextualised these problems within a broader framework, and having set out the aims and objectives of the study, it is necessary now to get on with the ‘business’ of the research study. The rest of the thesis is structured as follows:

- \* Chapter 2 provides a theoretical and developmental overview of the field of **reading comprehension** and serves to situate the present study within a broader reading context.
- \* Chapter 3 provides an overview of **inference literature and research**, and identifies some of the main issues, players and research methods in this field. The position of the present inference study is identified in relation to past and current research issues in inferencing.
- \* Chapter 4 focuses on **anaphoric inferences**. The different types of anaphoric inferences used in the anaphoric test are identified, the findings regarding anaphoric inferencing and its relation to academic performance are presented and discussed, and the errors in anaphoric inferencing are analysed.
- \* Chapter 5 focuses on **vocabulary inferencing**. This chapter looks at the relationship between reading, vocabulary development and inferencing, examines to what extent the students are successful at inferring word meaning from context, and considers these findings in relation to their academic performance.
- \* Chapter 6 focuses on two main kinds of inferences, viz. inferences relating to various **text-semantic relations** that are necessary for the understanding of expository texts, and **thematic inferences** (i.e. inferencing main ideas). The different types of text-semantic relations and thematic inferences are identified, and the findings regarding the students’ responses to the various types of semantic and thematic relations in relation to academic performance are presented and discussed. The inference categories that best predict

academic performance are also identified.

- \* Chapter 7 focuses on a one-off **general reading inference test** that was administered to the large group of Psychology students. It comprised all the different inference categories discussed in Chapters 4-6. The findings of this inference test in relation to academic performance are compared to the findings from the more detailed and in-depth tests administered to smaller groups of students, as discussed in Chapters 4-6. This chapter also includes results from the speed reading tests.

**NOTE:** In each of the Chapters 4-7, the analytic framework is first explained, the subjects are identified, the methods of the research are outlined, and the results are presented, followed by a discussion of the results and a brief consideration of the implications that follow from the results.

- \* Chapter 8 deals with the five **case studies** and reports on the observations and findings that emerged from the qualitative component of the research.
- \* Chapter 9 comprises the **conclusion**. It draws together the different threads of the research, identifies the limitations of the study, highlights similarities and differences in the quantitative and qualitative aspects of the study, and summarises the findings. Finally, consideration is given to the theoretical, methodological and educational implications that emerge from the findings.

## **CHAPTER 2**

### **READING: A THEORETICAL AND DEVELOPMENTAL PERSPECTIVE**

#### **1.0 Introduction**

The rationale and relevance of a particular study is put into sharper relief if it is viewed in relation to its broader historical-theoretical context and its developmental history. Because reading provides the context and impetus for inferencing, it is important to describe the theoretical assumptions of reading that this study of inferencing assumes, to identify the component skills in reading, and to describe how the relevant skills emerge and develop. The purpose of this chapter is twofold:

- (i) to briefly outline shifts in theoretical orientations and research trends in the domain of language comprehension and reading in order to show where and how the study of inferencing fits into this larger pattern;
- (ii) to briefly review reading from a developmental perspective in order to show where and how qualitative changes occur in reading ability that have implications for reading in the learning context.

#### **2.1 Assumptions about reading comprehension: a historical perspective**

Reading is a multidisciplinary field that is fed by various disciplines such as linguistics, psycholinguistics, cognitive and developmental psychology, artificial intelligence, education and remedial education. Paradigm shifts in these disciplines have naturally affected assumptions about reading, the selection and legitimation of data bases, and the descriptive and explanatory power that the models of reading generated. The past four decades of reading research have witnessed the advent of three main approaches to reading, namely the linguistic, the psycholinguistic and the interactive-constructivist approaches. The latter is in many respects a synthesis of the first two approaches, and follows them chronologically. These three approaches will be briefly sketched below.

The linguistic approach to reading was dominant until about the mid-sixties. Assumptions about language and language comprehension were determined by dominant thinking in linguistics and psychology at the time. Until about the mid-sixties, mainstream linguistics in the Western world focussed on the formal, structural component of language and on sentence-based grammar. During the heyday of structuralism and behaviourism, it was generally assumed in mainstream

linguistics and psychology that words and sentences have fairly fixed meanings, that meaning resides 'in the text' and that language comprehension is thus largely a function of linguistic knowledge (Orasanu & Penney 1986; Silberstein 1987). The reader was seen to be a passive recipient of information from the printed page. The database for reading research was restricted to decoding and understanding isolated sets of words or sentences. Connected sequences of linguistic units such as occur in written texts fell outside the domain of what was considered to be legitimate sources of data. By carefully circumscribing the data base, language in both its oral and written forms was abstracted away from its immediate context and co-text as well as from the broader socio-communicative matrix in which it functions.

During this period theories of reading had a strong linguistic basis. It was assumed that readers basically needed linguistic knowledge in order to read properly and effectively. In this data-driven or bottom-up approach, there was an emphasis on decoding skills, which are largely language-driven. The reading skills that were regarded as important were letter recognition, word identification, syntactic parsing and semantic access to word meaning.

Criticisms of this linguistic 'meaning-in-the-text' approach began to accumulate towards the end of the sixties. This criticism reflected a larger post-structuralist trend in various disciplines such as philosophy, literary studies, linguistics, psychology and the social sciences. In linguistics and related disciplines it was increasingly argued that the meaning of a sentence is more than the sum of its structural components, that meaning is often not derivable from directly stated information but from what the reader reads into the text, and that the meanings of words and sentences need to be viewed in relation to the immediate linguistic context and the broader socio-communicative context in which language use is embedded. To understand how humans process and understand language one needed to go beyond single sentences into stretches of connected language, i.e. oral or written discourse. This dissension in linguistic ranks led to a widening of the parameters of linguistic inquiry during the late sixties and early seventies, and 'real language' - discourse - as used in its communicative context, now constituted a legitimate data base (Hymes 1974).

With the inclusion of connected language - texts - into the domain of language comprehension and reading research, it became increasingly clear that there is a substantially wider range of knowledge than just linguistic knowledge that participants utilise in understanding language than had previously been believed. The computer revolution and research in artificial intelligence also made important contributions to studies on language comprehension and reading, in that they provided corroborating evidence of the importance of linguistic and general background knowledge, as well as inferential processing during language comprehension. The realisation that contextual factors and prior knowledge interact with linguistic knowledge gave rise to constructivist views of reading, in which the reader, on the basis of text, context and prior



knowledge, is perceived as creating or constructing meaning that conforms to a pre-existing world view. As Goetz & Armbruster (1980:214) put it, in the constructivist view, “the emphasis shifts from structure of text as an independent and immutable entity to structure and meaning imposed on the text by the reader”. In this view, reading is a psycholinguistic process, not simply a linguistic process, and so the seventies saw the emergence of psycholinguistic approaches to reading. These are often termed top-down or conceptually driven accounts of reading because the impetus during the reading process comes from prior knowledge that the reader possesses (Silberstein 1987). It was during this period that attention started being given to the role of inferences in reading, but the early research was restricted mainly to investigating inferences in short texts, for example within sentences or between two or three sentences.

The psycholinguistic approach to reading from the late sixties to the mid eighties was characterised by a strong emphasis on the role of background knowledge during reading. The psychologists Goodman and Smith were staunch advocates of the psycholinguistic approach to reading, and in fact the title of Goodman’s book, *Reading: A Psycholinguistic Guessing Game* (1967), reflects this trend, as also the increasing recognition given to inferencing - or guesses, as Goodman calls them. In his book, he strongly refuted the notion that reading was a precise process. Instead, he argued that reading is a selective process: “Efficient reading does not result from precise perception and identification of all elements, but from skill in selecting the fewest, most productive cues necessary to produce guesses which are right the first time” (in Silberstein 1987:30). Strong claims such as these downplayed the role of precise linguistic decoding processes in reading.

The seventies thus witnessed a swing of the theoretical reading pendulum away from linguistic to psycholinguistic models of reading, with an emphasis - and indeed sometimes an overemphasis - on the role of background knowledge, guessing, reader-text interaction and meaning-construction during reading. The attention given to the role of prior knowledge in language processing naturally called for an account of knowledge representation, and several models of reading adopted schema, frame or script-type notions of understanding (e.g. Schank & Abelson 1977; Rumelhart 1980; Carrell & Eisterhold 1983; Samet & Schank 1984). These notions all basically refer to an organised body of knowledge or data structures that allows for the efficient accessing, storage and retrieval of information.

At the same time a new discipline within linguistics, namely text linguistics, emerged in the seventies, which also made important contributions to our understanding of the reading process. Text linguistics looks at the structure and organisation underlying texts, and the way in which information is tied together within and across sentence boundaries. A critical concern in text linguistic research has been to identify and analyse the characteristic features of well-structured

or well-formed texts in different genres of written discourse, as well as their underlying functions and rhetorical conventions. A central concept that has emerged in this line of research is that of text coherence, the notion of text unity or connectivity. Coherence is perceived to be both a text 'product' and a text 'process' phenomenon (cf. Cooper 1988; Carstens 1993, 1997). The structural and organisational properties of a text, as well as the explicit linguistic elements such as cohesive devices, are text 'products' that contribute to the sense of connectedness in texts. However, coherence is a cognitive construct too, because it also derives from the inferential and integrative processes that readers apply to knit information in a text together into a meaningful whole, and from the ability of the reader to perceive underlying semantic or logical connections in a text. These issues will be taken up again in Chapter 7 where thematic inferences and inferences about text-semantic relations are investigated. Insights from text linguistics as well as from cognitive psychology have had an impact on reading theories since the eighties because they shifted attention away from the processing of discrete linguistic items to the massive amount of cognitive processing that occurs during reading.

Yet, although there has been a great body of research showing how prior knowledge affects one's understanding of a text (e.g. Bransford & Johnson 1972; Wilson & Anderson 1986), models of reading that emphasise the role of background knowledge in reading cannot adequately account for individual differences in reading ability, particularly in the learning context, which is characterised by the reading of topics about which readers initially have very little prior knowledge. Perfetti (1988:115) argues that the emphasis on schemata as a source of individual differences in reading ability is misplaced because it in effect reduces to the conclusion that there is no such thing as general reading ability - only that different reading performances are dependent on the match between a text and individual knowledge. As was argued in the first chapter, the interesting question in reading in the learning context is not whether students do or do not have prior knowledge about the topic they are reading, but how they come to acquire new knowledge while they read. This question is particularly important in relation to the Matthew effect in reading. Knowledge-based models of reading cannot readily explain how good readers bootstrap themselves into comprehending texts dealing with topics about which they initially have little prior knowledge. In other words, a model of reading, especially one that considers individual differences in reading in the learning context, needs to be able to give an account of the processes and strategies employed by skilled readers that enable them to comprehend texts despite lack of prior content knowledge.

The increasingly sophisticated use of computer research technology in recording reading-response times and tracking eye movements during reading has also brought about further changes in reading theories. It soon became evident from this kind of research that decoding skills such as visual perception and word recognition are key elements in skilful reading. Contrary to

Goodman's claims that reading is a selective guessing game, research now provided abundant evidence that reading requires the execution of very rapid and precise skills (Carpenter & Just 1987; Grabe 1991). These findings reinstated the importance of perceptual, oculomotor and linguistic decoding processes during reading. It is now generally accepted that establishing the automatising of bottom-up decoding skills is necessary for 'freeing the mind' to attend to top-down comprehending processes (Stanovich 1986; Perfetti 1988).

Concurrent with the changing theoretical and methodological events in language comprehension and reading research, there were also significant events taking place at tertiary level institutions that had an impact on theories of reading. During the late sixties, universities in the English-speaking world such as America, Canada and Britain were undergoing changes in their student populations. These English-speaking universities were formerly largely monolingual, monocultural institutions, but during the late sixties large populations of L2 students started arriving on these campuses from developed and developing countries around the world. Many of these students experienced severe problems in coping with the demands of academia in a non-primary language, even though they may have performed well academically in their home country and even though their competence in English may have met the minimum requirements for entry to an English university. It was increasingly recognised that proficient reading is the key to success in academic contexts, and many researchers turned their attention to investigating the specific problems that L2 students experienced in reading texts for learning purposes. L2 models of reading draw largely on L1 models of reading but they are not always able to account for the specific problems that occur in L2 reading. Unlike L1 readers, L2 readers come to the reading task with varying degrees of reading skill in their primary language and varying degrees of L2 competence. As Silberstein (1987:32) points out, "there is a ceiling below which language deficiencies prevent second-language readers from applying their top-down skills". Linguistic knowledge and decoding processes such as word recognition and lexical access are thus components that cannot be ignored in L2 models of reading. The application of largely top-down knowledge-driven theories of reading as applied to L2 reading proved to be inadequate in many respects, and the inadequacy of many L1 reading models in accounting for L2 reading problems encouraged a drive towards models of reading that combined both linguistic and psycholinguistic approaches.

Influenced by trends in sociolinguistic and ethnographic research, the seventies and eighties also saw greater attention being paid to reading as social practice. The functions of literacy within a society and the attitudes towards written texts have an important influence on how readers approach the reading task and interpret texts. Readers are socialised to read in specific ways and they come to the reading task with culturally determined expectations. For example, students who come from authoritarian or religiously circumscribed societies in which the written word is

perceived as representing ‘authority’ or ‘truth’ tend, as Grabe (1991) points out, not to regard a text as something to be interpreted or challenged by way of critical evaluation. Instead, they regard the text as representing ‘knowledge’, and the best way to serve knowledge is to memorise it. Grabe’s comments on the social context in which reading occurs is noteworthy:

Students who have not had easy access to libraries might be less likely to look for alternative sources of information or question the relative strengths and weaknesses of the texts they encounter. Students who come from communities with limited literacy ... may downplay the importance of literacy skills and do little extensive reading . ... In contrast to all these contexts, literacy in academic settings in developed countries exists within the context of a massive amount of print information. Students come to assume that any source of information can be balanced against alternative sources, and come to expect that challenging a text is a normal academic activity (Grabe 1991:389).

Research during the past thirty years has provided overwhelming evidence that reading is not simply a language skill, and that background knowledge, text knowledge, context, cognitive processing, attitudes, cultural beliefs and literacy practices are all vital ingredients that need to be taken into account in models of reading. This has given rise to interactive models of reading which recognise both the interaction between reader and text, as well as the interaction of the different component knowledge areas and skills. It is also from the interactive approach that the metaphor of skilled readers as efficient ‘information processors’ has emerged (e.g. Pressley 1986, in Vauras et al. 1994:385).

Although the various models of reading comprehension nowadays differ with regard to theoretical and analytic detail, they share some common assumptions about the reading process. Three such assumptions invoke the notions of **interaction**, **construction** and a **limited capacity system** respectively. However, the terms ‘interaction’ and ‘construction’ are used in a more circumscribed way in reading theories than they are used in post-modernist theories of meaning, as expressed in various literary and semiotic theories, and it is therefore useful to briefly dwell on their more specific use in reading theory. The notion of a limited capacity system is also dealt with briefly below.

### 2.1.1 Interaction

Current theories view reading as a complex, multi-componential phenomenon that includes the rapid and simultaneous interaction of numerous processes. For example, it requires the bottom-up oculomotor processes that direct eye movements across the printed page, perceptual processes that encode the visual pattern of a word, lexical processes that access word meaning from memory,

and various other linguistic processes that compute the semantic and syntactic relationships among successive words, phrases and sentences (Carpenter & Just 1986). In addition, there are comprehending or top-down cognitive mechanisms that compute the semantic and logical relationships between successive sentences and paragraphs at text-level and ascribe overall meaning and coherence to the text (Just & Carpenter 1987; Daneman 1991; Yuill & Oakhill 1991).

All these processes interact simultaneously and rapidly during reading. Problems in the effective functioning of any of these processes can cause decoding or comprehension problems and because comprehension is the result of a combination of processes, it is imprudent to ascribe reading problems to a single variable only. However, research studies over the past few decades have identified clusters of variables that seem to characterise good and poor readers respectively. As will be discussed later, poor readers who read quite fluently and who therefore do not have obvious decoding problems, but who nevertheless do not properly grasp the contents of what they are reading, often seem to have problems with the simultaneous integration of several top-down processes during reading, including inferencing.

### **2.1.2 Construction**

Current theories of reading also assume that during the comprehension process readers construct a coherent mental representation of the meaning of the text. This representation is not isomorphous to the text; rather, it is a conceptual map of what the text is about. The construction of a coherent text representation in memory must perforce go beyond the sum of the sentences in the text. It is generally agreed that this mental text representation is constructed on the basis of information that is both explicitly stated in the text as well as information that is inferred from previously encountered elements in the text or from background knowledge that the reader brings to the reading process. Problems in constructing a coherent representation of the meaning of a text can arise from text-based or reader-based variables. Text-based variables include variations in text structure and the extent to which texts are coherent and 'considerate' and help the reader to understand what the text is about. Problems relating to reader-based variables arise when a reader lacks the necessary processes or fails to engage these processes in order to construct a mental representation.

### **2.1.3 Cognitive mechanisms: limited capacity system**

With regard to the cognitive system generally, several theories of reading assume that the system operates under resource constraints. This means, in effect, that decoding and comprehension processes share a limited resource pool. This leads to different attention demands and resource

allocation within the system. Some processes demand more attention than others, leading to more resources being allocated to one process rather than another. This, for example, is the assumption underlying the limited-capacity working memory system of Baddeley & Hitch (1974, in Perfetti 1988:119) where, it is argued, there are constraints on the number of memory elements that can be simultaneously activated. Practice and the degree of automatization of processes affect the extent to which a process requires attention (LaBerge & Samuels 1974) but, as Perfetti (1988:119) points out, automatization doesn't lead to attention-free processing, only to reduced attention demands. According to Perfetti's Verbal Efficiency theory (1988), comprehension suffers if decoding processes take up too much of the limited resources.

#### **2.1.4 Interactive models of reading: a summary**

The problem of language comprehension and reading can be studied from many different perspectives and, as the above discussion has tried to show, different aspects of reading have been variously emphasised or downplayed, depending on the particular theoretical orientations of the time. To summarise, criticism against the narrow linguistic bias in reading theories in the sixties led to the guessing-game psycholinguistic models of reading in the seventies and the recognition of culturally constituted literacy practices. However, this in turn often resulted in an overemphasis on prior background knowledge and on top-down processing, with a concomitant underemphasis of bottom-up processing in reading.

Nowadays it is generally recognised that tremendous cognitive and linguistic complexity is involved in understanding even a single sentence in discourse. Disciplines such as linguistics, developmental and cognitive psychology, psycholinguistics, text linguistics, artificial intelligence and computational linguistics all feed into the area of human understanding in general and reading comprehension in particular. Today, researchers working within the domain of language comprehension and reading are concerned with describing and accounting for the linguistic and cognitive knowledge and processes involved in text comprehension. They are developing models to describe the representation of text in memory and the cognitive operations that operate on such representations. They are also examining the way in which linguistic, textual and background knowledge are acquired, stored in memory, interact and are made accessible during text processing, and the way in which reading is a tool for learning. This has naturally widened the field of reading research considerably, and it is not surprising that inferencing has become a familiar player in the playing fields of reading research (as will be shown in Chapter 3). This is indeed a far cry from the narrow, linguistic meaning-in-the-text approach of the sixties.

Although the theoretical framework within which the present research is situated is that of an interactive approach to reading, the focus in this research study is on comprehension processes

rather than decoding processes, with attention given in particular to differences in inferential activity during the reading of expository texts at undergraduate level. The assumption that at tertiary level reading problems are likely to stem from comprehension processes rather than decoding processes is borne out by Perkins' study (1991) of the reading skills of first-year students at Transkei University. Perkins (1991:232) notes that all the students at Unitra who were tested for reading had higher word identification scores than passage comprehension scores, suggesting that the students had comprehension problems rather than decoding problems. It is hoped that an inference-based approach to reading, framed within a constructivist, interactive theory of reading will provide some insights into the Matthew effect in reading and its subsequent effect on academic performance.

## **2.2 'Book language' - the language of written discourse**

In the previous section the different theoretical trends in reading research were briefly sketched in order to situate the present study within a broader theoretical framework. In this section we move to a brief discussion of some of the features that characterise 'book language' - the language of written texts. In the previous chapter it was argued that various linguistic-cognitive abilities develop on constant exposure to written texts, and that such texts are rich sources of declarative knowledge and hence play an important role in the learning context. Because this study examines differences in inferential activity, and the implications of such differences for the learning context where understanding information in written texts is critical for academic success, it is important to consider more closely some of the features of written discourse that distinguish it from spoken discourse, and to consider the way in which such features impact on reading to learn.

One of the themes underpinning this study is that it is the ability to access and understand information from written sources rather than oral sources that accounts for success in the learning context. Thus, in order to better understand the relationship between reading ability and scholastic success as well as the dynamics of the Matthew effect, it is important also to consider the nature of written language, and the ways in which it differs from spoken language.

The differences between written and spoken modes of communication were recognised by Cummins in the late seventies when he first proposed a distinction between two kinds of language proficiency, based on the context in which the language is acquired and the functions that it serves. These two types of proficiency refer to Basic Interpersonal Communicative Skills (BICS) and Cognitive Academic Language Proficiency (CALP) (Cummins 1979, 1991) and are associated with oral and written modes of language use respectively. The former is used in everyday communicative encounters and is described as being more context-embedded, in the

sense that oral discourse contains many deictic or indexical items whose meaning can be recovered from the interactional context. Oral discourse also makes much use of paralinguistic features to convey meaning. Because oral discourse is essentially dialogic, meaning can be negotiated in the course of interaction. A CALP type of proficiency, on the other hand, involves use of a more context-reduced language associated with written language and with the more formal aspects of classroom and lecture-hall language use typical of the learning context. This is not to say that written language is context-free, since no language use is context-free; rather, that meaning is 'built into' the text to a larger extent than is the case in oral discourse. For example, the meanings of indexical items such as *this* or *here* are to be found in the text discourse itself, rather than in the exophoric context, as is the case in oral discourse. The differences between oral and written forms of language should not be seen in terms of discrete and clear-cut differences but rather viewed as a continuum of greater or lesser context-embeddedness.

All children have acquired BICS in their primary language by the time they start school. They start acquiring CALP when they learn to read and write and are exposed to written forms of language, first via basal readers and then via a range of increasingly more complex narrative and expository texts. For some children the acquisition of 'book language' associated with CALP may start earlier, in the pre-primary years, if they are exposed to storybook reading by their parents or caregivers. To illustrate the difference in context-embeddedness between BICS and oral modes of language use on the one hand, and CALP and more formal or written modes of language use on the other hand, consider the language use as reflected in a story retelling task in Texts A and B below. The stories were produced by a 6- and a 9-year-old respectively, on being shown three picture frames depicting a little girl coming out of her house, buying ice-cream from an ice cream van, and then tripping over a stone and consequently dropping the ice cream (data taken from Karmiloff-Smith 1985).

#### **Text A**

*The girl's got a green dress like mine. She's coming out of her house and there's a lady selling ice creams. She wants a vanilla ice cream. So she gives her one and she walks off licking it. And there she's dropped it so she's crying her eyes out. I dropped my ice cream in the cinema once but I didn't cry. She's silly.*

#### **Text B**

*This is the story about a little girl who's taking a walk in the sunshine. She notices a lady selling ice cream and as it's hot she decides to buy one. The lady hands her a cornet and she walks off to enjoy it. But suddenly she trips on a stone and drops the ice cream, so she starts to cry because it starts to melt in the sun.*



In Text A, the child assumes that her audience is sharing the same communicative context as she, so her language use is embedded in the given context. Note her use of the definite noun phrase *The girl*, evoking a specific referent at the beginning of her story (rather than *A girl ...*), and the pronouns *she* (*So she gives her one and she walks off.*), each of which have a different referent. The older child in Text B situates the story within a context that is described to the audience rather than simply assumed to be shared. She specifies the referents in the discourse (*a little girl .... she ; a lady ... the lady*) and she provides causes and effects for the events in the frames and signals them by means of conjunctives (*as it's hot she decides to buy one; she trips on a stone and drops the ice cream, so she starts to cry because it starts to melt in the sun*). The language use in Text A is highly context-embedded, and is more coherent when the reader is informed of the circumstances in which it was produced. Text B is more context-reduced than Text A, and is coherent whether or not the reader is informed of the circumstances in which it was produced. The younger child is using a BICS mode of language use to retell the story, while the older child is using a CALP mode of language use to retell the story.

Many L2 students may acquire high levels of proficiency in English but if it is mainly an oral-based BICS-type of proficiency, and if the L2 is also the language of tuition and learning, then such students are unlikely to succeed in the learning context. The reasons for this are that the rich sources of declarative knowledge to which the students need access are expressed via written forms of language that require CALP, and much of the linguistic proficiency that underpins reading ability is CALP-based for it is acquired on constant exposure to written discourse. In her longitudinal research of children acquiring English as L2 in a primary school, Saville-Troike (1984:216) came to the following conclusion:

We need to recognize that there is a qualitative difference between the communicative tactics and skills that children find effective for meeting their social needs and goals and those that are necessary for successful academic achievement in the classroom. The lowest academic achievers in our sample were among the most successful at interpersonal communication ... [A]cademic success requires competence in using and understanding language in context-reduced situations, where students cannot rely on non-verbal elements of communication.

Other differences between oral and written discourse - and which are consequently reflected in BICS and CALP modes of language use - are reflected in lexical and grammatical features. Written discourse, especially that of expository texts, has a far greater frequency of more complex grammatical constructions such as relative clauses (which is a complex syntactic means of specifying a referent), passives and nominalisations. Consider, for example, the case of

nominalisation, whereby something is expressed in a nominal style (e.g. NP(PP)) rather than by means of verb phrases. For instance, instead of using a verb phrase to refer to the idea of *doing things with our minds*, one can express this nominally as *mental ability*. Williams (1981, in Romaine 1984:222-223) points out that a nominal style of writing emerged with greater frequency in written English texts during the Anglo-Norman period and in later Middle English, after extensive contact with Latin and French c.1150-1450.

The use of nominalisation in written discourse has lexical-grammatical spillover effects. For instance, nominalisation results in a high degree of lexical density, usually of low frequency, more abstract terms such as occur in expository texts, and it also leads to greater use of prepositional phrases. Nominalisation and high lexical density are thus features of English expository text writing, and occur to a far greater degree in written language than in spoken language. A heavy reliance on nominalisation and concomitant prepositional phrases can, of course, lead to a ponderous, turgid style and 'preposition piling' - what Tibbitts & Tibbitts wryly regard as "a fairly good sign of imminent breakdown in thought" (1978, in Romaine 1984:222)! Although the use of a nominal style is not inherently 'better' than a verbal style, and its overuse or misuse can result in decidedly reader-unfriendly texts, it tends to be valued in the learning context. For example, Romaine reports that research done in Sweden showed that teachers awarded higher scores to adolescents who had mastered a nominal style of writing. The teachers also viewed the nominal style as "better and more complex" (1984:224) than the verbal style. This nominal style is acquired from steady exposure to written texts. Students who write in a nominal style are therefore students who read well and often.

The differences between oral and written forms of language are to some extent a matter of convention, and these conventions may change, as evidenced by changes in written styles reflected in historical documents. However, critics of the hegemonic influence of written forms of language in the learning context sometimes overlook the functions served by specific features of written language. The relatively context-reduced nature of written language serves a very important function - that of building meaning into a text whose message must stand independently of the context in which it was produced. With regard to the function served by nominalisation, Williams (1981, in Romaine 1984:222) argues that it is very difficult to write on a very general or abstract level without using nominalisations.

Recognition also needs to be given to the fact that there are significant differences in the statistical distribution of content words that occur in oral and print language, due to a large degree to the specialist nature of many written texts. Oral discourse and BICS contain high frequency words common to our everyday lives, while written discourse and CALP contain many low frequency words and technical words of specialist subjects. There is a progressive increase in the occurrence

of low frequency technical words in school textbooks, as well as an increase in the general scientific (or academic) vocabulary used in the learning context that uses words common to all the disciplines and not restricted to a specialist domain, for example words such as *assumption*, *hypothesis*, *theory*, etc. The acquisition of this type of vocabulary increases from adolescence onwards and is acquired primarily through exposure to written language and to discussions in classrooms of texts containing these words (cf. Romaine 1984).

Moving away from syntactic and lexical aspects of written language to textual aspects, the features that are perhaps most characteristic of reading in the learning context are that texts at this level are typically dense, conceptually complex and often present multiple and conflicting viewpoints or theoretical paradigms. Such texts often need to be read repeatedly for maximum comprehension, even by skilled readers. Not only do students have to read, understand and critically evaluate numerous such texts, they also have to systematically accumulate information from various sources and integrate the often conflicting information into coherent knowledge bases or schemas on content-related topics. Unless students are familiar with the language use and conventions of this type of text, they will have difficulty understanding their texts and hence also have difficulty with reading to learn from them.

In what way are the features of written discourse related specifically to inferencing during reading? Firstly, the fact that written discourse is more context-reduced than oral discourse and that meaning cannot be negotiated in the course of communication means that readers have to learn how to utilise language and the text itself to construct a coherent representation of the meaning of the text. All the clues in the text need to be utilised for meaning construction. This means, *inter alia*, that readers should be able to continuously make links between incoming information and information already given in the text, integrate information within and across the text, infer new word meanings where possible, and keep track of referents introduced into the discourse so that anaphoric items can be linked back to their antecedents. It also means that readers should be able to infer main ideas in a text, distinguish primary from secondary information, and recognise or infer text-semantic relations (e.g. additive, temporal, causal, contrastive, concessive relations, etc.) between propositions. These are issues that this study looks at in some depth in Chapters 5, 7, 8 and 9.

The issue of reading and vocabulary development is also intimately linked to inferencing. The relationship between reading, vocabulary and inferencing will be examined in greater detail in Chapter 6. It suffices at this stage to point out that, due to differences in the statistical distribution of words in oral and written forms of language, the kind of vocabulary needed to succeed in the learning context is acquired through exposure to the written word rather than the oral word. If students do not read much, and if they have problems comprehending the texts that they do

manage to read, then it follows that they have fewer opportunities for vocabulary development.

Stanovich et al. (1996) argue that conversations are not a substitute for reading when it comes to vocabulary growth, especially the growth of the kind of CALP vocabulary needed to succeed at school, precisely because the kinds of content words that occur in everyday conversations are not the kinds of words that commonly occur in written texts in the learning context.

The relationship between inference generation and the ability to utilise the features of written language to construct meaning during reading will be examined more fully in Chapters 5-9. Chapter 5 examines anaphoric inferencing and the ability of students to keep track of referents already mentioned in the text. This ability is related to control of nominalisation, for many antecedent referents are expressed in nominal forms, as simple or complex noun phrases. Chapter 6 looks at the relationship between reading, vocabulary and inferencing, and the way in which the occurrence of words typical of written language affects the way in which vocabulary knowledge is acquired through extensive reading. By looking at various text-based inferences with regard to semantic and thematic relations, Chapter 7 explores more closely the relationship between context-reduced language use and inference generation during reading. Chapters 8 and 9 examine all these aspects of inferencing from a quantitative and qualitative perspective respectively.

In sum, the kind of language proficiency that students need to succeed in the learning context is CALP, which in the current study is acquired primarily through exposure to written texts. Simply trying to improve the general language proficiency of students is not necessarily going to lead to concomitant improvements in reading or in academic performance, since the relationship between language, reading and academic success is far more complex. One needs to acquire CALP for success in the learning context, and the primary means of doing this is through reading (although some forms of CALP can also be verbal, e.g. in formal classroom and lecture situations). Constant and extensive exposure to written language familiarises readers with the linguistic and textual features of written language, as well as with the conventions of expository texts. It is no coincidence, then, that reading skills correlate strongly with scholastic success.

### **2.3 The development of reading and the causes of reading problems**

In order to understand the Matthew effect more clearly, and to demonstrate more vigorously the argument that the relationship between reading and academic success is not simply a felicitous coincidence, that reading is not simply a language skill, and that improving the L2 proficiency of learners is not automatically going to lead to concomitant improvements in reading comprehension or academic performance, one needs to situate reading within a developmental perspective in order to see how reading as a skill in its own right develops and matures. One also

needs to look at the causes of differences in reading ability. In this section I shall first provide a brief developmental sketch of reading and then outline some of the causal determinants of reading problems that lead to Matthew effects.

### 2.3.1 A developmental perspective on reading

The processes and skills involved in reading do not all develop at the same time. Furthermore, variables such as the type and function of texts that are read in the learning context change as the reader develops. These are all factors that need to be taken into account in a developmental model of reading. Chall's model of reading (1979, 1983) has been chosen to illustrate the differential development of reading skills and the qualitative changes that occur. Chall's model includes six stages that reflect the major changes and the features involved in moving from 'learning to read' to 'reading to learn'. Stage 0 is the pre-reading stage (birth to about age 6) while Stage 5 is reached by the mature, skilled and efficient reader. These stages are summarised in Figure 2.1 on the following page.

Chall, Jacobs & Baldwin (1990) make the important point that the kind of thinking required for understanding and learning from texts changes over time, as does the relationship between listening and reading comprehension. Her stages of reading, as shown in Figure 2.1, illustrate how the language, type of processes and background knowledge needed to read texts change qualitatively in response to the type and functions of texts assigned to different educational levels. As children progress through school, the texts contain less familiar, more low-frequency words not encountered in everyday language, they contain longer and more complex sentences, and conceptually the texts become more dense and complex, with topics and language becoming more abstract.

During the pre-primary **Stage 0**, children may pretend to read, and may tell a story while looking at the pictures; they may recognise some environmental print and may even write their own name and know letters of the alphabet and some words. They know how to hold a book and turn the pages, and books, paper and pencil form part of their play world. They usually have a vocabulary of several thousand words, but can recognise very few of them in print.

**Stages 1 and 2** involve the decoding or 'learning to read' period that spans Grades 1-3. In Stage 1 children learn the alphabetic principles, letter-sound relationships, recognise high frequency words, and read simple texts, usually narratives, containing language and thought processes within their experiential frame of reference. Phonological skills and phonological inferences are used to 'sound out' new one- or two-syllable words that are encountered in the texts. At the end of Stage 1 children are estimated to be able to read over 600 words, while they are believed to

FIG 2.1: STAGES OF READING DEVELOPMENT

SAMPLES OF TEXT	AGE	CHARACTERISTICS
<p>"May I go?" said Fay. "May I please go with you?"<sup>a</sup></p>	<p>Grades 1-3 + 5-9 years</p>	<p>Students learn the alphabetic principle, letter-sound relationships, recognise high frequency words and read simple texts, mainly narratives. At end of Stage 1, students can read over 600 words and they can understand about 4,000-6,000 or more words in spoken language.</p>
<p>Spring was coming to Tait Primary School. On the new highway big trucks went by the school all day.<sup>b</sup></p>	<p>Grades 4-8 + 10-14 years</p>	<p>Decoding skills are strengthened and the reading of simple language and words becomes more automatised. Narrative texts still form the bulk of the reading material. At the end of Stage 2, about 3,000 words can be read and understood, and about 9,000 words are understood in spoken language. Listening comprehension is typically more effective than reading comprehension.</p>
<p>She smoothed her hair behind her ear as she lowered her hand. I could see she was eyeing <i>beauty</i> and trying to figure out a way to write about being beautiful without sounding even more conceited than she already was.<sup>c</sup></p>	<p>Grades 5-12 + 15-18 years</p>	<p>Students start using reading as a tool for learning, and they start reading expository texts. Texts contain more low frequency words and deal with less familiar themes. Students gain new knowledge, learn new ideas, attitudes and feelings, generally from one point of view. Listening comprehension is still more effective than reading comprehension. By the end of Stage 3, listening and reading comprehension are about equal.</p>
<p>Advances in technology enabled scientists to design and build new and better space equipment. By the late 1960's, it became possible to send astronauts to the Moon. On July 20, 1969, astronauts Neil A. Armstrong and Edwin E. Aldrin, Jr., landed on the Moon. They walked on the Moon, leaving the first footprints ever recorded by people on a place outside of Earth.<sup>d</sup></p>	<p>Tertiary level 18+ years</p>	<p>Student is reading from a wide variety of texts with different viewpoints. Reading comprehension is better than listening comprehension for complex topics. For poorer readers, listening comprehension may be better than reading comprehension.</p>
<p>Perhaps the most surprising aspect of physics is that its experiments and theories can be explained by a small number of relationships, or laws, and that these laws can often be expressed using mathematics. The language of physics is mathematics. For that reason, we begin the study of physics with a review of how measurements are made and how mathematics can be used to describe physical relationships.<sup>e</sup></p>	<p>Texts contain language and themes familiar to the child's frame of reference.</p>	<p>Learning to read</p>
<p>One of the objections to the hypothesis that a satisfying after-effect of a mental connection works back upon it to strengthen it is that nobody has shown how this action does or could occur. It is the purpose of this article to show how a mechanism which is as possible psychologically as any of the mechanisms proposed to recount for facilitation, inhibition, fatigue, strengthening by repetition, or other forms of modification could enable such an after-effect to cause such a strengthening.<sup>f</sup></p>	<p>Texts go beyond what the readers already know, linguistically and cognitively</p>	<p>Reading to learn</p>
<p>Stage 5 characterises the reading done for professional, study and personal purposes. It typifies reading done at tertiary level, where readers need to integrate, synthesise and evaluate information and acquire new knowledge. Reading is rapid and efficient (about 240 words per minute, or more). Reading is more efficient than listening. Skilled readers at this stage have a vocabulary of about 18,000-24,000 words, containing many general academic words and technical words related to specialised subjects.</p>		

understand around 4,000-6,000 or more words in spoken language. During Stage 2, decoding skills are strengthened and the reading of simple language and words become more automatised. Narrative texts still form the bulk of the reading material. At the end of this stage, about 3,000 words can be read and understood, and about 9,000 are understood in spoken language. Listening comprehension is typically more effective than reading by the end of Stage 2.

**Stages 3-5** characterise the ‘reading to learn’ stage, when texts start going “beyond what the readers already know, linguistically and cognitively” (Chall et al. 1990:14). The students’ language, knowledge, vocabulary need to expand, as does their ability to integrate varied and complex information and to think critically and broadly. A major transition occurs between Stages 2 and 3, when pupils are about 10-11 years old. Cognitively, they should be firmly in Piaget’s stage of concrete operations. During Stage 3 (Grades 4-8) pupils start using reading as a tool for learning, and they start reading expository texts. Learning strategies such as generalising, summarising and note-taking develop concomitantly with reading comprehension skills. Texts contain more low frequency words and less familiar material. New knowledge is gained, and pupils are exposed to new ideas, attitudes and feelings, generally from one point of view. Listening comprehension is still held to be more effective than reading comprehension. By the end of Stage 3, listening and reading comprehension are about equal. By Stage 4 (Grades 9-12), the student is reading from a wide variety of texts with different viewpoints. By this stage readers should achieve holistic integration of information across texts and should be aware of the hierarchic structuring of information. Reading comprehension is better than listening comprehension for complex topics; for poorer readers, listening comprehension may be better than reading comprehension. Stage 5 characterises the reading done for professional, study and personal purposes; it is what is done at tertiary level. At this level readers integrate and synthesise information and acquire new knowledge from reading. Reading is rapid and efficient. For highly skilled readers, reading is more efficient than listening.

There is plenty of corroborating evidence that children’s linguistic and cognitive development in the early school years is characterised by an increasing sophistication in the use of comprehension and learning strategies. By Grade 4, children start developing comprehension and learning strategies that

enable them to concentrate more on focal than peripheral information, to select main ideas for further elaboration, to connect ideas to form a global understanding of the intended meaning of a text, and to retain the information effectively for later recall (Vauras et al. 1994:362).

This developmental perspective on reading shows a progressive pattern in skill development,

especially from Grades 3-4 onwards, when children start engaging in meaning construction. There is a gradual move away from atomistic, element-by-element processing of information to a more holistic integration of information. This happens first at the micro level (establishing meaning within sentences and of individual sentences), then at the local level (establishing connections across adjacent sentences) and finally at the global level (constructing a generalised representation of the intended text meaning). Local connections are used with increasing frequency from age 10 onwards. By the age of 14-15 years, global connections should be made with increasing assurance and sophistication (Van den Broek 1988, 1997; Vauras et al. 1994; Lorch et al. 1987). Good readers show increasing sensitivity to text structure, to the hierarchic ordering of information, to inconsistencies in a text, and in general they constantly engage in meaning-construction processes by making inferences and integrating given and incoming information during reading.

However, acquiring skills necessary for reading to learn seems to be a common problem for many children around the world. Based on almost two decades of research into the development of reading skills, Chall argues that if adequate reading abilities are not acquired during this phase, then there are severe consequences:

Stage 3 reading skills are crucial to later academic success ... Reading science and social studies texts becomes an almost impossible task for students who cannot read on a Stage 3 level" (Chall et al. 1990:14).

In their longitudinal study of Grade 3, 5 and 7 American children from low socio-economic backgrounds but who scored at national level on reading tests at Grade 3, Chall et al. (1990: 15) found strong evidence of a decline in reading skills from Grade 4 onwards, the grade which coincides with this transition stage. The slump happens fairly abruptly for poorer readers, and more gradually for the better readers. They attributed the decline in reading skills to lack of exposure to more complex, non-narrative types of written texts after Grade 3, in both the home and school environment. The school had an accelerated reading programme for the early grades, but no sustained reading programme for the later grades. Both the good and poor readers in their longitudinal study had scores below national level by Grade 7, which indicates that Matthew effects had already taken effect. The researchers refer to this decline as the 'fourth-grade slump' and argue that it is a fairly well recorded fact in reading studies. Chall points out that different groups of problem readers typically experience this stage as a stumbling block, for example, deaf children, children with language, reading or learning disabilities, and children from lower socio-economic homes who do not have as many opportunities for exposure to books. The findings from Macdonald's large-scale study in South Africa (1990a and 1990b) indicate that many black children have problems understanding even narratives in the L2, and they also experience a



slump, although it occurs in Grade 5, where the problem is exacerbated because it happens when the cross-overs from both narrative to expository texts and from mother-tongue to English as the language of learning occur.

For those children who have problems learning to read from the early grades, the Matthew effect could start early in Grade 1. However, for many children who start off learning to read quite easily, and who do not fall into traditional categories of 'problem' children, reading problems could start emerging as they make the transition from learning to read to reading to learn. If neither their home nor their school context provide sufficient practice in reading skills and exposure to books, then the Matthew effect starts emerging at the level of comprehension.

As was pointed out earlier, in South African schools once children have learned to read, they are left very much to their own devices as far as reading to learn is concerned, and so they are not given the support they need to make this transition easily and effectively. The situation is exacerbated for children who also make the cross-over from mother-tongue to English as medium of tuition at this stage, and who have not yet developed appropriate reading skills in either their primary or their second language. These children also generally come from a non-reading community, and they attend schools where reading is not given particular attention. It is at this point that Matthew effects start kicking in - the students start reading at suboptimal levels and the trend continues throughout their scholastic career. As a result of these effects, the students have problems getting 'richer', linguistically, cognitively and in terms of their knowledge of content subjects, and the gap gets wider as they move through the educational system. Webb (1999) reports that the African students studying Politics at the University of Pretoria had Grade 7 reading levels, while those studying Medicine and Economics had Grade 8 reading levels.

### 2.3.2 Causal determinants of reading problems

From the preceding discussion it is clear that there are numerous reasons for individual differences in reading ability. These include factors that are intrinsic or extrinsic to the reader and that can impair the effective development of reading ability. Six main areas that can give rise to problems in reading ability are identified below:

- \* **Sociolinguistic.** This extrinsic factor refers to the reading habits and practices of the broader sociolinguistic community in which the reader lives, and include different literacy practices in different communities, different assumptions about the nature and function of texts, and the value given to print information and reading. If there is a mismatch between the home literacy practices and school practices, and if the wider sociolinguistic community does not reinforce the literacy practices that prevail in the learning context,

then the reader is bound to encounter problems in reading. In South Africa, as pointed out earlier, sociolinguistic factors play an important role in accounting for some of the reading practices - or lack of them - amongst L2 students.

- \* **Pedagogical.** This is an extrinsic factor that refers to the reading methods and practices that prevail in the language classroom and across the curriculum. If students have not been taught appropriate reading skills or given enough opportunities to practise them in the school context, then they are bound to experience various difficulties when required to read to learn. In South Africa, the lack of attention in schools to developing meaningful and effective reading skills sets many children up for reading failure and hence also academic failure.
- \* **Textual.** This is an extrinsic variable that relates to different written genre conventions, reader familiarity with these text genres, and the extent to which texts are coherent and reader-friendly. If texts are poorly written and lack coherence, as is the case with many school textbooks in South Africa (Van Rooyen 1990, Strauss 1995), then readers will have difficulty comprehending them effectively. Likewise, if readers lack familiarity with text conventions through lack of exposure to the written word, then they will have difficulty comprehending their texts. Both these factors apply in the South African context.
- \* **Cognitive.** This refers to the cognitive processes that come into play during reading and that interact with one another to decode and comprehend texts. If the interaction of bottom-up and top-down skills have not been adequately developed then the reader experiences various difficulties during the reading process. If extrinsic factors are not conducive to stimulating and promoting reading, then cognitive processes do not develop to their full potential, as is the case with many South African children.
- \* **Linguistic.** This variable is of particular importance in L2 models of reading and relates to different levels of L2 proficiency amongst the readers, specifically proficiency in the language of texts that are read for learning purposes. In South Africa, many L2 students have adequate BICS but not CALP. In this study, the relationship between L2 proficiency, inferencing and academic performance was examined.
- \* **Affective.** This refers to attitudinal and motivational factors that influence the extent to which students optimise opportunities that provide exposure to written texts. Students with negative attitudes to reading or who are not aware of the value of reading in the learning context, read less and thus have fewer opportunities to 'grow rich'. In South Africa, the difficulties that L2 students have in understanding their textbooks and the continuous cycle of failure and underachievement in the learning context create negative attitudes towards reading

All these variables are interrelated and have a significant influence on an individual's reading ability, and any theory of reading that claims to be truly interactive will need to take account of

all these factors. However, due to the specific nature of a particular research problem being investigated, researchers often tend to focus on one set of variables at the expense of others.

There have basically been two main viewpoints in the past, which variously emphasise intrinsic or extrinsic factors as causal determinants of reading. The one viewpoint is dominated by theorising and research within psycholinguistics and cognitive developmental psychology, the other within sociolinguistic and anthropological disciplines.

Within cognitive developmental psychology, comprehension problems are typically explained in terms of cognitive and linguistic processes that operate in a suboptimal manner. As Stanovich et al. (1996) point out, in this approach attention is focussed on individual differences in cognitive processes between groups of students that relate to skilled (or problem) reading. Aspects of cognitive-linguistic development affected by reading include phonological processing/awareness, word recognition and lexical access, vocabulary, syntactic knowledge, verbal fluency, working memory, inferencing, metacognitive awareness, and so on.

Researchers working within this 'intrinsic' domain favour experimental research paradigms. Stanovich et al. (1996:15) refer to this as the "cognitive correlates approach", whereby researchers posit causal models and try to establish the cognitive processes or knowledge bases that predict reading comprehension. Many of the researchers working within this paradigm are concerned more with reading disabilities rather than simply reading problems, and the particular nature of reading disabilities often leads to a strong emphasis on biological/neurological causation. Dyslexia, for example, is a case in point, for it arises from problems at the level of phonological processing. This approach can provide compelling accounts of individual differences within groups, but it does not always easily account for differences across different groups of readers. Thus, the body of research from this approach tends on the whole to overlook the fact that skilled reading develops within a socio-cultural context that involves complex interactions between reader and environment.

On the other hand, sociolinguistic and anthropological approaches that favour ethnographic research paradigms tend to emphasise external factors as determinants of reading. Although these approaches draw attention to the deeply embedded context in which reading emerges and develops, they tend to be inadequate in accounting for individual differences that inevitably occur within groups with regard to reading ability and academic achievement generally (Spear-Swerling & Sternberg 1996).

The differences between these two approaches to variation in reading ability are summarised in Table 2.1 on the following page.

**TABLE 2.1: INTRINSIC AND EXTRINSIC FACTORS AS CAUSAL DETERMINANTS OF READING PROBLEMS**

INTRINSIC	EXTRINSIC
* Assumes biological causation, e.g. a central nervous system dysfunction.	* Assumes extrinsic causation, e.g. home environment, print exposure, reading methods and instruction; teachers; school system.
* Posits suboptimal cognitive development in the absence of appropriate exposure to books and stimulation of reading skills.	
* Locates source of failure within the reader.	* Locates source of failure within the system.
* Accounts well for individual differences within groups but not for across-group differences.	* Accounts well for across-group differences but not for within-group differences.
* Tends to overlook the learning context in which reading and learning to read occurs; ignores the complex interaction between reader and environment.	* Downplays cognitive-linguistic processes and the cognitive-linguistic consequences of a poor stimulus reading environment.

From this and the preceding discussion it is clear that reading involves a complex interrelationship of various processes and skills that depend for their development on the interplay of numerous intrinsic and extrinsic factors. Reading models need to be able to account for reading differences and similarities within and across linguistic, socio-cultural and socioeconomic groups.

Although all these factors play an equally important role in reading, the domain in this study has been specifically delimited to one of the cognitive variables underlying reading comprehension, namely inferencing. This focus on one set of variables only in no way signifies that the other variables are less important, but rather that problems in reading comprehension are being examined with a particular research lens. In order to better understand the nature of the problems that students have when reading texts and learning from them, we need to understand in what way cognitive variables affect differences in reading comprehension between individual readers, and we also need to understand what effect lack of exposure to texts and lack of attention to the development of effective reading skills in the primary and secondary years of schooling have on cognitive processing during reading, especially one particular aspect of processing, namely inferencing.

## **2.4 Theoretical and developmental perspectives: a summary**

The first half of this chapter provided a brief historical overview of different theoretical approaches to reading, and it was shown how the domain of reading opened up beyond word and sentence boundaries, and how increasing attention was given to the role of cognitive processing during reading, especially inferencing. Inferencing is integral to reading because it essentially involves the ability to perceive links, relating newly encountered information to information encountered previously, either earlier in the text or else in long term memory, so that a coherent representation of the text can be constructed and new knowledge acquired. Inferencing is also integral to meaningful learning, which is, essentially, the ability to integrate new information with existing knowledge structures - which is what effective reading comprehension entails.

By looking at reading from a developmental perspective, it becomes clear that reading is a complex set of interrelated skills and that there is a qualitative progression of skill development. Once decoding skills have been established, readers start engaging with the text in meaning - construction processes, first at a local level and then at an increasingly global and higher-order level. If children have difficulty making the transition from learning to read to reading to learn, then they tend to adopt immature atomistic, element-by element processing strategies that do not move beyond the micro- and local levels of text integration, and they consequently have great difficulty in constructing meaning when reading conceptually dense and multi-level expository texts. There are several factors which, singly or combined, can cause reading problems amongst students, and Matthew effects can emerge at any stage of reading development.

So far, the discussion has focussed mainly on reading, since it provides the context within which inferencing occurs. In the following chapter, inferencing comes under the spotlight, where the concept is discussed in greater detail, and the theoretical and methodological inference framework used in this study is identified.

## CHAPTER 3

### INFERENCE GENERATION DURING TEXT COMPREHENSION: AN OVERVIEW OF THEORY AND RESEARCH

#### 3.0 Introduction

Although, in the previous two chapters, the role of inferencing during reading comprehension was identified as an important one, the discussion so far has centred mainly around the broader issue of reading and its function in the learning context. The purpose of this chapter is to return to the central topic of inferencing in this study and to present an overview of theory and research into the role of inferencing during text comprehension during the past twenty years or so. The notion of inferencing and the nature of inferential processes are examined more closely, and the issues and questions that characterise this domain of study are set out in greater depth. The position of this study in relation to the larger domain of inference research will also be identified in the course of the discussion.

Since the seventies there has been a proliferation of research into language processing and comprehension in different but related fields such as psycholinguistics, cognitive psychology and artificial intelligence, and some of this research has focussed on inferencing during comprehension. But what exactly does the study of inferences entail? There is no straightforward answer to this question since the nature and focus of inference research has changed with the decades. The earlier research was concerned with establishing what role inferencing itself played during language comprehension, and determining the occurrence of inferences during discourse processing. However, it was soon apparent that comprehension and inferencing are deeply interrelated; in fact, Rickheit, Schnotz & Strohner (1986:5) describe comprehension itself as “an inferential activity”, while Sanford (1990:515) wryly states that “the ubiquity of inferences in text comprehension makes the study of text comprehension look like a subset of the study of inference making”. The early recognition in the seventies of the prevalence of inferences in discourse processing caused a shift in research focus to more discriminating questions about the nature of inferences and the conditions that generate them. The questions that have informed and guided inference theory and research concern issues such as:

1. **What** is an inference? This question is concerned with definitional features of inferences and with the nature of inferencing in general. Definitions of inferences inevitably draw one into consideration of the different kinds of inferences that occur, since the question *What is an inference?* easily prompts an answer like *It depends on what kind of inference one is referring to.*

2. **What kinds** of inferences are drawn during comprehension? Although this question is closely related to the first one, it also concerns the taxonomic classification of inferences. What kinds of inferences do readers make and how should they be classified? As Sanford (1990: 516) points out, "(t)here is the sheer difficulty of deciding what is the possible set of inferences that could be made over any given period of reading a discourse".
3. **When** are inferences drawn? Here the controversy revolves around whether inferences are generated on-line, that is, during the comprehension process, or whether they are generated off-line, that is, later, after comprehension, usually in response to a prompt or a specific task.
4. **How** are inferences drawn and constrained? This question concerns the kind of knowledge and operations or processes involved in generating inferencing, and the factors that constrain them. Not all inferences that are potentially permitted by a text are made, for this would lead to an inferential explosion. It relates to both representational and procedural issues underlying inferencing, and to text-based and reader-based variables that constrain inference generation.
5. **How** are inferences detected and data obtained in order to study them? These are more practical questions that raise methodological concerns. Despite their ubiquity, inferences are very elusive processes to pin down, measure and analyse and the field is, understandably, fraught with methodological problems.

The literature review in this chapter will attempt to deal with each of these questions in turn. Much of the work related to these issues is highly theoretical in that it is concerned with establishing what skilled L1 subjects do when they read and comprehend texts. Afterwards, some of the research related to more applicational matters such as differences between good and poor readers and inference training in the classroom will also be described, and the approach adopted in the present study will be identified.

### 3.1 What is an inference?

To explain what an inference is - or is not - obviously calls for a definition of the concept. Although definitions are useful because they help to delimit the concept under discussion, one must be mindful that they are determined to a large extent by underlying theoretical assumptions and methodological purposes.

First of all, it is important to note that the word *inference* is associated with the word *implication*:

they are different sides of the same coin. As Singer points out (1994:480), these two terms “refer to activities on the part of the speaker and the understander, respectively”, a distinction generally observed in the formal study of language processing. When a speaker/writer implies something, the listener/reader is expected to make an inference.

Let us start examining the question of what an inference is from the long-standing formal and traditional perspective. Formal approaches to the definition of inference within the domain of language comprehension have used the **criterion of deducibility**. In other words, does the process entail a valid deduction? If so, then it is an inference. This formal definition defines a specific type of inference, the logical or deductive inference, and the criterion of deducibility gave rise to a distinction between **logical/necessary** and **possible/probable** inferences. As was pointed out in Chapter 1, logical inferences are based on formal rules. In logic, a specific conclusion [4c] that is derived from specific premises is termed a deductive inference [the primary premise 4a and the secondary premise 4b].

[4a] If an iron rod is heated, it will expand.

[4b] Hector is heating an iron rod.

[4c] The iron rod will expand.

The argument in [4] is a conditional argument, a type of causal inference, called Modus Ponens, where the secondary premise confirms the antecedent clause in the primary premise. There are four kinds of conditional inferences, which are classified in terms of whether the secondary premise confirms or denies a clause of the primary premise (Franks, Mulhern & Schillinger 1997:293). Other common types of logical inference include class instantiation (*Great Danes are large dogs. Hedda is a Great Dane. Therefore Hedda is a large dog*) and disjunction (*Either the fridge has tripped or the washing machine has tripped. The washing machine has not tripped. Therefore the fridge has tripped*).

Logical inferences are context-free because the premises entail the conclusion, and the conclusion is valid by virtue of the fact that it is not possible to assert the premises and deny the conclusion without contradicting oneself. In other words, logical inferences are 100% certain. Overton (1990, in Franks et al. 1997:287) defines a deductive inference as “a process whereby a proposition (the conclusion) is arrived at and accepted on the basis of other propositions (the premises) that were originally accepted”. Definitions of an inference, from a logician’s point of view, do not involve gap-filling operations. Instead, they involve reasoning that reaches conclusions that are not simply plausible or possible, but logically necessary, and they therefore involve different cognitive processes from those used in probable inferences (Franks et al. 1997:286).



Logical inferences are also called necessary inferences, because such inferences are necessarily true implications of sentences in the text. Negation of the inference leads to an inconsistency. Necessary inferences include presuppositions, entailments, conventional implications, as well as transitive inference, for example:

- [5] Hubert forgot to let the dog out (presupposition: the dog was supposed to be out)  
 [6] Humphrey is a father (entailment: Humphrey has one or more children)  
 [7] Hector is a linguist but he knows statistics (implication: Linguists don't usually know statistics).  
 [8] Hercules is taller than Xena and Xena is taller than Iola (inference: Hercules is taller than Iola).
- A                      B                      C                      A → C

Because everyday discourse is embedded in context and is far messier than the discourse of formal logic, looser definitions of inference involving possible/probable inferences (also called invited or pragmatic inferences) are typically adopted by researchers working in language processing. Probable inferences are possibly true implications of sentences in the text, given the state of affairs in the world. These inferences are typically based on people's general background knowledge: "although they are often probable, they are not certain" (Singer 1994:481). This was illustrated in Chapter 1 with the example of Hector burning his mouth. Negation of a sentence from which a possible inference is drawn does not lead to an inconsistency.

Vonk & Noordman (1990) state that the necessary/deducibility criterion for defining an inference is problematic because in terms of which criteria can an inference be said to be necessary? Comprehension is not a monolithic concept, but a graded one. In similar vein, Sanford (1990) argues that the necessary-possible distinction, though intuitively appealing, does not have a readily defined boundary, which weakens its usefulness. Although the logical/necessary-probable distinction serves to differentiate inference categories, "its utility as a processing distinction is somewhat limited" (Singer 1994:481), since detecting all the logical inferences of a message would lead to an inferential explosion. Likewise, some possible inferences are more likely to occur than others due to their high probability and "computational simplicity" (Singer 1994:481). Due to these kinds of problems, several researchers working within text comprehension avoided formal definitions of inference and adopted more procedural or computational approaches to the question of what constitutes an inference during text processing.

Let us briefly consider one such approach where, in the early stages of inferential research, the **criterion of automaticity or processing time** was used to determine whether or not a cognitive process involved inferential activity. In other words, processing time had implications for definitions of what constitutes an inference. The early work by Haviland & Clark (1974) suggested that a lot of inferential activity occurs when readers identify referents for definite noun phrases. In the by now oft-cited example, the researchers found that readers exposed to texts such

as [10] took longer to compute the referent for *the beer* in [10b] than readers did in [9b].

[9a] Mary got some beer out of the car.

[9b] The beer was warm.

[10a] Mary got some picnic supplies out of the car.

[10b] The beer was warm.

In example [9], a linking operation is performed via repetition of the noun *beer*, while in [10] the linking operation that the reader computes is that *picnic supplies* include *beer*. The differences in comprehension times in short samples of text such as these were explained in terms of the extra processing time that is needed to form a bridging assumption or backward inference as in [10]. The implication, as Brown & Yule (1983:257) point out, is that “inferences take time”. Linking operations that required extra processing time were regarded as non-automatic processes, and hence inferences, whereas linking operations that occurred rapidly and automatically were regarded as not involving inferential activity. However, such an approach is somewhat impractical, since one can only establish *post facto* whether a cognitive process is or is not an inference.

Empirical support for such an approach was contradictory. Sanford & Garrod (1981) used similar two-sentence texts involving missing links to those used by Haviland & Clark (1974), but they found that some missing links did not require extra processing time, e.g.:

[11a] Mary dressed the baby.

[11b] The clothes were made of pink wool.

[12a] Mary put the baby's clothes on.

[12b] The clothes were made of pink wool.

The researchers found that no extra processing time was required in the implicit text in [11] compared to the explicit text in [12]. The explanation they proffered moved beyond processing time to include representational issues. In [11] the missing link is that *dressing* a baby involves putting clothes on the baby. The researchers suggested that *clothes* is part of a reader's representation of the verb *dress*, and that when this verb is activated, then *clothes* is also automatically activated, whether it is explicitly mentioned or not. The conclusion based on this kind of psycholinguistic data was that when the missing link activated by a particular text is part of a reader's knowledge representation, then no extra processing time is needed, but when the missing link does not form part of the knowledge representation, then extra processing time is required to make a bridging inference. Such an approach incorporates both **procedural and**

**representational aspects** of text processing into definitions of what constitutes an inference.

This approach obviously has implications for how one defines inferences. Sanford (1990), for example, argues that it is misleading to say that in a sentence such as *He unlocked a door* the inference *He used a key* is necessarily made. Rather, such knowledge becomes **accessible** (Sanford 1990:519), but doesn't necessarily translate into the actual drawing of an inference. This gives rise to a position where inferences are defined in terms of a distinction between **activation (or priming)**<sup>1</sup> and inferencing. It has been argued that the activation of a concept in semantic memory leads to the activation of related concepts, such that a spread of activation occurs along neural pathways (Singer 1988:178). Corbett & Doshier (1978) distinguished between activation and encoding. They argued that the former involve the transient activation of implied ideas - although concepts are often briefly activated, they do not necessarily result in an inference being made, i.e. they are not always necessarily encoded. There has been a lot of research about priming of concepts at different levels, such as at the level of word meaning (Meyer & Schvaneveldt 1971, in Singer 1988), the factual level (Anderson 1976), and the level of text meaning (McKoon & Ratcliff 1990), but a discussion of these issues will take us beyond the scope of this chapter.

Singer (1988) adopts the activation/encoding approach when he defines inference with reference to propositional representations of text, where the meaning of a text is analysed as a network of units of meaning called propositions. These consist of a predicate (typically verb, adjective or adverb) and one or more arguments (typically nouns). Singer then uses inference to refer to "the addition of either an argument or an entire proposition, to the list of propositions that are explicitly conveyed by a text" (1988:178). Consider the following:

[13] The waiter lit a cigarette.

The proposition here is (light, waiter, cigarette). If one inferred that the waiter used a match (argument) to light the cigarette, or that the waiter was a smoker (proposition), then these arguments or propositions would be added to the list of explicit propositions underlying the message. Singer restricts his discussion to additional arguments/propositions for which there is evidence that they have actually been encoded and not merely activated. Thus, ideas, arguments or propositions which are not explicitly stated in a text but which are also captured by the internal representation of a text are called inferences. Singer further excludes inferences involved in reconstructive memory for tests (i.e. delayed recall): "It is well documented that with increased test delay, people are more likely to incorrectly recognise test sentences that are consistent with

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<sup>1</sup> Sometimes also called *instantiation*.

the meaning of a text ... while such reconstruction is clearly inferential in nature, it may be distinguished from the activity of drawing inferences in the course of encoding a message” (Singer 1988:179). Singer is primarily concerned with inferences that are made on-line during the reading of narrative texts in experimental situations, where the narrative is read once-off. This in turn delimits what he regards as legitimate criteria in the definition and study of inferences.

It must be noted that Singer’s position is contrary to the position taken in this thesis, where off-line inferences are considered legitimate data. By excluding cognitive activity involving delayed or off-line processing, Singer excludes some important inferential activity that occurs *within the learning context*, where conceptually dense texts are read repeatedly for learning purposes. Inferences important for building up a coherent representation of an expository text - and hence also for constructing new knowledge - are often not made on a first reading. This is an issue that will be taken up later in §3.3.

So far, it is clear that definitions that use procedural features such as automaticity or activation as constitutive criteria for inferences run into problems. The test samples used in many of the earlier psycholinguistic research on inferences tended to be rather decontextualised data. Consider, for example, what happens to automaticity if we embed Haviland & Clark’s picnic/beer data more firmly into specific contexts:

[14a] It was a beautiful, sunny spring morning for the final rugby match against Wales. Frik and his mates were having a picnic braai before they went to the match. They were well stocked and intended to have a good time. Frik got some picnic supplies out of the car. The beer was warm from lying in the boot for an hour.

[14b] It was a beautiful, sunny spring morning for the Sunday School picnic. Father Robinson, the Sunday School teacher, Frik, and the children looked forward to their lunch with anticipation. Father Robinson and the children got the fire going for the braai. Frik got some picnic supplies out of the car. The beer was warm from lying in the boot for an hour.

Based on our knowledge of who attends rugby matches in South Africa and what their expected patterns of behaviour are as opposed to our knowledge of who attends Sunday school picnics and the behaviour expected there, it is easier to perform a linking operation between the last two sentences in [14a] than it is in [14b]. In other words, the class inclusion of beer as a picnic supply is easier to make in the context of beer-drinking rugby fans than it is in the context of priests and Sunday school picnics. Does this mean that the link in [14a] is not an inference but that the identical link in [14b] is? From this it is clear that the context provides clues as to what kind of inferences are more likely to be made than others. Whether a linking operation is performed with greater or lesser processing time depends also on factors such as context, readers’ background

knowledge, attentional focus, and the aim of the reading task (these issues will be taken up again in §3.4). Automaticity is therefore not a satisfactory criterion for defining inferences.

Working within the psycholinguistic domain, but avoiding specific criteria such as automaticity and activation, Rickheit et al. (1985:8) define an inference as “the generation of new semantic information from old semantic information in a given context”. (This is similar to Singer’s (1988) position where an inference refers to the addition of an argument or proposition, cf. p.55). An important feature of their definition is the role of context in inferences. The authors specifically define ‘information’ as *semantic* information, which includes word concepts and higher semantic units such as propositions, mental models, or categories of super-structure (1985:8). The qualification of information as semantic information is a functional one, to differentiate the operation whereby new information is computed during text *comprehension* from the operation whereby new information is computed during *decoding*. During decoding the reader uses phonetic and graphemic knowledge (non-semantic knowledge) to decipher the printed symbols into word concepts and propositions (semantic knowledge). In other words, during decoding the reader generates new semantic information from given non-semantic information. Cognitive operations that occur at the sub-semantic level of information processing are therefore excluded from their definition of inference. The authors defend their distinction between semantic and sub-semantic processes on the grounds that “they play a different role in communication in terms of acquisition, attention, and memory” (Rickheit et al. 1985:8).

Defining an inference as the generation of new semantic information on the basis of prior information is in line with the general agreement that inferencing “is a cognitive process used to construct meaning” (Hammadou 1991:28). In fact, Hammadou (1991:28) goes on to define inferencing as a “thinking or reasoning process” that goes beyond the text, resulting in “generalisation and explanation”.

Winne, Graham & Prock (1993:53) define an inference as “the cognitive product of (a) operating on information provided, either from a text or from a previous stage of cognitive processing, (b) in the context of relevant prior knowledge”. The ‘relevant prior knowledge’ to which the authors refer here is either declarative or procedural knowledge. With regard to prior declarative knowledge, the generation of an inference is largely a function of prior knowledge about the topic of a text. With regard to prior procedural knowledge, the generation of an inference stems from “a rule or production system that supplies a method for operating on information represented in the text” (Winne et al. 1993:54). When the text itself is a source for generating inferences, then we are dealing with text-based inferences (a distinction also adopted in this study). As an example of a production system, the authors identify a *rule*, which is information in the text that provides grounds for inducing a probable event, and a *critical fact*, which is information in the

text that constrains application of the rule so that a particular generalisation can be made. In a story about two boys who go camping, for example, the text provides the following information:

the boys want to pitch camp near water (= *Rule*);  
there are two camping sites in the park - one next to an ice cream store and one next to a pond (= *Critical fact*).

An inference question to the text is: *Where did the boys camp?* The answer is not explicitly provided in the text but by fitting the critical fact to the rule, the reader can make a probable inference: *probable inference* = the boys choose to pitch camp next to the pond (Winne et al. 1993:54).

The production system to which the authors refer is thus a kind of pattern-recognising procedure that generates inferences, given the appropriate informational input provided in the text or stored in long term memory. Whether the particular production system identified above covers all kinds of possible text-based inferences is a question that the authors do not raise. However, this “pattern-recognising procedure” (Winne et al. 1993) could be related to different kinds of inferences, such as those pertaining to anaphoric resolution, new words; text-semantic relations; main ideas, and so on. This is an issue that will be taken up again later in this chapter.

To get back to the original question in this section, viz. *What is an inference?*, as the above discussion shows, defining inferences is not a straightforward task, since definitions of inferences automatically raise classificatory issues concerning definitions of different types of inferences. The various definitions also focus on different aspects of the notion, according to disciplinary interests. As Rickheit et al. (1985:8) remark, definitions of concepts are not right or wrong, but rather “more or less productive for the inquiry into a certain subject”. Although it is premature to spell out the way in which inferences are defined and used in this study so early in this overview chapter, it suffices at this point to state that, from a reading perspective, inferences in expository texts perform essential text-connecting functions that contribute new semantic information to the construction of a coherent representation of the text that approximates the meaning that the author intended. The concept of inferences as used in this study will be spelled out later in §3.7, once the various aspects of inferences have been discussed.

### **3.2 What kinds of inferences are made during comprehension?**

Another typical question in inference research concerns the identification and classification of different inference types. As the previous section has already indicated, there are many kinds of inferences that one can identify, including logic-based inferences which are derived via formal

sylogistic reasoning, propositional calculus, theorem proving, etc., as well as quantitative or statistical inferences. Graesser & Kreuz (1993:150) point out that although these more formal inferences can be generated during comprehension, they are difficult and are generally generated off-line. Although the making of logical inferences during reading are sometimes studied, these are not the kinds of inferences that researchers in language and reading comprehension generally focus on. Instead, a consistent question that runs through inference research in reading is: What kinds of inferences do readers *typically* make when they read? This question seems innocuous enough but the answers are conflicting and uncertain. It was initially thought that once researchers had gained some clarity on this question, they could go on to other related issues. But in attempting to answer this question one is immediately embroiled in several other issues. As was shown in §3.1, some inferences seem to occur automatically, some depend on variables such as contextual situations, background knowledge, and so on. The kinds of inference that are identified also depend on procedural perceptions and on the methodological procedures adopted by the researcher. Thus, there is no general consensus on the classification of inferences, except the acknowledgment that inferences can be classified in different ways.

Let us qualify the question posed above to: *What kinds of inferences do readers typically make when they read?* The qualifier is important because, potentially, there are a lot of inferences that a single sentence can generate. All inferences allowed by the text cannot be made, because that would lead to an inferential explosion. Inferences also use up valuable cognitive resources (Perfetti 1993). There must therefore be some constraints on inference generation - constraints that are imposed by the text, as well as attentional constraints imposed by processes within the reader, and knowledge constraints that the reader brings to the reading process.

Two broad categories of inference have been identified according to the 'direction' of the inferential link. In the previous section we saw how inferential activity was at one stage defined in terms of necessary versus possible inferences, where necessary was defined in terms of true implications. Using the same term but in a different sense, a distinction is made between inferences that are **necessary** for comprehension and those that are simply **elaborations** (Just & Carpenter 1987). 'Necessary' here is defined in terms of the contribution of the inference to the coherence of the text representation. In the early days of inference research it was thought that only inferences *necessary* for the establishment of cohesion are drawn. However, corroborative research in text linguistics and psycholinguistics soon made it clear that coherence is not just an overt property of the text but also derives from reader based factors as well as from underlying text-semantic relationships. The sets of sentences commonly used to illustrate the difference between necessary and elaborative inferences are as follows:

- [15] No longer able to control his anger, the husband threw the delicate porcelain vase against the wall. It cost him well over one hundred dollars to replace. (Necessary inference = The vase broke)

Because delicate porcelain vases tend to break when thrown against walls, to construct a coherent representation of these two sentences, the reader must link the first and second sentences by making the inference that the vase broke. This is seen as a necessary inference. However, consider now the following version:

- [16] No longer able to control his anger, the husband threw the delicate porcelain vase against the wall. He had been feeling angry for weeks but had refused to seek help. (Necessary inference = build-up of anger caused violent behaviour)

In [16], the reason for the man's actions is foregrounded. In order to construct a coherent representation of this text, the reader needs to perceive the causal link between the build-up of anger in the husband and his eventual inability to control it. If in [16] the reader additionally inferred that the vase broke, it would not be crucial to linking the first and the second sentences, and would thus just be an elaboration in the construction of the text representation. This elaborative inference may or may not be confirmed in subsequent sentences. As [16] illustrates, the kind of elaborative inference that is made can depend on whether the inference event or state of affairs is foregrounded. Elaborative inferences generate expectations, and they can therefore be used to great effect as a literary device, especially in the genre of thrillers and detective novels.

However, this distinction between necessary and elaborative inferences is problematic, due to the infelicitous choice of the term 'necessary'. Because comprehension is a relative rather than an absolute concept, some researchers such as Vonk & Noordman (1990) argue that comprehension should not be the criterion in terms of which 'necessary inference' is defined. In order to get away from this problem, a distinction is often now made between **elaborative** (or forward) inferences and **bridging** (or backward) inferences. Despite name changes, the distinction between them is very similar to the previous one. Elaborative inferences are forward inferences and predict events or states that may possibly occur. Bridging inferences refer back to previous text entities and link incoming information with previously given information. For this reason they are also often termed **forward** and **backward** inferences respectively. It is argued that bridging inferences are important for text processing because if they are not made, text coherence is disrupted. In order to understand a text, a reader must identify the relationship between current information and preceding information. Bridging inferences link current propositions with preceding information conveyed by the text, whereas elaborative inferences embellish textual information rather than establish coherence. In sum, the bridging-elaborative distinction allows



for a distinction between the contribution the inference makes to the *coherence* of text representation as opposed to the *elaborateness* of the representation.

The distinction between bridging and elaborative inferences has led to two opposing positions in the research camp - the minimalist view of inferencing on the one hand, and the more generous view on the other. Because inferences take up processing resources, some researchers argue that few inferences are made due to cognitive economy. This is the minimalist position as proposed by Ratcliff & McKoon (1992), as well as Perfetti (1993). Basically, this model predicts that inferences that contribute to the coherence of the representation will be made on-line, and that elaborative inferences are not made on-line during processing text information. Proponents of this view argue that reading is a process in which a balance between costs and benefits is achieved and that readers have a tendency to satisfy themselves with rather shallow reading.

Because bridging inferences are important for establishing text coherence, the hypothesis that bridging inferences are more likely to occur on-line than elaborative inferences is supported by most research findings (Singer 1994:488). Processing demands seem to restrict the amount of elaborative inferences that are drawn during reading. Intuitively, one can predict that there simply is not enough time to draw all probable inferences during reading, and indeed several studies show that elaborative inferences tend not to be drawn during comprehension (cf. Singer 1988:194). In fact, there is research that suggests that readers do not draw forward inferences even about highly probable ideas (Singer & Ferreira 1983). However, there are some studies that show that elaborative inferences are sometimes made. For example, in the case of drawing inferences about implicit plausible instruments, Garrod & Sanford (1982), using a self-paced reading instrument, showed that it took readers no longer to compute [17c] after [17a] than it did to compute it after [17b], despite the assumption that could be made that if the instrument inference is not made on-line, then the processing of the subsequent sentence will take longer.

[17a] Keith took his car to London.

[17b] Keith drove to London.

[17c] His car kept overheating.

However, like the earlier Sanford & Garrod (1981) data, it could be argued that in a modern context, *car* is part of a reader's representation of the verb *drive*. Proponents of the minimalist approach have conceded that forward inferences might be made, if the necessary background knowledge is available. As will be discussed in §3.4, there are factors such as reading/task purpose, background knowledge, and others that have an effect on the amount and kind of inferences generated during text comprehension.

Because most of the research findings indicate that backward rather than forward inferences tend to be made during reading, much of the inference research since the early eighties has concentrated more on backward inferences, on the basis that these are more important in comprehension (Black & Bern 1981). However, although these findings support the minimalist position with regard to the broad *kinds* of inferences most likely to be made, they do not necessarily support the minimalist position with regard to the *amount* of inferences that are made. Furthermore, the minimalist approach does not accommodate the way in which global inferences are made. In their review, Keenan, Potts, Golding & Jennings (1990) conclude that methodological factors such as task or type of measurement yield different results as regards type of inference being drawn in a text.

Proponents of constructionist models of inference generation (e.g. Suh & Trabasso 1993; Graesser, Singer & Trabasso 1994 ) have set up a taxonomy of 13 types of inferences, based on the text functions that these inferences perform, and which the researchers claim typically occur in narrative texts. They have a more extensive taxonomy of inference type and it is therefore not surprising that their model predicts that more inferences are made during reading. The taxonomy is as follows:

1. **Referential:** the inference refers back to an antecedent already introduced into the text.
2. **Causal antecedent:** the inference forms a bridge between the current explicit action/event/state and the preceding text elements.
3. **Causal consequence:** the inference is on a forecasted causal chain.
4. **Instrument:** the inference is an object, part of body, or resource used when an agent executes an intentional action.
5. **Instantiation of noun category:** the inference is a subcategory or a exemplar that instantiates an explicit noun, e.g. *breakfast* leads to the inference eggs and bacon (in English speaking worlds, at least).
6. **Superordinate goal:** the inference is a goal that motivates an agent's action.
7. **Subordinate goal/action:** the inference is a goal/plan/action that specifies how an agent's action is achieved.
8. **State:** the inference is an ongoing state, from the time frame of the text.
9. **Thematic:** the main point or moral of the story.
10. **Emotion of reader:** the inference is the emotion that the reader experiences when reading a text.
11. **Author's intent/attitude:** the inference is the author's intent or attitude in writing a text segment.

Application of this taxonomy to the comprehension of narrative texts indicates that at least five

of these inference types are claimed to occur regularly on-line during the comprehension of narrative texts. They include referential cohesion (anaphor) and the text-semantic relations of causality. These inferences in particular are regarded as being necessary for the construction of a coherent representation of a text. Examples that contribute to the elaborateness of the representation include transitive inference; instantiation of general terms; likely consequence of events ([8] above); and instrument inferences. The above taxonomy has been successfully used in the study of narrative text comprehension, but whether all the categories of inference are equally relevant to expository texts is uncertain. The nature and function of expository texts may require different inference categories that reflect the wide range of text-semantic relations and rhetorical arguments that typically occur in exposition, such as conditional relations, premise-conclusions, and problem-solution arguments.

As is evident from the discussion so far, there are different criteria for classifying types of inferences. These include the kind of information permitted by the text, the function of the inference in the text, and the contribution of the inference to the text representation. The inferences that typically occur depend to a large extent on the text function of the inferences themselves, the characteristics of the text and the reader, and the task requirement/purpose for reading. Some of these factors will be taken up again and discussed briefly in §3.5, while the taxonomy of inferences used in the present study is presented in §3.7.2 at the end of the chapter. In the present study, only backward inferences were tested because they were so prevalent. What is also interesting to note at this point is that, similar to the findings of Graesser, Singer & Trabasso (1994), certain types of inference regularly occurred. Although the specific pattern of frequency of inference types was not the same in the two studies, it may be that different text genres prompt different types of inference. For example, referential inferences and inferences relating to contrastive arguments abounded in the social/human science expository texts used in the present study.

As became clear from the preceding discussion, the question as to what types of inferences readers typically make is also intimately tied to the question of when inferences are made. This is an issue that is briefly explored below.

### 3.3 When are inferences drawn?

This question, which has occupied much of inference research, involves the controversy around on-line and off-line inferences. **On-line inferences** are those that occur during the comprehension process; they are usually generated quickly and automatically - within 650ms according to estimates by Kintsch (1988) and McKoon & Ratcliff (1992.) Some inferences also require more

time and effort and are measured in seconds rather than milliseconds (Graesser & Kreuz 1993:155). **Off-line inferences** are those that are generated later, but not during text comprehension, usually in response to a specific task, or during a retrieval task. The question as to when inferences are made is also referred to as the locus of inference and the on-line/off-line distinction is also referred to as inference-on-input and inference-at-retrieval respectively. On-line measurements include recording comprehension times, eye movements and think aloud protocols. Off-line measurements include answering text questions, verification tasks, free or cued recall and recognition tasks.

The question as to when inferences occur is regarded as an important one from a theoretical point of view, for answers to it can give researchers an indication of the inferences that are typically drawn by readers. If researchers can get a clearer idea of inferences generated on-line, then they can also come closer to answering questions about the constraints on inference generation. However, there are no easy answers to this question, for whether an inference is generated on-line or off-line is dependent on several variables, such as background knowledge, task requirements, text genre, reader characteristics, and so on.

One view, that only a few inferences are drawn on-line during text comprehension, is that shared by Kintsch & Van Dijk (1978). Their model assumes that successive sentences in a text are transformed into propositions which go, cycle by cycle, into working memory, which acts as a buffer zone for connecting propositions to one another and to propositions from the preceding text. A limited number of preceding propositions are stored in working memory and carried over from cycle to cycle, where they serve as points of contact for new, incoming propositions. Processing is assumed to proceed fluidly if new propositions are easily and quickly connected to those already in the memory buffer. If no points of contact exist in the buffer, then the long-term memory search is activated, which increases the processing time. Processing time increases even more if no reference points exist in long-term memory, because in such cases new propositions have to be created to make the needed connections between new propositions and those generated from the preceding text. One implication of this model is that a minimal number of inferences is made to create a coherent mental text representation - inferences only occur when a proposition cannot be connected to a previous one. If a new proposition can be connected directly to a previous one, then no inference is created. This model assumes that only local connections will be made (Graesser, Trabasso & Singer 1994).

However, not all findings support the minimalist position, and differences in obtained data and interpretation of such data may stem from methodological factors. For example, one particular determining factor in inference generation is the length of text used in research. Much of the inference research, especially during the late 1970s and early 1980s, relied on short texts

consisting of two or three sentences, or on short narratives. Researchers working within the constructionist framework of inference generation and who derive their data from more extended texts in narrative comprehension argue against a shallow reading view (e.g. Graesser & Clark 1985; Suh & Trabasso 1993; Graesser, Singer & Trabasso 1994). On the basis of more extended data, their findings suggest that readers generate more inferences than predicted by the minimalist position. These researchers suggest that the minimalist view arises partially from the shorter, more decontextualised nature of the texts used in the inference research of McKoon and Ratcliff (1992).

The research into on-line inferencing involves the use of texts that are typically read once-off by the subjects, since the objective is to determine what inferences are *typically* drawn during the reading process. However, doing on-line research on expository texts is not necessarily useful, for the following reason: because expository texts are sources of information and learning, they are generally read more than once, and each successive reading may elicit the making of further inferences that were not drawn on a previous reading. Since expository texts constitute the research material in the present study, the on-line/off-line distinction was not of critical concern here. Instead, an inference-on-retrieval approach was adopted whereby a category of inferences formulated within a text-analytic framework was established beforehand, texts were selected, instances of these inferences were identified in the texts prior to testing, and then subjects were tested by various question-and-answer methods to determine whether they were generating specific inferences. Time constraints were not an issue during the data collection sessions, and students were allowed to read the texts as often as they chose. For the purposes of this study, then, with its emphasis on what happens in the learning context, the important concern was not *when* the student was making the inference but *if* the student made the inference at all when the task required it. The primary concern in this study is whether students make inferences which are deemed important for the construction of a coherent representation of a given expository text, irrespective of whether they make the inference on- or off-line.

Before turning to the methodological issues concerning inference detection, let us briefly consider the fourth question that deals with the factors that promote and constrain inference generation.

### **3.4 How are inferences drawn and constrained?**

Closely aligned to the question of when inferences are made is another that concerns the constraints imposed on the making of inferences. Inferences are believed to use up valuable cognitive resources and their generation is therefore not unconstrained. A text can potentially induce any number of inferences of varying degrees of plausibility and complexity, but this could

lead to an inference explosion, so there must be constraints on the making of inferences. Are some inferences selected over others, and if so, which ones and why? How are inferences controlled to allow for coherent understanding of the text without minimalist processing of the text? The properties of human cognition impose constraints on inference generation. For example, there are inherent capacity limitations as well as individual differences in short-term memory, working memory and attentional aspects of language processing. Properties of the text can also impose constraints on inference generation. Furthermore, in studies of inferencing in an L2, language proficiency is also an important variable, since the level of L2 proficiency can constrain the amount and kind of inferential activity that occurs during the reading of texts in an L2.

Garrod & Sanford (1990:484) point out that the comprehension of a text is a process in which textual constraints (the explicit information in the sentences) have to be reconciled with attentional constraints in the reader and with the knowledge that the reader brings to the reading process. Perfetti suggests that inferences are restricted in part because unlike syntactic processes, which operate in response to simple memory symbols, inferences "depend on complex compositional representations that might not always be available" (Perfetti 1993:181). Graesser & Clark (1985), on the other hand, suggest that if a reader has rich and automatised knowledge structures, then many inferences may be generated during text comprehension. This is due to the fact that when knowledge structures are automatised, many parts of the knowledge structure may be directly accessible, and access and execution may impose few demands on working memory. Consequently, many inferences "may be purchased at little cost to working memory" (Graesser & Clark 1985:2). We shall now briefly consider some of the reader-based and text-based variables that constrain and influence inference processes.

### **3.4.1 Reader-based variables that affect inferencing**

Readers differ in terms of the resources, knowledge and levels of motivation that they bring to the reading process, and these factors affect successful comprehension and thereby also the kinds of inferences that are generated during the reading process.

#### **3.4.1.1 Working memory**

Several researchers have looked to aspects of memory to account for differences in reading comprehension in general, and inference generation in particular. Although this aspect is not dealt with in the current study, a brief outline is provided to situate it within the larger picture of inference research.

Three aspects of memory have been identified, namely short-term memory, working memory and long-term memory. Long-term memory refers to the memory component in which all our knowledge is stored and from which it is accessed. Short-term memory refers basically to a temporary storage facility but does not involve any language processing. Research into differences in short-term memory between good and poor comprehenders is somewhat contradictory and does not reveal any strong tendencies. In many of the studies, poor readers scored as well as good readers on short-term memory measures (cf. Oakhill 1994:833).

Working memory, on the other hand, refers to both storage and processing facilities during text processing. It lasts while reading is in progress. Working memory serves as a “work space for mental computations and the storage of currently active ideas” (Singer 1994:500). It also serves as the domain for coordinating information amongst the different levels of representation. Greater working memory capacity facilitates the generation of both bridging and elaborative inferences. Working memory is usually measured by a reading span task, which “reflects the trade-off between the computational and storage functions of working memory” (Singer 1994:501). Studies into differences in working memory suggest a different profile from that of short term memory, with poor readers having poorer working memory resources than good readers (Daneman 1987, 1991; Oakhill 1994). Daneman & Carpenter (1980) found a relationship between anaphoric resolution and working memory capacity, where the accuracy of pronoun resolution increased with reading span (i.e. working memory) scores. Singer et al. (1992, in Singer 1994:501) had similar results, in that they found that subjects’ accuracy in judging inference test statements that linked nonadjacent ideas increased systematically with greater working memory.

On the whole, it seems that there are differences in working memory between skilled and less skilled readers, and this may account for the fewer inferences that less skilled readers make during text comprehension. According to Daneman (1991:527), it seems that poor readers have difficulties holding information in working memory and this leads to integration and inferential problems, as well as to problems in anomaly detection and co-referentiality.

#### **3.4.1.2 Background knowledge and reader purpose**

It is a well-attested fact that background knowledge affects inference generation. Pragmatic inferences derive from one’s general knowledge of the world, so it stands to reason that a reader who has background knowledge on a particular topic is likely to generate more inferences when reading a text on a familiar topic. Vonk & Noordman (1990), for example, manipulated two factors, viz. reader’s purpose (or task requirement) and reader’s knowledge, to see what effect they had on inference generation. Both their experiments in which purpose was controlled showed significant results, where inferences related to information relevant to task/purpose were made

on-line. The researchers also manipulated the reader's knowledge, to see what effect it had on inference generation. Their experiments revealed that inferences that are related to available knowledge are made on-line. Their conclusion was that the control of inferences is dependent to a large degree on background knowledge as well as the reader's purpose. However, there are also some studies that indicate that background knowledge can sometimes be overwritten by other variables during comprehension. For example, Hammadou (1991) found that L2 learners did not always make more inferences in texts that dealt with familiar topics. The research by Adams, Bell & Perfetti (1995) showed that skilled readers attend to clues in the text that enable them to make inferences and construct a coherent mental representation in the absence of domain-specific knowledge.

### 3.4.1.3 L2 proficiency

In studies of inferencing during the reading of L2 texts, the question of level of L2 proficiency is also an important one. It is assumed that there is an L2 proficiency threshold, below which it is difficult for readers to generate inferences when reading texts in the L2. However, if after studying the L2 for a minimum of 8 years and having it as a medium of instruction, students' L2 proficiency levels still remain low, one needs to ask whether it is difficult for L2 readers to generate inferences when reading texts in the L2 because they have low L2 proficiency levels, or whether the students have low L2 proficiency levels because they have low inferencing levels while processing written language. The relationship between L2 proficiency, inference generation and academic performance is an issue that is examined in the present study, and this relationship is further discussed and explored in Chapters 4, 5 and 6.

### 3.4.2 Text-based factors that affect inferencing

*Content structure*

There are several factors within a text that can affect inference generation in readers. Some of these are briefly examined below.

#### 3.4.2.1 Thematic factors

It is argued (Singer 1994; Suh & Trabasso 1993) that thematic ideas in a text are more likely to generate inferences than secondary or peripheral ideas. The argument is that cognitive resource limitations increase the probability that thematic ideas will become the focus of inference processes because they are retained in working memory longer than non-thematic ones. Thematic/peripheral ideas are determined by their hierarchical level, causal connectivity and causal chain membership in the text structure (Singer 1994:498). As will be seen later in §3.7.1, thematic inferences were included in the taxonomy of inferences used in the present study.



### 3.4.2.2 Distance

Given cognitive resource limitations, it is predicted that successful anaphoric resolution and inference generation depends to a large extent on text distance. The further the antecedent is from the anaphoric item, and the further the one proposition is from another, the less likely it is that the appropriate bridging inferences will be made. As will be seen later in §3.7.1, distance was used in the present study as one of the criteria to distinguish high versus low inferences (i.e. inferences that are 'more' versus 'less' demanding to make in a given context).

### 3.4.2.3 Text affordances

Singer uses this term to refer to the fact that different genres as well as different text macrostructures lend themselves more easily to the generation of certain inferences: "The genre and form of a discourse may promote or 'afford' particular types of processing" (Singer 1994:499). For example, Perrig & Kintsch (1986, in Singer 1994:500) examined the different kinds of inferences that were made by subjects who read texts describing different locations in a fictitious town. One text described a sequence of places along a driving route, a style which was hypothesised to prompt a linear representation model, while the other used compass positions (north, south, etc), a style designed to prompt a spatial representation of the text. The subjects were more accurate verifying inference test statements that were written in the style consistent with the text version that they had read, i.e. linear or spatial representations tended to prompt linear or spatial inferences. Singer (1994) also refers to the 'interestingness' of a text and the effect that the extent to which a text interests a reader and engages his or her attention has on inference generation.

Text genre is also a factor that may vary the amount of inference generation. It has been argued that because narrative texts typically deal with events and situations that fall within the experiential frame of reference of their readers, readers will tend to make inferences more easily in this genre of discourse. It has also been argued that because expository texts contain far more explicit information, one can expect fewer inferences to be generated during their reading (Graesser 1981).

Although the issue of inference constraints was not a central concern in the present study, it was not ignored. In that component of the study that examines anaphor resolution, attention was given to the effects that textual constraints such as distance and semantic overlap between anaphor and antecedent, as well as length of antecedent had on successful anaphor resolution. These issues will be discussed and examined more closely in Chapter 4.

### 3.5 How are inferences detected and studied?

We come now to the last question concerning methods of researching inferences. The domain of research into discourse processing and comprehension is not an easy one because so much of what is being examined happens inside the mind. The researchers Olson, Duffy & Mack (1984:253) make an eloquent plea for the recognition of cognitive processes in understanding language and text processing:

... the analysis of cognitive processes in real time is one of the most methodologically difficult tasks in all of psychology. The events we wish to examine are internal to the mind, with only occasional observable correlates. Further, most cognitive tasks involve a lot of hierarchically interrelated subcomponents, likely operating in parallel ... and yet ... a deep understanding of how to access the readability of text and how to remedy reading difficulties will require the analysis of the process of cognition.

A very practical question that naturally arises in inference research is: how (by what process) can the presence of an inference be detected? Despite their ubiquity, inferences are very complicated, elusive and subtle processes to pin down, measure and analyse, and the field is understandably fraught with methodological problems.

Different methods produce different answers to the thorny question concerning inference detection. The question that has interested researchers right from the beginning is: what kind of inferences are typically drawn during reading? It is difficult to give a clear cut answer to this question for it is unclear whether differences in findings between studies as to when and whether inferences are typically drawn are due to type of inference, task requirement, time of test, inference measure (level to which inference is processed), and so on. Further complicating variables include the materials and analytic units used, since these determine the context in which the inference is drawn. Some studies have used single sentences, or sets of two or three sentences, whereas others have used short paragraphs, text excerpts or short narrative texts.

There are different methods for eliciting or detecting/tracking inferences during the comprehension process, and different times at which inferences are tracked. For example:

- \* during comprehension: this is an on-line measurement, to test whether the inference is typically drawn;
- \* soon after the reading process (immediate recall): this is an off-line measurement;
- \* delayed response: this is an off-line measurement made a long time after the comprehension process (e.g. a few days or weeks later).

The longer the delay between reading and testing, the more likely a subject will rely on inferences to recall and reconstruct a representation of what he or she read in the text.

Measures for studying inferences include reading times, word-naming latencies (i.e. responses), lexical decision latencies, recognition-memory latencies, latencies on the verification of test sentences, and errors on speeded-recognition decisions. Measures of inferences can also be divided into two types - **memory** measures and **activation** measures, as shown in Table 3.1 below. In the former, the subjects' representation of the text is accessed to determine whether the inference is part of the text representation. Tasks used here are cued recall, sentence verification, question answering, and recognition measures. In the latter activation measures, the subjects' text representation is not accessed. Instead, inferences are detected by means of concept priming, i.e. whether a concept is more activated after reading an inference version of a text versus a no inference control version: "The notion is that if an inference has been drawn, then the information will be activated as part of constructing the text's representation" (Keenan et al. 1990:381-382). Tasks used to access priming include **naming** tasks, **lexical decision** tasks, and the **modified Stroop test**. Table 3.1 below shows the different tasks in different inference measures.

TABLE 3.1: INFERENCE MEASURES AND TASKS

<b>Memory measures:</b> text representation is accessed to see whether inferential information is part of text representation	<b>Activation measures:</b> tasks test to see whether an inference concept is primed (more activated after inference version than control version)
cued recall (delayed)	naming tasks
sentence verification	lexical decision tasks
reading times (on-line)	modified Stroop test
question answering	
recognition tasks	
protocol analysis	

Theoretical views of what constitutes an inference determine to a large extent the choice of a memory or activation measure. As was indicated earlier in §3.1. the question is debated as to whether merely activating an inference concept constitutes a legitimate generation of an inference. Researchers who work with memory measures tend to reject the simple activation of an inference concept as a real inference. This debate reveals that there are two dimensions to defining an inference. One dimension concerns the **unit** of inferencing, which ranges from an activated

concept, to a set of concepts constituting a proposition, to a set of propositions constituting a higher order knowledge structure such as a schema. According to Keenan et al. (1990:382), some researchers believe that only the latter two units constitute an inference.

The second dimension in defining an inference concerns the **level to which an inference is processed**, which ranges from simple activation, to selection for maintenance in working memory, to incorporating the inference into the text base, the long-term representation of the text. Researchers who believe that only the latter level counts as an inference prefer memory measures. However, memory tests may be measuring activation instead of just incorporation. Furthermore, memory measures do not distinguish whether the inference occurred on-line or as a result of the test because, whenever the subject is required to go back to the text and process it, another opportunity is given to draw the inference (Keenan et al. 1990:382). Thus, evidence for the inference could be due either to encoding or processing at test time.

Although, with the exception of question answering, none of these measures, illustrated in Table 3.1, were deemed suitable for the purposes of the present study, we shall now take a brief look at each of them in order to sketch a broader picture of the methodological context within which the present study is situated. However, they will not be dealt with in detail. The reasons for this are discussed later, in §3.5.3.

### 3.5.1 Memory measures

Memory tasks measure the products of comprehension, thereby enabling researchers to evaluate the inferences that occurred during the reading process. The rationale underlying this approach is that “if ... an implied text idea has the same status as an explicit idea, then the idea was inferred during comprehension” (Singer 1994:506). However, the problem with this argument is that the text representation may have changed between comprehension and testing time, and the inference may have been made afterwards, cued by the memory task (Keenan et al. 1990:383).

#### 3.5.1.1 Cued recall

This was one of the earliest tasks used to detect elaborative inferences. Subjects read sentences in which some information (such as an instrument) is either implicitly or explicitly stated, e.g.

[18a] The hostess served the soup to her guests.

[18b] The hostess served the soup with a ladle to her guests.

After reading a set of such sentences, the instruments (e.g. *ladle*) are given as cues to recall the

sentences. Paris & Lindauer (1976) found that instruments were effective as retrieval cues in both the implicit and explicit conditions. These results suggested that the instruments must have been inferred during encoding. However, Singer (1978, in Singer 1994) challenged this conclusion by suggesting that the inference was processed during retrieval and not encoding. He provided counterevidence by showing, for example, that *ladle* rather than *spoon* was a more effective cue for a sentence containing *stir the soup*.

Because the cued recall measure tends to be used in delayed recall, it does not distinguish between processes occurring at encoding and those occurring during retrieval. As a result, tasks that employ on-line methods of inference detection that occur during encoding have tended to replace the earlier delayed retrieval tasks (Keenan et al. 1990:383-384).

### 3.5.1.2 Sentence verification

In sentence verification tasks, subjects are given either an explicit or implicit version of a text, e.g.:

- [19a] Implicit: Gas leaked from a butane tank. The explosion levelled a service station and a new home.  
 [19b] Explicit: Gas leaked from a butane tank and caused an explosion. The explosion levelled a service station and a new home. (Keenan & Kintsch 1974)

After reading the text, subjects are asked to respond True or False to a question such as *A gas leak caused the explosion* (which entails a backward inference.) If verification times are just as fast in the control (explicit) as in the inference (implicit) version, then it is concluded that the inference was drawn on-line. This task has also been used for testing forward instrumental inferences, and forward consequences of events (e.g. the earlier broken vase examples in [15] and [16]). However, Keenan et al. (1990) state that the problem with using this task is that evidence for the inference involves accepting the null hypothesis, i.e. that there are no significant differences in verification times between two versions of a text. (Research usually attempts to reject the 'no significant difference' null hypothesis in favour of a research hypothesis that specifies a significant difference between variables.)

### 3.5.1.3 Sentence reading times

Reading time, one of the most frequently used on-line measures, supposedly reflects the time that readers take to make inferences while reading. This measure involves comparing reading times for inference version texts, as in the by now well-known texts [20a], versus the control version [20b]:

[20a] Herb took the picnic supplies from the car. The beer was warm.

[20b] Herb took the beer from the car. The beer was warm.

Longer reading for the second sentence in the inference version [20a] is thought to reflect additional time required to draw an inference. However, the presence of word-based priming in the control version (i.e. the repetition of *beer*) could affect reading times, and hence confound the results. Reading times also seem to work better for backward, bridging inferences than for forward, elaborative inferences.

The problem of confounds between inferencing and word-based priming is not unique to the reading time measure. It applies to all activation measures. Another problem is that increased reading time may not be due to extra time required to compute an inference, but to some other variable, such as ease/difficulty of processing. In other words, a syntactically more complex sentence construction rather than more inferential activity could cause longer reading time. Also, as was pointed out earlier in §3.1, examples such as [20a and 20b] tend to be rather decontextualised samples of text, and this could also create difficulties for the reader. If contexts were provided, as in the previous case of a rugby match scenario versus a Sunday school picnic scenario, one may get different response times.

A more sophisticated refinement of reading time, namely eye fixation, provides on-line measures of both time and location of reading. The interpretation of eye fixation data is based on the assumption that “fixation is maintained on a word as long as the reader continues to process it” (Ehrlich & Rayner 1983, in Singer 1994:506). Eye fixations indicate the regressive searches that readers do to identify information to which the current item must be inferentially linked and seem to be more reliable forms of inference detection.

#### 3.5.1.4 Question-answering tasks

Both on-line and off-line questions are used to tap inferencing. In on-line question tasks, questions are interspersed throughout the text to tap the reader’s developing text representation to see if it contains knowledge about unspecified information such as why events have happened and what is going to happen next (Graesser & Clark 1985; Olson et al. 1984). The advantages of this type of task are that the answers can reveal the content of inferences and the questions can be used at any point in the reading. The drawback is that the inferences may not have been drawn on-line, but as a result of the task. The task may also be invasive, causing inferences to be drawn that would not normally be drawn while reading. The method is therefore deemed to be useful for revealing potential inferences that a reader might draw (Keenan et al. 1990:388).

Off-line questions, that is, those asked after the reading of a text, are also used to see whether readers make inferences between items of information in a given text. These question measures are useful for testing large numbers of subjects and to establish how well a reader has understood implied information in a text, but they are not used when the research aim is to determine on-line inferential activity. The present study makes use mostly of off-line questions to tap the inferences of L2 students. This issue is taken up again later in §3.5.4.

#### **3.5.1.5 Recognition tasks**

In this task, a variation on the cued recall task, the subject has to read either an inference version (*He lit a cigarette*) or a no inference control version (*He lit a cigarette with a match*) and then determine whether a test word (*match*) representing the inference occurred in the text. The argument is that if the inference were made, the concept will have been activated and incorporated into the text representation of the inference version but not the control version. In other words, if the test word did not actually occur in the text, it would be harder to say so because the concept would, as a result of the inference, be part of the text representation (Keenan et al. 1990:388). Again, the problem with this kind of measure is that it is difficult to determine precisely where the inference was drawn, on-line or during the test.

#### **3.5.1.6 Protocol analysis**

Protocol analysis, also known as think-aloud or verbal protocols, consists of subjects thinking aloud about the task they are engaged in. It has been used by various disciplines to examine human thought patterns, problem solving and text comprehension. When used in reading research, subjects read a sentence at a time and then say aloud what they understand by the sentence, what they are thinking about. It has proved to be a useful way of tapping into the thought processes of the reader during the reading process and has been used increasingly in reading comprehension during the past decade. It is especially useful for larger tracts of texts such as short stories or expository texts. However, it has been found to be less successful when used with L2 readers, especially L2 readers with lower levels of L2 proficiency. As will be discussed in Chapter 8 of this study, the method was found to be unsuitable in the case studies in the current study and was abandoned in favour of question probes.

### **3.5.2 Activation measures of inferences**

The rationale underlying activation measures is this: if an inference is made, then the activation level of the inference concept will be raised. If the activation level is raised, then lexical access will be facilitated. Hence any task that involves lexical access of the inference concept can be

used to determine whether the inference has been drawn or not. Let us briefly look at these measures.

In **lexical decision** tests, subjects read an inference version or a control version of a text. They then decide whether a letter string is a word; the strings of interest are those representing the inferences that the reader presumably made during reading (Keenan et al 1990:390).

In **naming tasks**, subjects are presented with either an inference version or a control version of a short text and thereafter the inference word and asked to say it aloud. These naming latencies reflect time for lexical access plus articulation time.

The Stroop task involves naming the colour ink in which a colour word is written. The **modified Stroop test** involves having subjects read a text and then naming the colour ink of a non-colour word. The rationale is that if a test word has been primed by the text, then it takes longer to name the colour ink that the word is written in than if it has not been primed. For example, imagine the word *doctor* is used as a prime in the following texts:

- [21a] The hospital is very busy. It is the festive season again. - doctor  
 [21b] The underground is very busy. It is the festive season again. - doctor

When a reader is asked to name the colour in which the prime *doctor* is written, it takes longer to name the colour ink in [21a] than in [21b]. This is because the word *doctor* has already been primed in [21a], from the reference to *The hospital...* and it is harder to suppress its articulation in favour of articulating the ink colour. In [21b] it is easier to name the colour ink because reference to *The underground* does not prime the word *doctor*.

The problem with the activation measures discussed above is that all these tasks involve not just lexical access but other processes as well. These tasks are also suited to the reading of short texts, such as two- or three-sentence texts only. They are not appropriate for the reading of longer texts, such as occur in natural reading situations, and as a result they have not been used much latterly in constructivist approaches to reading, where the interest is on how readers construct a coherent representation of a text. They are also not suited to testing inferences in large numbers of subjects.

### 3.5.3. Comments on above inference methods for present study

In their evaluation of the different methods used for detecting inferences Keenan et al. (1990) point out that all the tasks have their advantages and disadvantages and there is obviously a trade-



off between different methods. Some problems are not easily resolved while others are more tractable. In order to build up a composite profile of inference generation amongst subjects, researchers are advised to use more than one measure to detect and analyse inferences, and to try to avoid the confounding variables of past studies. The aims of a particular research study also obviously influence choice of methods. For example, in studies that feed directly into theory building, methodological issues relating to tasks that fail to distinguish between on-line and off-line inferences become important. Most of the above methods are used by researchers who are interested in theoretical issues related to what typically happens during reading by skilled, L1 readers, and the focus is usually on on-line inferences during a single reading of a text, usually short sets of sentences or narrative texts. There is also the question of availability of resources and cost of research methods. For example, computerised methods of research involving reading speed, timed responses and eye tracking movement, although efficacious, are costly and time consuming in that they require the requisite soft-ware and access to computers, and students can only be tested on a one-by-one reader-computer basis. Access to such research resources was not feasible for the purposes of the present study.

Due to the specific demands of this particular study, viz. testing inference generation in extended expository texts that are read more than once, and testing large groups of L2 students, many of the methods discussed above were deemed inappropriate for the present study. Because the focus in this study is on L2 readers, many of whom are not skilled readers, and on expository texts where reading is done for learning purposes and which therefore involves repeated reading of the same text, the on-line/off-line distinction with regard to inferential activity was not important. Instead, what was sought was a way of testing inferential activity in different ways and on different occasions, using authentic stretches of expository texts taken from existing textbooks used by undergraduate students, in order to build up a profile of a student's tendency to perform text-connecting tasks by making inferences about the information in the texts. As pointed out earlier in §3.3, what was of critical concern was not *when* students made inferences but *whether* they made them at all in response to task demands.

To avoid confounds with memory variables or with rate of reading to complete a text, test methods were needed that would not impose time constraints and which would allow students access to the texts at all times, so that even if they did not make an inference on a first reading, they could access the text for relevant information in response to the task demands, as often happens in the learning context. For the quantitative aspect of the study, research methods that made it possible for a single researcher to test large numbers of students at the same time were also required. The off-line question-answering tasks were deemed most suitable for this aspect of the study, while question-answering tasks were selected for the qualitative aspect of the study. However, because most of the methods used in inference research in particular were found to be

unsuited to the present aims, research methods used in text comprehension in general were also examined to see whether there were any feasible methods that could be adapted to inference research.

### 3.5.4 Methods for testing reading comprehension

In his discussion of methodological issues in testing comprehension, Pagé (1990) identifies two major aspects of text comprehension, namely methods that tap overall comprehension on the one hand, and those that tap comprehension of aspects or elements that make up the overall comprehension on the other hand. In other words, the former testing methods address the unified representation of the full set of textual information, while the latter address comprehension of aspects of the full representation. Table 3.2 below summarises the different methods used in each of these two aspects, and a brief discussion of each method is sketched afterwards.

**TABLE 3.2. TAXONOMY OF METHODS FOR TESTING COMPREHENSION**

<b>METHODS FOR TESTING COMPREHENSION</b>	
<b>I</b>	<b>II</b>
<b>Testing unified representation of the full set of text information</b>	<b>Testing comprehension of <u>elements</u> within a unified representation</b>
1. Conceptual puzzles	5. Testing comprehension of relations within sentences
2. Summarization tasks	6. Testing comprehension of relations between elements in adjacent sentences
3. Rearranging sentences/paragraphs	7. Testing comprehension of relations between elements in remote sentences
4. Sentence reinsertion tasks	8. Testing comprehension of hierarchical relations between details and macro information
	9. Testing comprehension of relations between superordinate elements of information

#### 3.5.4.1 Testing the unified representation of the full set of text information

In all, Pagé (1990) identifies four methods used in testing this aspect of comprehension.

The use of **conceptual puzzles** involves presenting the reader with a pack of cards containing all

the concepts dealt with in the given text, as well as a second pack of cards containing symbols indicating a relation between concepts (e.g. equivalence, class inclusion, example, causality, etc). The reader is then given the packs of cards and asked to display the cards in such a way that it represents the structure of his or her representation of the information in the text that has just been read. Pagé (1990:117) claims that this interesting and somewhat unusual method “gives the best access to the representation that the reader has constructed while reading”, but concedes that the method can only be used on a one-to-one basis between subject and researcher, requires that the subject first be trained thoroughly in the use of the cards, and can only be used with highly educated readers. It is probably also only efficacious when used with texts that are not too long.

The second method, **summarisation**, requires understanding of the macro statements of a text and the ability to represent these macro ideas into a coherent summary of the text as a whole. Given that summaries omit detailed information in the text, they provide good measures of the understanding of macro statements, but they do not test the reader’s understanding of the relations between specific elements within a text. Furthermore, because students are seldom properly trained in summarisation techniques, their performance in summary tasks may reflect poor mastery of summarisation skills rather than poor comprehension abilities. Pagé (1990:118) thus argues that this method is better suited for comprehension instructional purposes rather than for comprehension research purposes.

In **rearrangement** tasks, the subjects are given texts in which the order of sentences or paragraphs have been shuffled. The subjects then have to rearrange the sentences/paragraphs so as to reconstruct a coherent representation of the overall meaning of the text as a whole. This method is only suited to certain types of texts that lend themselves to a specific sequence, such as narrative or procedural texts. Texts that have a problem-solution structure are also suited to this task. Pagé (1990:118) claims that this method has high psychometric value.

The fourth method, that of **sentence reinsertion**, requires the subject, after reading a text, to insert an omitted sentence into the text in an appropriate place. The successful completion of such a task requires a good understanding of the gist of the passage and the relation of the omitted sentence to the text as a whole. The method can also be used with longer texts, where entire paragraphs have to be inserted. Pagé (1990:119) claims that this method has “a very high discriminate power” in testing comprehension.

#### **3.5.4.2 Testing comprehension of elements within a unified representation**

Testing a reader’s understanding of the relationships between different elements in a text can be done by means of different types of questions aimed at uncovering understanding at different

levels of text comprehension. The first three methods test relations between more detailed elements of information, while the last two methods test relations at a higher level.

The fifth measure, **testing relations between elements within a sentence**, involves testing relations between syntactic features of sentences, e.g. case relations such as the agent of an action. This is often referred to as the micro level of text comprehension. Because it only tests micro level relations, this method needs to be complemented by other methods. Pagé (1990:120) claims that questions pitched at this level are often too easy and therefore do not reliably reflect text comprehension.

The sixth method involving testing the comprehension of **relations between elements in adjacent sentences**, also referred to as local links (e.g. van den Broek 1988), focuses on the readers' understanding of cohesive devices such as referential continuity or thematic overlapping, and the progression of arguments marked by conjunctives such as *however, therefore*, etc. Pagé (1990:122) argues that questions that are formulated clearly and precisely to tap into these aspects of comprehension have high psychometric value.

The seventh method, that of testing comprehension of **relations between elements in remote sentences**, also referred to as global links (e.g. van den Broek 1988), involves semantic or logical relations which are not always signalled explicitly in a text, and they consequently need to be inferred by the reader (e.g. whole-part, causal relations and problem-solution relations, etc.). It is argued (e.g. Palinscar & Brown 1984) that the ability to establish these kinds of relations are "one of the most important features of the ability to comprehend texts as a network of information" (Pagé 1990:123). Here too, Pagé claims that the psychometric features of these kinds of questions "indicate that they are very good test items" (1990:124).

The eighth method, that of testing comprehension of **hierarchical relations between detailed information and macro information**, involves subsumption of detailed information into macro-concepts. The latter concepts are sometimes explicitly stated in a 'main idea' sentence in a paragraph, or in a heading/subheading within a section of text. If not explicitly stated, then readers have to infer the relationship between detailed and macro-level information. Understanding the hierarchical relations between elements of information is a necessary part of constructing a unified network of concepts during text comprehension. Pagé (1990:125) claims that these kinds of questions are easy to formulate and have been found to have high psychometric value.

The ninth method, that of testing comprehension of **relations between superordinate elements of information**, involves questions that test the ability of the reader to comprehend relations

between different parts of a text at a superordinate level (i.e. relations macro-elements in a text).

Pagé's taxonomy of comprehension testing methods reflects a synthesis of both psycholinguistic/cognitive views of text processing as well as text linguistic views of text coherence and ways in which information is organised and interrelated in coherent texts. The use of all the above methods of testing text comprehension are initially time consuming in that careful analysis of the texts is required beforehand in terms of identifying the relevant structures and relations. Questions must also be carefully formulated so as to be clear and unambiguous. However, the time and effort expended on the initial analyses are counterbalanced by the following advantages:

- \* the tests can be administered to large groups of students at a time;
- \* the responses can be analysed and marked relatively objectively and quite quickly;
- \* memory tasks are avoided that can negatively affect test performance, especially when tests are administered in the L2 (Pagé 1990:127).

In the present study, the question-answer method of testing inference was largely used in the quantitative aspect of the research because it is economical, practical, has solid psychometric value and is well suited to the specific needs of the study. The qualitative aspect of the study included mainly question-probes. Pagé's (1990) taxonomy of comprehension testing methods, outlined above, provided the framework for designing question-answering methods of inference detection, with different questions focussing on different aspects of text comprehension, and with different types of question techniques (e.g. multiple choice, fill-in answers, True/False answers, etc) providing variety to the question-answering method. Sentence rearrangement and insertion tasks were devised (methods 3 and 4), as were test items that tested relations between local, global, macro and superordinate elements of text information (methods 6-9). Various tasks that tapped, in particular, inferential processes relating to the following types of text-semantic relations were designed:

- \* inferring thematic relations (main ideas);
- \* inferring whole-part relations;
- \* inferring exemplification relations;
- \* inferring causal (antecedent-consequent) relations;
- \* inferring contrastive relations;
- \* inferring premise-conclusion relations.

Because the study comprises different aspects of inferencing skills, each of which are discussed in separate chapters, more detailed descriptions of the methods and the theoretical and

methodological rationales underlying the choice of methods, will be provided in the relevant chapters, namely Chapters 4-7.

Having so far provided a largely theoretical and methodological overview of the nature and role of inferential processes during text comprehension, we turn now to more research and applicational issues that relate to differences in inferential activity between skilled and less skilled readers.

### 3.7 Inference development and application issues

Because inferential activity is such an integral part of human cognition and reasoning, inferential skills are a form of reasoning that develops early in a child's life and becomes integrated into the development of oral language use and comprehension. Yet the application of inferential skills to the processing of written texts does not seem to happen with equal ease for all readers. Research studies reveal interesting patterns of inferencing behaviour in this regard.

There are a few researchers who have looked at logical inferences that occur during reading comprehension. Research suggests that some forms of deductive inferencing develop early, especially class inclusion and conditional inferences, from natural contexts such as conversations between adults and children (e.g. *If you eat your carrots, you can have some ice cream*) (Scholnick & Wing 1991). More complex forms of deductive inferencing, such as distinguishing between valid and invalid arguments, develop later, from adolescence onwards. Although typically associated with exercises in formal logic, deductive inferences also play a role in the comprehension of both narrative and expository texts. For example, in their research, Franks et al. (1997) found several examples of deductive inferencing in children's basal reader series, especially Modus Ponens (*If p then q; p, therefore q*). The researchers suggest that basal readers provide several opportunities for children to make logically necessary conclusions about what they read, or to observe such reasoning in texts that they read: "reading is a natural context that may help children construct their understanding of logical relationships" (Franks et al. 1997:304). In my research into causal relations across science, history and narrative texts at Grade 5 level, conditional arguments (*if p, then q* and its more common equivalent *when p, q*) occurred most frequently in the science texts (42,9%), with a gradual decline of occurrence in the history and narrative texts respectively (30,2% and 26,8%) (Pretorius 1993:120). If these kinds of inferencing examples occur so often in science expository texts, it stands to reason that students who are exposed to this kind of print information will have greater opportunities to acquire skill in deductive inferencing. In her research, Franks (1996, in Franks et al.1997:305) found a relationship between reading ability in general and the ability to make logical inferences.

Oakhill (1984) tested skilled and less skilled children on literal and inferential questions on four passages that the children read aloud individually, with help with decoding if needed. After reading the texts the children were asked literal and inferential questions (the unseen condition), and then, in order to eliminate memory effects, after completing the questions the children were allowed to refer back to the texts to check their answers (the seen condition). The findings showed that the skilled readers were better overall at answering questions in the unseen condition than the unskilled readers, and also better at answering inferential questions in the seen condition. The findings also showed that overall, the literal questions were in general easier to answer than the inferential questions. However, what was interesting was that the less skilled readers had difficulty answering inferential questions in both the unseen condition (45.8% errors as opposed to 15.6% in the skilled readers) as well as the seen condition (35.4% errors as opposed to 9.9% in the skilled readers). In other words, they had difficulty generating inferences even when they had access to the texts.

That poor readers have problems making inferences and make fewer inferences than good readers is supported by other research too (Oakhill 1982; Mason & Miller 1983; Oakhill and Yuill 1986; Oakhill 1994). For example, Daneman & Carpenter (1980) and Oakhill (1982) found that poor readers had problems inferring cohesive devices, while Oakhill (1983) found similar differences relating to inferences about the meanings of particular words. Sternberg & Powell (1983) found that the ability of high school students to infer the meaning of unfamiliar words from context correlated very strongly with reading comprehension (in Daneman 1991:525). Yuill & Oakhill (1991) found that good readers inferred the main points in a text 79% of the time, while poor readers were only successful at making main idea inferences 46% of the time. Differences in background knowledge between skilled and unskilled readers cannot account for the difficulties that poor readers have with inferences, because even in studies where background knowledge was controlled and the poor readers had the relevant knowledge available to them, they had difficulty making inferences (Cain 1994, in Oakhill & Yuill 1996:73). This phenomenon is examined in the current study, particularly in Chapters 5 and 8, and referred to again in the final chapter.

Several researchers have found both quantitative and qualitative differences in the inferential processing of skilled and less skilled readers. Tierney, Bridge & Cera (1978-1979, in Holmes 1987:14) found that although good and poor readers produced similar proportions of inferences during free recall tasks after reading texts, their inferences differed qualitatively. Wilson (1979) found that good readers showed logical, deductive type of inferencing based on information in the given texts, while less skilled readers tended to give less logical, more intuitive responses. Similar results were obtained by Holmes (1987) who compared Grade 5 and 6 skilled and less skilled readers' ability to make inferences in three different conditions, namely pictures, text with pictures, and text alone. In the text only condition, the less skilled readers "not only provided

fewer clues but also gave less specific and relevant ones than did the more skilled readers” (1987:17). In addition, many of the less skilled readers also gave no responses to inferential questions. Holmes suggests possible explanations for this: poor readers are more likely to skip information in text that they do not understand; due to the time and effort involved in making links in the text, they are also less likely to search back in the text for relevant clues (Holmes 1987:17).

In her comprehensive study, McCormick (1992) examined the incidence, distribution and types of errors in inferencing amongst poor readers (10-11 year-olds) in both narrative and expository texts. All the children performed significantly better on the literal questions than the inferential questions in both text genres. Of greater interest, though, is her analysis of the different types of erroneous responses to inference questions. Four main causes of inference errors were identified across both text genres. Firstly, the students showed too heavy reliance on prior knowledge and paid too little attention to the information given in the texts. The students tended to produce incorrect answers “resulting from substantial or complete dismissal of text information in favor of prior knowledge, interpreting text content to conform to prior knowledge, or giving an opinion rather than generating an inference” (McCormick 1992:73). This is similar to Wilson’s (1979) earlier finding that poor readers made ‘intuitive’ rather than logical inferences and ignored the writer’s message in narrative texts. The second category of inferencing error was that poor readers gave incomplete answers to inferential questions. The third category of inferencing error was that poor readers generated inferences “from insignificant text-explicit statements unrelated to major points implied by the author in relation to the question asked” (McCormick 1992:74). This happened regularly in both narrative and expository texts. Finally, the fourth major source of erroneous inferencing involved answers that were too specific in relation to inferential questions requiring more global constructs. This type of erroneous inference occurred twice as often in the expository texts as the narrative texts, and McCormick suggests that this type of error results from insufficient selection of background information provided in the text and from students’ “lack of experience in combining all pertinent information to form generalizations” (1992:74).

The finding that skilled readers are better at making inferences during reading than less skilled readers naturally raises an important question: does this pattern arise because less skilled readers are not good at inferencing in general, or is it because they are not good at making inferences during the reading process in particular? In other words, do poor readers’ difficulty with inferencing reflect a global reasoning problem or a more specific text-processing problem? Several research findings point to the latter option.

Hansen & Pearson (1983:821) comment that while inferencing is a regular part of children’s non-school lives, many children seem to have problems inferring during their in-school lives,



particularly during text comprehension. Holmes (1987) focussed on this very problem in her comparison of Grade 5 and 6 skilled and less skilled readers' inferencing ability in comprehending pictures, text with pictures and text alone. Results indicated that while there were no differences in inferential performance in the two ability groups in the picture and the text and picture conditions, the skilled readers outperformed the less skilled readers in inference performance in the print only condition. The less skilled readers also made many more inferential errors in the print condition although such differences did not emerge when they made inferences in the picture and text and picture conditions. Results such as these indicate that low inferential activity during reading is not due to a global reasoning problem, but due to a more specific problem with identifying relevant clues in texts as a basis for inferencing.

Differential inferential performance between good and poor readers has also been attributed to differences in classroom practices and teacher responses to different ability groups. Hansen & Pearson (1983) suggest that one reason why children in general find literal questions easier than inferential ones may be partly due to the fact that inferencing activities are seldom part of classroom instruction; literal questions are asked far more frequently than inferential questions in most classrooms worldwide, and children are often expected to learn new information simply by remembering it. Getting children to draw explicit links between what they read on the one hand, and the real world and the experiences of the children on the other hand, is a rare occurrence in many classrooms. It has also been observed that teachers respond to and instruct good and poor readers differently. In the primary school, teachers tend to concentrate on improving the decoding skills of poor readers so they get less instruction in reading comprehension strategies and even less instruction on inferential thinking than good readers (Hansen & Pearson 1983).

Several studies (Hansen 1981; Hansen & Pearson; Dewitz, Carr & Patberg 1987; Winne et al. 1993) have undertaken research to determine whether the introduction of inferential activity in classroom instruction improves children's comprehension skills in general and inferencing skills in particular, and whether such instruction narrows the gap between their literal and inferential performance during reading. Hansen (1981) worked with Grade 2 average readers, using two different treatments. In the one group children were trained to use inferential strategies when reading, while in the other group the children read texts and only practised answering inferential questions. Hansen found that both treatments were effective; in both groups the children's ability to answer inferential questions improved in comparison to the control group, and interestingly, so did their ability to answer literal questions. Hansen & Pearson (1983) did similar research with older children in Grade 4, and compared the effect of inferential instruction (combining inferential thinking strategies with inferential questions) on good and poor readers. Their results showed that the poor readers benefitted significantly from instruction while the good readers showed no greater improvement. One possible reason for the good readers not improving is that

the texts that were used may have been too easy for them. The good Grade 4 readers were reading at Grade 6 level, while Grade 4 level texts were used in the treatment and control groups for good readers. The authors speculate that the texts did not challenge the readers and that “reading too easy texts limits the thinking potential of good readers” (Hansen & Pearson 1983:828). The authors conclude that instruction in inferential comprehension is beneficial, especially for poor and intermediate readers.

Dewitz et al. (1987) look at the differential effects on inferential comprehension of four treatment groups of Grade 5 children: a group that received training in the structured overview (attention was focussed on overall organisation and the interrelationship of information); a group that received training in a cloze procedure (attention was focussed on textual information and the utilisation of textual clues to fill in the gaps); a group that received a combination of the two treatments; and a control group. All the groups were also tested for metacognitive awareness on the pre- and posttests, and given metacognitive training. The results showed that the group that received instruction in the cloze procedure (alone and in combination with the other strategy) significantly outperformed the other groups in both literal and inferential comprehension, and also showed an increase in metacognitive awareness. The authors suggest that the cloze strategy caused the students to focus attention on the text and to search for clues in the passages in order to answer questions. The authors conclude that children can be trained to improve their inferential comprehension and to apply these skills to unfamiliar texts. However, Dewitz et al. (1987:116) caution that “the comprehension effects only emerged after considerable training” (six weeks of instruction). On the basis of her analysis of inferencing errors, McCormick (1992) also advises that explicit inference instruction be given to students, especially less skilled readers. She suggests that attention should especially be given to helping students attend to information provided in the text, identify main ideas, and showing them how to combine specific information so as to be able to make inclusive generalisations.

There is further support for this position from the study by Winne et al. (1993). In their study, Winne et al. (1993) showed that Grade 3-5 low-achieving children could improve their inferential skills when provided with instruction that focussed on an inferential pattern-detecting procedure. The children were taught to identify a problem statement and a rule relating to the problem, and then to identify and apply a critical fact and fit it to the rule in order to solve the problem. The children were then randomly assigned to two treatment groups: in the one group, the children got inductive feedback on their answers, while in the other group they got explicit feedback. In both treatments, children were constantly encouraged and praised for their efforts. The findings showed that although the inferential skills of both groups improved, the group who received the explicit feedback made the most gains. An examination of the students’ inability to draw correct inferences showed that this invariably happened when the readers failed to identify or recall

information from the text (e.g. a rule and/or a critical fact) that served as input to processing an inference. The researchers argue that poor readers are not necessarily poor reasoners, but that their inferential reasoning is impaired when they fail to attend to clues provided in a text. They agree with McCormick (1992) that instruction that emphasises the utilization of background knowledge during reading may be counterproductive with poor readers, who tend to give intuitive answers rather than focussed answers. Instead, they strongly advocate “teaching low-achieving readers to discriminate and use text clues that aid inferencing” (Winne et al. 1993:64).

To summarise the main points that have emerged from the discussion in this section: research shows clear differences between skilled and unskilled readers in terms of their inferential processes. Due to the fewer inferences that they generate, less skilled readers have problems constructing coherent representations of the texts they read. It appears that less skilled readers do not have an inferential reasoning problem when processing information in general; rather, they have problems generating inferences when they process written information. Finally, research indicates that instructional intervention can help less skilled readers engage in greater inferential generation during reading.

### **3.7 Inferencing within an interactive-constructionist theory of reading**

Having looked at the five questions posed at the beginning of the chapter, and having discussed some aspects of inference generation during reading, it is appropriate to tie together some of the strands that have been braided into the discussion so far, and to synthesise the perceived role of inferencing in text comprehension.

One of the fundamental problems in psycholinguistics has been to explain what happens when we understand discourse. The problem of accounting for discourse comprehension must be couched in terms of understanding sentences in relation to adjacent sentences and to the broader discourse context in which they occur. Garrod & Sanford (1994:675) argue for “the characterization of sentence resolution as a process which anchors the interpretation of the sentence to the representation of the prior text”. Processes that anchor the interpretation of sentences to prior discourse representations involve, amongst others, referential links, logical and thematic links between the events and states depicted in the sentences of the text.

As was pointed out in Chapters 1 and 2, current theories view reading as a complex, multi-componential phenomenon that includes the rapid and simultaneous interaction of numerous bottom-up and top-down processes. The conventionalised form or structure of texts also affects the processing of texts. Understanding a text means building up a mental representation of what

the text is about. This entails resolving successive sentences in relation to the current representation of the text. This representation is dynamic during the reading process for each successive sentence modifies, extends, consolidates or challenges the text representation built up so far. The different levels of processing are thought to leave memory traces which become part of the mental representation: "The resulting ensemble of traces makes up the mental representation of the contents processed" (Rickheit et al. 1985:12).

It is generally agreed within the interactive-constructionist framework of reading that this mental text representation is constructed on the basis of information that is explicitly stated in the text as well as information that is inferred from previously encountered elements in the text or from background knowledge that the reader brings to the reading process. Both explicitly conveyed as well as inferred information are integrated and become part of the mental representation of a text. Suh & Trabasso (1993:279) suggest that the integration of information "is achieved primarily by the reader's linking of clauses or propositions through activation of relevant knowledge and inferences". This "relevant knowledge" refers to linguistic, textual or general background knowledge stored in long term memory. The linking of clauses or propositions in the text can be achieved by making a variety of inferences such as lexical, anaphoric, spatial, temporal, thematic, causal, and so on (Trabasso & Suh 1993:4). There is a bi-directional relationship between inferences and mental text representations in that inferences can affect the mental representation that is being created, but at the same time the mental representation already created can affect the generation of further inferences. "On the one hand, the formation of inferences is influenced by the mental representation already built up. On the other hand, the emerging mental representation is partly the result of the inferences which have already been drawn" (Rickheit et al. 1985:13).

As can be seen from the issues raised by the above questions, although the past twenty years have yielded a lot of research into inferences, researchers are by no means unanimous in their assessment of the role that inferences play during reading. Although the importance of inferencing in comprehension is not in dispute, the extent to which they occur is disputed, especially if primary consideration is given to on-line inferencing only. For example, Perfetti (1993) has a rather pessimistic view of the role that inferences play during reading. He argues that the evidence supporting the view of on-line goal-directed inferences is not yet substantial enough and is also open to other interpretations. He favours the minimalist position of McKoon & Ratcliff (1992) that readers make only those inferences necessary for local coherence. Alternate views are that readers make global inferences when the text is locally incoherent, or that readers make global inferences even if the text is locally coherent. The latter views tend to ascribe a far greater role to inferencing than the minimalist position allows (Suh & Trabasso 1993; Graesser, Singer & Trabasso 1994).

One fact that emerges very strongly from the complex and conflicting evidence is that inference generation is affected by several variables, such as the nature of the inferences themselves, characteristics of the text, the tasks used to trace inferences, the knowledge of the reader, reader's level of motivation and interest in the text and the topic, the purposes for reading a particular text, and the reading time available. For example, readers are likely to generate fewer inferences when skimming or reading aimlessly. Furthermore, some researchers suggest that there seems to be a continuum of inference activation, which can be attributed to fluctuations in the above variables. It is also possible that an inference is generated to some degree rather than in an all-or-none manner (Graesser & Kreuz 1993:156).

For the purposes of the present inquiry, where the focus is on inferences made in the context of reading for learning, and where the inferences do not necessarily rely on prior knowledge of the topic dealt with in the given texts, the following features together characterise the notion of a text-based inference, as used in the present study:

- \* the making of an inference is a cognitive process used to construct meaning in the context of expository text;
- \* the inferential activity consists of linking up information across text units, locally or globally, or of filling in gaps between text units;
- \* the inferential activity is a form of textual "reasoning" (Ripps 1988) involving the making of both logical and probable links;
- \* this meaning construction process would result in new information, not explicitly stated in the text, being added to the reader's mental representation of the text;
- \* particular information in the text provides grounds for inducing the logical or probable link;
- \* because inferences involve greater or lesser effort, depending on factors such as complexity of conceptual contents of text, semantic opaqueness of links and distance between units being linked up, inferences can be conceived of as occurring on a continuum, with low level inferences at one end and high level inferences at the other end. The notion of a continuum will be further explained in Chapters 4 and 7.

An important question when studying reading in the learning context is: how do readers build coherent representations of their texts so that they can understand them, learn from them and thereby add new information to or modify existing knowledge bases? Expository texts are read for instructional and learning purposes and are often read repeatedly. They deal with topics about which readers initially often have very little background knowledge. The reader reads and re-reads the text in order to learn something about the topic. Expository texts tend to deal with complex subject matter and are thematically dense and conceptually complex. Besides the usual

bridging inferences that need to be made during text processing, there are many interrelations between ideas in expository texts that are implicit. Constructing a coherent mental representation of an expository text therefore also requires the making of inferences. Because such texts are read repeatedly, the question of when inferences are generated is not critical. What is critical is whether the reader manages to generate text-based inferences that contribute to the construction of a coherent or unified network of information in memory during the comprehension process.

Why are text-based inferences important in the learning context? The hypothesis underlying this study is that text-based inferences to a large extent help to drive the reading comprehension process in the learning context, where conceptually dense expository texts have to be read and understood. Students who are better at making text-based inferences will also tend to do better in the learning context; because they attend to cues in the text from which to make inferences, they are better able to construct more coherent mental representations of the text during the reading process.

An examination of inferential ability during reading and its effects on text comprehension and, ultimately, on academic performance naturally brings one to the question of eliciting data to assess such ability. The issue of testing reading ability and inferential ability during reading is dealt with below.

### 3.7.1 Standardised reading tests

Testing reading ability is not an unproblematic area. Much has been written on this subject in the past century and numerous reading tests have been designed, some very well and some not so well. A good reading test should comprise minimally, a test of both decoding and comprehension ability. There are numerous standardised reading tests, most of which are developed to measure L1 reading development in the primary and middle grades and to make placement and instructional decisions. However, there are also a number of reading tests for older students at secondary and post-secondary level, and also standardised L2 reading tests. Although finer distinctions can be made as regards reading age and reading level, three levels of reading performance are commonly described as follows (Lesiak & Bradley-Johnson 1983:8):

**Independent level:** At this level the student can read with 95% word recognition accuracy and 90% comprehension accuracy. The student at this level is regarded as a skilled, independent reader.

**Instructional level:** At this level the student can read with 95% word recognition accuracy and 75% comprehension accuracy. Although the student can cope at this level, s/he can profit from instruction.

**Frustration level:** At this level, the student reads with 90% or less word recognition accuracy and 50% or less comprehension accuracy. The student is unable to handle relevant reading material at this level.

The most obvious problem with this categorisation is that there is not a separate level for those readers who fall into the large gap between instructional and frustration levels. Although it is not the purpose of the present study to address the problems in standardised reading tests, it is useful to keep these levels in mind when considering the results of the present study, and to see how these three levels compare to the inference ability and academic performance of the subjects who participated in the present study.

Although most reading comprehension tests include inferential questions, there is no standardised inferential reading comprehension test, and as far as can be established, no systematic attempt in the domain of reading research has yet been made to distinguish between different inference questions in terms of degree of 'inferential complexity' (e.g. high or low inference items) or inference categories according to specific text linguistic criteria. A group of researchers in psycholinguistics and cognitive psychology (e.g. Graesser, Singer & Trabasso 1994) have set up a taxonomy of inference categories that are applicable to language processing, but these categories derive principally from narrative texts and are not therefore necessarily applicable to expository texts. These researchers also work with skilled L1 readers and their research focus is more on on-line inferences during language processing rather than on problems in reading comprehension *per se*. The focus of the current study is on inference categories in expository texts, the effects of low and high inferences on text comprehension in L2 reading, and the relationship between inferences, L2 reading and academic performance.

### 3.7.2 Taxonomy of inferences adopted in the present study

Because inferences perform essential text-connecting functions during reading, a reading test that probes the inferencing abilities of students should give a reliable indication of the extent to which the students can effectively and meaningfully access and infer information from print-based learning materials. Thus, as pointed out in Chapter 1 (§1.3), the first aim in the current study was to set up an inference taxonomy comprising different categories of text-based inferences applicable to expository texts. This taxonomy would then serve as a framework for the testing of inferential skills during expository text reading.

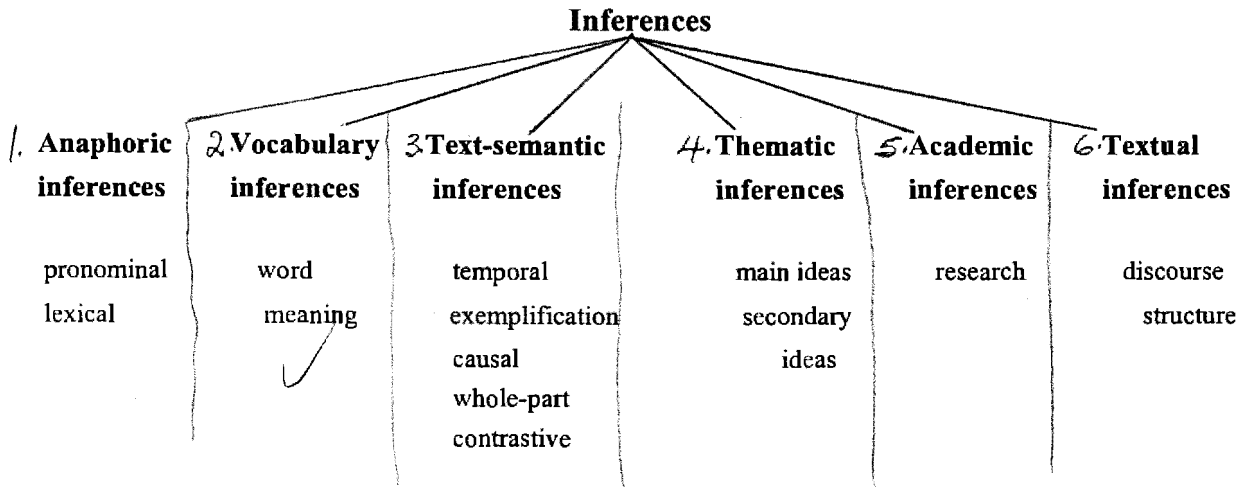
For the purposes of the present study, a fairly eclectic approach was adopted in deciding which types of inference would be selected for attention. What was wanted was a fairly solid battery of tests that would elicit different kinds of inferences that are not uncommon in expository texts, and

that reflected inferences of varying levels of difficulty. It was hoped that by focussing on different kinds of inference, a fairly broad-based inference profile could be built up for each student, one that would distinguish in which aspects of text comprehension there was greater or lesser inferential activity. Although a top-down approach to setting up an inference taxonomy was initially adopted during the literature survey of research into inference generation during text comprehension, this was complemented and constrained by a bottom-up approach at a later stage, especially during the period that preceded the design of the inference texts. Reading through the social and human science textbooks that later served as input texts for inference generation gave me an impressionistic and intuitive 'feel' for some of the kinds of inferences that were required by the texts. Specific texts also seemed to elicit specific types of inference. This interaction between the top-down pre-selected inference categories and the bottom-up data-driven types of inference resulted in a taxonomy that was felt to reflect different kinds of inferences that are not uncommon in expository texts.

As already stated, text-based inferences do not rely directly on background knowledge but can be derived from information already given in the text (e.g. by utilising given linguistic and/or semantic clues as well as discipline-specific content/pragmatic clues and by integrating information across sentences/paragraphs). To this end, a taxonomy comprising six text-based inference categories was developed, derived from work done in text linguistics on text-based and reader-based factors that affect the construction of coherence in texts. The constructionist model of inference generation provided the initial framework, from which some inference categories were selected that were also applicable to expository texts. These included referential, causal antecedent and consequent, superordinate goal and thematic. The instantiation of noun class category was modified to the more general logical inference of class inclusion. Another source for setting up inference categories came from work done in text linguistics, specifically research into coherence in texts. The impetus here came specifically from reference and lexical cohesion (which overlapped with the referential category mentioned above) and from the work on semantic or logical relations underlying text coherence (e.g. Fahnestock 1983; Crombie 1985; Mann & Thompson 1986; Hubbard 1989), specifically causal, contrastive and exemplification relations. Another category of inference that was used was that pertaining to vocabulary inferencing. Two further categories were created, namely research and textual inferences. The former refers to inferences that students make not about the contents of the text per se, but rather about the academic world of science and research, their functions and conventions. The latter category refers to inferences that students make about the overall structure, purpose and conventions underlying expository texts. In all, a taxonomy of six main categories of inference was established, each with their subcategories. These main categories are reflected in Figure 3.1 on the following page. Further criterial and analytic details about the main categories and their subcategories will be provided in Chapters 4-7.



FIGURE 3.1: INFERENCE TAXONOMY



This taxonomy provides a framework for the systematic examination of the inferencing abilities of first-year students during the reading of expository texts. The inference items in the test were further divided into low and high inference categories. These categories were operationalised in terms of criteria such as clausal distance between relevant text entities, amount of textual/linguistic clues, semantic opacity, degree of abstraction involved in the inference. These criteria are discussed in greater detail in the subsequent chapters (cf. §4.3.2 and 7.2.3).

### 3.7.3 Inference tests

In order to build up an in-depth profile of the students' inferential ability, a series of four inference tests were designed, based on authentic social and human science expository texts to which first-year Unisa and Medunsa students are typically exposed. A variety of question-answer methods were adopted to tap the subjects' inferential ability in different contexts and in different ways. A total of 10 literal questions were also included in the inference tests, in order to compare the students's performance in answering inferential versus literal questions. Because one of the aims of the study was to examine the relationship between inferencing ability and L2 proficiency, a standardised L2 proficiency test was used to assess the students' levels of English proficiency. The following tests were used in the study, each with a particular focus on eliciting certain types of inferential activity via question-answer methods:

**Test 1** This inference test focussed mainly on testing inferences about text-semantic relations and thematic inferences. It included 16 separate paragraphs, each averaging 80 words, and a longer text comprising three paragraphs and 415 words. All the paragraphs dealt with social science or psychology topics taken from prescribed first-year Sociology and Psychology textbooks used at Unisa. The 33 test items, of which two were literal

questions, included a mixture of different question types that are reputed to have high psychometric value, as discussed by Pagé (1990) (cf. above in §3.5.4). These included sentence insertion tasks (to test for the understanding of text-semantic relations across sentence boundaries), unscrambling and re-ordering sentences in paragraphs (to test for the understanding of main ideas and text-semantic relations), and multiple choice questions, true/false questions and fill-in questions to test for various other inference categories. The time it took the students to complete the test ranged between 35-90 minutes. Test 1 occurs in Appendix B. ✓

**Test 2** This inference test comprised 8 different expository text extracts taken from prescribed Sociology and Psychology textbooks used at Unisa. Each extract averaged 116 words, and several questions were asked on each extract. In all, the test included 57 test items, of which 8 were literal questions and, as with Test 1 above, a mixture of different types of questions reputed to have high psychometric value were used. Here, too, the inferential questions dealt mainly with inferences about text-semantic relations and thematic inferences. The time it took the students to complete the test ranged between 35-90 minutes. Test 2 occurs in Appendix C. ✓

**Test 3** This inference test focussed specifically on <sup>He she it they their us</sup> anaphoric inferences. In all, 27 separate paragraphs were used to assess both pronominal and lexical anaphoric resolution, and a total of 33 different anaphoric devices were tested. The paragraphs dealt with social science or psychology topics and were taken from prescribed first-year Sociology and Psychology textbooks used at Unisa. The students took between 35-75 minutes to complete the test. Test 3 occurs in Appendix D. X

**Test 4** This inference test focussed specifically on vocabulary inferencing in context. There test consisted of 14 separate paragraphs, from which the students were asked to infer the meaning of 14 target words. Each paragraph provided one or more clues to help infer the meaning of the underlined word. Here too, the paragraphs dealt principally with social science or psychology topics and were taken from prescribed first-year Sociology and Psychology textbooks used at Unisa. The students took on average between 45-60 minutes to complete the test. Test 4 occurs in Appendix E. ✓

**Test 5** This test was a norm-referenced L2 proficiency test developed by the Human Sciences Research Council (HSRC) for school leavers and adults. The entire test consisted of 60 multiple-choice items. In order to avoid test items that probed inferencing ability as opposed to linguistic ability in this test, 12 of these items were excluded from the final L2 proficiency score computed for each student (i.e. after completion of the test) because they

were inferential questions whose answers could be inferred from the accompanying paragraphs on which they were based. The remaining 48 questions relied more directly on grammatical or communicative competence in English and were thus a more direct test of knowledge of English. A final score for L2 proficiency was thus computed from these 48 items. The students took between 30-90 minutes to complete the test. Due to copyright constraints, only a sample of Test 5 is provided in Appendix F.

**Test 6** This inference test was a ‘one-off’ comprehension test comprising a running text of 440 words in five paragraphs, taken from a first-year Sociology textbook (Giddens 1993). The 30 inference questions included items from all the different inference categories. Due to the nature of the test passage, not all the categories are equally represented by the questions, for not all test passages lend themselves equally to probing the same kinds of inference types. The topic dealt with interactive theories of education and showed how research findings do not always support the predictions made by such theories. It is the kind of social/human science text that sociology or psychology students typically encounter.

The test was posted to 5,000 first year students as part of an extra, voluntary but credit-bearing Psychology I assignment. In all, 1,242 viable responses were received. Due to the distance education context of the inference test, there were no controls regarding the time it took the students to complete this test nor the sources they used to help them answer the questions. What the test lacks in depth it makes up for in the possibility of wider generalisation, for it reflects responses from a wide and fairly heterogeneous group of Unisa students. Test 6 occurs in Appendix G.

- \* In addition to the above tests, all students were also asked to fill in a short **questionnaire** that probed their reading habits and attitudes towards reading. This questionnaire appears in Appendix H. The Medunsa students were also asked to state in what kind of school they had matriculated (e.g. former DET township school, private school, etc.).
- \* Finally, to get some idea of the rate at which students were reading, it was decided to test some of the students for **reading speed** (and comprehension of the passage which they read, to prevent them from simply skimming the text and to encourage them to read for meaning). Because this test requires precision in timing, it is best administered in small groups and was not suitable for the larger group tests. Consequently, over a series of weeks, 26 Sociology and Psychology students at Unisa volunteered to see the researcher individually or in small groups of 3-4 on Saturday mornings at Thuthong, in between their Psychology and Sociology discussion classes. The passage that was used to test for

reading speed (and comprehension) was taken from Du Toit, Heese & Orr 1995). The passage occurs in Appendix I.

### 3.8 Summary

This chapter presented an overview of theory and research into the role of inferences during text comprehension. This included examining issues relating to *what* inferences are, *what kinds* of inferences occur, *when* they are made, *how* they are drawn and constrained, and *how* they are studied. This discussion provided a theoretical and methodological framework within which the present study was situated. A brief look was also taken at some developmental issues and at studies that examined differences in inferencing between skilled and unskilled readers, and the effects of teaching inferencing during reading. In the final part of the chapter, the definition of inferencing adopted in the present study was spelled out, the methods were identified, and the different kinds of inferences incorporated into the taxonomy were identified. Throughout the chapter, emphasis was placed on the need for sensitivity to definitional and methodological concerns relative to the aims and needs of a particular study. For the purposes of the current study, the focus is on inferences generated during the reading of expository texts *in the learning context*. If we wish to better understand reading as a means of constructing meaning and thus also as a means of acquiring new knowledge, then a study of inferencing during reading should not focus on *when* readers make inferences, but *whether* they make them at all.

## CHAPTER 4

### ANAPHORIC INFERENCING

#### 4.0 Introduction

This chapter deals with the first category of inferences in the taxonomy, namely anaphoric inferences, and focuses specifically on the ability of L2 undergraduate students to resolve anaphoric inferences during the reading of expository texts. The chapter starts off with a brief sketch of the theoretical framework that informs the investigation into anaphoric inferencing during language processing, and then provides an overview of some of the research into anaphoric resolution. Thereafter the research questions in the present study are identified and the analytic and methodological aspects of the study described. The distribution of successful anaphoric inferencing is first examined in terms of five categories of anaphoric referential ties. Thereafter the distribution of successful anaphoric resolution is examined in terms of strength of inference, whereby anaphoric ties that require low inference resolution are compared to anaphoric ties that require high inference resolution. The kinds of errors that occur when anaphoric inferencing is unsuccessful are also described. The chapter concludes with a consideration of some of the implications that follow from the findings that emerge from this aspect of the study.

Because anaphoric resolution is but one aspect of inferencing that is included for examination in this study, a detailed treatment of the phenomenon of anaphora in language is beyond the scope of this thesis. An outline rather than an in-depth discussion of the nature of anaphoric expressions is therefore presented, followed by an overview of some of the research that highlights the main trends and findings.

#### 4.1 Anaphora

Anaphora basically involves repeated reference in a text. In other words, a referent relating to a person, entity, event, state or idea that is introduced into a discourse is again referred to at a later stage, either by means of repetition of the same linguistic item or by means of another linguistic item. Consider, for example, the repeated references in the following text from Test 3:

- [22] The British sociologist, Barry Sugarman, related certain aspects of middle-class and working-class subcultures to differences in educational achievement. He claims that many middle-class occupations provide an opportunity for continuous advancement in income and status. This encourages planning for the future, for example, the investment of time, energy and money in training to meet the requirements of higher status jobs.

The highlighted noun phrases introduce a person, an idea and a concept into the text, and both are referred to again by means of the pronouns *He* and the determiner *This*. The pronoun *He* takes its interpretation from the noun phrase *The British sociologist, Barry Sugarman*. The determiner *This* takes its interpretation from the object complement clause expressing the idea that *many middle-class occupations provide an opportunity for continuous advancement in income and status*. The underlined items in the text are called anaphors, and the entities they refer back to are called the antecedents or the referents.

An anaphoric reference necessarily involves a binary relationship comprising a tie between a previously mentioned piece of information, the antecedent, and a following anaphoric item which refers back to the antecedent, thus forming an anaphoric tie/link. Anaphoric resolution refers to the inferential process of identifying the antecedent of an anaphoric item. Structural anaphora refers to anaphoric relations that refer back to information within a single clause/sentence (*Hercules gave his friend a sword*), while textual or intersentential anaphora refers to anaphoric relations that cross clause or sentence boundaries, as in [22] above. Because we are primarily interested in the way in which readers construct meaning in extended text, only textual/intersentential anaphoric relations are of concern in this study.

Anaphora is always backward referring, and anaphoric resolution is therefore often referred to as a ‘bridging’ or backward inference. Cataphora, which occurs more rarely, is forward looking, and can be used to great effect as a literary or rhetorical device. For example:

[23] He was a man of great strength. In fact, Hercules was a hero.

Sometimes the antecedent of an anaphoric item is explicitly stated, as in [22], but often the antecedent is implied from the context, as in [24] and [25]:

[24] Hercules rode at a furious pace towards Thebes. The horse was exhausted on arrival.

[25] Hector wants to become a cricketer because he thinks it is an exciting game.

Based on our linguistic knowledge that the verb *ride* can take a direct object specifying some creature, the information that what Hercules rode was a horse is evoked from the context in [24], although the definite NP *The horse* does not have an explicit antecedent in the first sentence. In [25], the referent represented by the noun *cricket* is never mentioned, but the referent is recoverable from the agent *cricketer*.

Because they refer back to antecedents, anaphoric items always evoke ‘given’ information. A distinction is commonly made in linguistics between given and new information in spoken or

written discourse. Given information refers basically to information that has either already occurred explicitly in the text (as in [22] above), or to information that is recoverable from the context (as in [24] and [25] respectively). Often the given information relies on information that the speaker/writer assumes is shared background knowledge, as in the case of [26].

[26] Pollini has invested the Chopin polonaises with vigour and lyrical introspection. The pianist has indeed provided a bold interpretation.

Unless one shares with the writer musical background knowledge such as that Chopin was a composer who wrote polonaises for the piano, and that Pollini is a pianist who plays Chopin pieces amongst others, the anaphoric definite noun phrase *The pianist* may not readily be matched with Pollini. The given-new distinction can occur at the level of the sentence, the discourse, or the participants' discourse-model (Prince 1981:224). In this chapter attention will be focused on the first category of given knowledge, namely information that has already explicitly occurred in the discourse, specifically written discourse. Thus, the pronoun *he* and the determiner *this* in example [22] above refer to entities that have already been explicitly introduced into the text. One doesn't have to know beforehand who Barry Sugarman is in order to link the pronoun *he* back to the referent in the first sentence. The reason for this decision was to obviate test situations where inferences depended on background knowledge and would therefore disadvantage students who lacked that specific background knowledge. The focus in this study is on the clues provided in a text - in this case, explicit antecedents and their anaphoric items - that can form the basis for inferences.

Let us look more closely now at the actual form and functions of such referring expressions. All languages comprise a number of different intersentential lexical and syntactic devices that speakers or writers can use to refer back to textually given or previously mentioned antecedent information. An antecedent comprises a referent which, as Packerham (1980:67) explains, is "an entity assumed by the writer/speaker to have already been established in the mind of the reader/listener by explicit mention in the discourse". This is a semantic concept with a posited psychological reality. The antecedent is a linguistic entity that may consist of a single word or a stretch of discourse such as a phrase, a whole sentence, or even an idea/event/state of affairs mentioned in one or more preceding paragraphs. It cannot comprise an adjective, adverb, preposition or quantifier. The anaphoric item can be a pronoun, a determiner, a noun phrase comprising a determiner(+modifier)+noun, or it may be a substituted or ellipped item. In English, anaphoric devices include zero anaphor, pronouns, demonstratives, ellipsis, substitution, and lexical anaphors which include proper names, definite noun phrases and noun phrases preceded by a determiner. These will be illustrated and discussed below.

Anaphoric devices, which are also sometimes referred to as referential expressions, vary in terms of their degree of referential rigidity, i.e., their lexical specificity as well as the extent to which their interpretation is determined by the context (Garrod & Sanford 1994:678). For example, a proper name or repeated noun phrase is likely to refer to the same referent, whereas pronouns are more fluid and their resolution depends on shifts in discourse focus. Consider the examples below.

- [27] Hector went to the bank and  $\phi$  drew some money.
- [28] Hector went to the bank and **he** drew some money.
- [29] Hector went to the bank and **the old spendthrift** actually drew some money.
- [30] Hector and Hercules went to the bank and **he** drew some money.
- [31] Hector likes going to his local branch because **the teller** is pretty. However, at the end of the month he goes to the main branch, where the service is good but **the teller/\*she** is not so pretty.
- [32] Hector went to the bank and **so did** Hercules.
- [33] Did Hector go to the bank?  
Yes, and Hercules also  $\phi$ .

The interpretation of the zero anaphor  $\phi$  in [27] and the pronoun in [28] is syntactically constrained and can only refer to Hector, while the interpretation of the pronoun *he* in [30] is ambiguous and can refer to either Hector or Hercules. However, although the definite noun phrase *the old spendthrift* in [29] is contextually constrained to refer back to Hector, the definite noun phrases *the teller* in [31] are not syntactically constrained to co-refer to the same teller, while the use of the pronoun *she* in the context of [31] is impermissible. In [32] and [33], substitution and ellipsis devices are used to refer to the previously mentioned notion of 'going to the bank'. Although the anaphoric devices in [31-33] have a referring function in that they pick up or repeat information given previously in the text, they do not involve co-reference, i.e., reference back to a specific denotated antecedent. Furthermore, there are many definite noun phrases in English that do not always have discourse antecedents and do not therefore always function as anaphoric devices. In fact, a large corpus study found that 60% of definite noun phrases in English did not have discourse antecedents (Fraurud 1990, in Garrod & Sanford 1994:678).

Anaphora is a major source of cohesion in texts. Cohesion in turn contributes to coherence in texts. Coherence is the superordinate construct that refers to the overall unity in a text. Cohesion is one of the factors that plays a role in creating overall unity. It deals with explicit or surface structure ties that link up sentences or propositions in discourse to build up coherence, as represented in the seminal work of Halliday & Hasan (1976). In other words, sentences are cohesive to the extent that they contain linguistic items or referential expressions whose interpretation depends on the interpretation of prior items or expressions in the text. A large group



of these anaphoric references fall under two categories of cohesive devices classified by Halliday & Hasan (1976), namely **reference cohesion** and **lexical cohesion**. Reference cohesion includes pronouns and determiners, while lexical cohesion includes systematic lexical cohesion (involving repetition, synonymy, antonymy and hyponymy) as well as lexical collocation. Collocation refers to words which are not semantic synonyms but which collocate together in specific contexts, e.g. *sandwiches, cooldrinks, rug, cushions, folding chair* and *sun screen* all collocate in the context of a picnic.

In this study, anaphoric resolution is examined only with reference to anaphoric devices clearly involving co-reference, where an entity introduced into the text is later referred to again, either by the same linguistic item or by another linguistic device that co-refers to the referent denoted by the antecedent item. The Hallidayan categories of substitution and ellipsis do not therefore fall within the ambit of this study for they do not involve co-reference. Because this study focuses on text-based inferences (i.e. inferences generated from textual clues), definite noun phrases that function anaphorically were also excluded from the study on the grounds that, because not all definite noun phrases in English are referring expressions, definite noun phrases might not as easily trigger a backward inference search for an antecedent as a noun phrase preceded by a determiner such as *this/that* would. Thus, the anaphoric devices that are used in this study are explicit co-referring lexical or pronominal anaphoric items whose textual antecedents occur across clause or sentence boundaries.

A compelling reason for including anaphoric resolution in a study on inferencing in reading stems from the fact that an important aspect of skilled reading involves the ability to recognise, unconsciously and rapidly, what is given and what is new, and to link up given information with new, incoming information in the text. An important component of the ability to link new text information with given text information is that of anaphoric resolution. When readers build up a mental representation of the text, it is important that they are able to identify and keep track, in later stretches of text, of referents that have already been introduced into the discourse in order to continuously update the text representation. Keeping track of referents depends on anaphoric resolution.

Although anaphoric resolution is 'traditionally' assumed to be part of inferencing by virtue of the fact that, since the 1970s, it has occupied a fairly robust niche in the history of the study of inferencing in language processing in general, it is appropriate to set out more closely the inferential nature of anaphoric resolution. Given that some anaphoric devices simply involve the repetition of identical linguistic items, the question naturally arises as to what extent anaphoric resolution involves *inferential* activity as opposed to say, mere *matching* activity.

In line with the definition of inferencing dealt with in §3.7 of the previous chapter, anaphoric resolution involves backward inferential processing in that it requires a reader to perform a text-connecting task that adds and integrates new semantic information to a text representation by operating on given information in a specific context. This text-connecting task integrates information across textual units by successfully linking an appropriate antecedent referent (amongst several prior referents) with a specific anaphoric referent, and in this way the mental text representation is continuously updated from incoming information.

It is to be expected that some inferences will be cognitively more complex than others. Inferencing, as has already been pointed out in Chapter 3, is not an absolute concept but a graded one, and should be perceived as occurring on a continuum, involving greater or lesser cognitive activity, depending on both text-based and reader-based variables (cf. §3.4.1 and 3.4.2). Likewise, anaphoric resolution is not a monolithic concept but a graded one, and one cannot study one end of the continuum in isolation of what happens at the other end. It is likely that different kinds of anaphoric ties require different expenditure of inferential energy. Anaphoric relations involving the exact repetition of a noun or proper name, whose referential potential is constrained, will likely occur at one end of the continuum and require less cognitive activity. Anaphoric ties involving more complex devices will occur at the other end and require greater cognitive activity. Anaphoric devices comprising exact repetition ( $x+x$ ) are thus more likely to involve a mental activity that matches information ( $x=x$ , *in this context*), requiring low level inferencing to update the discourse model; anaphoric devices involving the use of different linguistic items for the antecedent and the anaphor ( $x+y$ ) are more likely to involve a mental activity that adds new information ( $x=y$ , *in this context*) requiring more high level inferencing to update the discourse model. Furthermore, it is possible that anaphoric resolution in an L2 may involve greater inferential activity because the text-connecting tasks are less familiar and more opaque. Working with the notion of gradedness, this study thus includes anaphoric resolution within its scope and examines it within the framework of an inference continuum.

To sum up then, anaphora is a major contributory factor to cohesion in texts, and cohesion, in turn, is one of the factors that contributes to the coherence of a text. The successful resolution of anaphoric expressions during reading contributes to the construction of a coherent text representation because it enables the reader to integrate incoming information with given information by identifying and tracking the referents that are introduced into a text, and by tracking referential continuity and focus in the text, as well as shifts in the focus. Garrod & Sanford (1994:695) describe the resolution of referential expressions as “a process of anchoring the linguistic interpretation of sentences to the discourse representation”. Webber (1980:142) states categorically that “if a reader cannot handle an anaphoric expression as the writer intended, there is no way that he or she can correctly update his or her discourse model in response to it”.

Studying anaphoric resolution is a useful way of tapping into students' text-based inferential skills because it relies on the linking of explicit items that occur in the text. This aspect of the study thus sets out to examine issues such as: *How successful are students at making anaphoric inferences? What kinds of anaphoric inferences are more or less problematic for students? What do errors in anaphoric resolution reveal about reading problems? Do students who resolve anaphoric references more successfully also perform better academically?* The actual research questions formulated to address these issues are set out below in §4.3, after the brief discussion of research into anaphoric resolution.

## 4.2 Research into anaphoric resolution

Much of the research into inferencing has centred on anaphoric resolution, especially that of pronominal anaphoric resolution. Anaphoric resolution is usually tested by means of reading times, response times and, more recently, also eye-tracking measures. Most of the studies assume a memory-based view of anaphoric resolution, whereby current information in working memory is assumed to activate relevant information that occurred earlier in the discourse. O'Brien et al. (1997:16) explain the process as follows:

The retrieval of backgrounded concepts in a discourse is accomplished through a fast-acting, passive process by which information currently active in memory resonates with all information in long-term memory in parallel - that is, both the discourse representation and general world knowledge.

Given the different types of anaphors that occur in language, researchers have naturally been interested in uncovering the way in which the features, functions and contexts of anaphors affect anaphoric resolution. In other words, what factors affect the processing of anaphoric items? Research findings indicate that there are several syntactic, semantic, textual and pragmatic variables that affect anaphoric resolution. Three factors in particular have been shown to influence anaphoric resolution, viz.:

- \* Ease of antecedent identifiability;
- \* Topic continuity/discourse focus;
- \* Anaphoric distance (i.e. distance between anaphor and antecedent).

These factors will be discussed below. Another issue of interest to researchers working in the field of anaphora is that of when these processes occur during the on-line analysis of sentences, that is, "how the interpretation proceeds in relation to sampling the input" (Garrod & Sanford 1994:685). However, because this is an on-line concern, it is a topic beyond the scope of this

study and will therefore not be discussed further.

#### 4.2.1 Antecedent identifiability

An area that has been much researched in anaphoric resolution is that of antecedent identifiability, that is, the ease with which an antecedent can be successfully linked to an anaphoric item. This factor includes **featural overlap** between the antecedent and the anaphor, as well as strength of association between the concepts that co-refer. In many studies, it has been hypothesised (e.g. McKoon & Ratcliff 1980; Gernsbacher 1989) that successful anaphoric resolution is based on 'the best match' between anaphor and antecedent and the cohesion principles that bind them. One way of defining 'best match' is to describe it in terms of features shared by the antecedent and anaphor.

The hypothesis of antecedent identifiability thus predicts that the more features that the antecedent and the anaphoric item share, the easier will be the resolution of the anaphor tie. Anaphoric ties involving repetition are therefore predicted to be the easiest to resolve, since the antecedent and anaphoric item share identical features. In other words, the 'best match' occurs when featural overlap occurs, as in the case of repetition of antecedent and anaphoric device, or partial overlap as in the case of synonymy between antecedent and anaphoric device. There have been several studies whose findings support this hypothesis. For example, McKoon & Ratcliff (1980) found that anaphoric resolution for antecedent-anaphor repetition was faster than when the anaphoric item was a synonym of the antecedent. Packerham (1980:160) found similar results. The adult L2 subjects in his study found anaphoric reference involving repetition easier to resolve than reference involving either synonymy or paraphrase words.

The hypothesis also predicts that full referring anaphoric items such as repeated nouns and proper names will be easier to resolve than reduced referring expressions such as pronouns. Given the fluidity of pronominal references and shifts in discourse focus, reduced anaphors such as pronouns provide less information about their referents than full anaphors. In English, for example, the antecedents of pronouns are constrained only in terms of gender and number. This makes it possible to match pronouns up - in theory at least - with several potential antecedents. Consider, for example, the pronoun *they* in the earlier example [22]:

[22] ... By comparison, working-class jobs reach full earning capacity relatively quickly, but provide fewer promotion prospects and less income for investment. In addition, they are less secure.

Two plural noun phrases precede the pronoun anaphor *they*, namely *working-class jobs* and *fewer promotion prospects*, as well as the entire last compound NP, viz. *fewer promotion prospects and*

*less income for investment.* The morphosyntactic clues of the plural pronoun do not provide enough information to trace the right antecedent.

The notion that pronouns will be less easy to process than full noun phrases that provide more explicit information by which to identify their referents is indeed an intuitive one. In fact, Gernsbacher (1989) argues this very point by appealing to memory principles. She argues that co-referential nouns activate appropriate memory representations more effectively than pronouns, precisely because there is a better match to the memory representation. She used results from probe-word studies to support her argument, where it was found that repeated name anaphors gave shorter response times to probe words than pronoun anaphors. Similarly, Gallini & Spires (1992) found that subjects recalled more macro and micro idea units in passages involving anaphor repetition than in passages involving pronominal, substitution and ellipsis anaphora.

However, there is contradictory evidence on the ease of repeated anaphors as opposed to pronouns, and counterarguments to the ‘best match’ hypothesis. Gordon, Grosz & Gilliom (1993) suggest that the results obtained in the Gernsbacher study could be artifacts of the word-probe task rather than reflections of real discourse processing. Using computer self-paced reading tasks, Gordon et al. (1993) alternated three anaphoric conditions in a three-sentence text, namely Pronoun-Pronoun, Name-Pronoun and Name-Name. They found that reading times for the Name-Name (i.e. repeated anaphor) condition was significantly longer than for the other two conditions. The results of Gordon et al. (1993) were replicated by Kennison & Gordon (1997), who used eye-tracking experiments to investigate how referential items consisting of pronouns and proper names influence reading comprehension. Eye-tracking is a far more accurate and authentic measure of what happens during the reading process because it provides a complete record of eye movement patterns during reading. Unlike computer self-paced reading, where only portions of a text appear on the screen at a time, during eye-tracking readers have access to the text in its entirety and they can re-read it at any time. The researchers found increased reading times when an anaphoric expression in subject position is realised as a name repetition rather than as a pronoun. There was no such effect when the antecedents and repeated anaphoric items were in object positions. They also found more regressive eye movements in the subject-name position than in the subject-pronoun position. These results suggest that “reading comprehension is disrupted by the use of a name rather than a pronoun in subject position, but not in object position” (Kennison & Gordon 1997:242) and refer to this as the “repeated name penalty” (1997:248).

Thus, though the counterargument that pronouns are actually resolved more readily than repeated proper name anaphors seems at first hand counterintuitive, it is supported by robust findings which indicate that for skilled adult readers, repeated anaphors in subject position disrupt reading comprehension, as reflected in increased reading time and more regressive eye movements. This

clearly situates the memory principle underlying Gernsbacher's approach within a more complex context of text processing. This point is taken up again in 4.2.2 below, where the influence of macro text structures such as focus and topic continuity on anaphoric resolution are discussed. However, it is also possible that repeated anaphors have different resolution effects depending on a reader's stage of reading development. For example, repeated anaphors, which are common in the early grade basal readers, may be helpful in the early stages of reading. They may also ease anaphoric resolution amongst L2 readers whose L2 reading skills and/or L2 proficiency is poor. Clearly, though, not all readers have problems resolving pronominal anaphors, and the findings cited above indicate that in certain discourse contexts, repeated anaphors rather than reduced anaphors may in fact disrupt skilled readers.

The **strength of association** between the concepts that co-refer is also a factor in anaphoric resolution. Speed of resolution is influenced by the extent to which an entity is a typical member of a class category. For example, Garrod & Sanford (1977) showed that readers found it easier to resolve anaphors when antecedent-anaphor links in a hyponymous relationship were strongly matched (e.g. *vehicle - bus*) as opposed to those that were weakly matched (e.g. *vehicle- tank*), as shown in [33] and [34] below.

[34] The vehicle came lumbering around the corner at top speed. The pedestrians stared in amazement at the bus.

[35] The vehicle came lumbering around the corner at top speed. The pedestrians stared in amazement at the tank.

Ease of resolution was reflected in quicker reading times and verification times for samples of text such as [34] where the anaphor is a high typical member of the antecedent class and hence strongly associated with it, compared to [35], where the anaphor is a low typical member of the antecedent class and less strongly associated with it.

Although ease of antecedent identification has certainly been shown to play a role, it is not the only factor in anaphoric resolution. It does not always adequately account for pronominal resolution, as we saw above, nor does it successfully account for the comprehension of many definite noun phrases or pronouns that occur as anaphors of zero noun phrases, i.e. whose antecedents are evoked by the context. In everyday spoken and written discourse there are many definite noun phrases that do not have explicit discourse antecedents, yet comprehension does not always appear to be disrupted. We return to the previously cited examples in Chapter 3. Garrod & Sanford (1982) found that with examples of text such as the set below, [36] took no longer to read whether it was preceded by [35a] or by [35b].

- [36a] Keith took his car to London.
- [36b] Keith drove to London.
- [36] The car kept overheating.

The reader assumes that the following clause is relevant to what preceded it and therefore, to establish a link between [36b] and [36], the reader infers that a vehicle was being used to drive to London.

Similarly, in the previously cited example [25], *Hector wants to become a cricketer because he thinks it is an exciting sport*, the pronoun *it* does not have an explicit reference to cricket, but on the assumption that *it* relates to what has been stated, the referent can readily be evoked semantically and morphologically from the antecedent *cricketer*. Clearly the absence of an explicit antecedent does not always exact a comprehension penalty in terms of reading time or comprehension. Garrod & Sanford (1994:680) refer to these as situational anaphors and argue that coherence mechanisms as much as cohesion mechanisms play a role in directing comprehension processes. We turn now to another coherence mechanism, that of text focus or topic continuity.

#### 4.2.2 Theme, text topic and focus

Several scholars have suggested that readers resolve pronouns in terms of a restricted number of antecedents that are in focus in working memory. Chafe refers to this as *foregrounding*, Kuno (1976) as *theme*; in Artificial Intelligence the term *focusing* is used by Grosz & Sidner (1985), while *explicit focus* is used by Sanford & Garrod (1981) and the term *centering* by Gordon et al. (1993). There are a number of studies whose findings are consistent with this focusing approach.

The centering theory of Grosz et al. (1983, 1995), for example, accounts for the way in which referring expressions such as pronouns, definite noun phrases and proper nouns contribute to discourse coherence. According to this theory, each utterance in a locally coherent discourse is linked to a preceding utterance by an entity, the 'backward-looking centre'. Utterances also contain 'forward-looking centres' that provide potential links to subsequent utterances. To illustrate, consider the text in [37].

- [37a] Hector gave Iola a pet monkey.
- [37b] He said such monkeys were very rare.
- [37c] He asked her whether she liked the gift.
- [37d] Hector asked her whether she liked the gift.
- [37e] She said it was an unusual gift.
- [37f] Iola said it was an unusual gift.

In [37a] there are no backward-looking centres because it is the first sentence of the discourse. The referring expressions, *Hector*, *Iola* and *monkey*, are all forward-looking centres. *Hector*, being the most highly ranked forward-looking centre in [37a], is realised as a pronoun in [37b]. According to centering theory, the most highly ranked forward-looking centre of the preceding utterance must be realised as a pronoun in the current utterance if any of the less highly ranked forward-looking centres are also realised as pronouns in the current utterance. That is why [37c] is preferable to [37d], following [37a]. Findings such as these support models of text inferencing that posit local constraints on discourse processing, such as those of McKoon & Ratcliff (1992).

However, besides a purely local effect for pronoun resolution, as determined by the theme or noun phrase ranking in the previous sentence, more global text level factors also play a role. Some research indicates that if the incoming information continues the current topic, then the anaphoric item is resolved more quickly than when the incoming message incurs a shift in topic (e.g. Garrod & Sanford 1982). For example, Sanford et al. (1988) showed that the resolution of unambiguous pronominal reference was faster when the pronoun referred to a focused character as opposed to a non-focused one which was mentioned just as recently. In his study of newspaper articles from *The New York Times*, Rosenberg (1976, in Webber 1980:154) found no examples of pronominalised references that crossed thematic boundaries. In other words, the antecedents that writers pronominalise are those that function as themes. Readers, by implication, infer that the pronominalised expressions refer back to themes. Similarly, Hudson, Tanenhaus & Dell (1986, in Garrod & Sanford 1994:682) found a processing advantage for pronouns that referred to centred antecedents such as agents rather than patients.

Sanford & Garrod's Mental Focus Model (1994) looks not only at local effects but also at discourse level effects. According to this model, "readers will take as the referent to a pronoun the element that is currently in discourse focus" (Hoover 1997:195). In his study, Hoover (1997) found shorter reading times for coherent texts when protagonists were pronominalised as opposed to versions in which non-protagonists were pronominalised. He argues that these findings are consistent with models of text coherence that assume that readers are sensitive to higher level text information and not simply to local effects.

Studies such as these all suggest that anaphoric resolution does not simply operate on best match in memory but is sensitive to the focused state of the antecedent, for focused antecedents are the ones that are currently active in working memory. Pronouns serve to maintain reference to things or people currently in focus. Repeated anaphoric forms are not always quicker to resolve because they tend to be associated with the re-introduction of referents that were introduced much earlier in the text and went out of discourse focus, while definite noun phrases often serve to introduce



new topics into the discourse.

#### 4.2.3 Anaphoric distance

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Is it deixis or deixis is only in drama?

Another factor which has been shown to affect anaphoric resolution is that of distance between the antecedent and the anaphoric item. According to traditional theory of anaphora (e.g. Givon 1983), “the anaphoric device chosen by a speaker/writer is correlated with distance to the last mention of the relevant referent” (Fox 1987:18). The most recent referent is taken to offer the best match with the anaphoric item. Research indicates that when the anaphoric item occurs soon after the antecedent, then the antecedent information still resonates in memory and is therefore more easily and quickly recovered than when there is greater distance between the anaphor and the antecedent. The argument is that distant antecedents are no longer in active working memory and need to be reactivated in order to be resolved, hence the longer resolution time.

O’Brien et al. (1997) tested the prediction that successful anaphoric resolution decreases with increasing distance between the antecedent and the anaphor. They found that distance was a factor that strongly influenced the activation of an antecedent. They suggest that this supports the minimalist position of McKoon & Ratcliff (1992) in that readers rely on what is readily available in memory “and do not actively seek antecedents to anaphoric phrases” (O’Brien et al. 1997:17).

However, some researchers point out that the distance explanation is based largely on local effects and, like the ease of antecedent identifiability hypothesis, fails to take into account higher level text effects. Clifton & Ferreira (1987, in Hoover 1997:201) have argued that distance and focus measures are often confounded in experimental studies and that distance per se might not be the difficulty: “Greater distance often leads to a shift in focus such that the antecedent to the pronoun is no longer in focus” (Hoover 1997:202).

It is interesting to note that in her work on anaphoric patterns in spoken and written discourse, Fox (1987:141) argues that the distance argument in traditional theories of anaphora does not hold in conversational data, where long-distance pronominalisation is common (she adds that some researchers have recorded gaps between full NPs and pronouns of up to 30 minutes!). She argues that there are several discourse-level factors that also need to be taken into account. However, she agrees that long-distance pronominalisation is less common in written texts. In her corpus of data, it seldom exceeded five clauses at most (Fox 1987:142).

It should be borne in mind that the majority of the studies referred to above in this subsection involved skilled mother-tongue readers who are sensitive to top-level text effects. It is likely that for L2 readers, especially unskilled readers, anaphoric distance will have an effect on resolution.

In his study of L2 students with fairly high levels of proficiency Pakenham (1980) did not specifically measure the distance factor, but instead looked at the complexity of the intervening text between the antecedent and the anaphoric item. Although he found that this did not influence anaphoric resolution, he cautions against rejecting the distance factor, since some of the errors the subjects made (for example, incorrectly selecting the nearest antecedent as the target antecedent) suggest some influence of the distance factor.

#### 4.2.4 Concluding comments on anaphoric resolution

Most of the research into anaphoric resolution feeds back into language processing theories in general, so the research typically involves L1 subjects who are skilled readers. It goes without saying that a necessary component of skilled reading is the ability to recognise and understand anaphoric devices and to resolve them successfully during the reading process. Despite the fact that anaphoric resolution is a well-trodden research field in linguistic journals, there seems to be far less research into the ability of L2 students to resolve anaphoric references during reading. Although there is less research into text-based inferences in poor readers and L2 readers, those findings do suggest that such students do have problems making inferences during reading (Oakhill & Yuill 1986; Pakenham 1980).

Pakenham (1980) examined lexical anaphoric resolution amongst 39 advanced Latin American L2 learners of English at tertiary level. He found that the subjects' ability to resolve anaphors correlated positively with their overall reading ability. His findings indicated that anaphoric reference involving repetition was easier to resolve than reference involving synonymy, which in turn was easier to resolve than reference involving paraphrase. Using the same three categories, he then compared the L2 students' anaphoric resolution with that of 20 native speakers of English, and found that such differential effects did not obtain for the L1 readers of the same texts. Pakenham concluded that even at the advanced level, L2 students of English depend far more on the surface lexical and syntactic features of the anaphoric items than do native English students. In other words, differences in the successful resolution of different types of anaphoric reference shrink as proficiency in English increases (Pakenham 1980:162-163).

From the above discussion it is clear that several variables affect anaphoric resolution, and that anaphoric resolution in L2 reading is an area that requires closer scrutiny. In this study, it was decided to first examine anaphoric resolution in terms of the traditional Hallidayan text linguistic categories of reference, and to place these categories on an inference continuum, on the basis of ease of recoverability afforded by the linguistic features underpinning the categories. The same data was then re-analysed by using the notion of an inference continuum that considers factors other than linguistic ones. This latter approach takes into account some of the variables referred

to above and categorises anaphoric relations in terms of the relative amount of inferencing required to resolve them. This is referred to as the **inference strength** of the anaphoric relation. Anaphoric relations were categorised into either low or high inference anaphors. The two approaches were compared to determine what patterns of successful anaphoric resolution they yielded amongst L2 readers. Let us turn now to the aims and objectives of the anaphoric component of the present study.

#### 4.2.5 Aims of the present study

The overall purpose of the anaphoric component of the study was to examine more closely the anaphoric inferencing abilities of L2 readers during their reading of expository texts. More specifically, three broad aims were set up to establish:

- \* whether there was a relationship between anaphoric resolution and academic performance, as well as between anaphoric resolution and overall L2 proficiency;
- \* whether the different kinds of anaphoric ties had a differential effect on their resolution, and also whether the inference strength of anaphoric ties had a differential effect on their resolution;
- \* what patterns emerged from an analysis of errors in anaphoric resolution.

The specific research questions and hypotheses that were formulated to address these aims are dealt with in §4.4. But before dealing with the methodological aspects of the study, let us first turn to a discussion of the analytic framework and tools used to categorise anaphoric ties in terms of linguistic criteria as well as in terms of the inference strength of each anaphoric tie.

### 4.3 Analytic tools: Categorisation of anaphoric relations

In order to compare anaphoric inferencing along different parameters, two analytic approaches were adopted. In the first approach, traditional **linguistic categories** were adopted and linguistic criteria were used to distinguish different types of anaphoric ties. In the second approach a broader **cognitive-linguistic** approach was used. The criteria underlying the analysis of anaphoric ties into these two categories are explained below, as well as the rationale for using them.

#### 4.3.1 The linguistic categorisation of anaphoric ties

As was pointed out earlier in §4.2.1, the extent to which anaphors share features with their antecedents differs, and can range along a continuum in terms of lexical specificity and degree of

recoverability. Firstly, five categories of anaphoric ties were identified, using linguistic criteria as a classification base, namely **repetition, synonymy, paraphrase, pronominal** and **determiner** anaphoric ties. The pronominal and determiner categories fall under Halliday & Hasan's group of reference cohesion devices, while the repetition, synonymy and paraphrase categories belong to the Hallidayan category of lexical cohesive devices. Although the paraphrase category is not strictly a Hallidayan one, it is borrowed from Packerham's (1980) study and can be said to include two Hallidayan types of referring expressions, namely hyponymy and collocation. Paraphrase anaphoric ties include anaphoric items that serve to paraphrase the contents of the antecedent (a more detailed description is given below). All five of these Hallidayan categories were placed on an inference continuum in terms of greater or lesser morphosyntactic and semantic opaqueness. The rationale for this continuum was based on featural overlap, namely that the more morphosyntactic and semantic clues there were in the anaphoric tie, the more 'apparent' the link would be and hence the more easily anaphoric resolution would occur. The fewer the clues, the more opaque the anaphoric tie, and the less successful anaphoric resolution becomes.

**Note:** Henceforth, the numerical system for references to examples from the inference test will differ from other examples cited thus far. The former will have A followed by a specific number to signify an example taken from the anaphoric test. The anaphoric test appears in Appendix B.

#### 4.3.1.1 Repetition

The repetition category involves anaphoric ties where the anaphor is either an exact semantic and morphological repetition of an item in the antecedent, as in [A8], or a close repetition of an item in the antecedent, in that a derivational morphological change occurs, as in [A6] and [A14]. (Henceforth all antecedents will be identified with a shaded line and the anaphoric items marked with a solid line.)

- A8. Depending on the environment in which they live, pastoralists rear and herd animals such as sheep, cattle, goats, camels or horses. Many pastoral societies still exist in the modern world, concentrated especially in areas of Africa, the Middle East and Central Asia. These societies are usually found in regions where there are dense grasslands, or in deserts or mountainous areas. These regions are not amenable to fruitful agriculture, but may support various types of livestock.
- A6. The general public usually view the elderly as people who have already made their contributions to society and have retired from productive activity. The old person is expected to 'take it easy' and to enjoy himself or herself. This expectation ignores the fact that one of the more important ways we all 'enjoy' ourselves is by being involved in activities that are socially valued.

- A14. As a result of upbringing and personality, everyone in a society has preconceptions - positive or negative - about their fellow citizens. Usually these preconceptions are based on emotion rather than on reason. People are hostile to other social groups who are easily identifiable because they are different racially, religiously or politically. In fact, modern history is full of examples which show how politicians, in order to divide people and realize their own selfish ambitions, have exploited this hostility.

In [A6] the change is from a verbal past participle form to a noun, whilst in [A14] the change is from an adjective to a noun. Anaphoric ties involving repetition contain morphosyntactic as well as semantic clues. Those involving exact repetition were considered to be the most apparent of the anaphoric items while those involving a morphosyntactic change become somewhat less apparent. Because repetition anaphoric ties contain explicit morphosyntactic clues that can potentially guide the reader to make a link, they were expected to be the easiest to resolve and were thus placed first on the continuum. In particular, exact repetition would take precedence over repetition involving derivational change. In the pilot test there were 4 test items in this category, which was expanded to 8 items in the Medunsa test in order to provide a broader data base.

#### 4.3.1.2 Pronominal anaphoric ties

The pronominal ties included pronoun anaphors whose antecedents were either person noun phrases, as in *He* below, or noun phrases referring to concepts, as in *they* in [A2]. The pronominal references were all in subject position.

- A1. The British sociologist, Barry Sugarman, related certain aspects of middle- and working-class sub-cultures to differences in educational achievement. He claims that many middle-class occupations provide an opportunity for continuous advancement in income and status. This encourages planning for the future, for example, the investment of time, energy and money in training to meet the requirements of higher-status jobs. By comparison, working-class jobs reach full earning capacity relatively quickly, but provide fewer promotion prospects and less income for investment. In addition, they are less secure.

English pronouns only share gender and number features with their co-referents, and could potentially be mapped onto several antecedent noun phrases in a preceding text. (For example, there are two plural noun phrases onto which *they* above could map - *working-class jobs* and *fewer promotion prospects*.) Furthermore, the African languages do not have a pronominal system like English and many black L2 learners commonly make mistakes with pronouns in English. However, even though pronouns are indexical and can potentially map onto different antecedents,

they have a very high frequency rate (for example, *it* is the 10th most frequent word in English) and are probably the most frequent and familiar anaphoric referents for L2 readers. They were therefore placed second on the continuum - they have fewer overlapping features than the repetition category, but were considered more familiar than the following three categories. In the pilot test there were 4 pronominal items, which were expanded to 8 items in this category in order to provide a broader data base.

#### 4.3.1.3 Synonymy

In this category, the anaphoric item is semantically related to the antecedent, but not morphologically. For example:

- A2. The social democratic view on education is not simply a sociological theory. According to the Centre for Contemporary Cultural Studies at Birmingham University, this perspective has been developed by a number of individual groups. In the Centre's opinion, social democratic thinking has been reflected in the works of sociologists, economists, Labour Party politicians, and the teaching profession. For most of the post-war period British educational policies have been dominated by this approach.
- A16. It seems logical to assume that our periods of sleep must have some function. Moreover, since we spend so much time sleeping, it is reasonable to suppose that the function of sleep must be of considerable importance for us. The phenomenon of sleep has interested people for thousands of years. The idea that sleep gives the brain a rest is quite widespread. But modern research into sleep, which offers no strong evidence that brain activity decreases during sleep, apparently does not support this hypothesis.

This category of anaphoric tie thus has semantic but not morphological clues. It was therefore placed third on the anaphoric continuum. In the pilot test there were 3 items in this category. One was dropped because it was deemed too easy (it had a 95% accurate response rate, involving reference to the antecedent, *stage of development*, and immediately following it, a new sentence starting with the anaphor *This phase of development*. There were no other noun phrase antecedents and both *stage* and *phase* are fairly high frequency words. In addition to the remaining 2 synonymy items, 5 new items were included for a total of 7 items in the Medunsa test, in order to provide a broader data base.

#### 4.3.1.4 Paraphrase

This anaphoric item consists of the determiner *this* followed by a single noun which paraphrases or summarises the contents of the antecedent. The antecedent may consist of a clause which

functions as an object complement clause, as in [A4], or it may consist of an independent sentence on its own, as in [A15].

- A4. How far are differences in the behaviour of women and men due to biological differences? Opinions are radically opposed on this issue. Many authors hold that there are inbuilt differences of behaviour between men and women which appear in all cultures. Some writers believe that the findings of sociobiology point strongly in this direction. They are likely to draw attention to the fact, for example, that in almost all cultures, men rather than women take part in hunting and warfare.
- A15. Agrarian societies seem to have originated at about the same date as pastoral ones. At some point, hunting and gathering groups began to sow their own crops rather than simply collect those growing in the wild. This practice first developed as what is usually called 'horticulture', in which small gardens are cultivated by the use of hoes or simple digging instruments.

In some cases, the anaphoric item can refer to more than one antecedent clause; in fact, it can refer to a series of sentences, as in [A7].

- A7. Garrison (1979) found that female aspirations for high-status jobs rose by 7% between 1970 and 1976. During the same time, male aspirations for such jobs declined 5%. Lueptow (1981) found a similar decline in gender-typed occupational choices when he compared high school seniors of 1964 to high school seniors of 1975. Although such evidence is encouraging, we must bear in mind that women still tend to be heavily over-represented in traditional female jobs.

In this category, as Packerham (1980:77) explains, the anaphoric item "is filled by a noun which cannot be seen to have a morphological and/or synonymous relationship with an identifying lexical item in the antecedent". Pragmatic or strategic knowledge helps to make the link between the paraphrase anaphor and its antecedent. For example, even if one did not know that in the scientific context *evidence* includes research findings, a strategic knowledge of reading based on the assumption that sentences are related in a paragraph, could lead one to infer that the anaphoric item *such evidence* refers to the research findings cited in the two preceding sentences. Because a paraphrase anaphoric tie contains only a textual clue and no morphosyntactic or semantic cues, it was placed fourth on the inference continuum. The 5 items in this category in the pilot test were expanded to 8 items in the Medunsa test, to provide a broader data base.

#### 4.3.1.5 Determiners

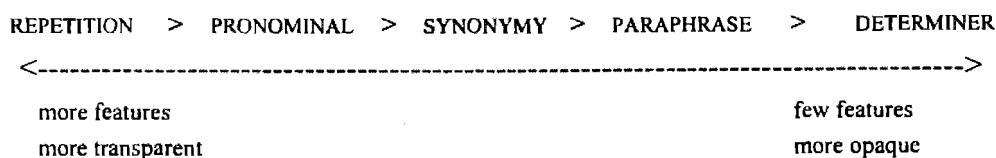
This tie consists of anaphors comprising only the determiner *this* (or *these*), the antecedent of which can be a noun phrase of varying length, as in [A1] and [A10] below.

- A1. The British sociologist, Barry Sugarman, related certain aspects of middle- and working-class subcultures to differences in educational achievement. He claims that many middle-class occupations provide an opportunity for continuous advancement in income and status. This encourages planning for the future, for example, the investment of time, energy and money in training to meet the requirements of higher-status jobs. By comparison, working-class jobs reach full earning capacity relatively quickly, but provide fewer promotion prospects and less income for investment. In addition, they are less secure.
- A10. In the light of the ending of the Cold War, we can anticipate a reduction in the developed world's spending for military purposes. Arms-related expenditure has dropped sharply in Russia. The United States and other Western countries are scaling back defence expenditure over the next few years. However, this will increase the pressure to export arms to make up for lost domestic markets. It is not certain that the ending of the Cold War will reduce what Third World countries see as security requirements, which are as often internal as external.

The antecedent of a determiner can refer to a single concept or to a more complex unit of thought as expressed in an entire sentence or even a paragraph. Like the pronominals, the anaphoric items in this category are also indexical, but unlike pronominals that mark gender and number, determiners in English only mark number. They therefore provide few morphosyntactic and no semantic or pragmatic cues for their antecedents. They were thus placed fifth, at the most opaque end of the continuum. There were 3 items in the pilot test and the category was expanded to 8 test items in the Medunsa test, to provide a broader data base.

Figure 4.1. shows the inference continuum as described above, based on featural overlap and using the basic Hallidayan categories of anaphoric cohesive devices:

**FIG.4.1: INFERENCE CONTINUUM USING HALLIDAYAN CATEGORIES**





### 4.3.2 Strength of inference

In order to assess whether the amount of inferencing required to identify the appropriate antecedent from the anaphoric stimulus is affected not only by morphological and semantic factors but also by text factors, such as distance and length of antecedent, the anaphoric ties were also analysed in terms of their inference ‘strength’ and categorised along a second continuum into low and high inference anaphoric ties. To operationalise the concept of inference strength, an anaphoric inference index was set up in terms of four parameters, viz. distance between antecedent and anaphor, length of antecedent item, grammatical functions of antecedent and anaphor, and featural overlap between antecedent and anaphor. Binary scores of 1 or 0 were used for each parameter (except for one parameter that included 1, 0,5 or 0 scores) giving a total score of 6. Items that obtained scores of 3,5 or more were classified as high inference anaphoric ties, while those that obtained scores of 3 or less were classified as low inference anaphoric ties.

#### 4.3.2.1 Distance between antecedent and anaphor

In order to set up a means of measuring distance between antecedent and anaphor, each of the paragraphs was analysed into F-units. If an anaphoric item appeared in the F-unit immediately following the F-unit in which the antecedent item occurred, then it was classified as adjacent and assigned a 0 value. If one or more F-units separated the antecedent and the anaphor, then the tie was classified as distant, and assigned a 1 value. For example:

- A28. The British sociologist, Barry Sugarman, related certain aspects of middle- and working-class sub-cultures to differences in educational achievement.<sup>1/</sup> He claims that many middle-class occupations provide an opportunity for continuous advancement in income and status.<sup>2/</sup> This encourages planning for the future,<sup>3/</sup> for example, the investment of time, energy and money in training to meet the requirements of higher-status jobs.<sup>4/</sup> By comparison, working-class jobs reach full earning capacity relatively quickly,<sup>5/</sup> but
- [a] provide fewer promotion prospects and less income for investment<sup>6/</sup> In addition, they are less secure<sup>7/</sup>
- [b]

In [A28a], the first F-unit containing the antecedent *The British sociologist, Barry Sugarman* is followed by the second F-unit containing the anaphoric item *He*. Instead, in [A28b], the antecedent *working-class jobs* occurs in the fifth F-unit, while the anaphoric item *they* occurs in the seventh F-unit.

#### 4.3.2.2 Length of antecedent

This parameter took the length of the antecedent into account. It was assumed that the shorter the antecedent item, the easier it is to map the anaphoric item onto it. Shortness of antecedent was defined as consisting of a single noun or of Det+Mod(Mod)+ Head(+Mod) and assigned a value of 0. If the antecedent item consisted of a more complex noun phrase comprising more than two modifiers or if it consisted of more than one F-unit, then it was classified as long, and assigned a value of 1. For example, in [A28] above the antecedent *The British sociologist* consists of det+mod+N. However, in [A4] below the anaphoric item *this discovery* refers back to a more complex antecedent consisting of a dummy subject followed by an object complement clause.

- A4. It has been widely known for some time that the natural milk of a healthy mother constitutes a complete diet for a new-born child. Recently it has been found that mothers' milk also gives babies a natural resistance to certain diseases. Doctors in developing countries where standards of health care are lower and where advertising encourages mothers to turn from breast to bottle-feeding by claiming that artificial milk is superior, hope that this discovery will be widely publicized by the governments of these countries.

The antecedent in [A6] is even longer, consisting of four entire F-units.

- A6. Garrison (1979) found that female aspirations for high-status jobs rose by 7% between 1970 and 1976./ During the same time, male aspirations for such jobs declined 5%. / Lueptow (1981) found a similar decline in gender-typed occupational choices when he compared high school seniors of 1964 to high school seniors of 1975. Although such evidence is encouraging, we must bear in mind that women still tend to be heavily over represented in traditional female jobs.

#### 4.3.2.3 Featural overlap

In this parameter, three features were selected to reflect morphological, semantic and pragmatic overlaps between antecedents and anaphoric items. Items that had any of these features were given a 0 value respectively, those without these features were given a 1 value. These features are similar to the ones used in the linguistic categorisation of anaphoric ties.

#### 4.3.2.4 Grammatical function of antecedent and anaphor

This parameter reflects the grammatical functions of the anaphoric tie, based on whether the antecedent and anaphor were in subject or object position. The reason for adopting this parameter

derives from research findings that show that topic focus or topic continuity is an important factor in anaphoric resolution. Three possibilities were identified here, viz. **subject-subject**, **object-subject**, **object-object**. Anaphoric ties in subject-subject continue the discourse focus and were assigned a value of 0, those in object-subject position assigned a 0,5 value, while those in object-object position are not in discourse focus and were assigned a value of 1.

The anaphoric ties in the test fall as follows into the low and high inference categories:

<b>Low inference anaphoric ties</b> (n=16)	<b>High inference anaphoric ties</b> (n=22)
A1, A3b, A5, A7, A10, A14a, A15b, A17, A19, A22, A24a, A25, A27, A28a, A28c, A29a	A2, A3a, A4, A6, A8, A9, A11, A12, A13, A14b, A15a, A16, A18, A20, A21a, A21b, A23, A24b, A26, A28b, A29b

#### 4.4 Research questions and hypotheses

As stated in §4.2.4, there were three broad aims. The first aim was to explore the relationship between anaphoric inferencing on the one hand, and academic performance and L2 proficiency on the other hand. The second aim was to see which kinds of anaphoric ties posed problems for the students, and the third aim was to determine the nature of anaphoric errors.

Because anaphoric resolution serves to integrate incoming information with given information, it helps readers access and understand written information more accurately and is thus viewed as an integral part of reading skill. It is therefore natural to assume that students who can resolve anaphoric relations successfully have a better understanding of their textbooks, which in turn affords them a better chance of performing well academically. It was thus expected that anaphoric resolution would be least successful amongst the Fail group and most successful amongst the Pass and Distinction groups of students in each discipline. The first aim thus generated the following research questions:

- 1a *What is the mean overall score for anaphoric resolution amongst the different groups of students?*
- 1b *Are there differences in subjects' mean scores for anaphoric inferencing between the different academic performance groups?*
- 1c *Is there a significant relationship between subjects' ability to make anaphoric inferences and their academic performance?*

Next, the relationship between anaphoric resolution and L2 proficiency was explored. Because

successful anaphoric resolution depends on the ability to make links between anaphoric items and their antecedents, it is natural to assume that students with higher levels of proficiency in the L2 will make better use of the morphosyntactic, lexical and pragmatic cues that form the basis for anaphoric resolution than students with lower levels of L2 proficiency. The following question was thus formulated:

- 1d *Is there a significant relationship between subjects' ability to make anaphoric inferences and their L2 proficiency?*

The second aim of the research was to examine the effect that different anaphoric ties had on anaphoric inferencing. To this end, two research questions were formulated:

- 2a *Will the mean overall scores of subjects for the five types of anaphoric ties decrease in the order: repetition > pronominal > synonymy > paraphrase > determiner?*
- 2b *Will the mean overall scores of subjects for low inference anaphoric ties be significantly higher than their mean overall scores for high inference anaphoric ties?*

The third research aim was concerned with describing and categorising the nature of the errors that occurred in unsuccessful anaphoric resolution. An exploratory, heuristic research question was formulated as follows:

3. *What kinds of errors occur in unsuccessful anaphoric resolution and what do they reveal about problems in reading comprehension?*

## 4.5 Research methodology

Having identified the research questions and hypotheses, the more general methodological aspects of the anaphoric test are described in this section.

### 4.5.1 Subjects

There were three groups of subjects whose anaphoric inferencing abilities were tested in varying ways.

- \* A group of 40 **Sociology I** students at Unisa (although they were not necessarily all first-year students). As explained in §1.4.1, not all these students completed all the inference

and L2 proficiency tests, so cross-correlations between scores in anaphoric inferencing and the other tests is not always possible. Of these 40 students, 17 also completed the L2 proficiency test that was administered on another occasion. Many of the students who attend the extra tutorials do so because they feel the need for extra support in their studies. This explains the under-representation in this group of students in the At Risk and Pass categories. The population from which the subjects are drawn is therefore not necessarily representative of all undergraduate L2 students at the university.

These Sociology students served as the pilot group for all the inference tests, which were subsequently modified (where necessary) and extended for the in-depth tests done with the Medunsa students and for the one-off inference test designed for the large group of Psychology students.

- \* A group of 58 Medical (MbChb) and 26 Occupational Therapy students from Medunsa. The anaphoric inference test the Medunsa students wrote was an extended version of the one the Sociology students wrote. The Medunsa students wrote all the inferencing tests as well as the L2 proficiency test, so cross-correlations between anaphoric inferencing and these other tests is possible.
- \* A group of 1,232 Psychology I students from Unisa (although they were not necessarily all first-year students). Because they wrote a one-off inference test, only 7 of the test items related to anaphoric inferencing. The data on their anaphoric resolution abilities is therefore not as detailed as the data pertaining to the Sociology and Medunsa students, although the results make for interesting comparisons, as will be shown in §4.6.

#### 4.5.2 Materials

The pilot anaphoric test contained 19 anaphoric items that occurred in 15 paragraphs. In order to keep the content variable constant, and to give the students authentic sociology texts, typical of the type of texts they need to read for their sociology studies, passages were taken from three different sociology textbooks, namely:

Giddens, A. 1993 *Sociology*. Cambridge: Polity Press. (Second edition.)

Haralambos, M. & Holborn, M. 1995 *Sociology: Themes and perspectives*. London: Collins Educational. (Fourth edition.)

Lauer, R.H. (no date) *Social problems and the quality of life*. Dubuque: Wm. C. Brown Publishers. (Fourth edition.)

Two items in paragraphs dealing with social science topics were also taken from Packenham's (1980) study (items A5 and A14). One of the test items from the pilot test was discarded because all the students answered it correctly. The test was expanded to include 30 paragraphs for the Medunsa students, so that an average of 8 items per anaphoric category could be tested. The more detailed anaphoric test thus included a total of 38 different anaphoric ties. Because the Medunsa students also all did Psychology I in their first year, various passages from a Psychology textbook were also included:

Jordaan, J. & Jordaan, W. 1998. *People in Context*. Johannesburg: Heinemann.

The full anaphoric test is included in Appendix C (the pilot test basically comprised the first 15 paragraphs of the test). In the inference test administered to the Unisa Psychology students, there were 7 anaphoric items in all. The details are provided in Chapter 7 (§7.2.3).

#### 4.5.3 Testing procedure

The test on anaphoric resolution comprised 'identification by underlining' tasks where all the paragraphs had specific anaphoric items underlined. The students were then asked to underline all those words/phrases or sentences that they thought the underlined words referred back to and to draw an arrow linking them. The test contained written instructions to the students on how to answer the anaphoric questions, and an example paragraph was given to show the students how to answer the questions. These instructions were repeated orally, an example was demonstrated on the overhead projector, and the students were urged to put up their hands if they had difficulty understanding what they needed to do. The researcher noted the time it took the first five students and the last five students in both the Sociology and Medunsa groups to complete the test.

To act as a control, 7 skilled L1 and L2 readers (senior students and student assistants) were also administered the test individually, and the time it took each subject to complete the test was recorded.

#### 4.5.4 Scoring of responses

Each test item in the anaphoric test counted 1 mark, except for the anaphoric item in [A6], which counted 2 because it had at least two antecedents. A fairly lenient scoring procedure was adopted whereby, in order to be given a full mark per item, the student had to have underlined, at least partially, the appropriate antecedent. Because so many of the antecedents were quite long, partial underlining refers to cases where, minimally, the head of the antecedent noun phrase and its primary modifiers were underlined. For example, in [A28] either *The British sociologist* or *Barry*

*Sugarman* or both were accepted as correct. In [A6] *This expectation* comprises the idea of 'taking it easy' and of 'enjoying himself or herself'. Even if only one of these clauses was underlined, the student was given a full mark. In the case of [A6], the first clause referring to taking it easy was typically underlined. Although a total of 40 students completed the test, five students had misunderstood the instructions and had not answered the questions correctly. These five cases were consequently discarded from the analyses.

#### 4.6 Results

In the shorter pilot test, the first five students finished the test within 27-28 minutes, and the last few students finished after 45 minutes. The majority took over half an hour to complete the test. In contrast, the control group completed the test within a span of 13-19 minutes. In the longer, extended test, the first five Medunsa students finished the test within 35 minutes, while the majority took about 45-50 minutes to complete the test.

The first research question attempted to get some idea of the average anaphoric inferencing level of the students: *What is the overall mean score for anaphoric resolution amongst the different groups of students?* The mean scores for anaphoric inferencing for the different groups of students are reflected in Table 4.1 below.

TABLE 4.1 MEAN SCORES FOR ANAPHORIC INFERENCING FOR DIFFERENT GROUPS OF STUDENTS

Subjects		Mean % for anaphoric inferencing	SD
Unisa: Sociology	(N=35)	54,9	19,4
Unisa: Psychology	(N=1,113)	57,5	17,2
Medunsa	(N=68)	64	15,7
Control group	(N = 7)	94	

As can be seen from the results, although the Medunsa students fared better than the Unisa students, the overall anaphoric inferencing ability of all the student groups is not very high, given that anaphoric inferencing is integral to skilled reading. Compared to the control group of skilled readers who read at the independent level, the anaphoric results suggest that the students on the whole are reading at frustration level (cf. the three reading levels referred to in Chapter 3, §3.7.1).

The second research question examines differences in anaphoric inferencing ability in relation to academic performance, viz. *Are there significant differences in subjects' mean scores for anaphoric inferencing between the different academic performance groups?* A more detailed

analysis of the data, as reflected in Table 4.2, shows how anaphoric inferencing ability is distributed across the different academic performance groups.

**TABLE 4.2: DIFFERENCES IN ANAPHORIC INFERENCING ACROSS ACADEMIC ACHIEVEMENT GROUPS <sup>a</sup>**

	Fail	At Risk	Pass	Distinction	Group mean
Unisa -Sociology	38,7	52,5	61	-	54,9
(N)	(19)	(8)	(5)	-	(35)
Medunsa	55,4	60,8	72,9	87,6	64
(N)	(24)	(19)	(22)	(3)	(68 )
Unisa - Psychology	58,1	67,5	70	83	57,5
(N)	(638)	(185)	(178)	(132)	(1,113)

<sup>a</sup> Scores express average percentages in each category

A one-way ANOVA was used to further explore the relationship between the four different academic groups with regard to their anaphoric inferencing abilities. The analysis yielded a highly significant effect,  $F(3, 64) = 10,27, p \leq .001$ . A Scheffé test showed significant differences between the Fail and At Risk groups on the one hand, and the Pass and Distinction groups on the other hand. These results provide strong evidence for differences in anaphoric inferencing ability in relation to academic performance; the better the student's anaphoric inferencing ability, the better his/her academic performance is.

To further explore this relationship, as well as the relationship between the subjects' ability in anaphoric inferencing and their L2 proficiency, a Pearson Product Moment correlation technique was used to test the relationship between performance in anaphoric resolution, academic performance and L2 proficiency. Because not all the Sociology students wrote all the tests, a Pearson Product Moment correlation technique was applied to the smaller group of 17 Sociology students who wrote all the tests. A significant moderate correlation of  $r = .52 (p \leq 0,03)$  was obtained between anaphoric resolution and academic performance, based on their marks in the final Sociology examination. A low, non-significant correlation of  $r = .29 (p \leq 0,25)$  was obtained between anaphoric resolution and L2 proficiency. Slightly different profiles were obtained with the Medunsa students, where a significant strong correlation of  $r = .69 (p \leq ,001)$  was obtained between anaphoric resolution and academic performance, and a correlation of  $r = ,73 (p \leq ,001)$  obtained between anaphoric resolution and L2 proficiency. The results are displayed in Table 4.3 on the following page.



**TABLE 4.3** CORRELATIONS BETWEEN ANAPHORIC INFERENCING, ACADEMIC PERFORMANCE AND L2 PROFICIENCY

		Academic performance	L2 proficiency
<b>Unisa Sociology: Anaphoric inferencing</b>	<i>r</i>	,52	,29
	<i>p</i>	,03	,25
	N	17	17
<b>Medunsa: Anaphoric inferencing</b>	<i>r</i>	,69	,73
	<i>p</i>	,001	,001
	N	68	72

A linear regression was then applied, with anaphoric inferencing as an independent variable and academic performance as the dependent variable. The results, as reflected in Table 4.4 below, showed that anaphoric inferencing accounted for 47% of the variance in academic performance. As will be seen again in Chapter 6, anaphoric inferencing emerged as a fairly robust predictor of academic performance.

**TABLE 4.4** REGRESSION BETWEEN ANAPHORIC INFERENCING AND ACADEMIC PERFORMANCE

Independent variable	R	Adjusted R <sup>2</sup>	F-ratio	Sig.	N
Anaphoric inferencing	,69	,47	61,7	<i>p</i> < ,000	68

The next step was to examine the distribution of successful anaphoric resolution amongst the five Hallidayan types of anaphoric ties. It was predicted that ease of resolution would be determined by the amount of morpho-semantic featural overlap between the antecedent and the anaphor. The research question was:

- 2a *Will the mean overall scores of subjects for the five types of anaphoric ties decrease in the order: repetition > pronominal > synonymy > paraphrase > determiner?*

Contrary to expectations, the most successful resolution occurred in the pronominal rather than the repetition category and, surprisingly, the anaphora in the repetition category proved to be more challenging than that in the synonymy category. As expected, the paraphrase and determiner categories proved to be the most challenging. The display of frequency scores in Table 4.5 on the following page shows the distribution of anaphoric resolution across the different categories of anaphoric ties.

**TABLE 4.5: MEAN OVERALL SCORES FOR ANAPHORIC RESOLUTION AMONGST THE FIVE CATEGORIES**

	<b>pronominal</b>	<b>synonymy</b>	<b>repetition</b>	<b>paraphrase</b>	<b>determiner</b>
<b>Unisa (n =35)</b>	66,5	60,7	49,3	44,9	44,8
<b>Medunsa (n=72)</b>	75,7	67,3	65,3	61,2	53,6

This pattern is maintained fairly consistently when these results are analysed in greater detail across the four academic groups gives, as displayed in Table 4.6 below.

**TABLE 4.6: COMPARISON BETWEEN STUDENT GROUPS AND ACADEMIC CATEGORIES ACCORDING TO TYPE OF ANAPHORIC TIE<sup>a</sup>**

	<b>Fail</b>	<b>At risk</b>	<b>Pass</b>	<b>Distinction</b>
<b>Unisa (N)</b>	<b>(22)</b>	<b>(8)</b>	<b>(5)</b>	<b>(0)</b>
<b>Medunsa (N)</b>	<b>(23)</b>	<b>(19)</b>	<b>(21)</b>	<b>(3)</b>
<b>Pronominals</b>				
Unisa	59,3	70,3	70	-
Medunsa	63,7	72,5	85	91,2
<b>Repetition</b>				
Unisa	45,6	37,5	65	-
Medunsa	56,2	61,2	76,2	76,2
<b>Synonymy</b>				
Unisa	58,7	68,7	80	-
Medunsa	63,3	62	68	88,3
<b>Paraphrase</b>				
Unisa	36,2	52	47	-
Medunsa	51,1	57,7	70	92,2
<b>Determiners</b>				
Unisa	44,1	44	46,6	-
Medunsa	40	50,6	67,5	88,7

<sup>a</sup> Scores express average percentages in each category

The only anomalies amongst the Unisa Sociology students are in the Repetition category, where the Fail group fared better than the At Risk group, and in the Paraphrase category where the At Risk group fared better than the Pass group. It is difficult to explain these discrepancies except to state once again that this pilot group was inclined to the academically weak side, and the Pass students, with 60,6% Sociology score, were close to the At Risk students, who averaged 53%. On

the other hand, one notes the fairly large difference in anaphoric inferencing ability between the Pass and Distinction groups in all the categories. The latter are readers who obviously function at an independent level.

The next research question examined the success of anaphoric resolution in terms of both linguistic and text linguistic factors, and predicted that ease of resolution would be determined by whether the anaphoric tie was a low inference or a high inference tie.

2b *Will the mean overall scores of subjects for low inference anaphoric ties be significantly higher than their mean overall scores for high inference anaphoric ties?*

The mean overall score for low inference anaphoric relations was 71,2%, while that of high inference relations was only 46,7%, clearly showing differences between the two types of anaphoric tie and supporting the hypothesis. Further analysis of the data showed that the expected pattern of anaphoric resolution obtained across the four academic groups, as reflected in Table 4.7 below.

**TABLE 4.7: COMPARISON BETWEEN STUDENT GROUPS AND ACADEMIC CATEGORIES ACCORDING TO LOW-HIGH INFERENCE CATEGORIES<sup>a</sup>**

		<b>Fail</b>	<b>At risk</b>	<b>Pass</b>	<b>Distinction</b>	<b>Average</b>
Unisa	(N)	<b>(22)</b>	<b>(8)</b>	<b>(5)</b>	-	<b>across</b>
Medunsa	(N)	<b>(23)</b>	<b>(19)</b>	<b>(21)</b>	<b>(3)</b>	<b>groups</b>
<b>Low inference</b>						
Unisa		66	67,8	80	-	71,2
Medunsa		67,3	73,4	83,5	89,5	75,9
<b>High inference</b>						
Unisa		39,2	49,5	51,5	-	46,7
Medunsa		50	55,1	71,2	90,8	60,2

<sup>a</sup>Scores express average percentages in each category

The relationship between the Medunsa scores on the low and high anaphor inference items was explored by means of one-way ANOVA tests. Because the Distinction group was so small, it was combined with the Pass group. The analysis with regard to low inference items showed a significant effect,  $F(2, 58) = 11.88, p < .000$ . A Scheffé test ( $p < .05$ ) showed significant differences between the At Risk and Pass groups ( $p < .01$ ), but not between the Fail and At Risk groups. In other words, these latter two groups behaved similarly, in that the differences between these two groups were not greater than the differences within these two groups. The results of the ANOVA with regard to the high inference items also yielded a significant effect,  $F(2, 54) =$

11.54,  $p < .000$ . Here, too, the Scheffé test ( $p < .05$ ) showed significant differences between the At Risk and Pass groups ( $p < .004$ ), but not between the Fail and At Risk groups.

As can be seen from the results, anaphoric resolution seems to be affected by the inference strength of the anaphoric tie. The low inference anaphoric ties were resolved more successfully across all four student groups. Successful anaphoric resolution dropped by an average of 24% amongst the Sociology students and 15% amongst the Medunsa students when the anaphoric tie required greater inferential processing. This drop was particularly evident amongst the Fail and At Risk groups, while the Distinction group maintained their skill irrespective of whether the anaphoric resolution required low or high inferential activity. For both low and high inference items, there were significant differences in the resolution of such items between the Fail and At Risk groups on the one hand, and the Pass and Distinction groups on the other hand. Students who pass seem to have less difficulty with this component of reading than borderline or fail students.

The results pertaining to the last research question, namely the nature of anaphoric resolution errors, are dealt with in §4.7 below.

To summarise the results, mean anaphoric scores of 55,9% and 57,5 were obtained by the Unisa Sociology and Psychology students respectively, which suggest that these students are performing close to a level associated with frustration reading. As expected, the Medunsa students scored somewhat better, with an average anaphoric inferencing score of 64%. Even so, the scores on the whole do not indicate a high level of anaphoric inferencing ability, given that anaphoric resolution is a central skill in reading. There is clearly a robust relationship between ability in anaphoric inferencing and academic performance, with a consistent increase in anaphoric skill mirrored by an increase in academic performance.

Of all five categories of anaphoric ties, the pronominals were the easiest to resolve across all four academic groups, perhaps because they occur with such high frequency and the students are therefore used to resolving them. Surprisingly, the students fared better at inferring synonymous anaphoric inferences than those involving repetition. This suggests a possible lack of attention given to morphological clues to aid anaphoric resolution. Anaphoric ties involving paraphrase and determiners were problematic for all but the distinction group. Low inference anaphoric ties were also more successfully resolved than high inference ties, with relative increments in the direction Fail < At Risk < Pass.

#### 4.7 Errors in anaphoric resolution

This section describes and discusses the errors that occurred in anaphoric resolution amongst the Unisa Sociology students, as evidenced by the incorrect signalling of antecedents by students. Only this group of students were chosen because they had the lowest scores in anaphoric inferencing and made the most errors. The errors were analysed in order to see whether any underlying patterns might emerge that would indicate where specific problem areas lie and what strategies readers use in resolving anaphoric ties.

In all, four main categories of error 10 categories of anaphoric error were identified, with 10 subcategories, as indicated in Figure 4.2 below. These categories comprised errors pertaining to particular 'search areas' for antecedents (Categories 1-3); faulty anaphoric resolution reflecting **semantic errors** (Categories 4-7); faulty anaphoric resolution reflecting **grammatical errors** (Categories 8-9); and a **miscellaneous** category (Categories 10-11). The categories were not mutually exclusive, for example, a semantic error may occur in a particular search error, and a particular grammatical error may also be cross-classified as a particular semantic error.

FIG. 4.2: ANAPHORIC ERRORS

Error Categories			
Search areas	Semantic errors	Grammatical errors	Miscellaneous
1. First sentence	4. Overspecification	8. Syntactic mismatch	10. Causal
2. Adjacent sentence	5. Underspecification	9. Inappropriate chunking	11. Omission
3. Cataphora	6. Irrelevant		
	7. Association		

The distribution of these errors was also recorded, as indicated in Table 4.8 below.

TABLE 4.8: DISTRIBUTION OF ERROR CATEGORIES PER FREQUENCY

Search areas	Semantic errors	Grammatical errors	Miscellaneous
1. First sentence 85 = 30,3%	4. Overspecification 64 = 22,8%	8. Syntactic mismatch 27 = 9,6%	10. Causal 8 = 2,8%
2. Adjacent sentence 49 = 17,5%	5. Underspecification 71 = 25,3%	9. Inappropriate chunking 35 = 12,5%	11. Omission 15 = 6,4%
3. Cataphora 8 = 2,8%	6. Irrelevant 49 = 17,5%		
	7. Association 29 = 10,3%		

#### 4.7.1 Erroneous search areas

The first three categories reflect particular ‘search areas’ in the test paragraphs in which the Sociology students erroneously sought antecedents. Based on the traditional belief that an anaphoric item generally refers back to the most recent referring expression, it was expected that students would erroneously seek antecedents in adjacent clauses or sentences. Contrary to expectation, by far the most common search area was the first sentence of the paragraph. In other words, students seemed to be following a strategy whereby they sought an antecedent for the anaphor in a head noun in the first sentence. For example, in A9 there were there were 8 instances where the antecedent for *It* was incorrectly identified as being *America's poverty*. This initial noun phrase is separated by four F-units from the anaphor. Similarly in A10 there were six instances where the antecedent for *this* was incorrectly identified as *the Cold War*, a noun phrase which occurs in the first sentence and which is separated by two fairly long F-units from the anaphor.

- A9. America's poverty must be evaluated in terms of the standard of living attained by the majority of Americans. The government's definition of poverty is based on the cost of a basic diet called the “economy food plan”. It is revised to account for inflation and varies according to the location, size of the family, and sex and age of the head of the family.
- A10. In the light of the ending of the Cold War, we can anticipate a reduction in the developed world's spending for military purposes. Arms-related expenditure has dropped sharply in Russia. The United States and other Western countries are scaling back defence expenditure over the next few years. However, this will increase the pressure to export arms to make up for lost domestic markets.

One possible explanation for this search strategy is that it may be confused with the well-known strategy commonly taught to students, namely that of looking for the main idea or topic sentence of a paragraph in the first sentence. Students may come to expect that the first sentence carries the main informational load and they therefore refer back to this sentence to identify a likely-looking antecedent. This strategy seems to override the distance factor because it occurs even when the first sentence is quite distant from the anaphor. For example, in A13, three noun phrases in the first sentence were incorrectly selected by five students as being the antecedents of the determiner *This*, which occurs 9 F-units later.

- A13. As understood in biology and sociology, an instinct is a complex pattern of behaviour that is genetically determined. The courtship rituals of many of the lower animals are instinctive in this sense. The stickleback (a small freshwater fish), for example, has an extremely complicated ritual which has to be followed by both male and female if

mating is to occur. Each fish produces an elaborate series of movements, creating a 'mating dance'. This is genetically patterned for the whole species.

An opposing search strategy was one based on proximity or adjacency, that is, to seek the antecedent in a noun phrase of the immediately preceding clause or sentence, for example:

- A2. The social democratic view on education is not simply a sociological theory. According to the Centre for Contemporary Cultural Studies at Birmingham University, this perspective has been developed by a number of individual groups. In the Centre's opinion, social democratic thinking has been reflected in the works of sociologists, economists, Labour Party politicians, and the teaching profession. For most of the post-war period British educational policies have been dominated by this approach.
- A5. It has been widely known for some time that the natural milk of a healthy mother constitutes a complete diet for a new-born child. Recently it has been found that mothers' milk also gives babies a natural resistance to certain diseases. Doctors in developing countries where standards of health care are lower and where advertising encourages mothers to turn from breast to bottle-feeding by claiming that artificial milk is superior, hope that this discovery will be widely publicized by the governments of these countries.

In A2, five students erroneously associated *this perspective* with the *Centre for Contemporary Cultural Studies*, while in A5 eight students linked *this discovery* to the immediately preceding clause that *artificial milk is superior*. The latter anaphoric resolution is particularly unsuccessful because it indicates that the student is interpreting the text in exactly the opposite way intended by the text. However, the adjacent search area was not nearly as prevalent (17,5%) in errors as the first-sentence search area (30,3%).

The third search area was a forward or cataphoric one, where students incorrectly identified as 'antecedents' noun phrases that occurred *after* the anaphoric item and not before it. For example, instead of realising that the plural pronoun *They* in A4 referred back to *Some writers*, one student made a cataphoric link forwards to *men rather than women take part in hunting*.

- A4. How far are differences in the behaviour of women and men due to biological differences? Opinions are radically opposed on this issue. Many authors hold that there are inbuilt differences of behaviour between men and women which appear in all cultures. Some writers believe that the findings of sociobiology point strongly in this direction. They are likely to draw attention to the fact, for example, that in almost all cultures, men rather than women take part in hunting and warfare.

Although this error was far less common (2,8%), it only occurred amongst the Fail students, despite the fact that the written and oral instructions emphasised backward references. Such errors in anaphoric resolution suggest that readers who commit them have problems finding their way around a text and lack strategic knowledge when reading, more specifically the strategy of backtracking in a text to establish what is being referred to. Pronouns and determiners typically refer *back* to given information, not forward.

#### 4.7.2 Semantically based anaphoric errors

The next four types of errors in the table relate more to the semantic nature of the anaphoric error. The area in which the students seem to have the most difficulty in resolving anaphors is that of **underspecification** (25,3%), i.e. identifying only part of the antecedent, neglecting to underline the other components of the antecedent and thereby missing the full informational content of the referent. This occurred in those test items where the anaphoric item referred back to a complex antecedent consisting of more than a simple noun phrase or more than a single sentence. In such cases students had problems correctly identifying what exactly it was that the anaphoric device referred to. The students often tended to identify an antecedent as consisting of a single idea as reflected in a simple noun phrase or part of a sentence only, instead of identifying the entire idea entailed in the referent. Consider for example A4 and A10 below.

- A4. How far are differences in the behaviour of women and men due to biological differences? Opinions are radically opposed on this issue. Many authors hold that there are inbuilt differences of behaviour between men and women which appear in all cultures. Some writers believe that the findings of sociobiology point strongly in this direction. They are likely to draw attention to the fact, for example, that in almost all cultures, men rather than women take part in hunting and warfare.
- A10. In the light of the ending of the Cold War, we can anticipate a reduction in the developed world's spending for military purposes. Arms-related expenditure has dropped sharply in Russia. The United States and other Western countries are scaling back defence expenditure over the next few years. However, this will increase the pressure to export arms to make up for lost domestic markets.

In A4 the noun *differences* was identified on six occasions as being the antecedent for the anaphor *this direction*. However, the idea reflected in the antecedent is more complex and specific than that of simple 'differences'. The important point made in the paragraph in A4 is not simply that of differences per se but more specifically inbuilt gender differences of behaviour. Obviously the students are on the right track here, but their antecedent is too general and fails to carry the full informational content of the full antecedent. Similarly, in A10 the determiner *this* does not simply



refer back to expenditure, but more specifically to a drop in defence expenditure, which is referred to twice as either *a reduction in the developed world's spending for military purposes* or as *scaling back defence expenditure*.

Now it is possible that in such cases a student may actually have been able to correctly identify the entire antecedent but, due to fatigue or other such factors, chose instead to identify only a head noun. In other words, these errors may reflect failure to follow instructions properly rather than inability to specify the antecedent. However, both the written and oral instructions for the test, particularly the oral instructions, stressed the importance of underlining *all* the words that were deemed important, and that sometimes an entire part of a sentence, a whole sentence or even more than one sentence might need to be underlined. Whenever a student underspecified an antecedent, a quick check was done to ensure whether this was the response pattern throughout the test. In all except 5 cases (which were discarded because the students had obviously totally misunderstood the instructions), other responses in the test showed that the student had actually underlined more than a simple noun phrase (e.g. clauses or parts of sentences) in some of the other test items. This was taken to indicate that the student understood the instructions and was aware that antecedents could consist of more than a single word or a simple phrase. Such errors were therefore treated as underspecification errors rather than instructional errors.

In his corpus of data Packenham found similar errors amongst his subjects, although he does not refer to them by this term. He suggests that such errors are clear “indications that the subjects had difficulty processing the syntactic structure of the antecedent and therefore did not achieve an adequate grasp of what the antecedent represented semantically”(Packenham 1980:179). It could also be that subjects do not always attend to the details of surface linguistic structures, and are guided by head nouns which act as key words and which then form a basis for a faulty representation of the meaning of the text, without further attention given to the relationships actually being expressed between the constituents of the antecedents. These kinds of underspecification errors suggest that students have difficulty in identifying meaningful stretches of information, and in chunking information together semantically. The integration of given and new information then occurs in a haphazard and inaccurate way, more complex ideas get lost in the process and this results in a partial or total misrepresentation of what the author intended. As was argued earlier in Chapter 2, skilled reading is a precise skill and the comprehension of expository texts requires precision and attention to detail. Failure to attend to detail can easily result in comprehension breakdown. Meaningful chunks of information such as antecedents often carry quite complex yet precise ideas whose meanings should not be blurred if an accurate understanding of what the text is about is to be achieved. Underspecification of the information carried by an antecedent means that a reader cannot update his/her text model accurately and cannot therefore construct a coherent mental representation of what the text is about.

Another large category of anaphoric errors was that of **overspecification** of referents, i.e. identifying a more generic idea for the anaphor (22,8%). Packerham found a similar tendency in his data for readers to “seek a more general referent for the anaphoric NP” (1980:173). For example, in A10, the determiner *This* was on six occasions incorrectly identified as referring back to the more general event of *the ending of the Cold War* or simply *the Cold War* rather than to a specific consequence, namely the reduction in military spending. Similarly, in A12 the anaphoric NP *Such conditions* was on 12 occasions incorrectly identified as referring back to the more general condition of *job dissatisfaction and alienation* rather than to the more specific conditions of ways of resolving job dissatisfaction and alienation.

- A10. In the light of the ending of the Cold War, we can anticipate a reduction in the developed world's spending for military purposes. Arms-related expenditure has dropped sharply in Russia. The United States and other Western countries are scaling back defence expenditure over the next few years. However, this will increase the pressure to export arms to make up for lost domestic markets.
- A12. A variety of measures can address the problem of job dissatisfaction and alienation. Having identified the causes of the problem, we can deduce what is needed to resolve them: more challenging work, greater worker participation and control, and more worker autonomy. A number of programs that provide such conditions are already operating, but they are not yet widespread.

Like underspecification, overspecification also indicates problems with chunking meaningful units of information and identifying referents in focus. As a result, the reader constructs either a partially correct text model by just ‘missing the point’ or else a completely inaccurate one. It is interesting to note that many of the overspecified anaphoric errors overlap with anaphoric errors that occurred when the antecedent was sought in the first sentence. This is not surprising, since the main idea of a paragraph is often introduced in the first sentence, and then the following sentences refine and develop this general idea. By not following the elaboration of the generic idea, the reader subsequently misses the more specific referent to which the anaphoric item actually refers.

A third type of semantic error that emerged was one in which the reader incorrectly identified a preceding NP as the antecedent of the anaphoric NP because of an **association** between them (10,3%). For example, in A2 *this approach* was incorrectly linked back to *a sociological theory* in the first sentence. A sociological theory can indeed be viewed as a theoretical approach, but in this case it is not the approach being referred to.

In A5, the anaphoric NP *this discovery* was linked back to the verbal items *found* and *widely*

*known*, as if the students were following a strategy of identifying synonyms for the anaphor, even though they had not consistently followed that strategy in their other responses.

- A2. The social democratic view on education is not simply a sociological theory. According to the Centre for Contemporary Cultural Studies at Birmingham University, this perspective has been developed by a number of individual groups. In the Centre's opinion, social democratic thinking has been reflected in the works of sociologists, economists, Labour Party politicians, and the teaching profession. For most of the post-war period British educational policies have been dominated by this approach.
- A5. It has been widely known for some time that the natural milk of a healthy mother constitutes a complete diet for a new-born child. Recently it has been found that mothers' milk also gives babies a natural resistance to certain diseases. Doctors in developing countries where standards of health care are lower and where advertising encourages mothers to turn from breast to bottle-feeding by claiming that artificial milk is superior, hope that this discovery will be widely publicized by the governments of these countries.

In the under- and overspecification and association errors, tenuous links can be said to exist between the incorrectly identified antecedents and the anaphoric items, resulting in a kind of 'half-baked' link between given and new information.

The fourth type of semantic error that occurred was one where the incorrectly identified antecedent was totally off the mark and hence **irrelevant** (17,5%). For example, in A8, the anaphor *these regions* was incorrectly linked back to the NP *the modern world*, while in A15, *this practice* was incorrectly linked back to *hunting*.

- A8. Depending on the environment in which they live, pastoralists rear and herd animals such as sheep, cattle, goats, camels or horses. Many pastoral societies still exist in the modern world. These societies are usually found in regions where there are dense grasslands, or in deserts or mountainous areas. These regions are not amenable to fruitful agriculture, but may support various types of livestock.
- A15. Agrarian societies seem to have originated at about the same date as pastoral ones. At some point, hunting and gathering groups began to sow their own crops rather than simply collect those growing in the wild. This practice first developed as what is usually called 'horticulture', in which small gardens are cultivated by the use of hoes or simple digging instruments.

These kinds of errors indicate the extent to which some students have problems integrating given

with new information and keeping track of the appropriate, in-focus referent amongst many other referents.

#### 4.7.3 Grammatically based anaphoric errors

This category of errors reflects the failure of students to attend to morpho-syntactic cues in the anaphoric items as well as in antecedent information. On the whole, the students rightly seemed to realise that anaphoric items, which have a nominal function, must be matched with prior linguistic items whose information content also contains head nouns. However, there were some instances where students made **syntactically ill-matched** links (9,6%). For example, in A4, two students incorrectly identified the past participle *opposed* as being the antecedent for *this direction*. Similarly, the plural pronoun *they* in A1 was linked back to a singular NP, *The sociologist Barry Sugarman*, and the singular, non-gender pronoun *It* in A9 was linked back to a plural noun, *the Americans*.

- A1. The British sociologist, Barry Sugarman, related certain aspects of middle- and working-class subcultures to differences in educational achievement. He claims that many middle-class occupations provide an opportunity for continuous advancement in income and status. This encourages planning for the future, for example, the investment of time, energy and money in training to meet the requirements of higher-status jobs. By comparison, working-class jobs reach full earning capacity relatively quickly, but provide fewer promotion prospects and less income for investment. In addition, they are less secure.
- A4. How far are differences in the behaviour of women and men due to biological differences? Opinions are radically opposed on this issue. Many authors hold that there are inbuilt differences of behaviour between men and women which appear in all cultures. Some writers believe that the findings of sociobiology point strongly in this direction. They are likely to draw attention to the fact, for example, that in almost all cultures, men rather than women take part in hunting and warfare.
- A9. America's poverty must be evaluated in terms of the standard of living attained by the majority of Americans. The government's definition of poverty is based on the cost of a basic diet called the "economy food plan". It is revised to account for inflation and varies according to the location, size of the family, and sex and age of the head of the family.

These kinds of errors suggest that the readers are not always attending to morpho-syntactic cues to help them track an appropriate antecedent, such as linking a plural pronoun with a plural antecedent.

Another related error pertained to the inappropriate syntactic chunking of information (12,5%), where the antecedent was identified as a string of words that did not reflect traditional syntactic units or boundaries, or a string of words separated from their superordinate structures, as in the complex embedded clauses of the third sentence in A5, that were identified out of their syntactic context. In A13, the antecedent was identified as an embedded clause which doesn't carry the referent, thus isolating the syntactic unit from its main clause which reflected the referent.

- A5. It has been widely known for some time that the natural milk of a healthy mother constitutes a complete diet for a new-born child. Recently it has been found that mothers' milk also gives babies a natural resistance to certain diseases. Doctors in developing countries where standards of health care are lower and where advertising encourages mothers to turn from breast to bottle-feeding by claiming that artificial milk is superior, hope that this discovery will be widely publicized by the governments of these countries.
- A13. As understood in biology and sociology, an instinct is a complex pattern of behaviour that is genetically determined. The courtship rituals of many of the lower animals are instinctive in this sense. The stickleback (a small freshwater fish), for example, has an extremely complicated ritual which has to be followed by both male and female if mating is to occur. Each fish produces an elaborate series of movements, creating a 'mating dance'. This is genetically patterned for the whole species.

In A14 a student identified the incomplete phrasal sequence *show how politicians* as the antecedent for *this hostility*.

- A14. As a result of upbringing and personality, everyone in a society has preconceptions - positive or negative - about their fellow citizens. Usually these are based on emotion rather than on reason. People are hostile to other social groups who are easily identifiable because they are different racially, religiously or politically. In fact, modern history is full of examples which show how politicians, in order to divide people and realize their own selfish ambitions, have exploited this hostility.

Packenhams notes that "antecedents which are syntactically more complex make it difficult for the ESL subjects to decide what information belongs together and constitutes the most explicit textual representation of the referent" (Packenhams 1980:173). Either students ignore surface linguistic cues or else they do not understand the syntactic architecture of the sentences (this was also a problem that occurred in the vocabulary inferencing test, as will be discussed in Chapter 5). However, the proportion of syntactic errors in this category was lower in comparison to the semantic errors. In other words, the majority of errors tended to reflect semantic mismatches between anaphor and antecedent in the form of under- and overspecification of referring

expressions, rather than syntactic mismatches. This suggests that the problem underlying anaphoric resolution is more of a semantic and strategic one rather than a syntactic one.

#### 4.7.4 Other error types

An isolated but interesting type of error and one which was different from the others arose in T14 where the antecedent for *hostility* was identified as *they are different racially* (seven times) and *they are different racially, religiously or politically* (once). One possible reason for this erroneous response is that the students seemed to opt for a causal strategy (i.e. give a reason for hostility) rather than for the strategy of identifying the referent of the anaphor (i.e. the larger idea that people are hostile to groups who are different). Given the racial history of South Africa, it could be that the phrase *they are different racially* elicited an emotional response in the students so that when they came to the anaphoric item *this hostility*, they linked it backed to a **causal** factor.

- T14. As a result of upbringing and personality, everyone in a society has preconceptions - positive or negative - about their fellow citizens. Usually these are based on emotion rather than on reason. People are hostile to other social groups who are easily identifiable because they are different racially, religiously or politically. In fact, modern history is full of examples which show how politicians, in order to divide people and realize their own selfish ambitions, have exploited this hostility.

The last category of errors was that of **omission** (6,4%). Although it may seem surprising to include omissions in an error category, research into reading problems indicate that weak readers often omit to do all the tasks during reading tests because, unlike good readers who are actively engaged in meaning construction, weak readers adopt fewer repair strategies when meaning breaks down, and as a result, they do not backtrack as often as good readers to search for specific information to ensure comprehension. The omissions in anaphoric resolution in the current study tended to occur with students who scored poorly in the test as a whole. This may suggest that these students in particular do not engage as readily in meaning construction, they give up more easily when comprehension eludes them, and move on even though comprehension has been unsuccessful. This tendency to give up on comprehension was evident amongst some of the case study students, as will be discussed later in Chapter 8.

## 4.8 Discussion

As the results of the present study show, many of the L2 students who were tested have problems resolving anaphoric ties successfully. The majority of the subjects took a relatively long time to complete the test and in general, did not achieve a very high success rate, especially amongst the

Fail and At Risk groups of students. The overall mean score for anaphoric resolution ranged between 54-64%, which is cause for concern, since anaphoric inferencing is an integral component of skilled reading. Anaphoric resolution becomes even more unsuccessful when the anaphoric ties involve more complex forms of referring expressions such as those involving paraphrase and determiners, and low inference anaphoric ties were more successfully resolved than high inference anaphoric ties. In contrast, the skilled L1 and L2 readers who served as a control completed the test quickly, had a very high success rate, and were equally good at resolving both low and high inference anaphora, as were the Distinction students. The results show a strong relationship between anaphoric resolution and academic performance, with students Distinction students showing obvious mastery in anaphoric inferencing, while those in the Pass group inferred anaphors more successfully than those in the At Risk group, who in turn inferred anaphors more successfully than those in the Fail group. In fact, as will be shown and discussed later in Chapter 6, anaphoric inferencing emerged as the strongest predictor of academic performance.

Major differences emerged between the different types of anaphoric relations, suggesting that the L2 students who are not skilled readers are sensitive to the linguistic and textual features of anaphoric ties. In contrast, anaphoric inferencing by the skilled L1 and L2 readers in the control group and the Distinction students was not sensitive to such features, i.e. resolution remained high irrespective of the type of anaphoric tie involved. This finding supports the results obtained in Pakenham's study (1980). Amongst the L2 subjects, pronominal ties were resolved most successfully. The high frequency rate of pronominals across all genres of texts makes them a familiar feature of written texts and this may account for their more successful resolution by the students. Yet anaphoric ties involving repetition, synonymy, paraphrase and determiners are features of expository texts in English and students therefore need to be able to resolve them successfully in order to access information effectively in the learning context.

The differential performance in anaphoric resolution suggests that the concept of an anaphoric continuum is a useful one for it indicates the increasing number of linguistic and text-based factors involved in anaphoric resolution. However, the predictions made by the anaphoric continuum based on linguistic factors needs to be modified for it fails in some respects to accommodate the complex interplay of linguistic and textual features. For example, anaphoric ties involving repetition of items with derivational changes posed difficulty for many students, while anaphoric ties involving pronominals showed the highest success rate, contrary to expectations. The relatively high success rate of pronominal anaphoric resolution suggests that a linguistic approach to anaphoric processing underestimates the effects of text linguistic and pragmatic factors, such as frequency and familiarity of anaphoric items involved in an anaphoric tie. Thus, despite the fact that pronouns are indexical and hence potentially opaque, the high incidence of pronominal references in texts makes them a relatively familiar feature, even for less

skilled readers.

The relatively higher resolution rate of the synonymous anaphoric ties compared to the repetition ties was an interesting result. One possible reason for this may lie in the high incidence of semantic errors, and the poor performance on two categories of anaphoric tie that rely on grammatical clues, viz. repetition and determiners. In other words, it may be that unskilled L2 students are more attuned to looking for semantic relations rather than grammatical relations when trying to find their way around text. As a result, they miss the grammatical clues that could guide them in constructing a more accurate mental representation of the text. Despite the clear grammatical clues provided by the identical and near-identical repetition ties, the students failed to pick them up. As will be seen in the following chapter dealing with vocabulary inferencing (Chapter 5), and in the discussion of the case study students (Chapter 8), there is strong evidence that students fail to attend to grammatical and textual clues in the texts they read.

As expected, the paraphrase and determiner categories of anaphoric relations proved to be the most challenging to infer. The resolution by L2 readers of lexical anaphoric ties in expository texts is obviously an area that requires further exploration.

The analysis of anaphoric resolution in terms of a continuum with low inference anaphoric ties lying along one end of the continuum and high inference ties inclining toward the other end is useful for it clearly demonstrates the extent to which inferential demands affect anaphoric processing. Anaphoric resolution becomes increasingly challenging as the antecedents become longer and more complex, the cues become more opaque and the anaphoric ties stretch over longer sections of discourse. However, a two-category continuum is not as nuanced as a more graded continuum, so this is an area that merits further research, both from a text linguistic as well as an applied linguistic perspective.

The poor performance of the students in anaphoric inferencing in general, and in particular their poor performance in the lexical types of anaphoric references, could be a result of poor language proficiency - low levels of proficiency hamper the ability of L2 readers to perceive morphological or semantic similarities between linguistic items despite morphosyntactic changes. Similarly, it could be argued that the students have low levels of vocabulary and this results in failure to identify antecedents of determiners or anaphoric relations involving paraphrase anaphora. As Pakenham (1980:168) points out, it is natural to assume that a basic prerequisite for successful anaphoric resolution is "an adequate knowledge of the meanings of the lexical items used as head nouns in anaphoric NPs or as identifying lexical elements in antecedents". To control the vocabulary factor, Pakenham tested his subjects for vocabulary to ensure that they had adequate knowledge of the words in the test passages. Their scores on the vocabulary test indicated that



they were familiar with the words used in the anaphoric reference ties. He concluded that “the subjects’ ability to resolve anaphoric reference ... was influenced by factors other than vocabulary knowledge” (Packenham 1980:169). Cooper (1999) found that the vocabulary levels of L2 first-year Unisa and Vista students were generally very low, in both basic and academic word categories. Although the students in the present study were not tested for vocabulary, it is reasonable to assume that the majority have similar low vocabulary levels (this issue will be taken up again in Chapter 5 which deals with vocabulary inferencing). However, the anaphoric items in the paraphrase category (with the exception of *such evidence* which is used in an academically specialised way here to refer to findings from scientific research) are not particularly unusual words and should be relatively familiar to undergraduate students (*this direction, this discovery, such conditions, this practice*). Obviously, there may have been several words in the head nouns of the antecedent phrases that posed vocabulary problems for many of the students.

Although correlations cannot be used to infer causal relationships, the discrepancy in correlations between anaphoric inferencing ability and L2 proficiency between the Unisa and the Medunsa students calls for a speculative account of the relationship between these two variables. The high correlation found with the Medunsa students ( $r = .73$ ) certainly suggests a close relation between these two variables. However, the low non-significant correlation ( $r = .29$ ) obtained with the 17 Unisa Sociology students, *all* of whom were in the Fail or At Risk groups, suggests a more complex relationship. Using Stanovich’s (1986) argument for reciprocal causation between factors, consider now the following argument. It could be that, for students who have been studying through the L2 for a minimum of 8 years (as the majority of the students in this study have) the relation between L2 proficiency and anaphoric resolution becomes stronger the more skilled the student becomes in reading, since reading skill can lead to an improvement in linguistic proficiency, whereas increased L2 proficiency does not necessarily lead to an increasing in reading skill - unless the subject has reading skills in the L1 to transfer to the L2. In other words, L2 proficiency may not correlate strongly with anaphoric ability amongst weak readers (such as those in the Fail and At Risk groups). The relationship between anaphoric resolution and L2 proficiency is indirect, given the qualitative differences between the two variables. The L2 proficiency test tests for general language proficiency and not the specific kind of academic proficiency required in the learning context. Anaphoric resolution on the other hand requires specific inferencing skills that integrate given with new information in the context of expository texts. General language proficiency does not automatically confer skill in anaphoric resolution in written discourse. As argued elsewhere, this study assumes that reading is a specific skill in its own right and not simply an extension of language proficiency. Reading develops specific cognitive-linguistic subskills, some of which include the ability to process chunks of meaning units in written texts, to make links between these meaning units, to attend to cues in the text to guide the chunking and linking, and to develop executive control processes such as knowing how and when

to use appropriate reading strategies. Constant exposure to texts over the years enable readers to build up procedural or strategic knowledge of reading comprehension that facilitates reading in any language. Anaphoric resolution relies not only on linguistic proficiency but also on procedural knowledge of reading, which includes attending to and making use of cues in texts in order to construct meaning, and chunking information into meaningful units so that new information is integrated with given information. Increased skill in reading brings about increased skill in anaphoric resolution. Increased skill in reading also brings about increased language proficiency, whereas increased language proficiency does not necessarily bring about increased skill in reading or in anaphoric resolution during reading. Poor anaphoric resolution is an indication of lack of reading skill, but it is not necessarily an indication of lack of language proficiency (given that these students have a minimum of 8 years of study in the L2), hence the obtained correlation with the 17 Unisa students. Skill in anaphoric resolution is an indication of skill in reading, which is also necessarily an indication of sound language proficiency, hence the obtained correlation with the Medunsa students, many of whom had high levels of reading skill and language proficiency.

Students who do not perform well academically may also be students who do not attend to text cues. Skill in anaphoric inferencing is particularly important in the learning context because readers need to rely on the cues in the text in order to comprehend texts that deal with topics about which they have little prior knowledge. Allen (1985:613), for example, found that increased dependence on text cues is necessary for reading texts on unfamiliar contexts. Students who do not perform well academically may also be students who do not readily keep track of referents in the text, which means that they also cannot readily integrate incoming information to already given information. Good readers use strategies that “rely more on processing *units of thought* and less on word-by-word reading” (Nicaise & Gettinger 1995:287, emphasis mine - EJP). Testing anaphoric resolution is a useful way of assessing the processing units that readers use when reading expository texts. As the anaphoric errors indicate, many of the subjects have difficulty in this area of reading because they do not identify and integrate the relevant antecedent ‘units of thought’ that tie up with anaphoric devices. The units of thought they identify are often either underspecified, overspecified or irrelevant. This failure to focus on the appropriate information units in turn leads to difficulty in combining different portions of meaning units in texts. Consequently the reader keeps ‘missing the point’ or misinterpreting it, presumably resulting in faulty and fragmented comprehension, as reflected in their academic performance.

The poor performance of the students with regard to anaphoric resolution suggests the importance of giving explicit attention to the development of reading skills at tertiary level. Anaphoric resolution is a skill that is developed as a result of repeated exposure to texts. Given the disadvantaged backgrounds from which many of the subjects come, it can be assumed that many - if not most - of the subjects in the study did not have adequate exposure to written discourse in

either their L1 or their L2 in their primary and secondary school years. If one wishes to reduce Matthew effects in reading and enable L2 students to become 'richer', one needs to tackle the issue of explicit skill instruction directly. Leaving these students to their own reading devices exacerbates Matthew effects.

Although I have not come across much research literature dealing with the teaching of anaphoric resolution specifically, there is plenty of research indicating the efficacy of teaching students reading strategies in general (e.g. Pearson & Fielding 1991; Nicaise & Gettinger 1995) and inferencing strategies in particular. I would urge that low achieving students be taught strategies that will raise their awareness of anaphoric ties and the way in which authors use various cohesive devices to relate new information to information already given in the text. Such strategies and exercises can be used in either language or reading classes and should enable students to better attend to text cues and to try to map new information to given information with greater precision than these results reflect. For example, if students are made aware that the determiners *this* and *these* always signal the presence of already given information, then students can learn to backtrack and look for suitable antecedents onto which the determiners can be mapped. Cloze exercises and underline-and-arrow tasks, such as those used in the test, should provide awareness-raising exercises. Such strategies should also enable students to enrich their vocabularies over time, especially in the case of synonymy and paraphrase anaphors. For example, if students do not initially know that *perspective* is a synonym for view, then the paraphrase anaphor preceded by the determiner cue, *This perspective*, should help alert the student to make a connection. In this way a student's academic vocabulary in particular can slowly expand. Given the fairly extensive occurrence of nominalisation and high lexical density in expository texts in English, helping students to develop strategies for resolving anaphoric relations empowers them to process these complex features of written text more easily. Teaching strategies to help students resolve anaphoric relations more successfully is a step towards curbing Matthew effects so that weaker readers can in fact grow richer through reading.

## CHAPTER 5

### VOCABULARY INFERENCING

#### 5.0 Introduction

The aim of this chapter is to present findings relating to the ability of students to infer the meaning of unfamiliar words from the surrounding context during reading, and to see how this ability relates to their performance in the other inference categories and to their academic performance in general. However, before discussing these findings, this component of the study must first be situated within the context of the role of vocabulary in reading comprehension in general, and vocabulary inferencing in particular.

The study of vocabulary acquisition is one that has burgeoned into an active, growing field that is being researched from several angles by linguists, psycholinguists, lexicographers and those interested in language pedagogy. There are many areas within the field of vocabulary acquisition that have stimulated debate and research, and there are complex methodological issues underlying the apparently simple question of 'How are words learned?'. Some of the topical issues within the domain revolve around differences in definitions of what constitutes a word; how word knowledge is assessed; how word counts in a language are undertaken; differences in frequency between words used in oral and written discourse; the design of reliable, valid and representative vocabulary tests; the morphosyntactic nature of word forms; lexical chunks and idiomatic meanings; the way in which learners acquire denotative, connotative and figurative word meanings; receptive versus active vocabularies; incidental versus explicit vocabulary learning; the role of vocabulary in reading comprehension; differences between L1 and L2 vocabulary learning; vocabulary pedagogy and vocabulary learning strategies. Most of these vocabulary topics are beyond the scope of this chapter. Only these latter issues relating more directly to the question of vocabulary inferencing will be included for discussion in this chapter.

One of the contentious areas within vocabulary studies revolves around the extent to which incidental word learning occurs during reading and the kind of word meaning that is acquired. Integral to this question are three complementary issues, namely, (i) the extent to which context facilitates vocabulary acquisition, (ii) the amount of exposure needed for incidental learning to occur, and (iii) the extent to which learners differ in their ability to utilise contextual clues. In the following section I shall first provide an overview of vocabulary acquisition and briefly identify some of the developmental issues that characterise this field. Thereafter I shall examine more closely the role that context supposedly plays in inferring word meaning during text

comprehension and the extent to which readers supposedly infer word meanings during reading. This discussion will be situated within a broader framework, namely a consideration of the role that vocabulary plays in text comprehension. This review section of theory and research findings is followed by a methodological section in which the aims of the vocabulary aspect of the current inference study are identified and the subjects, materials, and procedures are discussed. The results of the test that tapped students' ability to infer word meaning from context are then presented and the chapter concludes with a discussion of the findings and their implications.

### **5.1 Vocabulary development: an overview of some issues**

Children learn their first words from social interaction with significant people in their lives. This interaction is grounded in the concrete, here-and-now framework of daily events and actions of the young child's life, and provides a rich oral communicative context within which words are acquired. By the age of about 22 months a vocabulary 'explosion' seems to occur, when the child acquires the naming principle and attaches words to people, objects, attributes, actions, states and events. A child's vocabulary develops in tandem with the acquisition of new concepts in the child's physical, social and affective world, with concrete concepts and words being acquired more readily than abstract ones. Later the rich language environment expands from the family to the school, the broader community, the mass media, and the written texts that characterise the literate practices of school.

Even though the verbal richness of home background varies considerably, children's vocabulary development on the whole seems to follow a fairly linear incremental path in the preschool years. Although many words are explicitly 'taught' to young children during the course of social interaction, especially in the 'naming games' of the early years, it is generally agreed that there is a large amount of vocabulary that, for all practical purposes, could not have been explicitly taught and must therefore have been incidentally acquired in the course of social interaction. In other words, it is generally held that children infer the meanings of a large number of unfamiliar words from oral contexts before they start school. By the time 6-year-olds start school, their phonological systems are largely in place, they have acquired basic syntactic structures (more complicated structures such as passives and complement clause structures will be added in the following few years), and they have a fairly large 'basic' vocabulary that consists mostly of high frequency words that occur in oral contexts.

But how large is a "fairly large 'basic' vocabulary"? There are no easy answers to this question. Chall et al. (1990) put it at about 4,000 words at age 6, while Dickinson & McCabe (1991) put it as high as 10,000 words. This brings us to one of the thorny issues in vocabulary studies, that

of estimating vocabulary size. Estimates about vocabulary size and rate of development vary, depending on how the concept of 'word' is defined, how word counts in a particular language are undertaken, how word knowledge is defined and assessed, and whether one is referring to L1 or L2 vocabulary development. Some scholars use Carroll et al.'s (1971, in White, Graves & Slater 1990) definition of a word as a graphically distinct type (e.g. White et al. 1990). However, several scholars such as Laufer and Nation, and Anderson, Nagy and colleagues work with the notion of word families, where a word is defined "as a base form with its inflected and some derived word forms" (Laufer & Nation 1995:312). Thus, for example, *happy*, *unhappy*, *happily* and *happiness* belong to the same word family. Knowing the meaning of one of these words is assumed to increase the chances of being able to infer the meaning of the other members of the word family.

However, vocabulary development does not just involve the quantitative accumulation of new words to the lexicon; qualitative development is also an integral part of vocabulary acquisition. Many words in the lexicon are polysemous, conveying different meanings in different contexts. Accounts of vocabulary development should therefore also take into account degrees of knowledge. It is commonly acknowledged that word knowledge progresses from receptive knowledge (recognised when heard or seen) to active or productive knowledge (used in speech or writing). There are, however, also a large number of words that never progress to free active use but remain part of a learner's receptive vocabulary repertoire. Although different categories of word knowledge have been proposed, a useful four-stage explanation of acquiring a word was proposed as early as 1965 by Dale (in Ruddell 1994: 419). To these stages a fifth may also be added:

- |         |  |
|---------|--|
| Stage 1 | never heard or seen it before;   |
| Stage 2 | heard/seen it before but meaning not known;  |
| Stage 3 | recognises word in context as having to do with X; may have a broad understanding of the word; |
| Stage 4 | knows the meaning of the word well; has specific knowledge appropriate to context;             |
| Stage 5 | uses word productively.  |

Several vocabulary tests have been designed to be sensitive to partial knowledge and can distinguish between a learner having a general understanding of a word as opposed to a more precise and accurate one.

As the discussion so far indicates, vocabulary development is quantitatively and qualitatively

cumulative, and for L1 learners, fairly rapid too, with about 1,000 word families added each year. Proposing a developmental sequence for L1 vocabulary, Nation (1990) suggests that by age 5 at least 1,528 word families are known (more than 4,000 lexical items), by age 10 a child knows about 7,020 word families, by age 15 approximately 12,000 word families are known, and by age 18 there are at least 17,600 known word families. University graduates are estimated to have a vocabulary of about 20,000 word families. Chall & Jacobs (1983) and Chall et al. (1990) situate a child's vocabulary development within the broader context of literacy acquisition. They suggest that by the age of 6, children have acquired a vocabulary of about 4,000 words from oral contexts before they learn to read. Reading later becomes an additional means whereby children are exposed to unfamiliar words and gradually learn their meaning from exposure to written contexts. As was pointed out earlier in Chapter 2, Chall claims that in Stage 1 of reading (Grade 1 and early Grade 2), most children can understand 4,000 or more words when heard, but can only read about 600. At the end of Stage 2 of reading (end of Grade 3), most children understand about 9,000 words and can read and understand about 3,000. By the end of Stage 3 (Grades 7-8), reading and listening are about equal, and for good readers, reading may be more efficient, and many new low frequency words are learned from exposure to the expository texts of middle and high school. Although vocabulary estimates are not given after Stage 3 of reading, Chall's model of reading clearly situates vocabulary development within the context of the communicative needs and functions defined by the literacy skills needed within the school curriculum.

Nagy & Herman (1987) estimate that the average school child learns above 3,000 new words each year during the school years of which at least half are estimated to be acquired from written contexts, the other half from oral contexts. However, as pointed out previously, variables such as home and school background as well as individual ability affect vocabulary development considerably. For example, comparing the effects of socio-economic status (SES) on reading and vocabulary, Graves, Brunetti & Slater (1982, in White, Graves & Slater 1990:281) found that middle class Grade 1 children in the USA read and understood about 50% more words than their socio-economically disadvantaged peers. In real terms this amounts to a vocabulary gap of between 5,000 - 6,000 words. In their comparative study, White, Graves & Slater (1990) found that by the end of Grade 4, middle-class children knew an estimated 15,000 words while same grade low SES children knew an estimated 10,000 words (these estimates are based on graphically distinct words, not word families). In other words, middle class children's vocabulary grew at a rate of 5,200 words per annum, while low SES children had a median growth rate of 3,500 words.

Further evidence of vocabulary differences between SES groups comes from Corson's study (1983) of British and Australian children between the ages of 12-15. By comparing the

acquisition of words of Anglo-Saxon origin (which comprise the bulk of words in our everyday conversations) with words of Greco-Latin origin (which form the bulk of academic and technical language), Corson found not only quantitative but also qualitative vocabulary differences between working class and middle-class children. Corson found that there were very few differences in the use of words from Greco-Latin origin between the 12-year-olds that could be correlated with class differences. However, major differences in the use of these words emerged amongst the 15-year-olds, with working class children showing very little development in the use of Greco-Latin words in oral or written usage. Corson used this distinction to propose his 'lexical bar' theory in which he argues that speakers of some social dialects in English, especially working class dialects, are hindered from accessing knowledge categories in their school curriculum due to differences in the types of words they acquire.

Both Chall & Jacobs (1983) and Graves et al. (1982) argue that evidence points to SES differences in vocabulary growing larger with age. In other words, unless there is active intervention to narrow the vocabulary gap, differences between SES groups increase rather than level off. Besides vocabulary differences between SES groups, differences also exist within groups at the level of individual ability. For example, Shefelbine (1990) draws attention to the fact that students who have reading problems also have problems acquiring new words, and research has consistently shown that skilled readers, irrespective of SES, have larger vocabularies than their unskilled counterparts.

So far the discussion has been concerned with vocabulary acquisition and size in the L1. What about vocabulary development in an L2, and what are the estimates with regard to the size of L2 learners' vocabularies? The notion of incidental word learning in context is obviously less problematic when applied to the L1 since, by the time children start school, they have already acquired basic competence in the language, which provides a scaffold for inferring word meaning from context. Furthermore, they are extensively exposed to the language in print or oral form on a daily basis. The underlying linguistic competence of L2 students is not commensurate with that of L1 students, and they typically have less exposure to the language. Thus not only do they have fewer bootstrapping mechanisms to infer word meaning but they also have fewer opportunities in which to apply word inferencing processes. Laufer (1992) estimates that for L2 students a threshold of 3,000 word families (about 5,000 lexical items) is needed for 'minimal comprehension' in English. She argues that for L2 students below this threshold, no amount of general academic ability or reading skills in the L1 will enable them to read in a satisfactory manner (Laufer 1992:100). Hirsh & Nation (1992, in Laufer 1998:256) suggest that 5,000 word families (8,000 lexical items) are needed for pleasure reading. Extrapolating from their survey of the occurrence and frequency of Dutch words, Hazenberg & Hulstijn (1996) estimate that first-



year native speakers of Dutch have mean vocabulary levels of about 18,800 words, non-native graduate students 15,800 and non-native prospective students 11,200 base words. The researchers propose that the minimal vocabulary size needed for university studies through the medium of Dutch is 10,000 base words. Hazenberg & Hulstijn (1996:158) warn that students with vocabulary levels lower than this are highly unlikely to attain the reading comprehension level required for university studies.

Turning to the local situation, we see disconcerting findings on the low vocabulary levels of L2 students who study through the medium of English in South Africa. In the Threshold report, Macdonald (1990) points to the immense vocabulary gap that exists between the words that Grade 4 L2 learners know at the end of their school year and the words they are then expected to know the following year in order to understand their textbooks in Grade 5. Thus, these children have a vocabulary of about 800 words, and it would seem that at Grade 5 level the children have not encountered more than half of the words used in their science textbooks. The disparity between textbook vocabulary and the students' vocabulary ranges between 38%-55% (Van Rooyen 1990:98). In her study of older L2 learners, Cooper (1996, 1999) examined the vocabulary levels of first-year L2 students at Unisa and Vista. She found a relationship between vocabulary levels and academic performance, with weak students having "significantly fewer words in their receptive vocabularies, particularly in the case of low frequency words" (Cooper 1996:34). It is doubtful that our typical L2 undergraduates have the 8,000 lexical items needed for pleasure reading, let alone the posited 10,000 base words needed for study at university.

Having outlined some of the quantitative and qualitative aspects of vocabulary acquisition in the L1 and L2, let us now consider more closely the incidental learning of words during reading, within the broader context of the relationship between vocabulary and reading comprehension.

## **5.2 Vocabulary and reading**

A robust correlation that is regularly found in reading studies is that between vocabulary and reading comprehension. Vocabulary knowledge is claimed by many to be one of the best predictors of reading comprehension (Davis 1968; Thorndike 1973; Anderson & Freebody 1981). For example, after studying 100,000 subjects between the ages of 10-18 years, Thorndike concluded that reading performance is "completely determined by word knowledge" (1973:62, in Daneman 1991:525). Intuitively this makes sense, for words form the building blocks of meaning; if we do not know the meaning of words in the text, there will be gaps in the text and hence gaps in our construction of the meaning of the text. As Nagy & Herman (1987:27) state, "children who know more words understand text better".

However, a building-block view of the relationship between vocabulary and reading comprehension runs the risk of assuming a simple unidirectional causal relationship between vocabulary knowledge and reading comprehension: readers will understand a text to the extent that they know the meanings of the words in the text. An obvious pedagogical implication arising from this view is the promotion of active vocabulary instruction in the language and reading classroom. In fact, there are many scholars who hold that inadequate vocabulary knowledge is the main barrier to school success. For example, in his influential article, Becker (1977, in White, Graves & Slater 1990) reviewed the data on reading and language development amongst disadvantaged children, based on the University of Oregon's *Follow Through* programme. He concluded that disadvantaged students were hampered by an insufficient knowledge of words, and this prompted him to promote systematic and explicit vocabulary instruction in language classrooms. He argued that a basic vocabulary of 7,000 words should be taught to disadvantaged students to ensure success at school. Becker's article prompted a spate of vocabulary studies in the USA and elsewhere during the 1980s, where the effects of explicit vocabulary instruction versus incidental vocabulary development via reading were compared and heatedly debated.

Not all scholars support the idea of extensive explicit vocabulary instruction. Criticism of explicit vocabulary instruction and support for incidental vocabulary learning derive from both pragmatic and theoretical arguments. For example, based on their extensive studies of word frequencies occurring in American school books between Grades 1 -12, Anderson and Nagy and their colleagues at the University of Illinois argue that systematic vocabulary instruction is impractical - the magnitude of the task is too vast since there are simply too many words to be taught. Although they do not discount the usefulness of vocabulary instruction, they argue that the best long-term solution to enhancing vocabulary development is through reading. This latter suggestion has found favour amongst adherents of the whole language approach to language learning (cf. Moorman, Blanton & McLaughlin 1992).

In the flurry of criticisms and counter-criticisms, the underlying issues tend to get blurred. In the first place, it is important to distinguish between vocabulary as part of language development per se, and vocabulary as part of reading comprehension specifically. Promoting explicit vocabulary instruction as part of language development is one issue. Here the issue is largely uncontested, and debates revolve mainly around 'how?' and 'how much?'. Promoting explicit vocabulary instruction as a way of improving reading comprehension is another issue altogether, and one that is hotly contested by many reading researchers on theoretical grounds. Reading comprehension is not the sum of the meaning of the words in a text, and knowing the meaning of the words in a text does not tell us how the overall text meaning is constructed during the

reading process. Vocabulary knowledge is not the only factor underlying poor text comprehension, and to assume that vocabulary knowledge determines reading success is to oversimplify a complex relationship. Research has shown that explicit vocabulary instruction does not necessarily lead to improved reading comprehension (Daneman 1991; Ruddle 1994).

If inadequate vocabulary is perceived as a barrier to reading comprehension or to academic success, then it is important to ask whether inadequate vocabulary is a cause or whether it is a symptom. As Daneman (1988:146) points out, vocabulary is a reliable predictor not only of reading comprehension but also of verbal ability in general and of general intelligence. The fact that vocabulary interrelates with so many modalities suggests that positing a direct causal relationship between vocabulary and reading comprehension is too simplistic. The assumption of a direct causal relationship between vocabulary and reading comprehension does not explain why differences in vocabulary arise in the first place. Granted, good readers have larger vocabularies than weaker readers, but how did they come to acquire so many more words in the first place? Moreover, even when the vocabulary variable is controlled in experimental reading situations (e.g. when subjects are given passages to read commensurate with their reading level and they can ask the meanings of any words they don't understand), there are still subjects who display variance in reading comprehension (Pretorius 1996). In other words, low levels of reading comprehension should not simply be attributed to low vocabulary levels, for even when poor readers do not have to contend with vocabulary gaps in texts, they still experience comprehension problems in a way that good readers do not. Vocabulary knowledge, one could argue, is a necessary but not a sufficient condition for reading comprehension.

In fact, Daneman (1991:525) turns the causal equation around and argues that differences in vocabulary size are "*the result* of differences in reading skill rather than the primary cause of such differences" (emphasis mine, EJP.). In other words, it could be that the amount of exposure to written texts and the cognitive-linguistic abilities that are developed through extensive reading are the underlying causes for differences in vocabulary growth. Stanovich (1986) puts forward a strong case in favour of reciprocal causation between reading and several processes such as phonological awareness, vocabulary and motivation. For example, he argues that in the early stages of reading, phonological awareness leads to early success in reading, and early success in reading in turn promotes greater phonological awareness. Similarly, he argues for reciprocal causation between vocabulary development and reading - a large vocabulary helps reading comprehension, and the more exposure to texts, the greater the vocabulary growth. The same argument applies to motivational factors and reading skill. This reciprocal causation creates powerful bootstrapping mechanisms that result in a "cumulative advantage phenomenon" (Stanovich 1986:381), also referred to as the 'rich-get-richer' Matthew effect. In other words,

more reading leads to larger vocabulary, which in turn leads to better reading comprehension, which leads to more reading, which leads to larger vocabulary. This view supports a programme that focuses on improving both reading levels and vocabulary size.

The debates around vocabulary size, reading comprehension levels and vocabulary instruction have naturally been extended to the field of L2 learning and pedagogy. In L2 learning the situation is somewhat different, for explicit vocabulary instruction has always been a component of L2 classroom teaching, especially in the initial stages of learning. However, for students for whom the L2 is the language of tuition and learning, inadequate vocabulary levels are seen by many to constitute the single largest obstacle to academic success (Kelley 1989, in Laufer 1992). Consequently, it is argued that intensive explicit vocabulary instruction is a necessity. Laufer, for example, argues that “massive vocabulary instruction is of the utmost importance in the teaching of a foreign language”, and lexical levels below the threshold (5,000 lexical items) “predict certain failure” (1992:101). Laufer (1989) and Nation (1997) also argue that L2 students will have more difficulty inferring the meanings of unfamiliar words in a text unless they have a recognition rate of at least 95% of the words in the text. This may be an overly conservative estimate.

There is no quarrel with the argument that L2 learners need explicit vocabulary instruction, especially at the beginning and lower intermediate stages of L2 learning. However, one must be cautious in adopting a building-block hypothesis that assumes a direct causal link between vocabulary knowledge and academic success, without taking into account the complex interrelationship between reading, reading to learn, vocabulary and academic success. An important question to ask in this regard is: *What are low vocabulary levels symptomatic of?* Low vocabulary levels are natural ‘symptoms’ of early stages of language learning. But what are low vocabulary levels symptoms of, after a minimum of 8 years of using the L2 as a medium of tuition and learning? The argument for intensive explicit vocabulary instruction in the L2 seems to assume that L2 students already have reading skills in their L1 that can be transferred to the L2 reading situation, and all they need to help them gain access to print information is vocabulary knowledge. In South Africa, many L2 students never developed adequate reading skills in their L1, they do little reading in the L1, they come from a largely oral, non-reading culture, they had little opportunity to properly develop their ‘meaning making’ comprehension skills in the L2 during the eight or more years of senior primary and secondary schooling, and they developed rote learning strategies in their content and language subjects during the eight or more years in which the L2 was their medium of tuition and learning. Such strategies do not promote the transfer of skills and knowledge from one domain to another. Although massive vocabulary instruction will undoubtedly be beneficial for these students, solutions to their

reading and reading to learn problems will not simply be solved by raising their vocabulary levels through explicit vocabulary instruction.

These then are some of the main arguments and counterarguments in the vocabulary controversy. If, as proponents of explicit vocabulary instruction claim, vocabulary development is promoted via explicit instruction, this means (i) that such methods must prove to be practical and efficient and (ii) that transfer effects do indeed occur during reading comprehension. On the other hand if, as proponents of incidental vocabulary learning claim, vocabulary does develop via reading, this means (i) that the meaning of many unfamiliar words must be inferrable from their context, (ii) that learners have sufficient exposure to texts for incidental learning to occur, and (iii) that learners must have the necessary skill to infer such meanings. Much of the research around the vocabulary debate has gone into establishing to what extent these claims are verifiable.

Let us now look in greater detail at some of the research findings and the insights that have derived from almost two decades of research and debate on these issues. Due to the limited scope of this aspect of the present study, the following sections will not contain extensive reviews of the research literature but will instead refer to a few representative studies and try to capture main trends that emerged from them.

### 5.2.1 Explicit vocabulary instruction

As we saw earlier, the view that reading performance, and thereby also academic performance, is largely determined by word knowledge has inspired a lot of research in vocabulary pedagogy. Two main instructional approaches have emerged within this field, namely **explicit word teaching** via various methods such as the keyword, translation and definitional methods, and **strategy or contextual instruction** whereby students are taught skills that will help them infer word meaning from context (an approach which assumes, obviously, that there are sufficient contextual clues to warrant the application of strategies). Although it is difficult to deal with these two approaches separately, since they are usually contrasted in research studies, for the convenience of emphasis only the former will be discussed in this section, while the latter is included under the rubric of contextualised vocabulary learning in §5.2.2.

Much of the research literature revolves around comparisons between direct instructional programmes and strategy or contextual instruction and the relative merits of different word learning techniques. There have been several studies which have shown the efficacy of explicit vocabulary instruction in boosting vocabulary levels in both L1 and L2 settings (e.g. Stahl & Fairbanks 1986; Jenkins, Matlock & Slocum 1989; Zimmerman 1994, in Coady 1997; Prince

1996; Paribakht & Wesche 1997). The existence of numerous reading and vocabulary handbooks and manuals for teachers providing suggestions for vocabulary instruction and a variety of vocabulary tasks for the language classroom (cf. Coady 1997:280-281) also attest to a firm faith in the importance of systematic vocabulary instruction.

Let us look at a few of these studies more closely. With regard to L1 learners, Jenkins, Matlock & Slocum (1989) compared the effects of explicit vocabulary instruction with practice in inferring word meaning from context on fifth graders. Both methods were implemented with low, medium and high amounts of practice. Results showed that explicit vocabulary instruction resulted in higher word knowledge gains than instruction in deriving word meaning. However, the authors caution that the use of explicit vocabulary instruction in the classroom, if properly done, is a time consuming activity. For example, they estimate that if 15 minutes a day per 5-day week were set aside for vocabulary instruction, then about 430 words could be learned in this way over a 36-week school year. This represents about 15% of the 3,000 words that children are estimated to acquire a year. They therefore recommend that direct vocabulary instruction be complemented with strategy instruction.

Moving away from the primary school to the other end of the educational spectrum, Paribakht & Wesche (1997) found that over a three month period reading plus explicit vocabulary training led to significant gains in L2 vocabulary knowledge among university students. Sanaoui (1995) found differences amongst adult learners with regard to the strategies they adopted for vocabulary learning. Some seemed to cope very well on their own whereas others were heavily dependent on their teachers for their lexical development and relied on explicit vocabulary instruction. She recommends that these dependent students be taught strategies that assist them in managing their own vocabulary learning.

Prince (1996) conducted an experiment in which 48 French undergraduate Pharmacology students were tested on their recall of newly acquired English words (English being a compulsory component of the course). The aim of the experiment was to determine the advantages and disadvantages of context learning and translation learning (learning lists of words with their L1 equivalents). Although his findings showed that an impressive amount of words could be learned and recalled via the translation method, the weaker students had difficulty transferring this knowledge to L2 discourse contexts. Prince's study is more than a quantitative assessment of new words learned for he situates word learning within the context of functional discourse and learning strategies. He suggests that the translation method of vocabulary learning is a low-effort, shortcut strategy compared to the high-effort strategy of inferencing required to learn words in context. He observed that the weaker students were "far more comfortable with the limited

operations involved in forming and retrieving a one-to-one correspondence than with the more complex and less salient links formed when processing sentences” (1996:486). Prince argues that learners are unlikely to adopt high-effort strategies unless they are given guidance, and he therefore recommends that learning strategies that combine the advantages of both translation and contextual learning should be considered for L2 teaching. He suggests that the explicit translation method is best suited to the earlier stages of learning an L2, but that as students’ levels of proficiency increase, so should their repertoire of higher level learning strategies.

Strong support for explicit vocabulary instruction comes from empirical studies by Nation and colleagues on threshold comprehension levels. Nation (1997) points out that a basic vocabulary of 2,000 words enables a reader to understand 80% of a text, which means that about 1 in every five words is unknown. However, it is argued that this ratio of unknown to known words is not adequate enough to allow for successful inferencing of the meaning of unknown words in context. Liu Na & Nation (1985, in Nation 1997:11) suggest that the successful inferencing of unknown word meanings can only start occurring when a learner has a vocabulary of at least 3,000 words, which allows for at least 95% of coverage of a text, with a ratio of about 1:25 (sic). The ideal is 98% coverage, with a ratio of 1:67 for unknown to known words. Low vocabulary levels result in what Coady (1997:229) terms ‘the learner’s paradox’: how can L2 learners learn enough words to learn vocabulary via reading when they don’t know enough words to read well? It is therefore argued that the only way to boost vocabulary levels to this threshold level is via extensive vocabulary instruction. Coady (1997a) and Horst, Cobb & Meara (1998) advocate explicit vocabulary instruction in the initial phase of L2 learning in order to increase vocabulary size to the threshold level and beyond.

What are we to make of these varying views and results? An overview of the literature on explicit vocabulary instruction indicates that it certainly boosts vocabulary levels. As Ruddell blandly states, “when we teach vocabulary, students learn vocabulary” (1994:421). The effects seem to be especially beneficial when the instructional methods contextualise the words and promote processing at a deeper level. Whether explicit vocabulary instruction also improves reading comprehension is an issue less easily resolved. Referring to the claim that explicit vocabulary instruction increases comprehension, Ruddell concludes that the available evidence suggests that “the most we can say with assurance is that sometimes it does and sometimes it doesn’t” (1994:414). Increasing the size of weaker readers’ vocabulary does not automatically improve their comprehension skills, although increased vocabulary knowledge may improve decoding skills such as word recognition and lexical access. Daneman (1991:525) reports that several vocabulary training studies have failed to show a direct relationship between increases in vocabulary size and concomitant text comprehension amongst poor readers. Likewise,

Hacquebord (1994) argues that increases in vocabulary do not guarantee concomitant increases in reading comprehension. She assessed reading comprehension in relation to grammar, vocabulary, non-verbal IQ and background knowledge of given text topics among Dutch L1 and Turkish L2 students in the first three years of secondary school. She found that although the L2 students showed an increase in word knowledge, there was no progress in text comprehension. She therefore advocates the explicit instruction of reading comprehension strategies in secondary schools rather than an emphasis on explicit vocabulary instruction.

In L2 classrooms, explicit vocabulary instruction is naturally seen to play a crucial role, especially in the initial stages of learning, in order to boost vocabulary levels to the threshold level. Explicit instruction should be regarded as complementary rather than oppositional to contextual word learning. However, vocabulary growth via explicit instruction does not always involve transfer effects where new meanings are integrated in the extended discourse of written texts, and does not therefore necessarily lead to improved reading comprehension levels. On its own, it is not a solution to reading problems nor to poor academic performance.

## **5.2.2 Incidental word learning**

As we saw earlier, proponents of the incidental word learning hypothesis argue that the majority of new words are learned incidentally from context, first from oral discourse and later from written discourse. Empirical work to test these claims comes from two areas of research, namely classroom based research on the one hand, where the effects of context are examined within the reading activities that typically occur in classrooms, and research into the effects of extensive reading programmes in and out of school on the other hand. Each of these areas will be briefly discussed below.

### **5.2.2.1 Classroom based research: The role of context in word learning**

Quite a lot of classroom research has been devoted to examining the role of context in word learning, often with conflicting results. Much of the research in this area has been done on L1 students and revolves around (i) examining the extent to which context, as it occurs in school based readers and textbooks, actually facilitates the learning of unfamiliar words, (ii) how much exposure is needed for incidental vocabulary to occur in any meaningful way, and (iii) comparisons between explicit vocabulary instruction and strategy instruction, where students are taught to utilise contextual clues to infer word meaning. Contextual information in these studies includes layout, headings, paragraphing, content, words, morphosyntactic markers, orthography, punctuation and illustrations - in sum, all the verbal and nonverbal features that characterise the



text and which a reader could potentially use to aid the construction of meaning.

There are several studies whose findings point to the conclusion that context is not really helpful in aiding the learning of new words, e.g. Beck, McKeown & McCaslin (1983), Bensoussan & Laufer (1984), Schatz & Baldwin (1986). For example, Bensoussan & Laufer (1984) tested 60 first-year students to see to what extent context helps in guessing the meanings of unfamiliar words. They found that for many words there were no contextual clues, and that guessing only helped in 13% of the responses in 24% of the total words. Their findings pointed to the conclusion that word guessing was more a function of preconceived notions that students had about possible meanings of the new words rather than use of context. They also found that although the good students knew more words, they were not better than the average and low performing students at guessing the meanings of words. In the light of their findings, the researchers advocate the explicit teaching of vocabulary in the second or foreign language classroom. Similarly, in another study Schatz & Baldwin (1986) found little evidence of the usefulness of context in supporting word meaning. Although Jenkins, Stein & Wysocki (1984, in Ruddell 1994:432) found that word learning did occur from context, learning was only successful after repeated exposure to new words in context. They concluded that the estimated annual vocabulary growth of about 1,200 words via classroom reading was too optimistic.

Beck, McKeown & McCaslin (1983, in Ruddell 1994:) found that not all contexts are equally facilitative of vocabulary acquisition. They identified four types of context that provide varying degrees of support for vocabulary acquisition, viz.

- \* misdirective context: this is a 'red herring' type of context that leads the reader to make incorrect inferences about word meanings;
- \* nondirective context: this context offers little, if any, support for word meaning;
- \* general directive context: this context provides general clues as to the broad meaning of the word;
- \* directive context: this is the most useful for it provides an exact, correct meaning of the word.

Only the last two types of context facilitate word learning, but because they do not occur in all texts, the opportunities for vocabulary growth are minimised (cf. also Hubbard 1996). Clearly, factors such as author style, communicative function, intended target readership of text, level at which text is pitched, and the extent to which texts are considerate, can all affect the contextual support for vocabulary. If not all contexts are helpful, what then are the chances of incidental word learning from context? Some scholars have concluded that incidental word learning from

context is a slow and error-prone process (Kelly 1990), that not all students are good at inferring word meanings from context, that there is a low retention rate from incidental word learning (Hulstijn 1992), and that due to their lower levels of linguistic proficiency in L2, L2 students are less successful at inferring word meaning from context than L1 students.

On the other hand, however, there are several studies that show that context does facilitate the learning of word meaning (e.g. Nagy, Herman & Anderson 1985; Nagy, Anderson & Herman 1987; Sternberg 1987, Krashen 1990; Slater & Graves 1985; Herman, Anderson, Pearson & Nagy 1987; Konopak 1988.) Defenders of the contextual position have argued that effects from incidental word learning have not been found in some studies because the tests have failed to be sensitive to small and partial gains in word learning. Using tests sensitive to different levels of word learning, Nagy, Herman & Anderson (1985) found strong evidence of incidental word learning among Grade 8 students at all levels of word learning. For example, some students went from no knowledge to some knowledge, whereas others acquired more specific knowledge, even when many words only occurred once in the text. Vocabulary testing techniques obviously play a role, for studies that do use vocabulary tests that are sensitive to partial knowledge usually show increases in vocabulary knowledge. Acquiring meaning is not an 'all or none' process, and research must be sensitive to partial learning.

Some studies have focussed on specific text features and the ways in which they enhance or inhibit incidental word meaning. In a study involving 413 Grade 8 students, Herman, Anderson, Pearson & Nagy (1987) examined how text features affected the amount of incidental word learning during the reading of expository texts. Using a text designed to be sensitive to small gains in vocabulary knowledge, they found that the students who read text versions that were conceptually elaborated gained more word knowledge than students who read the original or other revised versions of the texts.

It is generally acknowledged that not all contexts are equally conducive to incidental word learning. Sternberg (1987) identifies six moderator variables that help to mediate the learning of unfamiliar words. These are:

- a) frequency of occurrence of unfamiliar word;
- b) variability of contexts in which unfamiliar word occurs;
- c) importance of unfamiliar word for understanding of text as a whole;
- d) extent to which surrounding context supports word meaning;
- e) density of unknown words in a text;
- f) usefulness of prior knowledge for utilising cues.

Konopak (1988) compared the effects that considerate and inconsiderate history texts had on the incidental word learning of high and average ability Grade 11 students. She controlled the frequency factor in both texts and then concentrated on above factors (c), (d) and (f). For each target word, a phrase was included in the immediate sentence context that helped define the word. A comprehension test was included to see whether incidental word learning contributed to understanding the text as a whole, and students were tested beforehand to establish their prior knowledge of the text topics. Although the posttests showed that word learning had occurred after the reading of all the texts, the revised texts elicited better word knowledge and overall text comprehension than did the original text passages. Although the high ability students had better prior knowledge of the topics and showed greater word learning after reading the texts, the average ability students also acquired considerable word knowledge and text information, even though they had less initial prior knowledge of the topic. Konopak's findings show that relatively simple revisions to texts (e.g. inserting contextual definitions) enhance incidental word learning. Her findings also "confirm that high school students with a range of abilities and background knowledge can learn word meanings from context" (Konopak 1988:35).

In the Jenkins, Matlock & Slocum (1989) study referred to earlier, the researchers found that training and practice in deriving meaning from context resulted in students increasing their ability to derive word meanings. As mentioned earlier, based on their intervention programmes, the authors state that although explicit instruction is very effective, they estimate that more words can be learned per year through contextual inferencing than from explicit vocabulary instruction. For example, if - according to Nagy et al.'s estimations (1987) - between 16,000-24,000 unfamiliar words are encountered per year during reading, and even if there is only a 0.10 probability rate for learning via context, then at least 2,000 new words could be learned from deriving word meanings in context. In contrast, Jenkins et al. (1989) found that only about 400 odd words could effectively be taught explicitly in a 36-week programme. The authors conclude that although explicit instruction and teaching derivational strategies operate in different ways, both approaches have potential as means of significantly increasing students' vocabulary and should be regarded as complementary methods.

McFalls, Schwanenflugel & Stahl (1996) tested concrete and abstract words learned by 62 Grade 2 children, both via a basal reader programme and via outside reading. The researchers found that concrete concepts were learned more easily from such words encountered in basal readers. They speculate that this may be a function of teaching methods, where teachers focus more on teaching concrete words. However, they also found that children displayed an equivalent and moderate knowledge of non-basal concrete and abstract words. Although word learning did occur from basal readers, the researchers conclude that the comprehension oriented approach of

outside reading seems to facilitate the acquisition of both concrete and abstract words.

In their cross-cultural study, Shu, Anderson & Zhang (1995) compared Grade 3 and 5 children (170 American and 317 Chinese children) by testing their incidental learning of words during school reading. Their vocabulary tests were sensitive to partial vocabulary learning for they tested words at both an easy global level (*glare* means 'look at') and at a more difficult and specific level (*glare* means 'look at angrily'). The results showed that although conceptual difficulty notably affected word learning, significant incidental word learning from context occurred for both grades in both countries. Interestingly, the American children at this age did not attend to morphological clues to derive word meaning, while there was a significant morphological effect on learning amongst the Chinese children, especially at Grade 5 level. The researchers attribute this to the structural features of the Chinese writing system.

Another issue that is of relevance concerns learner characteristics in determining the effects of context on word learning. The focus here has been mainly on the ability levels of students. Critics of the incidental word learning hypothesis point out that not all students are equally good at inferring word meaning. There are several studies that have looked at this variable. Sternberg & Powell (1983) investigated inferential ability and they found that the ability of high school students to infer the meaning of unknown words from context correlated very strongly with reading comprehension (in Daneman 1991:525). The researchers argue that the same types of syntactic, semantic, integrative and inferential processes that are used to decode and comprehend texts that contain known words are also used to infer the meaning of unknown words. According to this view, the obtained correlations between vocabulary size and comprehension derive from an individuals' ability to learn or acquire new information from context, and learning from context relies on inferential abilities. On this view, then, differences in vocabulary knowledge may not be the main cause of comprehension differences, but rather the *result* of differences in comprehension skills, which rely on inferential ability. In the Herman, Anderson, Pearson & Nagy (1987) study that examined incidental word learning during the reading of expository texts by Grade 8 students, the researchers found that overall, the high ability students learned more word meanings than the low ability students. The former had a .26-.46 probability for incidental word learning, while the latter had a .05-.10 learning probability. This finding is consistent with that of Jenkins et al. (1984) but not with some other studies. For example, Nagy, Anderson and Herman (1987) and Graves (1989, in Ruddell 1994:432) found that low-ability readers were as good as high ability readers in constructing meaning from context. Likewise, Shu, Anderson & Zhang (1995) found that word learning from context did not depend on ability. They argue that this has important pedagogical implications, for it means that "extensive reading will benefit all children, regardless of their abilities" (Shu et al. 1995:90).

The apparently conflicting results in some of these studies concerning ability levels obscures the real issue, which is that all students, irrespective of their reading and inferential abilities, seem to benefit to some extent from extensive reading. It is not surprising that ability differences in inferential skills emerge between students - ability differences occur in all populations along several dimensions. Ability differences also emerge in groups of students that have explicit vocabulary instruction, as the Prince (1996) study found, where low ability students had problems transferring their newly acquired vocabulary knowledge during reading. Students differ not only in ability but also in terms of attitude, motivation and strategy use, all of which can impact on vocabulary growth.

One factor that underlies the equivocal findings of incidental word learning concerns methodological issues. Determining vocabulary size and growth is a notoriously tricky methodological concern, and many studies are methodologically flawed in some way or another. It can also be argued that the reason why some of the comparative studies between explicit instruction and contextual learning did not find contextual learning effects was because the study was too short. Contextual word learning is a gradual and cumulative process and some kind of longitudinal perspective is therefore required in order to capture such effects. Several studies of the effects of reading on children's L2 development in general (and not just on vocabulary learning) found that significant language effects do not readily emerge before at least six months of extensive exposure to storybook reading (e.g. 20 minutes of storybook reading per 5-day week) had taken place (e.g. Elley 1991; Feitelson, Goldstein, Iraqi & Share 1993).

In sum, research into incidental word learning in the classroom shows that although not all contexts are facilitative of word learning, incidental word learning does occur through classroom reading, but it should not be seen as a quick-fix solution to increasing vocabulary levels or suddenly improving academic success. Although all children seem to be able to acquire new words incidentally through classroom reading, some students seem to be better at it than others. Incidental word learning and explicit vocabulary instruction are complementary not oppositional approaches, and any instructional programme that helps students to acquire new words, such as creating and encouraging opportunities for extensive reading, advising students how to remember new word meanings, how to transfer word knowledge to written texts, or how to utilise contextual clues to infer meaning, should be encouraged.

#### **5.2.2.2 Extensive reading and vocabulary development**

While the effects of incidental learning from contexts within the classroom setting are sometimes equivocal, the effects of extensive reading on vocabulary development are more robust. Support

for the facilitating effect of context on incidental learning comes from studies that have looked at the effects of 'book flooding' or extensive reading in and outside the classroom, not only on vocabulary acquisition but on language development in general. A staunch proponent of the benefits of extensive reading on the development of language skills in general, Krashen (1993) provides a review of numerous studies (involving mainly L1 subjects) that show beneficial effects of reading on language and conceptual development as well as the development of background knowledge. Krashen explains these effects in terms of his 'meaningful and comprehensible input' hypothesis: language acquisition occurs when activities providing comprehensible input, which is slightly in advance of the learner's level, are focussed on meaning rather than form. The reading of high-interest books provides such a context for learning. This contextualised, meaning-based approach to language learning lies at the core of the whole language approach within L1 and L2 pedagogy.

Anderson, Wilson & Fielding (1988, in Stanovich et al. 1996:21) tracked the out-of-school exposure to print of Grade 5 children (10-11 year-olds). From diary studies they estimated how much time the pupils were engaged in reading out of school. The results are thought-provoking. Pupils at the 20th percentile were reading for less than 1 minute daily outside of school, while those at the 80th percentile were reading an average of 14 minutes daily out of school. The researchers estimated that children in the upper percentiles were exposed to more than 2,5 million words per year *outside of school*, over 46 times more than a child at the 10th percentile, who was exposed to a mere 51,000 words per year outside of school. Obviously studies such as these raise methodological questions about the accuracy of the reading time and word exposure estimates; nevertheless, they do point to the importance of giving serious consideration to the enriching role that reading may play in constantly and consistently providing opportunities for lexical development within meaning-based contexts over extended periods.

In the Shu, Anderson & Zhang (1995) cross-cultural study referred to earlier, the researchers also tested the effect of out-of-school reading by Chinese children, since children are given very little out-of-school reading in China. Their results indicate that the probability of incidental word learning from context for children who did much reading was seven times higher than children who did little reading. These findings support the findings of Anderson et al. (1988) who found that out-of-school reading was a strong predictor of vocabulary development of American Grade 2-5 children.

There are also several studies that deal with extensive reading in the L2 and its effect on language and literacy development in the L2. Elley (1991) reviews nine book flooding situations where primary school children were exposed to extensive L2 reading programmes where the emphasis

was on reading for meaning from high-interest texts. The children in the control classes received extra L2 instruction based on the audiovisual approach to L2 learning and teaching. The findings consistently showed that extensive reading had positive effects not only on vocabulary growth but also on other measures of language development in comparison to the control treatments. From her work with Israeli and Palestinian primary school children, Feitelstein and her colleagues also found that book flooding had significant effects on several measures of language development, including vocabulary (Feitelstein, Kita & Goldstein 1986; Feitelstein et al. 1993).

Although most of the research on the effects of book flooding involve primary school children or adolescents, a few studies have been conducted more recently with adults, with similar findings. In their small case study, Cho & Krashen (1994) worked with four adult immigrant learners of English (three Korean and one Spanish) to see what effects leisure reading would have on their language proficiency. All the adults were between 21-35 years of age, had learned English in traditional ESL classrooms, and did very little leisure reading in English. They were asked to read the Sweet Valley range of books (written at Grade 2, 4 and 6 level) in their free time. Each book is about 70 pages long, contains about 7,000 words and includes a great deal of useful colloquial language. All four women became enthusiastic readers during the two-month period - two of them read 2 books a week and two of them managed 5 books a week. One of them read 23 books in a month. All four women showed considerable vocabulary gains on the posttests. The women also reported that the reading had helped their oral/aural language proficiency and they felt more confident when interacting with native speakers. Similarly, in their case study of an adult learning Portuguese as L2 during a 5 month stay in Brazil, Grabe & Stoller (1997:119) concluded that "extensive reading resulted in improved vocabulary, reading, and listening comprehension".

In their carefully designed study Horst, Cobb & Meara (1998) examined the occurrence of incidental word learning amongst low intermediate L2 students with mean vocabulary levels of around 3,000 words who were exposed to the reading of an abridged and simplified text (*The Mayor of Casterbridge*) during six hour-long reading sessions. They found that small but substantial amounts of word learning did occur, especially with concrete nouns that had a high frequency rate in the given text (i.e. words that were repeated eight times or more in a text of 21,000 words). However, the authors concluded that for low intermediate students with a vocabulary size of 3,000 words "extensive reading is not a very effective way for learners ... to expand their lexicons" (1998:220). They recommend the explicit teaching of high frequency words until lexical independence is reached, when "they will know enough words and can read in enough volume for more substantial incidental benefits to accrue" (Horst et al. 1998:221).

Overall, the findings of extensive reading studies show fairly strong support for incidental word learning from reading, although Nation (1997), Laufer (1998) and Horst et al. (1998) add the cautionary proviso that readers must have a base vocabulary of around 5,000 words to scaffold incidental word learning. Differences in exposure to written texts may explain why vocabulary differences arise in the first place. This supports Daneman's argument that students who have large vocabularies are students who do a lot of reading. Furthermore, the positive effects of extensive reading are not confined to vocabulary development alone, but affect other aspects of L2 learning too, such as increased background knowledge, longer attention spans amongst young children, the production of longer phrase or sentence units and more complex use of syntax, familiarity with the conventions of different genres of text and different authors, improved ability to infer causal connections during reading, improved word recognition skills, improved reading comprehension ability in general. Improved attitudes towards reading and better levels of motivation for language, reading and school have also been reported in several studies. All in all, the cognitive-linguistic benefits seem to accrue exponentially. Grabe & Stoller (1997:119) argue that their study suggests that "reading improves vocabulary knowledge and vocabulary knowledge supports reading development", thereby supporting Stanovich's view of reciprocal causation.

### 5.2.3 Oral/written contexts and vocabulary development

There is an increasing awareness of the fact that there are large differences in lexical richness between speech and print. These differences have important implications for both quantitative and qualitative aspects of vocabulary learning. Tied up with the argument that extensive reading provides abundant opportunities for lexical growth (as well as growth in other areas of language) is the fact that there are statistical differences in the distribution of words that occur in oral and written contexts. Why is it that students with smaller vocabularies typically know a high percentage of high frequency words (Corson 1983; White et al. 1990; Cooper 1996), words which occur predominantly in oral contexts? Alternatively phrased, why do students with small vocabularies know fewer words that occur predominantly in written texts? These kinds of word distributions strongly suggest that exposure to written texts is what accounts for differences not only in vocabulary size but also the source of word acquisition. There have been a few L1 studies that have looked at this question directly.

The study by Corson (1983) has already been discussed (§5.1) and I refer to it here to highlight its relevance to the oral/written source of acquired words. Corson looked at different types of words in English, and distinguished between words of Anglo-Saxon origin and those of Greco-Latin origin. Every day high frequency words are typically of Anglo-Saxon origin; very few



technical vocabularies derive from this origin. In contrast, Greco-Latin words abound in written texts and are typically associated with more technical and abstract knowledge domains. These words are also used increasingly in teacher-talk and in textbooks from the middle school years onwards. In fact, Corson (1983) estimates that these words comprise from 65-100% of specialist words used in the different content subjects in the school curriculum. The differences in the use of these words by working class and middle class adolescents became clearly evident by the age of 15, with middle class children acquiring a much larger percentage of words of Greco-Latin origin than their working class peers. Corson ascribes this to differential exposure to written language. Romaine (1984:215) explains as follows:

Familiarity with this part of the English lexicon is acquired late and largely through exposure to the written language and discussion of texts containing them in the classroom. Outside the classroom they tend to be infrequently used; in fact they may be avoided altogether by many speakers in their active spoken vocabularies.

Due to the differences in lexical richness between speech and print, several scholars now argue that conversations are not a substitute for reading when it comes to vocabulary growth. In their study, Hayes & Ahrens (1988) compared the frequency distribution of 86,000 English words in three main categories of language use, namely written language, TV shows and adult speech ranging from informal conversations to formal courtroom language. They found 50% more low frequency words in children's book than in prime time TV shows and informal adult conversations. They conclude that oral discourse does not provide nearly as rich a lexical abundance of words as written discourse and that for vocabulary growth to develop after the middle grades, students must be exposed to written texts. The bottom line is that students who read a lot are students who read well, and it is this extensive exposure to written rather than oral language that provides additional opportunities and impetus for vocabulary growth.

#### **5.2.4 Drawing conclusions**

An overview of the research shows some mixed results, which are sometimes due to different research foci and methods. It seems fair to conclude that although explicit vocabulary instruction is helpful in vocabulary development, and indeed necessary in the L2, especially in the initial stages of learning, vocabulary alone does not promote the broader literacy practices of making meaning through reading and writing. The two main weaknesses of explicit vocabulary instruction are that transfer effects do not always obtain and reading comprehension does not necessarily improve. The advantages of vocabulary development through contextual learning are that, firstly, words occur within their natural, communicative context, i.e. within a semantic, syntactic and discourse setting. Successive encounters with unfamiliar words in different

contexts enable learners to fine-tune their understanding of words so that partial knowledge can develop into specific knowledge. Secondly, acquiring new words through exposure to print helps students move beyond low-effort strategies that in the long-term are not productive or empowering. As Prince (1996:489) points out

... assessing the meaning of a word in context obliges the learner to develop strategies, such as anticipating and inferencing, which become increasingly profitable as learning progresses because they instill an attitude of self-reliance that is the hallmark of proficiency.

Simply knowing the definition of a word or its translation equivalent is not sufficient for reading comprehension; students need to integrate their new knowledge with existing knowledge bases, and this is facilitated by encountering new words repeatedly in context. Thirdly, as Perfetti's verbal deficit hypothesis (1988) predicts, readers pay attention to comprehension more readily once they start recognising words automatically. Learning translation or definitional lists of words does not guarantee automatic recognition of these words when they occur in natural running texts, nor does it guarantee transfer of vocabulary knowledge appropriate to the context. As Prince (1996:488) cogently argues, the ability of older learners to learn new words from lists is quantitatively impressive, but "this is no guarantee that they will be successfully accessed for use in an L2 context". Fourthly, acquiring words through exposure to print promotes the learning not just of vocabulary, but also of other aspects of language forms and functions, as well as of the acquisition of information in general. Extensive print exposure also increases general background as well as text knowledge, thus widening the declarative knowledge base on which high level processes can operate effectively during reading comprehension. Successful reading to learn depends on the ability to learn from context; the ability to learn from context leads to independent readers/learners.

All four favourable conditions outlined above obtain spontaneously and concurrently during the reading of natural texts but they do not necessarily all obtain when vocabulary is explicitly taught by other means in the classroom. This is not to say that explicit vocabulary teaching should not be undertaken - on the contrary, it complements incidental word learning, and is necessary for boosting the L2 lexical basis of students who have not reached the threshold level. However, it must be done in conjunction with a programme that develops reading skills. In South Africa, students who study through the medium of an L2 need to be well versed in the broader literacy practices of reading, writing and learning effectively in the L2, yet many have come from a non-reading culture, have marginal L1 reading skills to transfer to the L2 situation, and have previously had few opportunities to develop reading comprehension skills in the primary and secondary years of schooling. In order for them to become independent readers, programmes are

needed that will boost reading levels together with vocabulary levels.

We turn now to the current study to see how its focus on vocabulary inferencing relates to the study of inferences in general, and the study of contextual word learning in particular.

### 5.3 Aims of present study

Given that, during reading, inferencing is integral to meaning making in general, and to incidental word learning in particular, it is important to have a better understanding of the inferential behaviour of students when they encounter unfamiliar words. If we can determine to what extent students engage in word inferencing and attend to contextual clues, then we are in a better position to design instructional programmes that will address problem areas in this domain. The vocabulary component of the study was driven by three aims. The primary aim of the study was as follows:

- (i) To assess and examine the students' ability to infer the meanings of words from naturally occurring expository contexts and to see how this contextual inferencing ability relates to other aspects of their overall reading inference ability, their anaphoric inference ability, their L2 performance, and their academic performance. Four research questions were formulated to this end:

- 1a *Is there a significant relationship between students' ability to infer word meanings from context and their overall inference score from reading comprehension tests?*

The rationale for this question derives from the assumption that students who demonstrate ability in inferencing skills in general during reading comprehension will also show ability in specific inferencing skills, such as inferring word meanings from context.

- 1b *Is there a significant relationship between students' ability to infer word meanings from context and their ability to resolve lexical anaphors?*

This question is premised on the notion that lexical anaphoric ties involving repetition, synonymy and paraphrase provide a potentially rich source of lexical growth in texts. Anaphors co-refer to already stated antecedents, so even if one of the items in the reference tie consists of an unfamiliar word, if a student is able to infer a link between the anaphor and its relevant antecedent, this resolution process provides a basis for word

acquisition. In other words, students who are not successful at resolving lexical anaphors miss opportunities for lexical growth.

- 1c *Is there a significant relationship between students' ability to infer word meanings from context and their L2 proficiency?*

The rationale derives from the premise that if L2 proficiency is taken to reflect an ability to acquire new verbal knowledge, and if vocabulary inferencing reflects an ability to acquire new verbal knowledge from context, then there should be a relationship between these two factors.

- 1d *Is there a significant relationship between students' ability to infer word meanings from context and their academic performance?*

The rationale here derives from the argument that academic performance depends to a large extent on the ability to 'read to learn' and thereby acquire new knowledge from print information. Since reading to learn includes the ability 'to read to learn new words' in context, there should be a relationship between these two factors.

Besides these four questions, two further aims were also established, one of a text linguistic nature and the other of a psycholinguistic nature. These aims were:

- (ii) To establish which of the words in the vocabulary test were the easiest to infer and what kinds of clues in the given paragraphs proved to be the most facilitative in guiding vocabulary inferencing;
- (iii) To examine underlying patterns in the students' vocabulary inferences as well as their inference errors to see what light these might throw on their reading and inferencing skills in general and on Matthew effects in particular.

It must be stressed that this was not a vocabulary test but rather a test of the students' potential to learn new words from context.

## 5.4. Methodology

In this section the subjects, the testing procedure and the vocabulary inferencing test used in the present study are described in greater detail.

### 5.4.1 Subjects

There were two groups of subjects who participated in this part of the inference study. The first group consisted of 23 first-year Sociology students from Unisa. However, the test proved to be extremely stressful for many of the participants, they had problems finding clues in the text, and 17 of the 23 participants received less than 20% for the test, so the results are not displayed here. As stated elsewhere (§4.5.1), these students were academically vulnerable and over-represented in the Fail and At Risk groups and this may explain the difficulties they had in doing this test. The second group consisted of 72 students from Medunsa (47 Medical and 25 Occupational Therapy students) who wrote the vocabulary test. Further data on vocabulary inferencing also came from four vocabulary inference items that were included in the 27-item reading comprehension test that was sent out to first-year Psychology students, to which 1,240 students responded. However, these latter results will be discussed together with the rest of the Psychology test results in Chapter 8.

### 5.4.2 Test material

In order to replicate the naturally occurring text conditions of the students, it was important to use test material that reflected the kinds of expository texts that students regularly read for their course work. The detailed vocabulary inference test that was administered to the students consisted of 14 separate paragraphs all dealing with social science topics, taken from undergraduate Sociology and Psychology textbooks. The average length of each paragraph was about 85 words. In each paragraph a word was underlined and the students were asked to indicate whether (a) they knew the meaning of the word for sure, **or** (b) if they weren't sure of the meaning, to state what they *thought* the word meant in that particular context. After that, they were asked (c) to indicate or identify clues in the paragraph that could help a reader work out what the underlined word meant. Their answer in (c) could consist of either underlining relevant words or phrases in the paragraph that provided clues to the meaning of the underlined word, or of providing an explanation for how they inferred the word's meaning. At the beginning of the test the students were also told to underline all the words in each paragraph that they did not know. On the following page is an example of a vocabulary inference test item:

Answer either (a) or (b).

<p>(a) I know for sure that the word <b>drawbacks</b>, as used in this context, means ...</p> <hr/> <hr/> <hr/>	<p>(b) Although I'm not absolutely sure, I <i>think</i> that the word <b>drawbacks</b>, as used in this context, means ...</p> <hr/> <hr/> <hr/>
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- (c) Underline the words/phrases/sentence in the paragraph that provide clues, if any, to the meaning of this word, or else write down, in the space below, possible clues in the context that suggest the meaning of **drawbacks**.

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See Appendix E for the complete vocabulary inference test.

This kind of test format made it possible to distinguish between words known by the student from those words that were presumably unfamiliar and whose meanings were being inferred. Furthermore, in order to test whether the students could perceive the relationship between the underlined words and the clues provided in the paragraph, they were explicitly instructed to answer (c) and to identify the appropriate clues to the word meaning, irrespective of whether they claimed to know the word meanings or not. Question (c) was important for determining to what extent students were attending to clues and what kinds of clues they were using.

All the words (except for test item 7, *accounts*) belong to the category of advanced words in English, i.e. the non-technical kinds of words that are typically encountered in written rather than oral discourse. The word *account* (n), as used in the commercial sense (i.e. a record of money received or spent), belongs to the first 1,000 word list, but when used in an academic context, its meaning changes to 'explanation'. So although the word is listed as occurring amongst the first 1,000 words, its academic meaning is more likely to be found amongst the list of advanced words.

### 5.4.3 Test procedure

To try to make sure that the students understood what they had to do in the test, translation equivalents were provided of the word *clue* in North Sotho, Tswana and Zulu, and an analogy drawn between detectives and their use of clues in solving crime problems, and readers and their

use of clues in solving comprehension problems during reading. Even so, a few students had problems understanding what they were supposed to do in (c), and required individual explanations. (This was particularly so amongst the Sociology students, a response which in itself suggests lack of familiarity in searching for meaning within a text.) No time limits were set on the test, and most students completed it within 45-60 minutes. A few took up to an hour and a half.

#### 5.4.4 Contextual clues

All 14 paragraphs contained explicit clues that could guide a reader to infer the meaning of the underlined word. There were five types of clues in all, as explained below. Sometimes more than one type of clue occurred in a paragraph.

##### 5.4.4.1 Synonymous clues

In this case, a synonym of the underlined word was used later in the paragraph, preceded by the determiner *this/these* to make the link back to the underlined word more obvious. The clue is indicated by the shading in the example below:

1. For many years, people accepted technological advances uncritically, assuming that they could only improve their lives. The car, for example, was seen only as an efficient and convenient method of transportation. It was not recognised as a source of noise and pollution. But it is now clear that technology brings many drawbacks with it. Of course, those that argue that we should reject all technology are extremists, but there are many other people who are aware that these disadvantages can be enough to outweigh the potential benefits.

Although the lexical anaphor *these disadvantages* provides an explicit synonymous clue, it is not the only clue. The contrastive arguments expressed in the negative sentence *It was not recognised ...* and signalled by the *But ...* clause in the following sentence, together with the contrast between *disadvantages* and *potential benefits* at the end of the paragraph all provide thematic clues for inferring the meaning of *drawbacks*. In all, five paragraphs, viz. 1, 5, 7, 10 and 13, contained synonymous clues in the vocabulary test.

##### 5.4.4.2 Contrastive clues

In this case the clues were words or phrases that conveyed an opposite or contrastive meaning from that of the underlined word. For example:

3. From the age of one week, newborn babies will look at a patterned surface (e.g. stripes or circles) more often than even a brightly coloured plain surface. Under the age of one month, a baby's perceptual capacities are still weak, and images more than about a foot away are blurred. Thereafter, visual abilities increase rapidly and images become more focused. By the age of about four months, a baby will keep in sight a person moving about the room.

In this example the comparative phrase *Thereafter visual abilities increase* and the comparative cohesive device *more focused* can help the reader infer that the previously given information referred to visual abilities that were low and that were 'less focused', i.e. blurred. In all there were five paragraphs in which antonymous or contrastive meanings could help cue a reader to infer the meanings of the underlined words, viz. 1, 3, 9, 11 and 13.

#### 5.4.4.3 Thematic clues

In this case, the topic or theme of the paragraph as a whole provided a clue as to the meaning of the underlined word. For example:

14. Carceral organizations were rare in medieval times. Jails and dungeons sometimes existed, but they were few and far between, and were not places where convicted criminals served fixed sentences. People were kept in them as a means of stifling political opposition, to be tortured in order to extract information, or to await trial. The mentally ill either lived within the community, or were forced to roam the countryside. There were no asylums or mental hospitals.

The fact that both jails and mental hospitals were included in a paragraph dealing with *carceral organisations* should cue the reader to the common theme, i.e. institutions which limit people's freedom. Three paragraphs in the vocabulary test provided thematic clues, viz. 4, 12 and 14.

#### 5.4.4.4 Paraphrasal/definitional clues

In this case, a phrase that explained or defined, via paraphrase, the meaning of the underlined word either preceded and/or followed the given word. For example:

2. A small amount of alcohol can result in changes in a person's mood and behaviour. A blood alcohol level of about .05% can make a person feel a sense of release from tension and inhibitions. This mild euphoria is the aim of many people who drink moderately. However, this feeling of happiness drops as the alcohol level increases; there is an increasing loss of control because alcohol acts as a depressant on functions of the brain.

There were five paragraphs that contained paraphrase or definitional clues, viz. 2, 4, 6, 8 and 9.



#### 5.4.4.5 Morphological clues

In this last category, a morphological clue could help cue the reader to inferring the meaning of the given word. In the present test there was one paragraph containing an explicit morphological clue, which was the prefix *in-* meaning *not x*. For example:

9. The relationship between the mind and body is a thorny and problematic issue. The problem stems partly from the way in which the terms *body* and *mind* are used in everyday language. When we speak of our body we generally mean something which is our own, which is tangible and has form, colour and texture - something which can be touched and felt. We use mind to refer to something intangible but which, like the body, is still a part of oneself. It is, amongst other things, the storehouse of your private and personal experiences.

As can be seen from this paragraph, it is not only the morphological clue *tangible-intangible* which helps cue the reader to the meaning of *intangible*, but also the fact that the meaning of *tangible* is explicitly given in the preceding part of the paragraph (definitional clues) and is also an antonym of *intangible* (contrastive clue).

Paragraph 14 containing the word *carceral organisations* also constitutes a morphological clue (from *incarcerate*), but it was not expected that the students would be familiar with the Latinate form. In fact, only one student in answering 14(c) used the term *incarcerate*.

In all, the 14 vocabulary test items fell into the following categories, according to their clues. As can be seen, several paragraphs contained more than one clue to help the reader infer the meaning of the underlined word (as indicated by the bracketed numbers below).

ANTONYMOUS/ CONTRASTIVE	SYNONYMOUS	THEMATIC/ COLLOCATIONAL	PARAPHRASE/ DEFINITIONAL	MORPHOLOGICAL
(1)	(1)	(3)	2	
(3)	5	(4)	(4)	
(9)	7	12	6	(9)
11	10	(14)	8	(14)
(13)	13		(9)	

As mentioned earlier (cf. §5.2.2.1), according to Beck, McKeown and McCaslin (1983, in Ruddell 1994), there are two types of context that are the most helpful for vocabulary inferencing, namely a general directive context and a specific directive context. Because all the

paragraphs in the test provide some or other explicit clue to identifying the relevant word meaning, they can all be said to comprise a specific directive context. In cases where there are more than one clue, the one may provide a more explicit directive context while the other provides a more general directive context. These issues will be examined more closely in §6.4.2 below.

#### 5.4.5 Scoring procedures

Subjects were assigned a full mark if, in their response to either (a) or (b) they provided an accurate meaning of the word as it was used in the given context. In order to make the test sensitive to partial vocabulary knowledge, the subjects were assigned half a mark if, in their response to either (a) or (b), they provided a partially correct answer of the meaning of the word. ‘Partially correct’ was defined as containing a general or gist awareness of the word’s meaning. For example, if a student described *blurred* as meaning ‘not seeing well’ instead of a more precise meaning such as ‘out of focus’ ‘not clear’ or ‘fuzzy image’, a score of 0.5 was still given. Similarly, an explanation of the *Cold War* as ‘a war that started because of competition’ was given 0.5 because it recognised the competitive nature of the Cold War, even though the student seemed unaware that it was not a real war. With regard to question (c) of each paragraph, the subjects were assigned 1 mark for any relevant clue they correctly identified as contributing to inferring the meaning of the underlined word.

Because this was a test of inferencing ability and not word knowledge, in working out a total vocabulary inferencing score, no marks were allocated to answers to (a). Instead, 14 marks were allocated to the 14 answers to (b) and 14 marks to answers to (c), giving a final total of 28, which was then converted to a percentage. The total number of responses answered in (a) were subtracted from this sum of 28, and a percentage worked out on the number of remaining answers the students inferred in (b) and all his/her answers to (c). For example, if a student claimed to know for sure 4 of the 14 words in the test, and thus answered (a) four times, then 4 marks were subtracted from 14, and a percentage worked out on the remaining 10 marks for (b) and all the 14 marks for (c). In this way a student’s ‘known’ vocabulary score from (a) was kept separate from his/her word inferencing score, as reflected in (b) and (c).

### 5.5 Results

In this section I shall describe three sets of results in the same sequence as the set of three aims. Firstly, the psycholinguistic results pertaining to word inferencing and clue identification per se are described, where the four vocabulary hypotheses are tested (§5.5.1). Thereafter, results of a

text linguistic nature, pertaining to the textual characteristics of those clues that seemed to be the most useful in guiding vocabulary inferencing (§5.5.2) are given, and thirdly, patterns underlying the responses and the inferencing errors (§5.5.3) are presented.

### 5.5.1 Vocabulary inferencing hypotheses

Before testing the stated four vocabulary hypotheses (cf. §5.3), it was first necessary to test whether there was indeed a significant relation between inferring a word and identifying an appropriate clue, and not just a random configuration between these two factors. To this end chi square tests were applied to each of the 14 items in a 3 x 3 cross-tabulation (incorrect x partial x correct word inference vs incorrect x partial x correct clue identification). The patterns of significance are displayed in the table below:

**TABLE 5.1: RELATIONSHIP BETWEEN WORD INFERENCE AND CLUE IDENTIFICATION<sup>a</sup>**

	<b>p ≤ ,01</b>	<b>p = &gt; ,01 &lt; ,05</b>	<b>p = &gt; ,05</b>
<b>test item</b>	1, 2, 4, 5, 7, 8, 9, 11, 12, 13, 14	3, 6	10 (p = ,055)

a One must be cautious in interpreting these results unequivocally. Some of the 14  $\chi^2$  tests gave a warning that the expected count in some of the cells was less than 5. However, in 11 of the 14 items not only was the .05 probability level exceeded, but it was also at the .01 level.

As Table 5.1 shows, the pattern that emerged was that of a significant relationship between correctly inferring the meaning of a word and correctly identifying an appropriate clue. In other words, when students correctly guessed the meaning of a given word when answering (b), they seemed to have used the relevant clues to guide them in inferring the meaning of those words, as reflected in (c). There was not simply a random match between answers in (b) and those in (c).

The relationships between a student's score on vocabulary inferencing and his/her scores on four other variables were then tested, namely **overall inferencing performance** (inference tests 1 and 2), **anaphoric resolution**, **language proficiency** and **academic performance**. In order to test the relationship between vocabulary inferencing and these four variables, two-tailed Pearson Product-Moment correlations were applied, with alpha levels set at 0.05. The results are displayed in Table 5.2 on the following page.

**TABLE 5.2: CORRELATIONS BETWEEN VOCABULARY INFERENCE, OVERALL INFERENCE ABILITY, ANAPHORA, L2 PROFICIENCY AND ACADEMIC PERFORMANCE**

	<b>Overall inference performance</b>	<b>Anaphoric resolution</b>	<b>L2 proficiency</b>	<b>Academic performance</b>
<b>Vocab <i>r</i> coefficient</b>	,78*	,72*	,72*	,68*
<b>Sig. (2-tailed)</b>	,001	,001	,001	,001
<b>N</b>	71	72	73	69

\* Correlation is significant at the 0.01 level (2-tailed).

As these results show, vocabulary inferencing shows robust positive correlations with all these variables, especially with overall inference performance, and so the null hypotheses are rejected and the research hypotheses supported. In other words, students who performed poorly when inferring the meaning of new words also tended to perform poorly on all the other inference tests; the opposite happened with students who performed well on the vocabulary inferencing test. The strong correlation between vocabulary and anaphoric inferencing suggests that anaphoric devices are useful for building new word meanings. The relationship between vocabulary inferencing and L2 proficiency is interesting, and in fact consistent with some of the literature discussed earlier. This issue will be taken up again in the Discussion section later on.

The correlation between vocabulary inferencing and academic performance mirrors the pattern we saw emerging in the previous chapter, namely that the better students are at text-based inferencing, the better they perform academically. Table 5.3 below reflects this pattern amongst the Medunsa students.

**TABLE 5.3: MEAN DIFFERENCES IN VOCABULARY INFERENCE ACROSS ACADEMIC ACHIEVEMENT GROUPS <sup>a</sup>**

<b>Fail</b>	<b>At Risk</b>	<b>Pass</b>	<b>Distinction</b>	<b>Group mean</b>
<b>(24)</b>	<b>(21)</b>	<b>(21)</b>	<b>(3)</b>	
25	35.5	55.4	86.8	40.1

<sup>a</sup> Scores express average percentages in each category

The relationship between vocabulary inferencing and academic performance was further explored by means of a one-way ANOVA. The analysis yielded a significant effect,  $F(3, 65) = 15,9$   $p < ,000$ . A Scheffé test showed significant differences between the At Risk and Pass groups, but not between the Fail and At Risk groups, or between the Pass and Distinction groups. In other words, the differences between each of these latter two groups were not greater than the differences within them. In other words, borderline and failing students are characterised by poor vocabulary inferencing ability, while Pass and Distinction students are characterised by stronger

abilities in this component of reading.

### 5.5.2 Textual characteristics of the vocabulary clues

In this section the text linguistic nature of the response pattern is presented. Column 1 in Table 5.4 below reflects the rank order of words claimed by the students to be known to them, as reflected in their correct answers to (a). The words in the second column were weighted in terms of their frequency of correct inference and the frequency of correct identification of clues in the paragraph. This weighting shows the rank order of words, starting with those whose meanings and clues seemed to be the easiest to infer and ending with those whose meanings and clues were the most challenging.

TABLE 5.4.: RANK ORDERING OF KNOWN AND INFERRED WORDS

Ranking of words known	Ranking of words correctly inferred and clues correctly inferred
1. <i>Blurred</i>	1. <i>Proliferation</i>
2. <i>Intangible</i>	2. <i>Blurred</i>
3. <i>Drawbacks</i>	3. <i>Intangible</i>
4. <i>Proliferation</i>	4. <i>Drawbacks</i>
5. <i>Euphoria</i>	5. <i>Euphoria</i>
6. Counter (v)	6. Sever (v)
7. Cold War	Determines 7.5 Accounts
Sever (v) 9. Accounts Trivial	9. Counter (v)
11 Carceral	10. Dates
12. Inclination	11. Carceral
13. Dates	12. Cold war
14. Determines	13. Inclination
	14. Trivial

It is interesting to note that the same five words that were best known were also the same words whose meanings the students found easiest to infer from their contexts. One must also allow for

the possibility of false reporting of vocabulary knowledge in these responses - it is possible that some students might have inferred the meanings of the words but still answered (a). However, the important point was whether they could identify the relevant clues in each case.

The reason why the meanings of these five words were so much more easily inferred than the meanings of the other words seems to lie in the relatively 'rich' contextual clues that occurred in these particular paragraphs. All five words had *at least* two clues which, in terms of Beck et al.'s (1983) categories, provided the two most helpful contexts for vocabulary inferencing, namely a general directive context and a specific directive context (cf. §5.2.2.1). For example:

- \* *(nuclear) proliferation* had punctuation and definitional support; the word was followed immediately by a hyphen (which is often an advance signal that an explanation is coming up<sup>1</sup>) and an explicit explanation: “ - the spread of nuclear arms to states that do not have them”, which provides a directive context. The rest of the paragraph thematically supports this notion of weapons spreading to states that previously did not have them, thus providing general directive support for inferring word meaning.
- \* *blurred* had contrastive thematic support, where not only is “blurred” contrasted with the specific directive context of “more focused”, but this contrast is embedded in the more general directive context of a baby’s initial “weak ... perceptual capacities” being described as thereafter becoming stronger (“increasing rapidly”).
- \* *intangible* has the negative morphological marker *in-* thereby contrasting it clearly with the specific directive context provided by the prior explicit explanation of *tangible*, which is signalled via hyphen punctuation “- something which can be touched and felt”. The rest of the paragraph deals with the body-mind comparison, thereby providing a more general directive context.
- \* *drawbacks* has the more familiar synonymous term *these disadvantages* occurring as an anaphoric reference to it in the following sentence, thus providing a specific directive context. However, these synonyms are embedded within an entire paragraph that carries the contrastive theme of technological advances bringing both advantages and disadvantages with them, thus providing a general directive context. (Interestingly, it was this contrastive thematic clue rather than the anaphoric synonym that many of the students used, because they described *drawbacks* in the more general sense of meaning

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<sup>1</sup> It is interesting to note that the hyphen followed by a direct explanation occurred three times in the vocabulary test: in 4, 9 (with reference to *tangible*) and 11 (with reference to *gaze*).

'problems' and they justified this meaning in terms of the clue that cars were described as being "a source of noise and pollution".)

- \* *euphoria* had two phrasal explanations preceding and following it to guide interpretation, namely, "a sense of release from tension and inhibition" and thereafter the paraphrase anaphoric reference of "this feeling of happiness". Both these clues provide a specific directive context.

The only paragraph that didn't contain a specific directive context but rather a general directive context was paragraph 14 containing the word *carceral*. Taking a text linguistic clue from the fact that both jails and mental institutions are mentioned in a single paragraph, the student had to generalise at a more abstract level and infer that carceral institutions refer to institutions that limit people's freedom. The majority of students seemed to find this kind of generalisation difficult for they simply ignored the second reference to mental patients and institutions, and focussed instead on the first reference to jails and prisoners, and on that basis inferred more narrowly that carceral institutions were places where criminals were locked up.

Although 13 of the 14 paragraphs contained directive clues, some of these clues were overlooked when students became distracted by other clues. This was particularly noticeable in items 8 (*Cold War*) and 11 (*trivial*). For example, in 8 the majority of students missed the preceding detailed directive context of "the arms race and other forms of military competition between the United States and the Soviet Union" as explicitly providing an explanation of the Cold War, and instead inferred it to mean a "disastrous war", taking their cue from the phrase that occurs in the last sentence. Because forward inferencing seems to occur to a lesser extent than backward inferencing, it could be that explanations that precede an unfamiliar lexical item (as in 8) rather than follow it (as in 4) may be overlooked more easily as clues for vocabulary inferencing. Another clue that was regularly overlooked was that in paragraph 10, where *trivial (aspects)* is contrasted with the directive context "turn out ... to be important ... aspects" in paragraph 11. The students consistently missed this contrast and instead described trivial to mean "social interaction" or "the gaze". It must also be noted that here the students did not use syntactic clues to guide them in their inferencing, because the word meaning they gave was converted to a noun, even though the underlined word in this case occurred as an adjective and clearly required an explanation that reflected a qualifying function.

In all, there were four paragraphs where the word meanings could be inferred from synonym or paraphrase anaphoric references, which provided directive contexts for word meaning, viz. 2 (*euphoria - this feeling of happiness*), 5 (*inclination ... this tendency*), 6 (*sever - Being cut off*

*in this way*) and 7 (*accounts - in these reports*). Except for paragraph 2, which actually contained two anaphoric references, both of which were used to guide inferencing, these anaphoric clues were not always readily apparent to the students, especially in the case of 5. This could be due to the fact that the students might not have known the meaning of either *inclination* or *tendency*, both of which are advanced words, and so the students missed the meaning clue, whereas in 6 and 7, more familiar words were used together with the advanced words, and so the link was more apparent to the students. The tendency to miss the anaphoric clues was more frequent among the weaker students.

In sum, these results suggest that, from a text linguistic perspective, word meanings may be inferred more easily when clues in the paragraph provide both a general directive and a directive context. However, even when directive contexts are provided for inferring word meaning, students may still overlook the clues to meaning, especially the weaker students. Possible reasons for this will be suggested in the discussion section below (§5.6).

### 5.5.3 Features of vocabulary inferencing

In order to better understand how words are acquired - or not - through reading, one needs to look not only at the correct inferences that are made but also at the underlying patterns that occurred regarding inferencing errors. In this section I shall briefly describe some of the patterns that emerged and also discuss some of the inference errors that occurred.

First of all, it must be reiterated that this was not a test of vocabulary size, but a test of the ability to infer word meaning when explicit clues were provided in the paragraph. Nevertheless, the pattern of responses does tentatively suggest vocabulary proficiency in an indirect way. For example, the breakdown of responses to questions (a) [*"I know for sure that the underlined word means ...."*] and (b) [*"Although I'm not sure, from the context I think the underlined word means ..."*] was analysed. It was interesting to note that the 11 top performers in vocabulary inferencing answered (a) 75% of the time, i.e. they claimed to know for sure about three-quarters of the given 14 words. In contrast, the 13 lowest performers in vocabulary inferencing answered (a) 25% of the time, i.e. they claimed to know for sure only 25% of the given 14 words. Furthermore, the top performers in the vocabulary inferencing test answered (a) correctly with almost 89,8% accuracy. In contrast, the low performers in the vocabulary inferencing test answered (a) with only 37,6% accuracy. In other words, the top performers knew far more words, their explanations of the words' meanings were generally correct, and they were much better at monitoring their vocabulary performance in that they generally 'knew when they knew' a word. In contrast, the low performers knew fewer words (they answered (b) rather than (a)),



and even when they claimed to know a word their explanations were not always correct, which suggests that they were not as good at vocabulary monitoring for they 'didn't always know when they didn't know' a word. Table 5.5 below shows a breakdown of scores for the high and low performers in vocabulary inferencing.

What is striking to note here is that differences between the high and the low performers increased dramatically in the vocabulary inferencing test compared to the differences between them in terms of overall inferencing skill. The low performers seem to engage far less in vocabulary inferencing during reading than other forms of inferencing and the task was clearly effortful and challenging for them.

As stated earlier (§5.2.1), Nation (1997) argues that word inferencing can only occur if the ratio between unknown and known words is at least 1:25, which allows for a 95% coverage of a test. In order to check how many other words besides the underlined words were unknown, the students were asked to underline all those words that they did not know. Not all students did so in each paragraph and it is difficult to determine whether this was because they forgot to underline the words because of halo effects, or because they didn't have problems understanding other words in the paragraphs (an unlikely reason in the case of the weaker students). When

**TABLE 5.5: DIFFERENCES BETWEEN LOW AND HIGH PERFORMERS WITH REGARD TO VOCABULARY INFERENCES**

	low vocabulary performers (N = 13)	high vocabulary performers (N = 11)
Words claimed to be known with certainty	25%	75%
Accuracy in correctly answering known words (Question a)	37,6%	89,8%
Mean vocabulary inferencing and clue identification (b & c)	13,3%	87,5%
Mean overall inferencing	52,7%	83,7%
Mean L2 proficiency	54,1%	89,3%

words were underlined, there were, with one exception, never more than three per paragraph. This still gave the student a 96% coverage of the text, which is sufficient for word inferencing to occur. One student underlined four words in 14, namely *carceral*, *dungeons*, *stifling*, and *asylums*. This gave him a 94% coverage of the text, which is still sufficient for word inferencing

to occur. Despite the relatively poor response to this part of the vocabulary test, one can tentatively conclude that the students did seem to understand most of the words in the text, to the extent that the amount of unfamiliar words did not cause a breakdown in comprehension and the students had a basis from which to infer word meanings.

The most striking feature of the weaker students' performance in the vocabulary test was the problems they experienced in identifying appropriate clues to word meaning. They often tended to identify words, phrases or sentences in the paragraph that were not directly relevant to or had little bearing on the underlined word. For example, one student guessed *euphoria* to mean 'alcohol problems' and the clue given was the reference in the first sentence that alcohol can cause changes in a person's mood. In paragraph 9, despite the explicit explanation of *tangible* that could be used to infer *intangible*, one of the weak students stated that the word meant "something which is wrong" and the clue was "it is like the body, still part of oneself". Another stated that he'd never seen *intangible* before and therefore didn't know it, and that there were no clues in the paragraph that related to this word.

## 5.6 Discussion

As discussed earlier in the review section (§5.2.1 and 5.2.2), while some studies have found that both high and low ability students are able to infer word meanings from context, other studies have found that high ability students outperform low ability students in inferring word meanings from context. The findings from the current word inference test tend to support the latter group of studies, namely that clear differences emerged between students in terms of their vocabulary inferencing skills. Students who were good at making inferences in general in text comprehension were also students who performed better at inferring word meanings when the surrounding context provided explicit clues; in fact, the scores of the top vocabulary inferencing performers were consonant with their other inferencing scores. However, students who had poor inferencing skills in general had severe problems inferring the meanings of words despite the occurrence of explicit clues in the paragraphs. This relationship also obtained for anaphoric resolution and L2 proficiency. In other words, these individual differences in ability to infer word meaning from context were also related to individual differences on other measures of verbal performance such as anaphoric inferencing and L2 proficiency. What is interesting, however, is that the vocabulary test in particular seems to have been, quintessentially, a test of inferencing skill, for although the good students remained good, the weak students' scores dropped dramatically - the Matthew effect in action, as the poor became poorer. This was dramatically illustrated with the Sociology students who were an academically vulnerable group - the fact that they had difficulty understanding what they were supposed to do, finding clues in

the text and completing the test within a reasonable time frame suggests that they do not readily engage in active meaning construction when they read their textbooks.

The Medunsa students who were good at resolving anaphoric references were also students who were good at inferring word meanings. As argued in the previous chapter, lexical anaphoric devices involving synonymy and paraphrase are potentially rich sources of vocabulary learning for, provided that the reader 'figures out', albeit unconsciously, how anaphoric references function, such cohesive devices provide a specific directive context for vocabulary inferencing. The results from this vocabulary test as well as the anaphoric test discussed in the previous chapter suggest that the weaker students seem to have problems paying attention to explicit details in the text and identifying relevant clues that can help them construct meaning while they read. As Just and Carpenter (1987) have pointed out, skilled reading is a highly accurate process that requires attention to details in the text. The low performers in the anaphoric inferencing test had problems identifying relevant antecedent references. Similarly, the low performers in the vocabulary inferencing test had problems identifying relevant clues to guide them in searching for word meaning. These kinds of problems point to several underlying problems with processes that extract information from text, namely, analytic, constructive and integrative processing.

Although conclusions about causal direction are not permissible from correlations, tentative speculations are not impermissible. Low language proficiency and low vocabulary levels traditionally go hand in hand and together these factors are said to be responsible for inhibiting inferential activity. However, the equation can also be turned around: students who engage minimally in inferencing will have low proficiency and vocabulary levels. Sternberg & Powell's (1983) argument about the role of inferencing in language learning finds support in this study. What the vocabulary inferencing findings seem to point to is that the ability to acquire new verbal knowledge is strongly related to the ability to recognise and use potential clues that occur in the surrounding context to make links between items of information. This pattern could also explain the relationship between vocabulary inferencing and L2 proficiency - the particular ability to acquire new lexical knowledge from contextual clues resonates at a broader level in that the general ability to acquire new linguistic knowledge also depends to a large degree on the ability to attend to clues in the L2 learning context in general.

An interesting point that came to light during this vocabulary test was that some of the students (who later turned out to be students who were amongst the low performers) had problems understanding what they were required to do in the test. Many of the students who took long to complete the text also turned out to be the weaker students. These kinds of responses suggest that the notion of looking for clues in a text to help construct meaning was an unfamiliar one to them.

Later, when I was working through the vocabulary inference test with the case study students from psychology (discussed later in Chapter 8), one of them afterwards expressed surprise at the test and said she had never realised until then that there might be clues in the text that could help her work out what was going on. Responses such as these suggest that, after many years of failed reading experiences, many students develop passive attitudes to reading and seem to perceive it as a 'delivery' system - the text delivers a message - or (usually) not. The students approach reading tasks on the assumption that the text is probably going to be obscure and that there is not much that the reader can do about it. Reading is not perceived as a process of grappling with the text and wresting meaning from it. There is convergent evidence for this from other studies. For example, based on their extensive research of comprehension problems amongst children, Oakhill & Yuill (1996:77) make the point that "poor comprehenders may not realize that inferences are necessary or even permissible".

The finding that the low performers were not always good at monitoring their vocabulary knowledge compared to the high performers is in line with studies in metacognition both in L2 learning and in reading - weaker students don't always realise that they have a language or reading problem, whereas good students have a far more realistic assessment of their performance in the L2 or in text comprehension (cf. Baker & Brown 1984; Baker 1989 for metacognition in L2 learning, and Oakhill & Yuill 1996; Baker 1996 for metacognition in reading).

The results of the good students, it could be argued, may be inflated in that although their answers to (a) were excluded from their vocabulary inferencing score, the fact that they knew so many more words made it easier for them to identify the clues in (c), and this artificially increased their score. To obviate this an ideal situation would be to test the students' word knowledge beforehand to establish which words they did not know and then to include only those unknown words in the vocabulary inference test. However, the fact that weaker students did poorly in identifying clues even when they claimed to know the meaning of a word for sure (question a), and that good students typically identified relevant clues when they claimed to infer rather than know the meaning of a word (question b) suggests underlying differences in word inferencing ability, despite the challenges in measuring such differences quantitatively and fairly. Obviously further tests are needed to tease apart these factors.

The vocabulary inference test only contained 14 items and this may be thought to comprise too small a data base from which to draw either psycholinguistic or text linguistic conclusions. This may be so from a text linguistic point of view, but from a psycholinguistic point of view, the results obtained here are fairly consistent with those from the other inference tests that the

students were given. Furthermore, given that many of the students read slowly and that reading through the 14 paragraphs and responding to the questions took most of the students at least an hour to complete, this fact, together with the fatigue factor caution against preparing tests for L2 readers that are too long. One way around this problem for future researchers is to design a vocabulary inferencing test that can be written over more than one test session.

It is clearly imperative for students who study through the medium of an L2 to increase their vocabulary levels, especially the kind of academic vocabulary needed in the tertiary learning context. Given the low levels of vocabulary amongst tertiary level L2 students in South Africa, every available opportunity or method should be utilised to enhance vocabulary size. Students should be made aware that they actively need to work on expanding their vocabulary size. Explicit vocabulary instruction can be provided at tertiary level in the form of glossaries, glosses, lists of key words per chapter, lists of high frequency general academic words, etc. Such direct vocabulary aids are not only useful but are also appealing because they provide an immediate remedy for a pressing problem. However, these students do have reading problems, and not just vocabulary problems, and these problems should be acknowledged up front and dealt with via reading programmes. Making students aware that they need to actively work on developing their vocabulary, either directly or indirectly, is an important first step in consciousness raising. Because of their passive approach to reading, many students are missing ideal opportunities for incidental word growth while they read their content subject textbooks and this contributes to keeping them poor in the academic context. Students should be made aware of the fact that they need to construct meaning as they read. Several of the studies discussed earlier show that training in word inferencing can improve incidental word learning from reading. Students need to develop more constructive, analytic skills such as attending to details in a text and searching for clues for meaning making. It is important that they be taught intentional strategies for inferring word meaning, such as attending to synonymous or paraphrase anaphoric devices, punctuation that signals upcoming explanations, contrasting meaning, morphological clues and thematic clues.

The text linguistic finding that the brief explanation following the noun *proliferation* in 4 was the most useful clue to inferring the meaning of unfamiliar words supports Konopak's (1988) finding that simple revisions to texts (e.g. a brief explanation, as in the case of 4) enhance incidental word learning. Writers of guides and textbooks should be made aware that brief definitions are often easily inserted into a text without being obtrusive (Hubbard 1996). Definitions are often given to technical words but, as item 4 shows, simple definitions can also be given to advanced, non-technical words. Paraphrase or synonym references can also be used to the same effect, especially if reading programmes are designed that will alert students to the function of anaphoric devices and students are given practice in resolving them.

Evidence of the kind of relationships revealed by these results supports the argument underlying the Matthew effect, namely that good readers develop information processing skills that are enabling mechanisms in that they can bootstrap readers into constructing meaning even in contexts where the topic is unfamiliar or the language usage complex and challenging. In this way, skilful readers get richer while readers who have not developed these mechanisms or who do not apply them during reading, stay poor. Stanovich's (1986) "cumulative advantage effect" is clearly visible here: the good students have better anaphoric inferencing skills, better vocabulary inferencing skills, better inferencing skills in general, better L2 proficiency levels and better academic performance. Although it is not the purpose of this study to unravel the causal relationship between inferencing and L2 proficiency, these results show that they are robustly related and it is reasonable to suppose that there is reciprocal causality between them - inferencing skills help develop L2 proficiency, and increased L2 proficiency makes it possible for a reader to perceive more links and so make more inferences. These skills are mutually reinforcing and together they develop specific information processing skills that function as powerful bootstrapping mechanisms for constructing meaning from the text. These information processing skills consist, *inter alia*, of attending to text details and making links between text details in order to construct meaning. It is likely that increased L2 proficiency improves the ability to attend to text details, while increased inferencing skills naturally improve the ability to make more accurate links between text details so that a more faithful representation of the text can be constructed in working and long-term memory.

## CHAPTER 6

### TEXT-SEMANTIC RELATIONS AND THEMATIC INFERENCES

#### 6.0 Introduction

This chapter rounds off that part of the research which involved the relatively in-depth examination of the meaning-making inferential reading skills of the Sociology students at Unisa and the Medunsa students. The purpose of this chapter is fourfold:

- (i) to examine the students' ability to actively construct meaning during reading by comparing responses to inferential questions with responses to questions that require less active meaning construction, such as literal and paraphrase questions;
- (ii) to describe two categories of inference, namely inferences relating to **text-semantic relations** and **thematic inferences**, and to present the results of the Sociology and Medunsa students' responses to these types of inference;
- (iii) to see which of the question types and inference categories best predict academic performance;
- (iv) to examine the results of the short questionnaire that the Medunsa students filled in relating to their perceptions of their reading practices.

The reasons for including the two categories of text-semantic relations and thematic inferences in the study derive from the important role they play in texts and in reading. As already stated, successful reading comprehension involves the construction, in the reader's mind, of a coherent representation of what the text is about. The ability to perceive the various text-semantic relationships between elements in a text, together with the ability to distinguish main ideas from supporting details are both important skills that contribute to the construction of a coherent text representation during the reading process. However, responses to inferential questions should also be seen within a broader reading context, and so the students' performance on inference questions is also compared to their performance on more literal types of questions. Finally, the reason for including the short questionnaire in the study was to balance, albeit in a small way, the largely quantitative aspects of the study with some qualitative information from the students as to how they perceived their reading problems.

The chapter is structured as follows: In order to situate logical or text-semantic relations within a broader theoretical framework derived from work in both text linguistics and reading, the notion of text coherence and the role that text-semantic relations play in contributing to text coherence will first be briefly discussed, followed by a description of the six different types of

text-semantic relations that were singled out for attention in the present inference tests. Thereafter the focus shifts to a discussion of thematic inferences and the role they play in reading, and a description of the different kinds of thematic inferences that were included in the tests. These two review sections will be followed by a discussion of the methodological aspects of the present inference tests and the questionnaire, and a presentation of the inference and questionnaire results. The chapter ends with a brief discussion of the results.

## 6.1 Coherence, texts and reading

In this study the notion of text-semantic relations, as used in text linguistics, was adopted to examine certain aspects of text processing and inferencing. However, text-semantic relations themselves should be viewed within a broader context of coherence in texts and in text processing in general. In this section I shall thus briefly outline a text linguistic conceptualisation of coherence and show its relevance to research into reading ability.

Although researchers working within the domains of text linguistics and reading typically do so independently of one another, any theory of text linguistics must have psychological validity in terms of the way written language is processed during reading. Likewise, theories of reading concerned with text representations in memory must have correlates at the level of text structure. The notion of coherence is a concept that features in both text linguistic and reading theories and serves as a convergent focus. Charolles & Ehrlich (1991:251) describe this relationship as follows:

The issues of text coherence are central both for the linguist, whose interest lies in the description of discourse structure and its governing principles, and for the psycholinguist, whose goal is to gain a better understanding of how subjects ... understand texts.

Let us briefly examine these issues a bit more closely. A critical concern in text linguistic research during the past three decades has been to identify the characteristic features of well structured texts. A dominant issue that has emerged in this field revolves around the question: What makes a text connected? What gives a text unity? The central concept that has arisen in this regard is that of **text coherence** (De Beaugrande & Dressler 1981; Carstens 1997). Two approaches have emerged within text linguistics that address the issue of coherence: the 'text as structure' and the 'text as process' approaches (cf. Cooper 1988). In the former, coherence is perceived as deriving from the surface features of the text. According to this view, a text is coherent if there is referential continuity, semantic congruence, topic continuity or argument overlap between entities in the text. The notion of cohesion evolved out of this 'text as structure'



approach, as represented in the seminal work of Halliday & Hasan (1976). Cohesion deals with local ties in a text's surface structure that link up sentences or clauses in discourse and so give it unity and connectedness. Typical cohesive ties, as mentioned in Chapter 5, include anaphoric textual phenomena such as reference, ellipsis, substitution and lexical relations, as well as conjunctive cohesion. The logical/semantic inferences that feature in this chapter originate partially from the work done in conjunctive cohesive relations. Halliday & Hasan identified four main types of conjunctive relations between chunks of information expressed in clauses, sentences or larger sections of text. These conjunctive relationships and the formal markers that signal them are given below:

additive	<i>and, furthermore, similarly, in addition ...</i>
temporal	<i>then, since, thereafter, after that, finally, at last ...</i>
causal	<i>so, consequently, because, for this reason ...</i>
contrastive	<i>but, however, although, on the other hand, yet ...</i>

The presence of such markers, the authors argued, gave a text its connectedness. This 'text as product' approach was particularly dominant in text linguistic studies during the 1970s and early 1980s and it generated a solid amount of research into the structural and organisational principles underlying well-formed and less well-formed texts (Meyer, Brandt & Bluth 1980; Neuner 1987; Cooper 1988). As Le Ny (1991:205) points out, scholars working within this approach were mainly interested "in identifying the marks in discourse that render coherence manifest".

However, text coherence is not the sum of its structural parts and does not simply derive from the surface features of texts. Coherence also derives from underlying semantic unity and from the inferences that readers make to link text components. Readers bring something to the reading process that enables them to perceive and construct explicit and implicit connectivity and unity in texts. Furthermore, readers who encounter texts that are not coherent unconsciously attempt to construct a coherent mental interpretation of them. The second approach to text coherence views textuality from a process rather than simply a product perspective and tries to integrate the "reader's cognitive processes and the writer's cuing system" (Cooper 1988:352). According to this 'text as process' view, coherence also derives from the semantic and rhetorical relations underlying units of discourse. These relations have been variously referred to as *basic thought patterns* or *logical relations* (Brostoff 1981), *semantic relations* (Fahnestock 1983), *relational propositions* (Mann & Thompson 1986), *functional relations* (Hubbard 1989) and *coherence relations* (Sanders et al. 1992), but they all basically refer to the same concept and will henceforth collectively be called *text-semantic relations*. It is these text-semantic relations that form one of the foci of inquiry in this chapter. These relations underlie the way we perceive the world and the way we think and cognise. As Brostoff (1981:279) puts it

...thinking consists of making relationships; and these mental processes which the writer performs appear in the discourse, at the level of the sentence, the paragraph, and essay, *as patterns which the reader perceives.* (emphasis mine- EJP)

These text-semantic relationships may or may not be overtly signalled in a text and can be represented in “general conceptual terms, abstracting away from the context-specific content of the segments” (Sanders et al. 1992:2). According to this view then, coherence is regarded as a cognitive construct and not only an overt property of texts.

The notion of coherence as a cognitive construct is central to most models of reading. The reader, on the basis of both explicit and implicit information, is said to construct a coherent representation of the meaning of the text. On this reading, coherence is established at the level of text representation. Le Ny (1991:205) explains this cognitive view of coherence as follows:

Text comprehension may be considered to involve a series of specific processing phases whose ... result is a complete semantic, mental representation, which is not a representation of the text, but rather of what the text is about. From a psychological, cognitive point of view, the word ‘coherent’ must be applied to this representation, once it is constructed. If a text or any other form of discourse may be described as ‘coherent’, it is by virtue of its ability to produce such a coherent semantic mental representation in one or several readers.

The mental representation that the reader constructs of the text while reading must be a coherent one in that it must match, with some fidelity, the intentions and ‘message’ of the author. Failure to construct a coherent text representation stems either from text-based or reader-based factors. From a text-based point of view, texts that lack coherence create problems for readers who subsequently find it difficult to construct a meaningful representation of what the text is about. From a reader-based point of view, if a reader fails to construct a coherent representation, it may be because s/he has not yet adequately developed the appropriate skills to construct a coherent text representation, or has difficulty applying them during the reading construction process.

It follows that if text-semantic relations, whether explicitly or implicitly conveyed, contribute to the coherence of a text, then readers should be able to perceive and understand these relations in order to construct a coherent representation of what the text is about. If readers have problems understanding these relations, then they will have problems building and updating (i.e. reconstructing) coherent text models. In fact, research findings from several studies indicate that knowledge of text structure and cohesion distinguishes skilled readers from their less skilled counterparts (Meyer, Brand & Bluth 1980; Geva 1983; Geva & Ryan 1985). Although most of the research has been done with first language readers, the findings indicate that skilled

adolescent and mature readers have a better understanding of conjunctives and attend to the semantic or logical functions signalled by these conjunctives to infer intersentential relationships than younger readers and less skilled readers. Geva & Ryan (1985) found that skilled readers were more likely than average and less skilled readers to infer interpropositional relations, even when these were not explicitly signalled in the texts. The less skilled readers were less familiar with the precise meanings of conjunctives such as *in fact*, *besides* and *however*, they inferred fewer logical relations, and they also had problems integrating information across propositions, even when the relations were explicitly signalled by conjunctives. The study by Cox et al. (1990) strongly suggests that knowledge of conjunctive cohesion is the result of both learning to read and maturation. They found that as early as Grade 3, knowledge of cohesion in written texts separated good from poor developing readers. Irwin's (1986) research on cohesion factors suggests that even at college level, unskilled readers have problems inferring implicit connections between sentences. In his research, Hubbard (1989) found that coherent student writing at tertiary level correlated strongly with the occurrence of text-semantic relations in a text. This applied to both L1 and L2 student writing.

Text-semantic relations, then, whether overtly or covertly conveyed, contribute to the coherence of a text both from a writer- and a reader-based perspective. Skilled readers perceive these relations, albeit unconsciously, and this enables them to see the connectedness between items of information in the texts at a micro and a macro level. This in turns enables them to construct a coherent mental representation of the text as they read. Let us now turn to a more detailed description of the text-semantic relations that were singled out for examination in the present study.

## 6.2 Text-semantic relations

The four-type taxonomy of conjunctive relations identified by Halliday & Hasan (1976) and referred to earlier in §6.1 has since been expanded and refined by several researchers, and various taxonomies of semantic or logical relations have since been proposed, such as those by Fahnestock (1983), Mann & Thompson (1986), Hubbard (1989) and Sanders et al. (1992). It is beyond the scope of this study to deal with the numerous types of text-semantic relations that have been identified and classified in these taxonomies. It suffices at this point to draw attention to two important features of text-semantic relations. Firstly, in order for a semantic relationship to exist between text units there must, minimally, be two units in the relationship. This implies binary membership between two (or more) text units: 'binary' in that one unit is semantically linked to the other and in some way completes the meaning of the other, and 'membership' in that the one unit belongs to one member of the relation and the second one to the other member (Winter 1978:86). For instance, in temporal and causal relations, the one member functions as

an antecedent [X] and the other as a consequent [Y].

Another important feature is one that derives from Fahnestock's taxonomy (1983) and was subsequently adopted by Hubbard (1989), namely, the distinction between **continuative** and **discontinuative** text-semantic relations. The distinction refers basically to positive/negative propositions and the expectations they generate during text processing. Influenced by research in memory and comprehension, this distinction is based on the assumption that a sentence or idea unit raises expectations in the reader's mind about what is to follow in the text. Continuative relations are seen to "fulfill expectation, or represent normal expectation; the discontinuatives are less expected, often surprising, and therefore somewhat less readily comprehended" (Fahnestock 1983:406). Continuative relations thus have a negative counterpart which "is a distinct relation that reverses in a way the logic of the connection because it provides a less expected alternative" (Fahnestock 1983:405). Consider, for example, the following text that occurred in Text E in inference Test 2.

... For such an operation [to the temporal lobes] a local anaesthetic is used, so that the patient remains fully conscious. *In order to locate the injured area it is necessary to stimulate the temporal cortex point by point with an electrode. **However, this is not painful since the brain is not equipped with pain receptors.*** (Jordaan & Jordaan 1989:196).

The sentence in bold italics conveys some unexpected information in relation to the preceding given information in italics. One expects that an electrical probe of the brain will be painful - after all, 'stimulating' certain parts of the body with an electrode is an effective method of torture! The fact that this procedure is not painful in the brain is discontinuative in relation to the expectations raised in the preceding text.

In terms of Halliday & Hasan's taxonomy, adversative conjunctive relations are discontinuative, whereas most relations, i.e. additive, temporal and causal conjunctive relations, are mainly continuative (although some can become discontinuative, e.g. when the chronological sequence of temporal relations is reversed). Of the six categories of text-semantic relations examined in this study, five were continuative - since they make up the bulk of text-semantic relations - while one set of discontinuative adversative text-semantic relations were included in the inference tests (discussed in §6.2.6 below), to see whether there were differences in student responses to them as opposed to the continuative text-semantic relations.

Although there are numerous text-semantic relations, not all these semantic relations occur in every text. It was therefore decided to focus on a limited number only in order to build up a more

detailed profile of readers' comprehension of such relations. In all, six types of semantic relation were singled out in this study, namely **temporal, exemplification, whole-part, causal, premise-conclusion** and **contrastive** relations. The reason for focussing on these six arose mainly from the fact that they were relations that occurred quite commonly in the texts that comprised inference Tests 1 and 2. This made it possible to test each of these relations minimally at least five times across different texts. To this end, specific items in the inference tests were designed to assess the extent to which subjects can make inferences about the underlying text-semantic relations in the given texts. Each of these relations is described below and their inclusion in the test explained.

### 6.2.1 Temporal relations

The simplest of the text-semantic relations is the additive relation, whereby new information is added to a given proposition and is loosely related to it, e.g. *Jeremiah went to a party and he had some cake and popcorn*. In developmental terms, this is the first relation that children typically include in their early discourses (Bloom, Lahey, Hood, Lifter & Fiess 1980; Peterson & McCabe 1987; Raban 1988). The next fairly simple relation to appear is that of temporal sequencing, where sentences in a discourse are linked by means of a temporal sequence of events or states of affairs (Bloom et al. 1980). Temporal sequences are typically expressed as continuative relations, although they can be conveyed as discontinuatives by re-ordering temporal sequences (e.g. *Before Jeremiah came to the party he ate popcorn*), often for literary effect, as in flashbacks. Temporal sequencing may be explicitly expressed by temporal markers such as *then, afterwards, later on, subsequently, next, the following day, last week/month/year*, etc. or they may be inferred from the semantic contents of a text or from the ordering of information. Temporal sequences are also often tied up with causal relations, since many states/events that follow are the result or consequences of prior causes or reasons and follow them temporally (although their actual order of presentation in a text may be reversed).

The sequencing of events plays an important role in the comprehension of narrative texts and it is important for a reader to keep track of temporal sequence in order to understand the unfolding events in the story. Even though expository texts do not always have a clear story line as do narrative text, the ideas, arguments and events dealt with in expository texts are often presented within an historical, chronological or developmental perspective, in which case an understanding of the temporal dimension is important for text comprehension. The ability to sequence ideas or states is an important reasoning skill and, as Lesiak (1983:212) points out, this skill "can affect performance in several academic areas". It is generally expected of undergraduate students to build up some general temporal framework of the different periods or eras in cosmic, geographic or human history within which they can contextualise the contents of their subjects or disciplines.

In the present study, several items that tested the readers' ability to infer temporal sequences were included in the tests. In all, there were nine items that tested for students' awareness of temporal sequencing and their ability to make inferences about it when it was not explicitly given in the text. These items consisted of the following tasks:

- \* Unscrambling a five-sentence paragraph (88 words) dealing with perceptual development in babies in the first four months of life. Although explicit temporal markers such as *by the age of one week, within the first month, by the age of four months* and *thereafter* occurred in the sentences, the sentences were scrambled and needed to be re-ordered. This kind of task tests to what extent the reader pays attention to text clues and makes inferences about the sequence of events in order to render the paragraph coherent.
- \* Statements that the students had to judge as true or false inferences with regard to temporal sequencing in a given text.
- \* Multiple choice questions where, on the basis of textual clues, students had to infer when events referred to in a given text occurred.

The results of the Medunsa students' ability to infer temporal relations are presented in Table 6.3 in §6.5.1 below.

### 6.2.2 Statement-exemplification relations

In this relation, a sentence is related to the immediately preceding one because it provides an example of what was mentioned in the preceding sentence (Fahnestock 1983:403). The relation is thus typically continuative. The overt linguistic markers for this relation are words or phrases such as *for example, for instance, thus, to illustrate*. Sometimes punctuation such as a hyphen or a colon can also be used to signal an illustrative phrase or sentence. This category of text-semantic relations can be categorised under the class of amplification relations that Hubbard (1989:133) uses in his study of coherence relations in student academic writing. He defines amplification relations as those where the second unit "adds content that further specifies some aspect of the content of the first". In the text below, the sentence in bold italics serves to amplify or exemplify the statement in the preceding sentence about progress in education being linked to "factors over which individuals have little control":

- A8 Numerous psychologists and sociologists have sought to explain the differences in achievement amongst school children. *Some of these explanations suggest that pupils' progress in education is strongly influenced by factors over which individuals have little control. For example,*

*intelligence and home background are presented as largely determining the performance of pupils within the educational system. ... (Test 1)*

These relations are often unmarked in expository texts. Amplification relations have been found to be linked to coherent writing. In his study of coherence in student writing, Hubbard (1989:258) found amplification relations to be a feature of high-rated (i.e. coherent) texts; they also occurred with less frequency in texts written by L2 students of English. If they play a role in coherent writing, they must also play a role in coherent reading, i.e. in constructing a coherent representation of what the text is about. Recognising, consciously or unconsciously, that what is being stated in an incoming sentence is actually an illustration of what was stated in the preceding or given sentence is an important component of reading comprehension. Exemplification should play an important role in expository texts in aiding comprehension and helping to build up new knowledge because, while a reader may not have a good grasp of the contents of a sentence due to its complex or abstract nature, a clear and timely example can help to clarify this. Readers can often identify more readily with an example about a phenomenon than they can with an abstract statement about a phenomenon. For example, in the text above, if a reader does not know beforehand what constitutes “factors over which individuals have little control”, then the immediate example enables the reader to fill this knowledge gap. Perceiving the relatedness between adjacent statement-exemplification sentences enables a reader to integrate incoming information with given information in a way that not only contributes to the coherent construction of a mental text representation but also facilitates the construction of new knowledge.

In all, there were finally five items that tested for statement-exemplification relations. They were tested in the following way:

- \* Sentence insertion tasks, where the exemplification part of the semantic relation that started with a marker such as *For example...*, *For instance ...* was omitted from a paragraph and the student asked to indicate where in the paragraph the sentence should go. Although the omitted sentence started with an explicit exemplification marker, the student still had to make an inference about where it belonged in relation to the information in the rest of the sentence. Pagé (1990:119) argues that such insertion tasks have high discriminating power in psychometric tests. Four of the five exemplification relations were tested in this way.
- \* The explicit marker at the beginning of an exemplification sentence (*For example ...*) was deliberately omitted in a text that dealt with the function of the frontal lobes and the behaviour of patients with frontal lesions. A question item was included in the test that

asked the student to give an example of a patient's aberrant behaviour in relation to the task that he was asked to perform. In order to answer this correctly, the student had to make an inference that would link up a sentence containing a concrete example of unusual behaviour in the text with a more general or abstract statement about unusual behaviour.

Examples are a typical feature of expository texts and are therefore not unfamiliar to students. Also, it was thought that because the exemplification part of the statement-exemplification relation helps to make abstract statements more concrete, the students would be able to make exemplification inferences relatively easily. The results of the students' ability to infer statement-exemplification relations are presented in Tables 6.2 and 6.3 in §6.5.1 below.

### 6.2.3 Causal relations

As the name indicates, in this relation two or more sentences stand in a cause-effect relation. There are many different types of causal relation (Pretorius 1993; 1995) and too extensive categorisations would have resulted in too few examples of each in the selected texts. Consequently, the causal relations were defined quite broadly into two categories. The one category included physical and psychological relations comprising an antecedent (X) and a consequent (Y), where the antecedent causes or brings about the consequent (physical) or the antecedent comprises a reason for a consequent result (psychological). The second category included a specific type of causality involving causal reasoning, namely premise-conclusion, to be discussed in the following section.

Causal relations are typically continuative since the Y element 'flows from' the X element. Linguistic markers that explicitly signal causal relations include *because, since, and so, consequently, for this reason, therefore, the reason for this, if ... then*, and so on. For example:

- A10. Pastoral societies usually migrate between different areas according to seasonal changes. Unlike hunting societies, *they have animal transport. As a result, they move across much larger distances than the hunting and gathering peoples, who usually go about on foot.* ... (Test 1)

In the above text, Sentences 2 and 3 are causally related, with Sentence 2, being the antecedent X providing the cause or reason for the consequence Y in Sentence 3.

Research has established that elements in a text that are causally linked to each other are important determinants of text comprehension and memorability for both child and adult readers (cf. Myers et al. 1987; Trabasso et al. 1989, Trabasso 1991; Pretorius 1996). Although the ability



to perceive causal connections between things starts in early childhood, explicit causal relations in young children's discourse tend to occur after additive and temporal relations have already emerged. By the age of 10 children are competent in perceiving and making causal connections between events and states of affairs, even though they may not always encode this knowledge precisely or accurately at the linguistic level (Bloom et al. 1980; McCabe & Peterson 1985). The centrality of causality in text comprehension for adult readers has been well established by several researchers (Black & Bern 1981; Caron et al. 1988), although to a lesser extent with L2 readers. However, the developmental pattern of acquiring additive, then temporal, then causal connections seems to be reflected in L2 learning amongst mature learners too.

In all there were eight items across Inference Tests 1 and 2 that tested the readers' comprehension of causal relations in the following ways:

- \* Sentence insertion tasks, where the consequent part of the relation was omitted from the text and the reader was asked to indicate where in the paragraph the omitted sentence should go (e.g. Item A10 above). In order to complete this task successfully, the reader needs to perceive from which causal sentence the consequent statement follows, even if an explicit marker occurs in the omitted sentence. In other words, the reader has to make a causal inference.
- \* Unscrambling a six-sentence paragraph (75 words) dealing with factors that gave rise to wars in the history of human development. The reader needed to re-order the sentences so that the paragraph made sense. Four of the sentences were causally linked to one another. None of the sentences contained explicit causal connectives, and the reader needed to attend to the meaning cues and to the causal sequence of states and events referred to in the sentences. This kind of task tests to what extent the reader pays attention to text clues and makes inferences about the causes and consequences of states and events in order to render the paragraph coherent.
- \* Statements that the students had to judge as true or false inferences with regard to causal events in a given text.
- \* Fill-in questions, where the reader had to infer either the cause or the consequence of a state of affairs or an event referred to in the text.

Because causal relations are conceptually more difficult than temporal ones, and because they tend to emerge a little later in discourse use than temporal ones, both for L1 and L2 learners, it was therefore expected that the students in this study would be better at making temporal

inferences than they would at making causal inferences. The results are presented in Tables 6.2 and 6.3 in §6.5.1 below.

#### 6.2.4 Premise-conclusion inferences

This category of text-semantic relation is a type of causal relation that involves a form of reasoning whereby the contents expressed in a prior unit of text provide a basis from which a conclusion is drawn. According to Hubbard's taxonomy of functional relations (1989:131), the heuristic used to identify this relationship is:

Does X provide an observation in terms of which a deduction is made in Y?

In expository writing, the supporting statement(s) X can comprise an observation, causal statement, argument, or research evidence, from which a deduction or conclusion Y is drawn. As Fahnestock points out, the sentences comprising a premise-conclusion link in everyday logic cannot always be expanded into valid syllogisms, "but they are intended by the writer and meant to be taken in by the reader as pairs of supporting and supported statements" (Fahnestock 1983:404). Linguistic markers such as *thus*, *therefore*, *consequently*, *in conclusion* may overtly signal this kind of relation.

Although, as already stated, the premise-conclusion relation is also a type of causal relation, it was singled out as a separate semantic relation because it seems to form a more abstract type of reasoning based not simply on causal connections between states of affairs or events but on causal connections in terms of ideas and argumentation (which may themselves be based on empirical events or affairs). For example:

- A7. The major Latin American cities are surrounded by large-scale shanty neighbourhoods. In Mexico City, over a third of the population live in dwellings without running water and sewerage. The city contains an old centre, business districts and affluent housing areas. Almost all the outer perimeter, however, is occupied by shanty or slum dwellings. *There is a large amount of state-subsidized housing, but no more than 40% of the city's population can afford it. The majority of the city's population, therefore, are excluded from access to available housing.* ... (Test 1)

In the above example, a reader needs to understand that the observation that only 40% of the Mexican population can afford state-subsidized housing provides the grounds for the following conclusion that the majority of them (i.e. the remaining 60%) cannot afford state-subsidized housing. Here, the antecedent to the conclusion is anaphoric, or backward looking. In other

words, the rationale or grounds for a conclusion are to be found in preceding statements, not following ones.

In all, there were 10 items that tested inferences about premise-conclusion relations. These inferences were tested in the following ways:

- \* Sentence insertion tasks, where the conclusion part of the semantic relation was omitted from a text and the student asked to insert it in an appropriate place. In order to complete this task successfully, the reader needs to infer a link between the omitted sentence and one of the sentences in the text that constitutes a premise.
- \* Statements that the students had to judge as true or false conclusions that could validly be inferred from statements or observations referred to in the texts.
- \* A multiple-choice question, where the students had to decide which of four options was a valid conclusion that could be inferred from information in the given texts.

Premise-conclusion text-semantic relations involve some kind of verbal causal reasoning, and because they occur often in academic texts, it was expected that the students in this study would be familiar with them. The results are presented in Tables 6.2 and 6.3 in §6.5.1 below.

### 6.2.5 Whole-part relations

This category of text-semantic relations involves sentence pairs (or chunks of information) where one of the pair parts deals with more generic information while the other pair part deals with a specific aspect (or aspects) of that information. In other words, the relationship between the pairs can be one of semantic hyponymy, e.g. *vehicle* -> *car*, *bus*, *bicycle*, etc. or the relationship can be a broader conceptual one which expresses how parts relate to the whole, or how different parts are included in or related to a class category. For example, in Text E (Test 1) that deals with the functions of the prefrontal cortex, students need to understand that there are different *cognitive processes* (the generic category) dealing with the *retrieval and storage of information* on the one hand (specific category of processes), and the *regulation of behaviour* on the other hand (specific category of processes). Apart from words that are related to one another semantically in hyponymous relationships, there is not always a clearly defined set of terms that specifically signals whole-part relations, as is the case with many other text-semantic relations, and the relationship between the different categories and the parts to the whole is usually determined from textual clues, the semantic content and from lexical items that collocate in a specific context and that refer to the parts and the whole.

Although there has been little research into the development and occurrence of this specific semantic relationship at the text level amongst both young and mature readers, one can surmise that the ability to perceive this kind of relation is very important, especially in the reading of expository texts. Many expository texts typically deal with descriptions and explanations of phenomena and their component parts, be they states, events, actions or objects. Understanding how parts relate to wholes also underlies the ability to make generalisations, to move from specific details to more abstract conceptualisations (and vice versa), and to perceive hierarchical relations amongst things. Understanding whole-part relations thus not only plays an important part in text comprehension but also in the acquisition of new knowledge and the hierarchical storage and retrieval of such knowledge. (This issue will be taken up again in Chapters 8 and 9.) Consider, for example, the paragraph below:

- A. Carceral organizations were rare in medieval times. Jails and dungeons sometimes existed, but they were few and far between, and were not places where convicted criminals served fixed sentences. People were kept in them as a means of stifling political opposition, to be tortured in order to extract information, or to await trial. The mentally ill either lived within the community, or were forced to roam the countryside. There were no asylums or mental hospitals. The situation has changed considerably in the intervening eight centuries. Carceral institutions have been built in great numbers since the turn of the nineteenth century. (Test 2)

Making use of textual clues such as the fact that references that occur in the same paragraph usually refer to the same theme or topic, a reader can use whole-part relations to infer that both jails and mental institutions (parts) form part of carceral institutions (whole). In this way an awareness of how parts relate to wholes can also assist in vocabulary development and the acquisition of new knowledge.

In all, six items tested for whole-part relations (originally there were eight items but two of these were eventually omitted from the final results after the reliability test indicated that they had low reliability ratings). These whole-part relations were tested in the following way:

- \* Unscrambling a six-sentence paragraph (75 words) dealing with the factors that gave rise to wars in the history of human development. Three of the sentences were related to one another in terms of whole-part relations: the origins of war were traced to several factors (generic category), of which two factors were specifically mentioned, namely human aggression (part) and the rise of more complex state-based societies (part) - though not in that order. In re-ordering the paragraph, the student needed to pay attention to textual cues such as *the origins of war*, *human aggression*, *other factors*, and *the most important factor* in order to sort out the way in which these factors related to each other.

- \* Statements that the students had to judge as True or False inferences with regard to whole-part relations between items of information in a text.
- \* Choosing an option between two diagrams comprising empty 'boxes' that needed to be filled in with component parts of information in the text. In one diagram the component boxes were arranged in a linear manner, while in the other they were arranged hierarchically. In order to answer this question correctly, the students needed to understand the hierarchical relationship between the whole and the component parts.

The results for whole-part relations are presented in Table 6.3 in §6.5.1 below.

### 6.2.6 Contrastive relations

The final category of text-semantic relations to be examined was that of adversative or contrastive relations. In a contrastive semantic relation, the second statement in the 'pair' carries information that counters the information in the first part. It presents an opposing or unexpected point to what has been stated, a concession or qualification to a previous statement, or a denied implication. It is a discontinuative relation because it provides a less expected alternative to what has already been stated. Because it provides a contrasting point, a discontinuative relation is typically signalled explicitly in discourse with conjunctives such as *yet, however, but, although, conversely* and *on the one hand ... on the other hand*, and so on. In order to understand contrastives, one needs to understand the line of argument presented in the first pair part in order to recognise that the second pair part that follows reflects an opposing, contrasting or qualifying point. For example:

- A9. From our everyday experience we know that people often try to arrange their environment in such a way that there is a place where they can sometimes be alone and private. In other words, they want a place where they can, for whatever reason, be isolated from other people for a while. *The term *privacy* expresses this human tendency. *But this does not mean that the person wants no interaction with other people.* (Test 1)*

In the above example, the line of argument concerns privacy and the fact that people like to be alone sometimes. The view that follows (in italics above) is a contrastive one in the sense that it qualifies the previous sentences by pointing out that wanting privacy does not imply that one always wants to cut oneself off from human interaction.

Research has shown that negative statements tend to be processed more slowly than positive statements, and the same seems to be true for discontinuative text-semantic relations. Because they present a contrasting point of view to that just given, adversative relations are not

understood as readily as their continuative counterparts (Fahnestock 1983:406). Research also indicates that, developmentally, several discontinuative relations tend to be acquired after their continuative counterparts. This would explain why, developmentally, children usually acquire contrastive relations later, after they have acquired additive, temporal and causal relations (Bloom et al. 1980; Wing & Scholnick 1981; McClure & Geva 1983; Peterson 1986). L2 learners also often seem to have problems understanding contrastive relations in L2 discourse and it seems that contrastive conjunctives are mastered after continuative conjunctives in the L2. In his study of relational coherence in student academic writing, Hubbard (1989:256) found that in high-rated student essays, discontinuatives had a high density while student essays rated as having low coherence had far fewer discontinuatives. One can expect that this pattern will also be reflected in L2 reading, where discontinuative arguments may be more challenging for readers, and where weaker readers are likely to be more successful at processing continuative than discontinuative relations.

It was interesting to note that contrastive relations regularly occurred in the textbooks used in this study and it was not difficult to find examples around which test questions could be designed. This may be partly due to the contested nature of knowledge typically presented in social and human science texts, where a particular point of view or theory is described and then an argument or research evidence is later presented that disputes the validity or accuracy of the previously described point of view. Whether this is typical of all academic expository texts or of certain genres of such texts would be an interesting avenue for further genre and text analysis. Fahnestock (1983:415) points out that discontinuatives reflect “the processes of distinguishing, making exceptions, conceding or contrasting by which thinking, and the prose which represents thinking, is carried on”. Skilled reading therefore naturally includes the ability to perceive and follow discontinuative twists and turns in the text .

Due to the common occurrence of contrastive relations in the test texts, it was not difficult to design test questions around them. Their regularity of occurrence also made it possible to distinguish between local and global contrastive relations. Local relations are those where the sentence pairs are juxtaposed or occur in close proximity, whereas global relations occur over larger stretches of discourse, and the second part in the pair occurs two or more sentences later, after the first pair part. For example:

- A. ... Jails and dungeons sometimes existed, *but they were few and far between, and were not places where convicted criminals served fixed sentences.* (Test 2)

The fact that jails and dungeons existed in medieval times may create the expectation in the reader that they were common and served the same function as they do today, but this

expectation is countered or qualified in the immediately following clause. In contrast, the paragraph below shows how a contrastive idea is developed globally, over a longer stretch of discourse.

- F. Over the past thirty years or so, in most Western countries, there have been major changes affecting inmates of mental institutions. The mentally and physically handicapped have been released in large numbers, with the objective of replacing confinement with community care. These reforms have been prompted largely by humanitarian motives, combined to some extent with a desire to cut costs, since the expense of maintaining custodial institutions is very considerable. *But the effects of these reforms seem to be unfortunate.* Many mental patients now seem worse off than they were before. Many live in poverty and isolation, and without the security they previously had in the mental institutions. (Test 2)

The above paragraph starts off referring to the changes in the treatment of inmates, and continues this idea in the first three sentences. The expectation is built up that these changes were for the good. The contrastive argument introduced in the fourth sentence therefore comes as something of a surprise, that despite all the good intentions, the effects of the reforms were not felicitous. The contrastive argument is further developed in sentences 5 and 6. The continuative-discontinuative argument is presented over a whole paragraph and is therefore classified as global; one needs to read the whole paragraph in order to comprehend the contrastive nature of the argument.

Developmentally, it has been quite well documented that in the early or unskilled stages of reading, readers tend to process information in a piecemeal or atomistic way, and are better at making local rather than global connections in the texts they read (Van den Broek 1997; Vauras et al. 1994). As readers mature and become more skilled at reading, they develop more holistic strategies during reading and become better at processing information across larger chunks of text. It was therefore expected that the students would find it easier to make inferences about local contrastive relations rather than global contrastive relations.

In the present study, a total of 13 items were used to test inferencing about contrastive relations in diverse paragraphs, locally and globally. Of these, six items tested local contrastive relations, where the second or discontinuative part followed immediately after the first part. Seven items tested contrastive relations at a more global level, where the second or discontinuative part of the relation did not occur immediately after the first part, but only occurred two or more sentences later or even at the end of the paragraph.

Inferences about contrastive relations were tested in the following ways:

- \* Sentence insertion tasks, where the contrastive/concessive or qualifying part of the argument was omitted from a paragraph and the students were asked to indicate where in the given text the omitted sentence should go. In order to complete this task successfully, readers need to perceive the adversative nature of the omitted sentence and, despite the fact that the omitted sentence has an explicit contrastive marker, make an inference as to which sentences in the text provide a contrastive argument to the one in the omitted sentence.
- \* Multiple choice questions concerning the contents of a specific text, where the distracters presented the information in the paragraph in a continuative way (e.g. as if the events were associatively or causally linked) as a causal argument, while the correct option reflected contrastive text-semantic relations, with an opposing or concessive argument.
- \* Statements that the students had to judge as true or false inferences with regard to contrasting views presented in a particular text.
- \* A fill-in question, where the students had to explain the contrasting argument presented in a particular text.

The results of the contrastive text-semantic relations are presented in Tables 6.2 and 6.3 in §6.5.1 below. In the following section we move away from text-semantic relations and examine instead inferences concerning main idea or themes in text.

### **6.3 Thematic inferences**

If the successful comprehension of a text depends on the reader constructing a coherent mental representation of what the text is about, this means that the reader should be able to deal with successive ideas in a text and extract the overall gist or theme of what the text is about. It is therefore not surprising that a salient difference between skilled and less skilled readers is the ability to identify main ideas and to recognise the gist of a text. This ability of skilled readers to perceive the interrelationships amongst ideas and draw out the main threads in a text is well documented in reading research, both amongst L1 and L2 readers. But before discussing some of the research findings, let us look more closely at what the 'main idea' entails.

The theme or gist of a text is "the idea to which most of the information in the passage refers" (Goldman et al.1995:275). The ideas that relate to the theme are the more important ones. The ability to identify main ideas is a crucial component of text comprehension, especially in the learning context, where the aim of reading is to acquire new information. Many tasks in the



learning context depend on main idea identification, such as summarisation tasks, study reading for discussion and study reading for recall. Such tasks require a reader to identify main ideas and to distinguish main ideas from supporting ideas and from more peripheral information. Paris, Wasik & Turner (1991) argue that finding the main idea requires readers to engage in three processes, mainly:

- \* understanding what has been read;
- \* making judgements about the importance of information;
- \* consolidating information succinctly.

Making judgements about the importance of information and then consolidating information across stretches of discourse requires moving away from an atomistic way of processing information to a more global information processing mode. Just & Carpenter (1987:250) refer to this as “a process that constructs high-level generalizations or abstractions, referred to as a macro process”.

The developmental pattern for main idea identification differs in narrative and expository texts. In narratives, the main idea of a story includes the causal chain of events (Goldman et al. 1995:275). Because stories tend to be structured around fairly predictable goal-directed actions, young readers can develop story schemas from an early age that help them identify the main ideas in stories. In their study of young children’s ability to retell stories, Oakhill & Yuill (1996:72) found that the less skilled comprehenders construct poorly integrated mental models of texts, whether the texts were presented in oral or written modes. Even though they were quite good at recalling verbatim information, they were poor at providing the gist of what they heard or read. The poor comprehenders also performed poorly in telling a story from a sequence of picture frames, and tended to describe each frame separately rather than perceiving the sequence as a whole and describing the gist. Cain (1996:183) approached the notion of thematic sensitivity in reading from a unique perspective by investigating children’s awareness of the purpose of a story title. In her comparison of 41 less skilled with 34 skilled comprehenders, she found a highly significant relationship between comprehension skill and awareness of titles. Over 80% of the skilled comprehenders were able to explain how the title of a story could inform a reader, whereas three-quarters of the unskilled readers had difficulty doing so. For example, some suggested that titles indicated whether one liked a story or not, and others claimed that it didn’t tell the reader anything at all. Several said they didn’t know what purpose titles served. Approaching the problem from a different angle, Cain did a similar study but worked with a smaller sample of 12 skilled and 14 less skilled comprehenders. They children were asked how they would make up a title for a story that someone was going to read to them. The majority of skilled comprehenders said they would listen for important bits of information in the story and/or

they would think of what the story was about. The majority of the less skilled readers reported not knowing what they would do, or else they suggested using strategies such as looking for the title at the top of the page of the book (Cain 1996:183). These studies suggest that skilled comprehenders process information at a global level and become strategic readers in that they develop thematic strategies, i.e. strategies to determine ‘what they text is about’, whereas less skilled comprehenders do not seem to be thematically oriented to the texts they read.

Unlike the typical story schema structure of narratives, expository texts have more varied text structures, and so the identification of main ideas in expository texts is less straightforward. There are both text-based and reader-based factors that affect readers’ ability to identify main ideas in expository texts. Text-based factors include semantic, macrostructure and surface text features. Semantic cues such as the recurrence of concepts or ideas and argument overlap help readers identify main ideas. Goldman et al. (1995:300) argue that semantic features play an important part in main idea identification, due to the sheer number of semantic clues available in a text. The macrostructure of a text also provides clues as to the relative importance of the various ideas presented in a text. Surface features such as spacing and indentation signal paragraph boundaries. Paragraphing helps to identify main ideas and shifts in topic because there is often a topic sentence that introduces the main idea of the paragraph. This main idea is then elaborated, modified or qualified in the following sentences. Topic sentences are thus sentences that have many subsequent sentences related to them, and they then take on the status of superordinate information. As Goldman et al. (1995:277) point out, topic sentences “set up readers’ expectations about the content of the remainder of the paragraph”.

The topic sentence usually occurs at the beginning of the paragraph, although it can also occur medially or at the end. In English expository texts, the main idea is often introduced at the beginning of the paragraph, but this is not necessarily the pattern across genres or cultures. Furthermore, some paragraphs do not have a topic sentence, in which case the reader has to infer the main idea. There are also paragraphs which do not necessarily have a single main idea, but which develop two or more main ideas. This is not uncommon in expository texts where paragraphs deal with complex ideas that are not easily expressed in a single topic sentence. Hare et al. (1989) point out that expository texts are often more complex than the contrived paragraphs that occur in reading or study skill exercises or workbooks, and that in real-life expository texts, paragraphs do not always begin with an explicit topic sentence. O’Hear & Aikman (1996) examined main ideas in 12 English contemporary nonfiction best sellers, and they found that 88% of paragraphs contained main ideas. Clues to the gist of longer stretches of text can be inferred from subheadings, headings and chapter titles, from typographical features such as using bold or italics, from enumerators such *firstly*, or from text signals such as *in summary, it is important to note that ...* etc., as well as from the semantic thrust of the arguments in the text.

Inferring the main idea(s), identifying topic sentences and distinguishing main from supporting or peripheral detail is therefore not always an easy task.

Developmentally, younger readers do not readily perceive the gist or main ideas of expository texts (Bauman 1983; Paris et al. 1991). Even by the age of 12-13 years, while young readers may understand what they have read, many still do not readily distinguish primary from more secondary information. In their longitudinal study, Vauras et al. (1994) examined the development of strategies when learning from expository texts in low, average and high achieving children from Grades 3-5. As expected, the findings supported the prediction of higher order processing skills with age, with a movement from local to global processing skills. They found that at third grade, low achieving students' learning was characterised by atomistic, unstructured and reproductive strategies that resulted in unsuccessful attempts to extract accurate meanings from texts. After two years, there was little qualitative development in these students' learning. In comparison, "profound qualitative progression was found in the high achieving students' macro-level processes and learning strategies. At the fifth grade (they) exhibited the use of holistic ... strategies" (Vauras et al. 1994:385). These findings are convergent with an earlier study of Vauras et al. (1992, in Vauras et al. 1994) where they looked at first-year undergraduate students. They found that the atomistic, unilevel approach to learning from texts of low-achieving students was characterised by element-by-element processing of information regardless of its importance, whereas top achieving students had a holistic, hierarchic approach where attention was allocated to important units such as main ideas (Vauras et al. 1994:386).

Looking at the interaction between text- and reader-based factors, Baumann (1986) found that middle grade students were better at identifying main ideas when the main ideas occurred paragraph initially. In their study of the effects of reader- and text-based factors on main idea identification by skilled undergraduate readers for recall and summarisation tasks, Goldman et al. (1995) varied the sentence position of topic sentences in paragraphs, whereby topic sentences were paragraph initial in some passages and non-initial in others. They also took into account readers' familiarity with the passage topics. They found that both semantic and structural cues aid main idea identification, although they carry different weights in different conditions. For example, when readers were familiar with the text topics, then semantic features had a powerful effect on text comprehension. When main ideas did not occur paragraph initially, then the weight of semantic cues overrode structural cues. When readers were unfamiliar with the topic of a passage, then structural cues were given more weight, "especially in suggesting starting points for main idea identification". Not surprisingly, when semantic and structural evidence converge, the "main-idea threshold is exceeded relatively quickly" (Goldman et al. 1995:300). Spyridakis & Standal (1987) argue that skilled and less skilled readers use different strategies. The former "identify superordinate content and form hierarchical frameworks in memory. Poor

comprehenders tend to use a listing strategy. They perceive all content as equally important and place superordinate and subordinate content in memory in a list-like fashion” (1987:287). These findings are in line with earlier findings by Meyer, Brandt & Bluth (1980).

Yuill & Oakhill (1991), for instance, found that good comprehenders identified the main point in a text 79% of the time, whereas the poor comprehenders were only successful 46% of the time. In a local intervention study, Dolgoy-Kaplan (1998) found that L2 students’ ability to identify topic sentences and main ideas improved with instruction that specifically taught them strategies for identifying main ideas in paragraphs.

To summarise, research consistently indicates that poor readers have problems dealing with successive ideas in a text and integrating them into a coherent mental representation. This problem manifests itself in several overlapping ways. For example, poor readers are less successful than good readers at integrating the meanings of successive sentences and paragraphs (and even of successive picture frames in the visual mode); they are less successful at identifying main ideas or overall gist in texts (Daneman & Carpenter 1980; Oakhill 1982; Palinscar & Brown 1984; Stothard 1994). These patterns indicate difficulty in the global processing of information.

### 6.3.1 The testing of thematic inferences

In this study the **thematic** category of inferences tapped the students’ ability to infer the main or generic ideas of a paragraph or text. In all, there were 16 items in the final tests that tested thematic inferences in various ways, such as:

- \* Tasks that required the students to infer a topic or generic sentence in a paragraph and to underline it. This task has a built-in bias in that in most paragraphs, the main idea is often expressed in the first sentence, so students may tend to underline the first sentence anyway, irrespective of their understanding of text theme. To control for this, a paragraph with a medial topic sentence was also selected, and other tasks, as discussed below, were also used to tap topic sentence inferences.
- \* Multiple choice questions, where students had to infer an appropriate heading/title from the options. Headings or titles represent a superordinate idea or concept as the theme of the given text. The distractors in the questions typically consisted of an item (e.g. a heading or paraphrase) that was too generic for the paragraph, one that was too specific and focused only on one idea in the paragraph, and one that was not relevant in that it referred to a relatively minor point in the paragraph.

- \* Multiple choice questions where students were required to infer an appropriate gist sentence for a given passage. The contents of the appropriate paraphrase sentence contained the main ideas expressed in the text, whereas the distracter paraphrases contained information that was too generic, too specific or else inaccurately summarised some aspect of information in a given text.
- \* A gist statement that the students had to judge as a true or false inference with reference to the given text.
- \* Unscrambling the sentence sequences of two paragraphs. In re-ordering the sentences into their proper sequence in order to render the paragraphs coherent, the students had to infer the generic/topic sentence in each paragraph. This kind of task determines whether the student can infer which sentence conveys the most general idea and then to place it in the first position, so that all the subsequent sentences further develop this idea.

The results of the thematic inferences are presented in Tables 6.2 and 6.3 in §6.5.1 below.

## **6.4 Methodology**

In the previous sections the role of thematic and text-semantic relations in creating coherent text representations during reading was outlined, and the six text-semantic relations singled out for attention in this study were identified and discussed. In this section the aims underlying Tests 1 and 2 are identified and the subjects, materials and test procedures are described.

### **6.4.1 Aims of current component of study**

Given that information in expository texts is structured around main ideas, and that different kinds of text-semantic relations knit the propositions in a text together, it is important to have a better understanding of how students comprehend such relations, and what kinds of relations pose problems for students. It is also important to find out how students themselves perceive their reading abilities and their reading problems. If we can determine in what respects students have problems comprehending their expository texts and to what extent they are aware of such problems and can monitor their comprehension, then we are in a better position to understand the nature and extent of their problems and to design instructional programmes that will address problematic areas. However, in order to better assess students' ability to make such inferences during the reading of expository texts, it was important also to test students' ability to answer other kinds of questions on the given texts, so as to have some kind of yardstick in terms of which to compare performance in text comprehension. To this end, two other kinds of questions

were included in Tests 1 and 2 for the Medunsa students, viz. literal and paraphrase questions. The aims underlying this component of the study, viz. Tests 1 and 2, were as follows:

- (i) To compare students' responses to **inference questions** with their responses to **literal and paraphrase questions**.
- (ii) To compare students' responses to **different kinds of text-semantic relations and thematic inferences** in order to establish which kinds of semantic and thematic relations were easier to infer and which were more challenging.
- (iii) To examine relationships between the students' ability to answer literal, paraphrase questions and inferential questions relating to semantic and thematic relations with their ability to perceive **anaphoric and vocabulary inferences**, as well as with their **L2 proficiency and their academic performance**.
- (iv) To analyse the data to determine **which of all the inference categories** as well as other categories (e.g. L2 proficiency, school attended) **best predict academic performance**.
- (v) To analyse the Medunsa students' **perceptions about their reading skills** to see what patterns emerge in relation to their inferencing skills and their academic performance.

#### 6.4.2 Subjects

Inference Tests 1 and 2 dealt mainly with inferences concerning text-semantic relations and gist or main ideas. The students who wrote these tests were as follows:

- \* In all, 40 Sociology I students from Unisa who attended extra tuition on Saturday mornings at the Thuthong centre. For reasons explained in Chapter 1, not all these students completed all the inference tests or the language proficiency test, so a full profile of their inferencing abilities is not available. The tests with these students served mainly as pilot tests that were subsequently modified, refined and expanded. These tests thus served as a testing ground for the design of the Medunsa tests and the test used with the Psychology students.

As explained in Chapter 1, the Sociology students were also under-represented in that the majority of them fell into the Fail category. Even those in the At Risk and Pass category were very similar in that some At Risk students had scores in the mid- to high 50s, while most of the students in the Pass category had scores in the low 60s. There were no

distinction students in this test population.

- \* The Medunsa students included 52 first-year medical and 30 first-year occupational therapy students. These students completed all the other inference tests as well as the language proficiency test, so a fairly detailed profile of their inferencing abilities was compiled. The results presented in this chapter deal mainly with the responses of the Medunsa students to Test 1 and 2.

#### 6.4.3 Test material

The texts that comprise Tests 1 and 2 were taken from the prescribed textbooks used at Unisa for the first-year Sociology and Psychology courses, namely Giddens (1994) and Jordaan & Jordaan (1994). The texts are taken to be fairly representative of the genre of social and human science textbooks that first-year students typically encounter. Although these books are not used by the Medunsa students, this did not seem to disadvantage them. In fact, as will be seen later in the results section, the overall scores of the Medunsa students on these tests were higher than the Sociology students, for whom some of the texts should have been familiar since they were taken from their prescribed textbook.

Besides the inference test items, there were also non-inference questions, as follows:

- \* Ten **literal questions** of a fill-in nature. Literal questions test comprehension at a superficial level since they basically require a reader to find explicitly stated information in a text. In other words, the reader does not have to perform any *text-connecting* task to answer the question but simply has to match explicit information in the question with explicit information in the text. Literal questions were not included in the pilot tests with the Sociology students.
- \* Seven **paraphrase questions** of explicitly stated information. Although paraphrase questions can require inferencing at different levels of text processing, the paraphrase questions that were used here were basically paraphrases of explicitly stated information, where the students needed to perceive the gist of a text and then accurately match explicit information in the text with explicit information in the paraphrase options. In other words, these questions were intended to be slightly more demanding than literal questions in that they required some text-connecting processing of the text, but unlike inference questions, they still basically dealt with explicitly stated text information. They were thus intended to be somewhere between literal and inferential questions. Paraphrase questions were not included in the pilot tests with the Sociology students.

In the pilot tests only four text-semantic relations were tested, viz. causal, statement-exemplification, premise-conclusion and contrastive. Two more relations were added in the final tests, viz. temporal and whole-part relations. The contrastive category was also expanded to include both local and global contrastive relations. The final Test 1 consisted of 33 question items in all, based on 18 separate paragraphs and one longer text of 3 paragraphs (415 words). The final Test 2 consisted of 58 question items based on 6 separate paragraphs (average of 116 words per paragraph).

The reading questionnaire comprised a range of statements relating to the students attitudes to and perceptions about their reading, what kinds of problems they experienced when reading, and what strategies they adopted to deal with such problems. Tests 1 and 2 as well as the reading questionnaire appear in Appendix B, C and H respectively.

#### **6.4.4 Testing procedures**

As pre-arranged with the Sociology tutors and the students, the Sociology students wrote the tests during the slot allocated to them for a Sociology tutorial, although no specific time limit was set for completing the tests. The test was administered by the researcher and each test was written about two weeks apart. Once again, many of the students took a long time to complete the tests. It was also telling that the tasks requiring them to re-order the scrambled paragraphs seemed to be especially stressful and taxing for many of the students. Some of them had difficulty understanding what they were required to do in these specific tasks, and seemed to find it extremely difficult to know how to go about the task, even after they were told to look out for clues in each sentence to guide them in re-ordering the sentences. As a result of this response, the number of re-ordering tasks were reduced from four to two paragraphs in the final test, to save time and to reduce test stress.

As pre-arranged with the English lectures and the students at Medunsa, Inference Tests 1 and 2 were administered during two two-hour slots allocated to the students for their English classes. The tests were administered by the researcher and a lecturer, since the medical students were divided into two groups. Test 2 was written after an interval of about three weeks after Test 1. The students took between 35-90 minutes to complete the test on each occasion. Here too the re-scrambling tasks were found to be challenging by some of the students, but not seemingly to the same extent as with the Sociology students. It was noticeable that several of the students who had no difficulty with these items were also those students who scored well on the tests overall.



#### 6.4.5 Statistical procedures and CHAID analysis

In the study, all the different question types and inference categories serve as independent variables while academic performance serves as the dependent variable. In order to achieve aims (i)-(iii), simple descriptive statistics were used to obtain frequency profiles of the responses to the different question types and inference categories. In order to achieve aim (iv) and determine which independent variable(s) best predicted the dependent variable, a CHAID analysis was used. CHAID stands for Chi square + Automatic Interaction Detection.

A CHAID analysis is a statistical technique that can be used to explore the relationship between a large number of independent variables and a single dependent variable. It has as its basis a CHI-squared test based on non-metric data. It has become a popular method in the social sciences for it is suitable for the analysis of large sets of data (Kass 1980). The analysis goes through the following basic steps:

1. Metric (i.e. continuous) predictor variables are converted into non-metric or categorical variables.
2. Predictor variables that are similar are combined, or small categories or categories with low frequencies are omitted or combined with other categories.
3. Each predictor variable is examined, and the one that accounts for the most variation in the dependent variable is used to split the sample into subsamples.
4. After a split, each of the subsamples is analysed, according to the above procedure. This process is repeated until no further significant relationships are found, or until sample sizes in the subsamples get too small, i.e. have low frequencies (Kass 1980).

The results of a CHAID analysis are displayed in a dendrogram (cf. Fig. 6.1 below), which clearly shows the hierarchical ordering of the predictor variables and also shows which of the predictor variables are significantly associated with the dependent variable.

In accordance with step 2 above, because there were so few students in the distinction category, this category was merged with the pass category. The dependent variable *academic performance* thus had three subcategories, viz. fail (0-49%), At Risk (50-59%) and Pass (60%+). The statistical package SPSS was used to do the CHAID analysis<sup>1</sup>.

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<sup>1</sup> I am grateful to Prof. VSS Yadavalli of the Department of Statistics, Unisa, for drawing my attention to this technique and guiding me through it, and to his Masters' graduate student, Alfred Ngwane of Central Statistical Services, for performing the CHAID analysis and for interpreting the results for me.

## 6.5 Results

The results section is divided into two parts: the first part deals with the results of Tests 1 and 2 in terms of aims (i) - (iv), while the second part deals with the results of the reading questionnaire in relation to aim (v).

Before the results were analysed, an Alpha (Cronbach) model reliability test, available on the SPSS program, was applied to each test. This is an analysis of internal consistency, based on the average inter-item correlations. It enables one to get an overall index of the internal consistency of the test and to identify problem items that could be eliminated from the test. Reliability scores of between .60 and .70 are regarded as satisfactory, while scores above .80 are regarded as desirable. After item E5 in Test 1 was found to be unreliable and was subsequently discarded, Test 1 then had an Alpha coefficient of .82 (83 cases and 41 items). In the case of Test 2, item D3d was discarded before the reliability test was applied, because this item had a 100% correct response rate<sup>2</sup>. After applying the reliability test, three test items in Test 2 (A6d, D4 and E4) were found to be unreliable and were subsequently discarded. With these items omitted, Test 2 had an Alpha reliability coefficient of .80 (77 cases and 51 items).

### 6.5.1 Semantic and thematic inferences

First of all, let us consider the responses to literal, paraphrase and inference test items in the two tests. The average score for the Medunsa students' responses to the literal and paraphrase questions were 87,7% and 74% respectively, while the average score for their responses to the inference questions was 57%. Not unexpectedly, students found the literal questions far easier to answer than paraphrase and inference questions, irrespective of whether they were performing well academically or not, and the paraphrase questions in turn were found to be easier than the inference questions. The distribution of literal, paraphrase and inferential questions is displayed in Table 6.1 below.

As can be seen from the table, there is a greater evenness in the spread of scores in literal questions than in paraphrase questions, indicating greater uniformity within and across the groups in answering this type of question. Although the Sociology students were not tested on literal and paraphrase questions, their mean inference score was somewhat lower than that of the

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<sup>2</sup> The question asked whether, on the basis of information in the given paragraph, the inference that parental support is an important factor for a child's success at school, was a valid one. This inference can be made on the basis of background knowledge and not necessarily from information in the text and this was clearly how students responded to it.

Medunsa students, at 52,9%. Like the Medunsa students, there is the same differential performance across the different academic groups, with an increase in inferential activity the stronger the academic group.

**TABLE 6.1: MEAN GROUP SCORES IN LITERAL, PARAPHRASE AND INFERENTIAL QUESTIONS<sup>a</sup>**

<b>Group (N)</b>	<b>Fail (25)</b>	<b>At Risk (22)</b>	<b>Pass (21)</b>	<b>Distinction (3)</b>	<b>Total mean (71)</b>
<b>Literal questions</b>					
Mean	84	86,1	93	93	87,7
(SD)	(9,2)	(14)	(11)	(11)	(12,1)
<b>Paraphrase questions</b>					
Mean	67,9	73,4	79,3	94,4	74,1
(SD)	(19,7)	(19,7)	(14,8)	(9,6)	(18,8)
<b>Inferential questions:</b>					
<b>Medunsa</b>	47,2	57,5	64,6	81,8	57
Mean	(8,2)	(13)	(14,5)	(8)	(14)
(SD)					
<b>Inferential questions: Unisa</b>	(n=27)	(n=10)	(n=10)		(n=47)
Mean	39,5	57,8	61,6		52,9
(SD)	(9,8)	(10)	(17)		

<sup>a</sup> The mean scores in the columns are expressed as percentages

The relationship between these different question types and academic achievement groups was further explored by means of one-way ANOVAs. (Because there were so few subjects in the Distinction group, this group was merged with the Pass group.) Although the analysis yielded a significant effect with regard to literal ( $F(2, 69) = 4.05, p < .02$ ) and paraphrase questions ( $F(2, 69) = 3.23, p < .04$ ), the Scheffé tests only showed significant differences between the Fail and Pass groups, that is, the two groups at either end of the continuum where we would most expect differences. On the other hand, the analysis yielded a highly significant effect for inference questions ( $F(2, 69) = 22,4, p < .0001$ ), and the Scheffe test showed significant differences between both the Fail and At risk groups, and between the At Risk and Pass groups.

Next, the overall or mean response to each of the different semantic and thematic relations was computed and converted to a percentage. The same procedure was applied to the different academic groups. The Sociology results are presented first, in Table 6.2. As mentioned in §6.4 above, the tests administered to the Sociology students were pilot tests, only five text-semantic relations were tested, and there were only 4-5 test items per category of semantic relation. The

results of the different types of inference relations are arranged hierarchically in Table 6.2 below, according to their relative ease of inference response, as reflected in the total percentage. Although all the results are relatively low, the students found causal relations the easiest of all, and contrastive and premise-conclusion relations the most difficult. As has already been pointed out, the students in the Fail group outnumber those in the other groups, and the At Risk and Pass students had very similar scores

**TABLE 6.2: UNISA, SOCIOLOGY: MEAN GROUP SCORES IN SEMANTIC AND THEMATIC INFERENCES<sup>a</sup>**

<b>Group (N)</b>	<b>Fail (27)</b>	<b>At Risk (10)</b>	<b>Pass (10)</b>	<b>Group mean (47)</b>
<b>Causal</b>	37	60	75	57,3
<b>Thematic</b>	53,7	55	55	54,5
<b>Exemplification</b>	41,3	53,3	61,6	52
<b>Contrastive</b>	34	35	35	34,4
<b>Premise-Conclusion</b>	23,4	30	36	29,8

<sup>a</sup> The mean scores in the columns are expressed as percentages

About six months later the revised and expanded tests were administered to the Medunsa students, the results of which are presented in Table 6.3 on the following page. The thematic inferences and the six different types of inference relations are arranged hierarchically in the table according to their relative ease of inference response, as reflected in the total percentage.

As can be seen, the students found temporal relations the easiest of all to infer, while global contrastive relations, as predicted, proved to be the most difficult. The most noticeable differences between these and the Sociology results concern the reverse order in terms of ease of response of the causal and premise-conclusion categories. The most striking fact, from both the Unisa Sociology and the Medunsa results, is the consistent pattern of improved inferencing ability during reading across the different inference categories, from the Fail to the Distinction groups.

**TABLE 6.3: MEDUNSA: MEAN GROUP DIFFERENCES IN SEMANTIC AND THEMATIC INFERENCES<sup>a</sup>**

Group (N)	Fail (25)	At Risk (22)	Pass (21)	Distinction (3)	Group mean (71)
Temporal	74,1	77,7	76,1	100	76,9
Premise- conclusion	54,8	62,7	75,4	85,7	64,6
Thematic	49,1	58,8	62,2	80,9	58
Whole-part	38,6	56,7	69	94,4	55,6
Exemplification	43	59	64,5	66,6	55,3
Contrastive (Local) <sup>3</sup>	38,2	49,6	63,9	76,1	50,9
Causal	29,1	43,3	55,3	77,7	43,3
Contrastive (Global)	26,1	42,3	52	70,3	40,7

<sup>a</sup> The mean group differences are expressed as percentages.

The relationship between these different categories of inferences and academic achievement groups was further explored by means of one-way ANOVAs. (Once again, because there were so few subjects in the Distinction group, this group was merged with the Pass group.) The results are displayed in Table 6.4 below.

**TABLE 6.4: DIFFERENCES BETWEEN INFERENCE CATEGORIES AND ACADEMIC PERFORMANCE**

	F -value	df	p	Fail-At Risk <sup>+</sup>	At Risk-Pass <sup>+</sup>	Fail-Pass <sup>+</sup>
Thematic	6.47	2, 69	.003			*
Temporal <sup>‡</sup>	.47	2, 69	.59			
Premise- conclusion	6.11	2, 69	.003			*
Exemplification	5.28	2, 69	.007			*
Whole-part	15.86	2, 69	.0001	*	*	*
Contrastive (Local)	11.46	2, 69	.0001		*	*
Causal <sup>‡</sup>	12.10	2, 69	.0001		*	*
Contrastive (Global)	19.86	2, 69	.0001	*	*	*

<sup>+</sup> significance at .05 level is indicated by \*

<sup>‡</sup> The data in these two categories did not originally meet the assumption for homogeneous variances. After the data were transformed, these two categories met the requirements on Bartlett's's test for homogeneity.

<sup>3</sup> As mentioned previously (§6.2.6), after the pilot tests with the Sociology students (cf. Table 6.2), a distinction between local and global contrastive relations was made in the tests administered to the Medunsa students.

As can be seen from these results, the Fail and the At Risk groups once again behave similarly in that in six out of the eight inference categories, there are no significant differences between them. However, there are four inference categories (viz. inferences involving whole-part, local contrast, global contrast and causal relations) that identify significant differences between the At Risk and the Pass groups, suggesting that the ability to perceive these kinds of relations are important in the reading and academic context. In particular, inferences involving whole part and global contrasts showed significant differences between all three academic groups.

Pearson Product Moment correlations were used to explore the relationship between the Medunsa students' ability to answer literal and paraphrase questions, and to infer semantic and thematic relations in texts on the one hand, and their scores on anaphoric inferences, vocabulary inferences, L2 proficiency and academic performance on the other hand. The alpha levels were set at  $p < .05$ . The results are displayed in Table 6.5 below.

**TABLE 6.5: MEDUNSA: CORRELATIONS BETWEEN QUESTION TYPES, ANAPHORIC AND VOCABULARY INFERENCES, L2 PROFICIENCY AND ACADEMIC PERFORMANCE**

N = 71		Anaphoric inferences	Vocabulary inferences	L2 proficiency	Academic performance
Literal questions	( <i>r</i> )	,42 (,001)	,46 (,001)	,41 (,001)	,37 (,001)
Paraphrase questions	( <i>r</i> )	,37 (,001)	,26 (,02)	,33 (,004)	,33 (,004)
Semantic inferences	( <i>r</i> )	,71 (,001)	,72 (,001)	,72 (,001)	,71 (,001)
Thematic inferences	( <i>r</i> )	,54 (,001)	,63 (,001)	,66 (,001)	,48 (,001)

The results indicate that the ability to answer literal and paraphrase questions is only mildly correlated to the four stated variables. On the other hand, the ability to infer semantic and thematic relations in texts was more robustly related to the four variables. In particular, the ability to infer text-semantic relations was more strongly and significantly related to the three variables that reflect verbal ability (viz. anaphoric and vocabulary inferencing and L2 proficiency), than was the ability to make thematic inferences. Surprisingly, skill in thematic inferencing did not correlate as strongly with academic performance.

We come now to the **CHAID analysis** and aim (iv), viz, to determine which inference categories

best predicted academic performance. The CHAID analysis, as mentioned earlier, is a powerful statistical technique that can be used to determine which of a group of independent variables best predicts a dependent variable. The variables listed below were converted into categorical variables that served as the set of predictor variables for the dependent category *Group*, comprising *Group 1* Fail (1-49%), *Group 2* At Risk (50-59%) and *Group 3* Pass (60%+) students. Because the distinction group was a small category, it was merged with the Pass group.

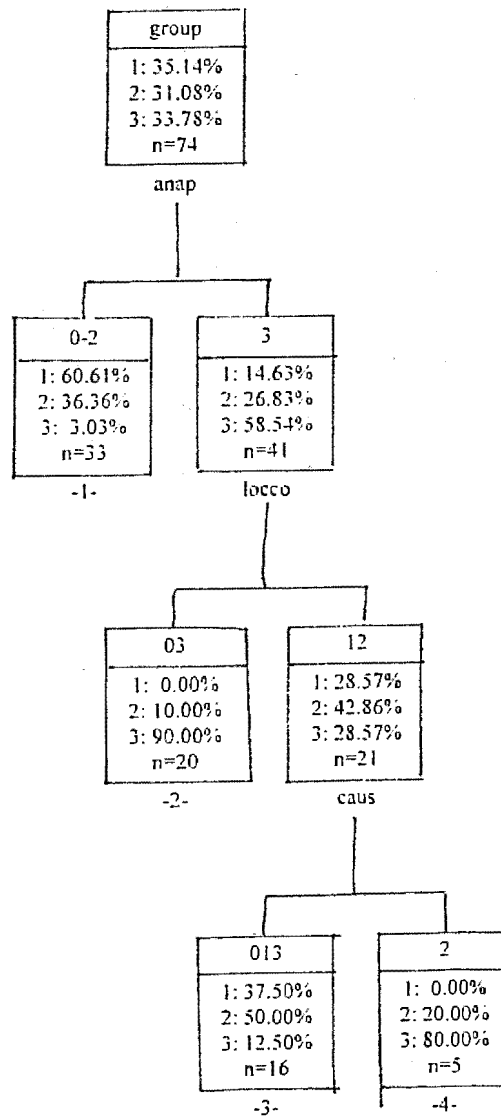
<i>allpa</i>	paraphrase questions
<i>anap</i>	anaphoric inferences
<i>cause</i>	causal inferences
<i>contr</i>	global contrastive inferences
<i>exem</i>	exemplification inferences
<i>liter</i>	literal questions
<i>locco</i>	local contrastive inferences
<i>perco</i>	premise-conclusion inferences
<i>temp</i>	temporal inferences
<i>them</i>	thematic inferences
<i>vocab</i>	vocabulary inferences
<i>whpa</i>	whole-part inferences
<i>langt</i>	L2 proficiency test
<i>school</i>	school attended in matric (ex DET 'township school'; ex Model C school, private school, agricultural school)

An eligibility level of 0.05 was specified. This eligibility value means that the observed relationship between the dependent variable and the set of predictors will only occur 5% of the time if in fact the dependent variable and the predictors are not related.

The dendrogram in Fig. 6.1 below shows that, out of 74 cases, 35.14% were in *Group 1* (the fail group), 31.08% were in *Group 2* (the At Risk group) and 33.78% in the pass *Group 3* of the dependent variable. Of the set of predictor variables, three variables, namely, *anap* (anaphoric inferences), *locco* (local contrastive inferences) and *cause* (causal inferences) were significantly associated with the dependent variable. The anaphoric variable had the most significant relationship with the dependent variable. Also, those with marks less than 60% for *anap* (i.e. *anap* group 0-2) were grouped together. In this group, 60.6% of the candidates would be expected to fail, 36.6% fell in the At Risk category and only 3% of the candidates would be expected to pass. In other words, an inability to resolve anaphoric inferences successfully seemed to go hand-in-hand with the likelihood of becoming a Fail or an At risk student. For those who passed the test on anaphoric inferences, significant differences emerged between those

who failed and those who are at risk of failing local contrastive inferences and causal inferences on the one hand, and those who passed these two inference categories on the other hand. In other words, students who did well academically were also readers who, in addition to resolving anaphoric inferences successfully, were also students who resolved contrastive and causal inferences successfully.

**FIG. 6.1: MEDUNSA: DENDROGRAM OF PREDICTOR VARIABLES WITH REGARD TO DEPENDENT VARIABLE**



Predictor variables:

anap = anaphoric inferences

locco = local contrastive inferences

caus = causal inferences

The dependent category, *group*, comprised *group 1* Fail (1-49%), *group 2* At Risk (50-59%) and *group 3* Pass (60%+)



In sum, what the results of the CHAID analysis show is that of all the 14 possible predictor variables, three emerged as the strongest predictors of academic performance, namely, **anaphoric inferences**, **local contrastive inferences** and **causal inferences**. The ability to make these kinds of inferences seems to underlie the ability to successfully comprehend expository texts.

Because a CHAID analysis requires the conversion of continuous data into categorical data, it was decided to further test the relationship between the independent variables and academic performance by means of the more traditional technique, the regression analysis. A stepwise regression analysis was thus performed to see which variables were most strongly associated with academic performance. The variables that were entered as independent variables were **literal questions**, **paraphrase questions**, **anaphoric inferences**, **vocabulary inferences**, **thematic inferences** and **semantic inferences** consisting of contrastive, whole-part and causal inferences. Academic performance was the dependent variable. Interestingly, from this analysis, semantic inferences emerged as the strongest predictor of academic performance, accounting for 49% of the variance ( $R^2 = .49$ ,  $F = 62.84$ ,  $p < .0001$ ), while anaphoric inferences, the second strongest predictor, accounted for a further 7% of the variance. In other words, semantic relations and anaphoric relations together accounted for 56% of the variance in academic performance ( $R^2 = .56$   $p < .003$ ).

One of the aims of this study is to gain a better understanding of Matthew effects in reading and how they impact on academic performance. Despite differences in specific details, both the statistical techniques reported above showed anaphoric and text-semantic inferences consistently being associated with academic success. Results such as these give us insights into the Matthew phenomenon because they clearly suggest that the ability to infer anaphoric and semantic links and relationships during the reading of expository texts is a crucial determinant in constructing coherent text representations. This ability seems to underpin text comprehension, and hence academic performance. This is obviously an area of expository reading that needs to be further explored.

### 6.5.2 Results of reading questionnaire

The purpose of the reading questionnaire was to elicit the students' own perceptions of their reading abilities and practices via a few probe questions. The responses to the reading questionnaire by the Medunsa students are presented in Table 6.4 below, according to the four different academic groups. Note that because not all the students from each group answered all the questions, some of the cells remain empty.

**TABLE 6.6: RESPONSES TO READING QUESTIONNAIRE<sup>a</sup>**[<sup>a</sup> the numbers in each column represent percentages of the total number of students in each group ]

N =	Fail 25	At Risk 23	Pass 21	Distinction 4
<b>1.</b>				
<i>I enjoy reading and don't usually have problems understanding the texts I read</i>	19	35	57	100
<i>I enjoy reading but I find it a bit slow and difficult sometimes, especially with my textbooks</i>	77	65	38	
<i>I don't like reading because it takes too long and the texts are difficult</i>	4		4	
<b>2.</b>				
<i>I generally read through a text once</i>	4	4		
<i>I generally read through a text twice</i>	31	39	67	
<i>I generally read through a text three to four times</i>	58	39	33	100
<i>I generally read through a text five times or more</i>	7	17		
<b>3.</b>				
<i>When reading, I have problems understanding the grammar of sentences</i>	27	14		
<i>When reading, I have problems understanding the meaning of many words</i>	38	55	35	50
<i>When reading, I have problems understanding the overall meaning/arguments in a text</i>	8	14	23	50
<i>When reading, I have problems understanding the background knowledge assumed by the text</i>	12	4	18	
<b>4.</b>				
<i>When I don't understand a section of text, I usually ... (tick as many options as are applicable to you)</i>				
<i>... ask a friend to explain it to me</i>	39	44	29	
<i>... use a dictionary</i>	23	13	10	33
<i>... re-read the section over again until I understand</i>	15	35	48	67
<i>... ask the lecturer to explain it to me</i>	15			
<i>... skip the section and continue reading</i>	4	9		

Most of the students who enjoyed reading and didn't really experience problems with it fell into the Pass and Distinction groups. Many of the students from all four groups perceive their comprehension problems with texts to stem primarily from vocabulary problems. Although this is a common problem area, the results of the quantitative study show that there are other areas of reading comprehension in which many students have major problems. The Fail students also see their problems as stemming from grammatical difficulties, while the Distinction students perceive

their problems from a more global perspective, viz. following the overall meaning in a text. There clearly seems to be an inverse relationship between awareness of comprehension difficulties and academic performance, since 50% of the Distinction students claimed to have problems “understanding the overall meaning/arguments in a text”, while only 8% of the Fail students claimed to have such a problem.

When students experience problems understanding their texts, the majority of the students in the Fail and At Risk categories ask a friend to explain the contents of the text to them, a response which indicates that they are not yet independent learners and do not have strong metacognitive repair strategies. Students in the Pass and Distinction groups are less reliant on other people for their comprehension problems, since the majority of the students from these two groups re-read the texts over until they understand them better - a strategy that few of the Fail students claim to adopt. One also notes a possible discrepancy in the responses of the Fail students: nearly 60% of them claimed to read their texts at least 3-4 times, yet only 15% of them said that they re-read their text over again if they had problems understanding it. The former figure could reflect a socially acceptable response - the testee responds in a way that s/he thinks is acceptable to the researcher, whereas the actual pattern of behaviour might be different. As will later be seen in Chapter 8, the case study students did claim to re-read their chapters several times, but sometimes the effort was too great so they just gave up on it and relied instead on explanations from their tutor or from other students in their discussion group. Because they tend to be passive and non-strategic readers, their re-reading of a passage may be just as ineffective as their first reading.

## 6.6 Discussion

The main aims of this aspect of the study were to compare the students' performance on inferential questions to their performance on literal and paraphrase questions, to examine their responses to semantic and thematic inferences, and to determine which kinds of inferences best predict academic performance. What is striking about the results obtained from Tests 1 and 2 is the consistency across the four different academic groups of differences in inferential reading performance, and the steady improvement in inferential reading skills the stronger the academic group. These results robustly support the assertion that academic performance is related to reading ability.

As predicted by the literature, the Medunsa students in general found the literal questions easiest of all to answer. Literal questions are cognitively undemanding as they simply require a reader to find surface information in the text that matches information in the question. Literal questions are not good discriminators of reading comprehension because even though the stronger students (Pass and Distinction) scored better on literal questions than the weaker students (Fail and At

Risk), the weaker students still performed very well on these scores in comparison to their inferential scores. For example, the Fail group of students experienced an overall drop of almost 40% in their responses to inferential questions compared to literal questions, while the Distinction students had a drop of about 5% only. The responses to the paraphrase questions were interesting in that although they are cognitively more demanding than literal questions, they are not as demanding as inferential questions in terms of meaning construction, yet they do require students to synthesise information across longer stretches of text such as paragraphs. The paraphrase questions start to differentiate the weaker students from the stronger ones more accurately than do the literal questions, while the inferential questions reveal these differences consistently and fairly robustly.

What these results suggest, at a theoretical level, is that answers to literal questions reflect the relatively inert assimilation of information but this does not affect the processing 'architecture', for no new semantic information is added, via linking processes, to the mental representation during the reading process. It is only when the construction of meaning involves greater linking processes (i.e. inferences) that the processing architecture changes, for now new semantic information is added to the mental representation and meaning construction becomes generative and richer. Reading is essentially a meaning construction process and it is inferential rather than literal and paraphrase questions that reflect the amount of generative meaning construction that readers engage in during the reading process. In fact, the Distinction students perform consistently well irrespective of the type of question, while the academically weak students get weaker when test items tap into their ability to enrich their meaning construction process by making links and hence adding new semantic information to their text representations.

What is the significance of the results relating to semantic and thematic inferences? The findings on the ability to infer semantic and thematic relations provide further insight into the construction process of reading. Text linguistic research into text-semantic relations in writing has shown how such relations 'knit' ideas together in a text and give it coherence. The ability to perceive such relations while reading enables a reader to construct a rich and coherent representation of what the text is about. The Pass and Distinction students were much better at perceiving such relations than were the Fail and At Risk groups. Likewise, the presentation of main ideas in a text provides it with a macro-structure around which details are interwoven. The ability to identify main ideas, to subsume smaller details of information into a larger picture, and to perceive the hierarchical relations between the details, are vital skills in reading comprehension, and once again, it was the Pass and Distinction students who outperformed the Fail and At Risk students in answering inference items that tapped into these abilities. Despite the fact that explicit markers occurred in the tasks involving sentence insertion and the re-ordering of scrambled paragraphs, the weaker students still had problems inferring where omitted propositions belonged in the text as a whole.

In other words, they failed to see the relationships between items of information. Together, these results suggest that more skilled readers seem to actively engage in a search for patterns of meaning, or what Nicaise & Gettinger (1995:287) refer to as “units of thought”. In essence, they search for relationships. If a reader can organise the mass of details in a text into ‘chunks’ of related information, and further recognise the relations between these chunks then, to borrow a phrase of Van Dijk & Kintch (1983:195, in Bilheimer 1992:103), “... the extremely complex task of keeping some order in the vast amount of semantic details can be managed”.

The finding that the students had least difficulty with making inferences about temporal relations is not unexpected, since this is regarded as one of the easier of text-semantic relations. The finding that many students, especially the weaker students, had most difficulty making inferences about contrastive relations is also consistent with what the literature has suggested. Developmentally, and in terms of L2 learning, these relations have been found to be difficult semantic relations because of their discontinuous nature. It is also interesting to note the finding that local contrastive relations were easier to infer than the global ones. This pattern is also reflected in other research (Vauras et al. 1994; Van den Broek 1997) where younger and weaker readers find it easier to construct meaning in local, nearby units than across longer stretches of discourse. As reading skills improve, readers cope better with linking information across larger sections of text.

One finding that was unexpected in the Medunsa results was that pertaining to premise-conclusion relations, which are regarded as being quite challenging text-semantic relations but which the students seemed to find relatively easy in comparison to the other relations. One reason for this could be that 5 of the seven items in the final tests that assessed this type of relation were items where students had to judge whether given statements were True/invalid inferences that could be drawn from the text. These types of question items in the present study proved to be easier to answer than other question types, and this might account for the higher overall scores in this relation. In future reading research such items should be used sparingly, or else made more ‘accountable’ by having students justify their response in each case.

The relatively low scores of the exemplification relations were somewhat surprising, since exemplification is a typical feature of expository texts. It is also disturbing that thematic, whole-part and causal relations also had overall low inference scores, since these are basic and vital relations that knit the fabric of texts together. Given that the relations that were singled out for study here are fairly widespread relations that characterise social/human science expository texts, the findings obtained in this component of the study help to identify specific areas where students are having problems constructing meaning from the reading of their expository texts. This enables researchers and practitioners in the field to devise ways of addressing these problem areas

in order to help students develop appropriate reading skills that underlie the comprehension of expository texts. Reading exercises and tasks could be designed that specifically target common text-semantic relations in subject-specific expository texts and provide students with practice in recognising and understanding such relations.

The results of the CHAID analysis revealed that three types of inference were significantly associated with academic success, viz. the ability to infer anaphoric relations, contrastive and causal relations. These results are striking and mirror the central role that these kinds of relations play in expository texts. The ability to resolve anaphors depends on a reader's ability to link incoming information with what has gone before in the text. If readers cannot successfully resolve anaphors, then they cannot construct accurate representations of what the text is about and they have difficulty updating their current representations to accommodate new information. As Fahnestock (1983) points out, so much of our everyday as well as academic discourse consists of making distinctions, adding qualifications or concessions to our arguments. Attention to these contrastive details is crucial if we wish to construct an accurate representation of the meaning of a text. The ability to perceive discontinuative aspects of an argument appears to be a cornerstone of text comprehension and if students have difficulty in this area, then they are going to have difficulty entering into the world of academic discourse in general. It is therefore not surprising they do not perform well, academically. Likewise, the ability to perceive causal connections in text has long been shown to be a strong determinant of reading comprehension and text memory. If students have difficulty perceiving causal links, then they are missing vital information in texts. It is not surprising that students who do not perceive these links in their textbooks do not perform well academically since they will have difficulty constructing accurate representations of what their texts are about.

When we look at the responses to the reading questionnaire in relation to the four academic groups, we find some interesting patterns emerging that mirror the findings from the quantitative study. For example, the Distinction students reveal characteristics typical of independent readers and learners - they enjoy reading, they engage in meaning construction and they don't usually have problems understanding their texts. When they do encounter problems, they adopt independent strategies to address them, such as dictionary use and re-reading texts. These are the students for whom reading is an effective learning tool. As the results from the quantitative tests show, these students are good at searching for patterns of meaning and relationships in texts and this enables them to build up a rich representation of the meaning of the text. This rich meaning construction in turn enables them to construct new knowledge from their texts. Thus they get richer in the learning context.

One of the characteristics of weak readers relates to problems in metacognitive awareness, namely

the ability to monitor and assess one's own performance. Although one must be mindful of socially acceptable effects in questionnaires, it is interesting to note that at least 25% of the academically weak students claimed that they didn't have problems understanding the texts they read, yet their performance in the reading tests belied their self-assessment. (Similar response patterns were obtained with the Psychology students, as will be discussed in the following chapter, in §7.3.) In contrast, at the other end of the spectrum the Distinction students had a far more realistic assessment of their reading ability - they claimed not to have reading comprehension problems and the test results supported their self-assessment. As will be recalled from Chapter 5, the same pattern was obtained with regard to the vocabulary scores, where the good students knew when they knew a word meaning, while the weak students often claimed to know word meanings but in fact seldom gave the correct meaning of the words. Only the Fail and At Risk students admitted to skipping sections of text when they did not understand them, and many of them admitted to only reading a text twice in preparation for an assignment, yet they are the students who most need to re-read sections again in order to construct their meaning. It is also interesting to note how many students in the Fail and At Risk groups adopted external strategies to help them deal with difficult texts, viz. asking someone else to explain the text to them. As will be seen in Chapter 8, this was also a common response amongst the case study students with whom I worked. For many students, reading is not an effective learning tool, and because they are not independent readers, they are dependent on other media for constructing meaning and acquiring new knowledge. These students tend to rely on culturally mediated oral transmissions of information to overcome reading comprehension difficulties, by appealing to fellow students and lecturers/tutors for explanations of information in texts. The problem with this kind of compensatory strategy is that the detail and accuracy of textual information may be compromised with second- and third-hand transmissions of information. Furthermore, students miss opportunities for developing text-based skills that enable them to construct rich and coherent representations of text meaning.

All the results in the study so far show a robust relationship between inferential ability and L2 proficiency. The academically stronger students not only have better inferential reading skills, they also have a stronger language base from which to engage in meaning making processes during reading. It is not the aim of this study to unravel the causal directionality between inferencing skills and language proficiency. In all likelihood the relationship is reciprocal. However, it is interesting to note that the Pass and Distinction students didn't identify grammar as a factor that caused problems during reading, while some of the weaker students did. Furthermore, many of the students across the different groups identified vocabulary as a major problem in text comprehension. The low vocabulary levels of our L2 students are a very real problem but, as argued elsewhere in this thesis, vocabulary problems should be regarded as symptoms rather than simply causes of poor reading comprehension. Reading success is not

simply the sum of word knowledge. If one considers the four factors mentioned in section 3 of the questionnaire results, then one could argue that the weaker students perceive reading to be a bottom-up process relying on the building blocks of grammar and vocabulary. The better the students became academically, the more they admitted that they sometimes had problems perceiving the overall idea in a text. This was not really an issue for the weaker students, yet it is a vital aspect of text comprehension. The low performance of the weak students in inferring thematic relations confirms that they have problems in understanding overall meaning in texts, yet they do not perceive this to be a problem. The quantitative findings indicate that the weaker students regularly miss vital textual clues that aid in constructing and keeping track of the overall meaning in a text. In contrast, the stronger students attend to textual details that enable them to construct meaning more effectively, which in turn makes it easier to perceive the overall meaning of their texts.



## CHAPTER 7

### GENERAL INFERENCING SKILLS

#### 7.0 Introduction

This chapter sets out the context, aims, design and findings of a general reading inference test that was administered to undergraduate Psychology students at Unisa. The aim of the inference test was to assess the extent to which the first-year psychology students understood the kinds of expository texts which they were expected to read and from which they had to learn. In this chapter the methodological issues of the study are first dealt with, after which the different categories of inference questions will be described, followed by a presentation of the results. The chapter also reports briefly on the reading speed/rate of several Sociology and Psychology students tested at the Thuthong Centre. The chapter concludes with a discussion of the findings of the general inference test and speed reading tests, and the implications that follow from them.

#### 7.1 Research context

The data presented in this chapter are derived from a reading inference test that formed part of a larger, two-year longitudinal study undertaken in the Psychology Department at Unisa in 1998-1999 to assess the effectiveness of print-based learner support strategies in a distance teaching situation. These learner support strategies and tasks were built into the new Psychology I course that started in 1999. More specifically, the departmental research project aimed at assessing whether these improved 'built-in' learning support strategies embedded in the print-based teaching medium would contribute to an improvement in students' academic performance, as measured from scores obtained in the final Psychology I exam. The students were thus tested over a two-year period, first in 1998 *before* the new material was introduced and then again in 1999, *after* the new material had been used for a year. However, the effectiveness of print-based learner support strategies also needed to be situated within the context of reading practices, attitudes and general reading abilities of the students for whom these learner support strategies are designed. The Department of Psychology therefore approached the Department of Linguistics with regard to the reading test, and in this way the researcher of the current study became involved in the psychology research project. Because inferencing is such a pervasive component of reading, it was decided that a reading test that probed the text-based inferencing abilities of the students would give an indication of the extent to which the students can effectively and meaningfully access information from print-based learning materials. A reading test was thus designed, using the same categories of inference items that were used in the pilot study with the Unisa Sociology I students but using a different text. Permission from the

Psychology department was granted to the researcher to incorporate the data from the reading inference test into her doctoral research.

The assessment of the first-year Psychology students as a whole was done via two voluntary but credit-bearing 'assignments' that probed the students' home background, study habits, study strategies, attitudes towards their study material and courses, and reading comprehension. Certain affective factors of the learners, such as locus of control and attitudes towards learning, were also probed in order to determine to what extent students were taking control of the learning process and becoming autonomous learners. To encourage participation in these extra assignments, the students who submitted them were given extra credits towards examination admission, and two prizes of R500 were given in a draw. Further details about the reading comprehension component of the student assessment are given below.

#### **7.1.1 Aims of inference test**

The aim of this component of the study was to design a 'one-off' reading test using different categories of inference items applicable to expository texts. Whereas the previous inference tests used with the Sociology and Medunsa students provided a fairly detailed profile of the students' text-based inference abilities, this test was a one-off, cross-sectional type of test designed to test a large group of students once. What this test opportunity lacked in depth it was hoped would be complemented by its scope - the opportunity to test a large number of students once. The results of this test would then be compared to the results of the more in-depth tests to see how the two sets of tests differed and how the different groups of students differed in their inference abilities.

There were four main research questions for the test, as follows:

1. How successful are students at making inferences during reading?
2. Is there a significant relationship between the making of inferences during reading and academic performance?
3. Is there a relationship between the kinds of inferences made during reading and academic performance?
4. To what extent does text-based inferencing predict academic performance?

#### **7.1.2 Reading speeds**

In order to put the results from the inferencing tests into a broader context, it was decided to test a small sample of students to determine what their reading speeds were. Although readers who

read too fast often miss out important information, research does suggest that reading at too slow a rate not only jeopardises efficient comprehension but also reduces enjoyment of reading (Anderson 1999). Because reading rates differ depending on reading level, text type and genre (e.g. narrative versus expository), reader familiarity with the topic, and purpose of reading (e.g. pleasure reading versus study reading), it is difficult to reach consensus on what an optimal reading rate is for different age groups and reading levels. Nuttall (1986:56) states that a reading speed of 300 words per minute is the norm for L1 readers of English with average education and intelligence, while Dubin & Bycina (1991) suggest that 200 words per minute is the minimum required for proper comprehension. Higgins & Wallace (1989, in Anderson 1999:3) propose that 180 words per minute is a threshold between mature and immature reading, and that reading speeds below this level compromise comprehension. Segalowitz, Poulsen & Komoda (1991, in Anderson 1999:2) argue that the reading rates of bilingual L2 readers are usually about 30% slower than L1 reading rates. Some researchers suggest that L2 readers who study through the L2 should try to approximate L1 reading speeds (Jensen 1986, in Anderson 1999:3).

The speed reading tests were administered to 24 Psychology and Sociology students at the Thuthong Centre. All of them volunteered to do the test because they said they were interested in finding out how fast/slow they read. In return, the students were given some advice on how to improve their reading speeds and why it was considered important to be able to read relatively fast without compromising comprehension. The test that was used is taken from Du Toit, Heese & Orr (1995). It occurs in Appendix I.

## **7.2 Methodological issues**

Methodological details pertaining to the subjects, test materials, procedures and results are presented below.

### **7.2.1 Subjects**

The students who participated in the reading inference test were all undergraduate students enrolled for the Psychology I course. A total of 5,000 students were registered for Psychology 1 and a total of 1,242 students responded to the reading test. Given the heterogenous nature of the Unisa student population, these students include those who are studying in English as their L1, many Black students who study in English as an additional L2, as well as some Afrikaans students and students from non-African language backgrounds. The majority of the Black students come from disadvantaged educational backgrounds where the acquisition of academic literacy skills are not developed to their full potential.

### 7.2.2 Materials and test procedure

The test passage, taken from a social science text book, dealt with interactive theories within the educational context, specifically the labelling and the self-fulfilling theories. Although the passage was taken from a sociology textbook, it was representative of typical passages that occur in social and human science textbooks where a theory to a particular problem is briefly described and research findings that either do or do not support it are presented. It was decided, after consultation with two of the first-year Psychology lecturers, that this topic, structure and style of expository text would not be unfamiliar to Psychology I students. The reading test was part of a much larger assessment and came at the end of the second 'extra' assignment thus, taking into account the fatigue factor and the 'fed-up' factor, the reading test could not be too long. The passage comprised five paragraphs and was 440 words long, and was followed by 30 inference questions that tested comprehension of various aspects of the passage. In order to vary the question formats, the test included a mixture of multiple-choice questions, fill-in type questions and open-ended questions.

All the tests were printed in A4 booklet form and posted to the students in July. The students were requested to complete the answers in their own time at home and to post back the assignments by the end of August. In all, 1,242 responses to the reading test were received.

The fact that the students completed the tests at home means that there was no control over factors such as the time it took them to complete the tests or whether they consulted other sources for responses to the questions. However, these conditions prevail when students prepare their assignments or learn for examinations; the test conditions therefore replicate those of a typical distance teaching situation. These test results thus make for an interesting contrast between the controlled conditions under which the Sociology and the Medunsa students wrote their inference tests.

### 7.2.3 Inference categories

Because an in-depth profile of the inference skills of each subject could not be built up from a single test only, it was decided to give a broad inference test that would sample inference responses from a variety of the inference categories that had already been set up in the pilot study and the Medunsa tests, and which have already been described in Chapters 4-6. Two extra types of inference questions were added, namely inferences about **text structure** and inferences about **research discourse**. These two inference items were added to the reading test because the text lent itself nicely to eliciting these particular kind of inferences. The test items on **text structure** tested whether the students could make inferences about the way in which the writer organised

information in the paragraphs. For example, in the test passage reference is made to two theories, viz. the *self-fulfilling prophecy* and the *labelling theory*. Both these concepts are printed in bold, which raises the expectation that both concepts will subsequently be discussed in the passage. However, only the first theory is explained but not the second, thus defeating the reader's expectations. A question was then formulated to see whether the students could infer the asymmetry in the writer's presentation of these two concepts. In all, there were three items that tested this type of inference category. The test items on **research discourse** tested whether the students could make inferences about the nature of social science research from the references in the passage to research findings that did not support the predictions of the self-fulfilling prophecy. In all, there were three items that tested this type of inference category.

A specification of the different kinds of inference types that were tested is given in Figure 7.1 below. The test in its entirety is given in Appendix G.

**FIG 7.1: SPECIFICATION OF THE CONTENTS OF THE GENERAL INFERENCE TEST**

TYPE OF INFERENCE BEING TESTED	NO. OF ITEMS	ITEM NUMBER
Pronominal anaphoric resolution	4	2, 16, 17, 18,
Lexical anaphoric resolution	3	10, 21, 23
Inferring vocabulary meaning from context	5	4, 5, 7, 8, 9
Inferring main ideas from text	3	1, 6, 26
Inferring conclusion from given information	4	19, 22, 24c, 27
Inferring whole-part relations	3	3, 24a, 24b
Inferring statement-exemplification relations	2	14, 20
Making inferences about text structure	3	11, 15, 26
Making inferences about the academic discourse-world	3	12, 13, 25

Due to the relatively general rather than focussed nature of this test in comparison to the other inference tests, there were fewer test items per inference category. It was therefore not possible to make direct comparisons between the results of this test and the other, more detailed tests administered to the Unisa Sociology students and the Medunsa students.

#### **7.2.4 Coding of responses**

The Department of Psychology appointed and paid graduate students to mark and code the

responses to the two extra assignments. A memorandum was drawn up beforehand for the inference reading test and appropriate answers indicated for the multiple-choice and fill-in questions. A range of possible right or appropriate answers was also drawn up, as a guideline for the markers, for the more open-ended, fill-in questions. Before the coding proper started, a sample of twenty responses was examined to check the memorandum, especially with regard to unforeseen problems, for example possible options that had not previously been considered for the fill-in responses. The coding of responses was computerised and the data saved in SPSS files that were kept in the Department of Psychology. The researcher was thus not involved in any direct way with the marking and coding of these responses, and access to the data was obtained via a lecturer in the Department of Psychology, Mr Johan Kruger, who did all the statistical analyses of the data for the researcher, as required and requested.

#### **7.2.5 Statistical techniques**

Besides the usual descriptive statistics used to display patterns of performance, two statistical techniques were applied to the data to explore the relationship between the independent and the dependent variables, viz. inferencing ability and academic performance. These techniques were one-way ANOVA and Multiple Regression.

One-way ANOVAs are used to determine whether there are significant differences between groups with respect to a specific variable, i.e. whether the differences *between* groups are larger than the differences *within* the groups. Multiple Regression is a technique that is used to predict changes in a dependent variable in response to changes in several independent variables (Hair, Anderson, Tatham & Black 1995).

#### **7.2.6 Reliability of test**

In order to test for reliability of inference test items, the Alpha (Cronbach) model Reliability Analysis test, available on SPSS, was applied to the reading inference responses (this reliability model was explained in §6.5). The reliability test was administered to all those responses where all the inference questions had been answered. This comprised a total of 703 of the 1,242 responses. An Alpha index of .78 was obtained, which is considered a satisfactory reliability index.

Of the 1,242 responses initially marked and coded, all those respondents who did not complete the last 10 items of the test were excluded from the data analysis. This left a total of 1,113 responses that were included in the statistical analyses.

### 7.3 Results

The results of the Psychology students' responses to the general inference test will first be presented, after which a report on the reading speed of some Unisa students will follow.

#### 7.3.1 The results of the general inference test

In order to address the first research question, namely *How successful are students at making inferences during reading?*, a mean score was computed for the Psychology group as a whole. The mean inference score for the 1,113 respondents was 52.8% (sd. 17.2). Here, too, we see a relatively low inference score for the group. Table 7.1. below reflects the mean inference score for the Psychology students in relation to the mean inference score of the Sociology and Medunsa students.

TABLE 7.1: MEAN INFERENCE SCORES OF DIFFERENT STUDENT GROUPS

Student group	N	Mean inference score
Psychology	1,113	52.8%
Sociology	17	52,9%
Medunsa	71	57%

What is striking about these results is the remarkable consistency in inferencing scores across the different student groups, despite the fact that the Psychology students had a different test from the Sociology and Medunsa students. The slightly higher scores of the Medunsa students is to be expected, given that Medunsa only accepts students with matriculation exemption. This consistency in scores across the different groups indicates support for the construct validity of the tests.

The second research question explored the relationship between the independent and dependent variables, viz. *Is there a significant relationship between the making of inferences during reading on the one hand and academic performance on the other hand?* As in the case of the Sociology and Medunsa students, the dependent variable, academic performance, was categorised into groups of respondents, depending on their final examination mark for Psychology I. Initially there were four groups but because the Fail group turned out to be such a large group (638 students), it was subsequently divided into two groups, as shown below. The five groups were as follows:

Group 1:	Fail I:	students who received 0-39% in the Psychology examinations; (N=355)
Group 2:	Fail II:	students who received 40-49% in the Psychology examinations; (N=283)
Group 3:	At Risk:	students who received 50-59% in the Psychology examinations; (N=185)
Group 4:	Pass:	students who received 60-72% in the examination; (N=178)
Group 5:	Distinction:	students who received 73% or above (at Unisa students with 73-74% can be adjusted upwards to a 75% distinction pass). (N=132)

A one-way ANOVA was used to explore the relationship between the Fail, At Risk, Pass and Distinction groups in terms of their overall inference scores. The analyses yielded a highly significant effect,  $F(4, 1128) = 74,73, p < .01$ . A Scheffé test ( $p < .05$ ) showed significant differences between all the groups except the two fail groups.

Table 7.2 below reflects the mean inference scores for each of the academic groups of psychology students in relation to the same groups of Sociology and Medunsa students. As can be seen, there are clear differences in inferential ability across the different academic groups with all three sets of students.

TABLE 7.2: MEAN INFERENCE SCORES OF DIFFERENT GROUPS ACCORDING TO ACADEMIC PERFORMANCE<sup>a</sup>

	Fail 1 (0-39%)	Fail II (40-49%)	At Risk (50-59%)	Pass (60-72%)	Distinction (73+%)
Psychology	44.6	50.4	55.2	60	70.1
Sociology	39.5		57.8	61.6	-
Medunsa	47.2		57.5	64.6	81.8

<sup>a</sup> The mean scores are expressed as percentages.

The third research question examined the relationship between the kinds of inferences made during reading and academic performance, viz. *Is there a relationship between the kinds of inferences made during reading and academic performance?* In order to test this relationship, all the inference test items used in the Psychology reading test were then categorised into low and high inference categories. The low inference questions were regarded as fairly 'easy' in terms of criteria such as proximity between items of information from which the text-based



inference was drawn, and amount and transparency of text-based clues. The high inference questions involved greater processing effort and a greater degree of abstraction or generalisation from the given text-based information. The differences in the mean low and high inference scores between the different academic groups are displayed in Table 7.3 below.

**TABLE 7.3: MEAN LOW AND HIGH INFERENCE SCORES BETWEEN DIFFERENT ACADEMIC GROUPS<sup>a</sup>**

	Group 1 (Fail I)	Group 2 (Fail II)	Group 3 (At Risk)	Group 4 (Pass)	Group 5 (Distinction)	Overall Mean
N =	355	283	185	178	132	1133
Low inference	60.3	63.6	68.6	69.3	79	66
High inference	43	46	52.2	56	72.3	49

<sup>a</sup> The mean scores are expressed as percentages.

The relationship between scores on high and low inference items and academic performance was then explored by means of one-way ANOVAs. The analysis with regard to low inference items yielded a significant effect,  $F(3, 1129) = 10.04$ ,  $p < .01$ . A Scheffé test ( $p < .05$ ) showed significant differences between three of the four groups (the At Risk, Pass and Distinction groups) but not between the Fail and At Risk groups. In other words, the differences between these two Fail groups with regard to low inference items were not greater than the differences within these groups. The analysis of the one-way ANOVA with regard to the high inference categories yielded a highly significant effect,  $F(3, 1129) = 11.85$ ,  $p < .001$ . A Scheffé test ( $p < .05$ ) showed significant differences between all four groups.

The responses to the different inference categories were also computed. The different types of inference categories are arranged hierarchically in Table 7.5 according to their relative ease of response, as reflected in the mean percentage. Here too one can see clear differences in inferential ability across the academic groups, irrespective of the kind of inference category, with academic performance improving as inferencing ability increases. As in the case of the Sociology and Medunsa students, pronominal anaphoric inferences also proved to be the easiest inference items for the psychology students, while inferences about word meanings, lexical anaphora, main ideas and research were the most difficult. One notes, too, the 'watershed' differences between the Pass and Distinction students on all these inference categories, with the latter showing a fairly steep increase in inferencing ability compared to their Pass peers. The ability to perceive relationships appears to play a crucial role in meaning construction during reading, and this is what characterises the Distinction students.

TABLE 7.4: MEAN SCORES IN DIFFERENT INFERENCE CATEGORIES ACROSS THE ACADEMIC GROUPS<sup>a</sup>

	Group 1	Group 2	Group 3	Group 4	Group 5	Overall
	Fail	Fail	At Risk	Pass	Distinction	Mean
N =	355	283	185	178	132	1133
pronominal anaphora	68	74	79	81	92	76
exemplification	61	69	75	67	89	71
premise-conclusion	64	69	74	74	89	71
whole-part	58	63	66	71	76	65
text structure	53	56	65	61	79	60
vocabulary inference	44	50	55	60	73	53
lexical anaphora	42	49	56	59	73	52
main idea	36	45	51	56	70	48
research discourse	37	44	49	52	69	47

<sup>a</sup> The mean scores are expressed as percentages.

The fourth research question, viz. *To what extent does text-based inferencing predict academic performance?* further explored the relationship between text-based inferencing and academic performance. A Multiple Regression Analysis was used for this purpose.

The Multiple Regression analysis was applied to the data, although not by the researcher herself. The results are nevertheless included here because they place the students' performance on the reading inference test within the wider context of their responses to the rest of the Psychology questionnaire. Data from the whole questionnaire were collated by two of the lecturers in the Psychology department (Janeke & Kruger, 2000) and grouped into eight independent variables, viz. *the living conditions of the students* (e.g. how many people per household, access to electricity, radio, computers, etc), *matric results*, *study habits*, *attitude to subject and course contents*, *the perceived usefulness of course material*, *level of motivation*, *locus of control* and *the reading inference score*. (Information concerning methodological procedures with regard to these eight variables can be found in Janeke & Kruger 2000.) Using a linear regression model, predictions of the final psychology examination results came out as follows (cf. Table 7.6 on the following page):

As can be seen, the inference scores were most strongly correlated with the examination results and of all the variables, accounted for the most variance in the examination scores. In other words, the reading inference score was the strongest predictor of academic performance of all

eight independent variables.

**TABLE 7.5: PREDICTIONS OF PSYCHOLOGY EXAMINATION RESULTS BY LINEAR REGRESSION MODEL**

Variable	R	R <sup>2</sup>	Significance <sup>a</sup>
Study habits	0.06	0.004	
Attitude to work	0.18	0.03	*
Perceived usefulness of course material	0.23	0.05	*
Matric results	0.27	0.07	*
Living conditions	0.27	0.07	*
Motivation	0.32	0.10	*
Locus of control	0.38	0.15	*
Reading inference	0.48	0.24	*

<sup>a</sup>  $p < 0.05$

Having presented the results concerning the main aims of the reading test, we now place these results within a broader context by considering some statistics regarding the students' backgrounds and their answers to some of the items in the questionnaire.

### 7.3.2 Results of responses to questionnaire

Only the responses to some of the questionnaire items which have a bearing on the inference reading test are presented here. Not all the students responded to all the items; because the number of responses vary with each item, the raw frequencies are not given in table 7.7, but have been converted to a percentage. The responses have been analysed according to the different academic groups.

**TABLE 7.6: RESPONSES TO SELECTED ITEMS ON THE QUESTIONNAIRE <sup>a</sup>**

<sup>a</sup> The scores are expressed as percentages

<i>Age of students</i>	17-71 (mode 23; mean 28)
<i>Average matric symbol</i>	E
<i>University exemption</i>	55% of respondents

	Fail I	Fail II	At Risk	Pass	Distinction	Average
<b>How well do you understand English?</b>						
<i>Very well</i>	49,5	45,6	53	52,1	58,6	67,5
<i>Average</i>	47,8	53,9	45,3	45,8	41,4	31,8
<i>Not well at all</i>	1,7	0,5	1,7	2,1	-	0,7
<b>What mark do you expect in the psychology exam?</b>						
60%	21,5	17,6	15,4	17,7	17,2	
70%	19,8	18,7	24,8	24	24	70
80%+	23,9	24,9	25,6	26,3	31	
<b>Do you enjoy reading?</b>						
<i>Very much</i>	59	59,1	67,5	58,3	62,1	62
<i>Quite a lot</i>	31,4	33,2	22,2	35,4	34,5	27,8
<i>A little</i>	6,5	5,7	8,5	4,2	3,4	8,1
<b>How often do you use your dictionary?</b>						
<i>Often</i>	41,3	37,8	40,2	41,7	35,7	35,8
<i>Sometimes</i>	46,4	51,3	47	42,7	57,1	46,5
<i>Seldom</i>	6,5	4,7	9,4	7,3	3,6	10,7
<b>How many books do you have at home?</b>						
<i>More than 100</i>	20,5	23,3	28,2	27,1	41,4	38,7
<i>About 50</i>	33,4	34,7	24,8	29,2	20,7	27,8
<i>About 20</i>	27,3	21,2	29,1	29,2	21,4	21,1
<i>About 10</i>	16,7	18,1	17,9	11,5	14,3	10,9
<b>I manage to read all the prescribed material easily</b>						
<i>Agree strongly</i>	16	16,6	22,2	16,7	13,8	
<i>Agree</i>	50,2	48,7	41,9	53,1	58,6	
<i>Disagree</i>	31,4	32,6	35	29,2	27,6	
<b>I have problems understanding visuals</b>						
<i>Agree strongly</i>	6,5	2,1	6,8	1	6,9	
<i>Agree</i>	42,3	35,2	35	33,3	10,3	
<i>Disagree</i>	44,4	51,8	45,3	56,3	72,4	

From the average matriculation symbol and the high percentage of students who did not receive matriculation exemption (i.e. entrance to a university), it is clear that many of the students are academically vulnerable when they embark on their undergraduate studies, yet they generally have high expectations regarding their performance in the final examination - the average expected mark was 70%, while at least 24% of the students who failed thought they could achieve 80% in the examinations. Many of them also come from homes in which books are not a common feature - about 60% have 50 or fewer books in their home (hardly two shelves of books in a small bookcase) while of these 32% have 20 or less books in their home, hardly a nurturing environment for literacy practices. Although over 60% claim to enjoy reading, and at least 72% of them claimed they didn't have problems reading their prescribed material, the average result of 52,8% on the inference reading test suggests that for many of these students, reading expository texts must be a tiring and burdensome experience for them and one that does not yield proper comprehension of the contents of their textbook.

The discrepancy between the picture that is projected from the questionnaire items and the actual performance of the students in the inference reading test and in the Psychology examination may be due to a common problem with questionnaires, namely the tendency on the part of the respondents to produce what they perceive to be socially acceptable responses. However, the discrepancy between perception and performance is not uncommon among weaker students. The literature in reading research has repeatedly shown that unskilled readers have problems with metacognitive awareness and monitoring - they are not always aware that they have a reading problem, they find it difficult to state where the problems lie, and they have poor monitoring skills to effect repair strategies to comprehension problems.

To summarise the findings, there are clear and consistent differences in inferencing ability between the five groups, with inferencing skills improving the higher the academic group in all the inference categories. The range between scores on low and high inferencing questions also diminishes the stronger the academic group. Of all the independent variables, the Multiple Regression model showed inferencing ability to be the strongest predictor of academic performance.

### **7.3.3 Reading rates**

The average reading speed of the 24 students who were tested at the Thuthong Centre was 96,9 words per minute, while the average comprehension rate was 40,4%. The maximum speed was 151 words per minute with a 70% comprehension level, while the minimum speed was 53 words per minute, with a minimum comprehension rate of 20%. The average reading speed of the five

case study students was marginally better, at 108,4 words per minute, with a similar average comprehension rate of 40%. Although no controls were formally used for the reading speed test, three Grade 8 L1 readers were tested, using the same test. Their average reading speed was 174 words per minute, with an average comprehension rate of 85%. If one considers that the text on which the speed reading test was conducted was a narrative and not an expository text, and given a 30% slower reading rate for L2 readers, then the undergraduate students at Unisa are still reading at slow speeds, and with disquietingly low comprehension levels.

#### 7.4 Discussion

As is the case with the other data presented in the previous chapters, we see a similar pattern of inferencing ability emerging amongst the Psychology 1 students, namely the better a student's inferencing ability, the better her chance of academic achievement. The consistency in this pattern is all the more remarkable, given that different groups of students were tested across a span of two years and that different texts were used on the various testing occasions. However, the outcome is not surprising, given that academic performance depends to a large extent on the ability to independently access information from the written word and to construct meaning from it, thereby also constructing new knowledge in the process and so getting richer.

Inferential processes during reading essentially involve the linking of different ideas in a text and relating newly encountered information to information encountered previously, implicitly or explicitly, either earlier in the text or else in long term memory. If students have difficulty making inferences during reading, this means that they will have difficulty linking up information in texts, in which case they will have difficulty understanding the texts they read. The overall inference score of 53% obtained from this inference test suggests that the Psychology I students do indeed have problems reading expository texts in meaningful and effective ways. It is instructive to compare these results with the third level of reading performance commonly identified from standardised reading tests, namely the *frustration level*, where a student who obtains 50% or less comprehension accuracy is regarded as being unable to handle relevant reading material at this level. Although one must be cautious in extrapolating results from standardised reading tests to a reading test based purely on inference items (used as an index of comprehension accuracy), the results do suggest that many of these students are reading at frustration level and could benefit from instruction in reading comprehension strategies.

In what way does inferencing relate to Matthew effects in reading? Successful comprehension of a text depends on the reader constructing a coherent mental representation of what the text is about. This representation is continuously updated as new, incoming information is integrated

with given information or with information in long term memory. The fact that the weaker students engage in less inferential activity and that they are also less successful in engaging in higher order, more complex forms of inferential processing suggests that these students are not effectively constructing meaning while they read. The findings strongly suggest that students who are scoring poorly on inferencing skills manifest problems with meaning construction in overlapping ways. For example, the weaker students are less successful than their skilled counterparts at :

- \* integrating the meanings of successive sentences or paragraphs;
- \* identifying main ideas or overall gist in texts;
- \* resolving anaphoric references;
- \* inferring the meaning of unfamiliar words when linguistic/semantic clues do occur in the context;
- \* detecting inconsistencies in the text;
- \* perceiving how parts relate to wholes;
- \* inferring more abstract generalisations from specific details.

Skilled reading is a very rapid and precise process, and skilled readers attend to and make use of cues in texts in order to construct meaning. Dependence on text cues is especially necessary for reading texts on unfamiliar contents, which is typical of reading at university level. Because weaker students fail to attend to relevant clues in the text, they fail to make relevant connections between text elements, and this results in the construction, during reading, of inaccurate and oversimplified representations of complex content matter. If weak students are having problems inferring and integrating information at various levels of text comprehension when they read to learn, then it is not surprising that they fail to get rich.

From the average E symbol obtained for matric, it is clear that many of the respondents come from a disadvantaged educational background. Almost 60% of the respondents own less than about 50 books, which suggests a rather impoverished environment for the nurturing of sound literacy practices. Many of the respondents also have high expectations of their academic achievement, expecting to attain at least 70% in the examinations. Yet sadly, given the poor comprehension skills of many of the students, they have unrealistic expectations of what they hope to achieve. This is a typical characteristic of unskilled readers. There has been considerable research during the past 20 years into the metacognitive abilities of skilled and unskilled readers, i.e. the knowledge and regulation that readers exercise over reading strategies. The findings from such research consistently show that unskilled readers have poor metacognitive awareness of the reading process, they often have difficulty accurately assessing their reading performance and pinpointing their difficulties, and they do not always adopt effective strategies for improving

their text comprehension (Baker & Brown 1984; Paris et al. 1991). There is evidence of this from some of the responses in the questionnaire. For example, despite the poor vocabulary levels of the students, only 35% of the students claimed that they had problems understanding the meaning of words in the textbook, and almost 50% of the students claim to use a dictionary “sometimes” only. These kinds of responses are typical of weak readers who are non-strategic readers and who do not know how to get themselves out of their negative cycle of poor reading outcomes.

Given the amount of reading required at tertiary level, and given too that expository texts usually require repeated reading for full comprehension, it is advantageous for undergraduate L2 students to achieve reading speeds of at least 150-180 words per minute. All the students who were tested achieved scores well below this recommended reading rate.

The findings from the psychology data indicate that urgent attention needs to be given to improving the reading levels of undergraduate students and to creating a culture of reading at tertiary level. Students cannot become independent, autonomous learners at tertiary level if they are not skilled readers. Improved study packages, the creation of more reader-friendly texts, pedagogical shifts to student-centred teaching approaches and outcomes based education are not going to be fully effective unless attention is also given to the development of reading skills. Reading begets skill in reading. Explicit instruction in reading strategies and in inferencing can improve the reading levels of unskilled readers so that they can indeed grow rich from exposure to the print-based material in their distance learning situation. These issues will be taken up again in the concluding chapter.



## **CHAPTER 8**

### **CASE STUDIES**

#### **8.0 Introduction**

This chapter deals with the five case studies that were included in the research study. The background to the case studies is first described, a brief sketch of the five students is given, data and observations from the case studies are presented and an in-depth probe into some of their reading skills is described. Where possible, the findings are compared and related to the quantitative aspects of the research. The chapter concludes with a summary and a brief consideration of the implications that follow from the case studies.

#### **8.1. Background**

In the belief that quantitative and qualitative research methods should be regarded as complementary rather than oppositional methodological tools, it was decided to balance the largely quantitative perspective on reading problems in this study with a more qualitative perspective by conducting some case studies. The purpose was to see what observations and insights this type of research would uncover about the problems that students have when reading expository texts and whether it would throw some light on the underlying reasons for the poor reading performance evinced in the quantitative tests.

Initially the aim was to administer the inferential tests to the case study students and then to work through the tests with them afterwards to see where and why they had problems understanding the expository paragraphs used in the test. In other words, the interview sessions would have revolved mainly around the students' responses to the inferential tests. However, during the first interview session it became clear that the students were having problems understanding the contents of their prescribed Psychology textbook. At the back of my mind was also a concern that, after the novelty of the first few sessions had worn off, the students might not attend the interview sessions regularly if they did not perceive them to be beneficial to their studies. I therefore decided to broaden the scope of the sessions to include not only the tests but also sample sections of the psychology textbook. The aim of the case studies was thus twofold:

- (i) to observe and examine the responses of the students to the inferential tests to see where and why they had problems understanding the expository paragraphs used in the test;
- (ii) to observe and examine expository reading problems the students had in the context of reading their textbook in preparation for assignments and the examinations.

The qualitative research involved interviewing five students about themselves, their reading attitudes and habits, the problems they experienced when reading both their textbook and the inferential tests, and generally tracking the students over a 2-3 month period to see how they went about reading in preparation for their assignments and for the examinations.

It was decided to recruit five volunteers from the Psychology I tutorial class at Unisa's Thuthong Centre at the Sunnyside Campus. The Centre was established in 1995 to provide extra tuition for Unisa students. I approached the Psychology I tutor at Unisa's Thuthong Centre and asked if I could address his class of students before the tutorial started to ask for volunteers for the case studies. The tutor was very keen for the students to be involved and remarked that many of the students seemed to have problems understanding their textbooks. Consequently, one Saturday morning I addressed the class, explained what the purpose of the research was and asked for five volunteers, who would be paid a small stipend for their participation. The response was very positive and practically all 20-odd students who attended class that morning put up their hands, some clamouring for attention so that they would be noticed, and several expressed disappointment at not being selected. One student from each table of student groups was chosen on a first-come, first-serve basis, names taken and dates set for the first appointment.

The majority of the students in the class were female, and the five volunteers reflected this demography, for they comprised four female and one male student. Four of the five students were studying Psychology I for the first time, while the fifth student was repeating the course, having failed the year previously. All five were in their late teens or early twenties, studying full time and they regularly attended the Psychology tutorial groups at Thuthong on a Saturday morning.

## **8.2 Interview procedures and methodological limitations**

The interview sessions lasted over approximately three months, starting in the last week of May and ending by mid-September. Each student was seen individually for 10 sessions, except for one student who only attended 7 sessions. The students were paid a small stipend of R10 per session. They were all paid after the first session, but agreed that they would prefer to be paid the rest in a lump sum at the end. Each student signed a register at the end of each session so that a clear record was kept of attendance.

Each interview session lasted for an hour, although sometimes a session would go on for a while longer. Four of the students regularly came to the Unisa campus during the week to study in the library or seminar rooms that are made available for full time students. The sessions for these four

students were held in my office on campus. Because the one student only came through to Pretoria once a week on a Saturday to attend the tutorial classes at the Thuthong Centre, I met her after class each week at the Centre, where we would find ourselves a quiet spot and work on her reading problems.

My role in the interview sessions was not a straightforward one for I was there partly as a participant observer and partly as a reading teacher. Initially I had hoped - perhaps naively so - that I could assume the role of the largely unobtrusive ethnographic researcher and could elicit data on their reading problems via think-aloud protocols (a procedure where a student reads a sentence at a time and provides a running commentary on his/her thoughts to the researcher). In practice, the path to the ethnographic high ground was strewn with more mundane obstacles. The students came to the sessions expecting to be helped and to be given tips on how best to tackle their reading. Their obvious difficulty in accessing information in the texts resulted in me adopting the role of a 'reading teacher' and becoming actively involved in suggesting and modelling more effective reading strategies right from the second session, and this set the pace and expectations for the subsequent sessions. On the one hand I was concerned that this might 'contaminate' subsequent observations of what the students were or were not doing and that this approach would not therefore yield an accurate reading profile of the students. On the other hand, the option for me not to become a 'reading teacher' and to remain the observing ethnographer would have raised an ethical problem in this particular research context, and would also probably have resulted in the students not coming back to the sessions as regularly as they did because then they would not really have got anything in return for their confidential admissions (besides the small stipend). In retrospect, the decision to become an active teacher-participant in the sessions yielded a rich and interesting set of data and there were still ample opportunities to observe the problems that the students experienced and the ways in which they dealt with their reading and assignment demands, and to ponder possible ways of resolving some of these very real and pressing reading problems. However, because of this involvement the descriptions presented in these case studies are naturally disposed to a particular orientation towards reading.

Although I had initially hoped to use **think-aloud** or verbal protocols during the interview sessions, they did not work very well with the students. The students often found it difficult to articulate where and why they had difficulty in understanding the texts, they demonstrated passive styles of reading and in many respects displayed a non-strategic approach to their reading. They were often overwhelmed by a section of text and didn't know how to go about unpacking its meaning, beyond stating that they didn't really understand what they had just read. Although, on the whole, their spoken conversational English was relatively fluent, at times they seemed to find it difficult to express their thoughts and feelings in English and my impression was that they also

had a rather limited language to reflect on the reading process. Think-aloud protocols in an L2 are perhaps better suited to bilinguals who are fairly proficient in academic discourse and have available a wider range of metalanguage with which to explain their thought processes during reading.

In the end I mainly adopted a **read-and-probe procedure** (where the subjects read a few sentences or paragraph at a time and answers questions that probe their perception of the text and the reading process). Although this method provided a structured way to identify problems, it too has its drawbacks. As Deegan (1995) points out, probe or prompts have the disadvantage of sometimes subtly indicating to the reader that certain kinds of responses are more valued than others and the responses then become biased. For example, when questioning the students about the strategies they used for learning the meanings of unfamiliar words, I tried to probe them as to whether, once they had looked a word up in a dictionary, they wrote the meaning of the word down somewhere or not.

EP: *OK, so once you've looked up the word in the dictionary, what do you do then?*

S: *I try to remember it. I try to put it in my memory.*

EP: *Yes? What else do you do? Like, do you write the word down anywhere to help you remember it?*

The very fact that I asked the latter question may have suggested that this was a desirable practice and that a positive response was appropriate. They all answered that they did write down new word meanings, but in the subsequent sessions there was never much evidence of this - until I started making them become more active participants in their vocabulary development. Although I continued to use probes and prompts throughout the interview sessions, I realised it was important to weigh their responses to questions in relation to what I observed they were or were not doing and to their apparent understanding of a piece of text.

### 8.2.1 Sessions

The students completed all the formal inferential tests that comprised the quantitative aspect of the research, but in order not to use up the valuable interview time for test writing, they would do the tests as homework assignments and would return them the following session. I usually went over the test with the students in a subsequent session to see how they had perceived the texts and the questions, and what kind of reasoning they had used to arrive at their answers.

When planning the interview sessions beforehand, I wanted to keep the sessions fairly open-ended and flexible so that individual reading problems could emerge from the researcher-student

interaction. However, because reading is also a multi-faceted, multi-layered process, I also felt that I needed to have some kind of observational focus so that the outcome was not too diffuse. I wanted to probe the students on certain aspects of their reading, and to focus more specifically on what processes and strategies they used to construct meaning during the reading process. To this end the sessions roughly followed the following broad framework:

**Session 1** The first session was an informal open-ended interview over a cup of tea, where **biographical information** on the students was obtained while they told me about themselves and their perceived reading problems. Each student spoke about herself and the family, where she grew up, schools attended, subjects being taken for tertiary study, impressions of school and university, hobbies, perceptions about reading, and procedures followed when working for an assignment, etc. The sessions were tape-recorded and transcriptions of the interviews made soon afterwards. After about 40 minutes of interview each student did a silent reading rate test as well as a short comprehension test so that I could get a rough assessment of their reading level.

The students were given the test on **anaphoric inferences** for homework.

**Session 2** Feedback was first given on reading rates and suggestions as to how each student could improve their reading speeds. The main focus in the rest of this session was probing the students on the **previewing strategies** they adopted prior to starting to read a chapter for assignment purposes. A chapter dealing with *The Self* (Jordaan & Jordaan 1998:Chapter 36) in the prescribed textbook was used as a basis. After the previewing strategies had been dealt with, the students also read aloud a few paragraphs from the chapter and the read-and-probe procedure was used to see how they dealt with the information in the paragraphs. Informal, holistic observations were made about the oral fluency of the students while reading, the nature and extent of their vocabulary problems, and the way in which they went about their reading in general. The session was tape-recorded and transcribed.

The students were given the **vocabulary inferencing** test for homework.

**Session 3** Feedback was given on the results of the anaphoric inferencing test and we worked through the test so that I could gain a general impression of how they went about resolving anaphors during reading.

The main focus in the rest of this session was probing the students on their **awareness of paragraph and text structure** as aids in meaning construction, as

well as their **awareness of scientific conventions regarding research**. The chapter *The nature of feelings* (Jordaan & Jordaan 1998:Chapter 32) was used as a basis for this exercise, specifically the sections dealing with a central concept in the chapter, that of *cognitive content*, and research revolving around the two-factor theory from which this concept emerged (§32.3.2 and §32.3.2.1). Again, the read-and probe method was followed to obtain further information on their reading strategies and skills.

Session 4 Feedback on the vocabulary inferencing test was given and we worked through the tests. Based on my prior observations of their awareness of vocabulary problems and the strategies they adopted for dealing with unfamiliar words, considerable time was spent on encouraging the students to become more active participants in their vocabulary development and making them aware of different **vocabulary strategies** they could adopt. The students were asked to buy themselves a small pocket-sized index book (e.g. a small, black hard-covered address book, obtainable at the CNA for R10) in order to develop their own vocabularies. This was thereafter referred to as their “little black book” (LBB).  
The students were given **Inference Test 1** to do for homework.

Session 5-6 Feedback on Test 1 was given and we worked through the various items in the test and their responses to them. Thereafter, the focus in these sessions was largely on observing how the students **constructed meaning** during reading and how they dealt with diagrams in the text. The chapter on *Impulse conduction in the nervous system* (Jordaan & Jordaan 1998:Chapter 10) was used as a basis, specifically the sections dealing with the rather complex and detailed concepts of *resting membrane potential* and *synaptic transmission* (§10.2 and §10.4). Two of the students had asked if I could work through these chapters with them and the other three fell in with the suggestion, as they also had had problems understanding this chapter. This section of the textbook had a strong neurological-biological descriptive basis, the information was dense, detailed and technical, the content matter complex, and many of the neurological concepts and processes were totally foreign to the students. The chapter also contained several diagrams detailing aspects of neuronal structures and activity to aid comprehension of the largely descriptive text.  
The students were given **Inference Test 2** to do for homework.

Session 7 Feedback on Test 2 was given and we worked through the test to see which items

presented comprehension problems.

The focus in the rest of this session was then on the **temporal dimension** of information and the use of strategies to keep track of temporality, such as drawing time lines. The chapter on *The origin of psychology* (Jordaan & Jordaan 1998:Chapter 1) formed the basis for this session. It lent itself to this focus because it traced folk psychology in China, India, Africa and Europe through the ages, from ancient to modern times.

Session 8-9 These sessions were fairly open-ended and each student basically selected a chapter/section of text that she had found difficult in the past and we worked through it, following the usual read-and-probe method.

Session 10 The final session was used to write the L2 proficiency test which, because of its confidential nature, was written in an empty office in the Department of Linguistics. The students either phoned me afterwards or came to see me in my office to get their results for the proficiency test. The students were also paid the balance of the stipend money that was owed to them.

In effect, 8 of the 10 sessions were used to work through the tests and the textbook. It must be emphasised that although in six of the eight sessions (excluding the first and last sessions) I had a specific focus in mind and attempted to probe the students with regard to a specific aspect of reading, both in the tests and the textbook, each of the sessions provided on-going information with regard to the students' attitudes and approaches to reading in general. The same format and sequence was not strictly followed with each student (for example, sometimes a student forgot to return the homework or asked for us to work through a particular section of the textbook) and although the sessions with each individual student were intended to be fairly flexible, I did try to include the focus areas in my sessions with all five students, though not necessarily in the same sequence.

For the second and all subsequent sessions, the students were asked to bring along their psychology textbook as well as any notebooks they usually used for assignment and study purposes. The read-and-probe procedure was followed throughout, with the student reading a paragraph at a time, and then telling me what the paragraph was about, and responding to specific probes concerning content, anaphoric references, word meanings, text structure and strategies. The first two sessions with each student were recorded and transcriptions of the session made afterwards. However, not only did this prove to be a very time-consuming activity, it also caused logistical problems because the machine had to be fairly close to the student to pick up her voice,

and the desk became crowded with the tape-recorder, our textbooks, notebooks and rough paper. Furthermore, after the third session I could not use the tape-recorder with one of the students at the Thuthong Centre because the place that we eventually found to work in didn't have a power point. Thus, from the third session onwards, I jotted down notes throughout the session, and when the student left (or as soon as possible afterwards), I wrote up a report of what had been said and done in the session. It was not an ideal way of recording all the finer details but in this way I managed to keep track of most of what had transpired in each session.

### 8.2.2 The psychology textbook

Before continuing, it is apposite at this point to briefly comment on the textbook that was used as a basis for probing the reading problems of the students. The textbook is:

Jordaan, J. & Jordaan, W. 1998 *People in Context*. Johannesburg: Heinemann. (3rd edition)

The book comprises 42 chapters, covering five different aspects of psychology, and is 860 pages long. It includes a preface, a bibliography and an index. The third edition has been edited to be more reader-friendly, more gender neutral (the previous title was *Man in Context*) and to be more relevant to the South African context. Each chapter has heading and subheading titles that are in bold and are numerically indexed, key words are in bold, and practically every page contains diagrams, pictures, sketches and graphs to support the information in the text. At the beginning of each chapter there is a summary of the chapter's headings that functions as a preview of the chapter's contents, and each chapter ends with a summary. Each chapter also included **Forums**, which are shaded and boxed sections of text that provide supplementary information on a topic under discussion. A sample page from the textbook has been included on the following page by way of illustration.

Two study guides have been compiled as ancillary study material to the textbook. They package the textbook into short study units and provide guidance on study methods, some reading strategies, summary and memorising techniques, as well as self-assessment questions and tasks.

The book is undoubtedly long. It covers a very wide domain in a fairly comprehensive way but much of the content material is dense and complex. The complexity of the material is perhaps unavoidable, given the complexity of the subject matter, especially the sections on the biological and neurological aspects of psychology. The language is written in typical academic English and, like all domain specific textbooks, assumes familiarity with academic discourse and vocabulary (§2.2).



## Chapter 29

# Cognitive learning

Introduction  
 Perceptual-motor skills  
 Verbal skills  
 Intellectual skills  
 Summary and perspective

## Introduction

This chapter discusses the nature of classical conditioning (see 27.5) and in the conclusion of this chapter on operant conditioning (see 28.5) it was pointed out that your symbolic 'learning equipment' is also used in these two forms of learning, albeit at a fairly low level of awareness. In Chapter 29 we focus specifically on the human ability to learn through insight at a high level of awareness.

According to the gestalt psychologist Wertheimer (1945) (see 2.5), classical and operant conditioning merely provide descriptions of how to learn a series of correct or incorrect responses which actually require no more than parrot-like repetition in reinforcing circumstances. They offer no explanation of learning with insight and comprehension.

Wertheimer maintains that people also learn through insight, which presupposes that the learner perceives the learning situation or learning material perceptually; forms concepts and reorganises the information gathered; and reorganises the information gathered into this way into new and meaningful patterns.

Some of the learning psychologists who adopted a behaviourist perspective have been especially since the 1940s and 1950s, but association principles and reinforcement are inadequate to explain all forms of learning. Tolman (1948) developed **cognitive learning theory**, which regards learning as an

outcome of cognitive perceptual impressions, discoveries and expectations. It was also found that learning often occurs without any reinforcement (Postman, 1964; Sheffield, 1965). In later years there has been growing interest in these cognitive aspects of learning (Leahy & Harris, 1989; Lieberman, 1990; Nisbett, 1993).

Saying that people also learn and arrive at insight and comprehension through cognition or thought does not imply that the principles of association explained in Chapters 27 and 28 do not feature in cognitive learning. But cognitive approaches to learning broaden the concept of association, in the sense that the formation of associations is regarded as a conscious thought process as well, not just a 'blind' activity. (See Focus 29.1.)

Against this background we can now ask the question: *What is learnt in cognitive learning?* At least three interrelated things are learnt in a predominantly cognitive way:

- perceptual-motor skills;
- verbal skills; and
- intellectual skills.

## 29.2 Perceptual-motor skills

Human beings have an impressive capacity to perform a wide range of activities with great proficiency. The following examples are to admiration:

- tennis players who place a backhand ball exactly where they want it and easily return a shot that we can barely see;
- ballerinas who can move gracefully on the points of their toes;
- potters who dexterously mould figures from clay; or

### Focus 29.1

#### 'And I'll take the high road and you'll take the low road ...'

The distinction between learning as a conscious cognitive activity and as a 'blind' activity corresponds with the important distinction made by Salomon (1987) between a 'high road' and a 'low road' to learning.

The 'high road' to learning implies the conscious application of non-automatic processes to acquire knowledge and skills. It requires a great deal from the learner. The 'low road' to learning depends on the regular practice of skills which become increasingly automatic.

Salomon points out that although these two approaches to learning differ, they often occur in combination or alternately. In many instances automatic execution of a skill only becomes possible after conscious effort, so that the 'high road' in effect precedes the 'low road' to learning.

The reverse also happens, as when the performance of arduous intellectual tasks is based on the automatic execution of lesser skills. An example is the application of complex mathematical formulas, which depends on the automatic performance of skills like multiplication,

division, addition and subtraction, the removal of brackets and the sequence in which this is done.

Another interesting instance of this distinction is the way in which students summarise study material. Some students simply go ahead and write down words almost automatically; they end up with a mass of words and phrases which then have to serve as 'cues' to recall their acquired knowledge. This approach corresponds with the 'low road' to learning. Once the exercise has been completed, some will take the 'high road' by reorganising all these words and phrases in terms of main ideas and supporting information.

Other students start off by trying to grasp the study material in terms of main ideas and supporting information. They then proceed to compile their summaries on the basis of the insight they gain from this. This approach corresponds with the 'high road' to learning. Afterwards they may add missing details in a 'low road' manner.

Both approaches are acceptable, but on the whole the 'high road' approach is more effective.

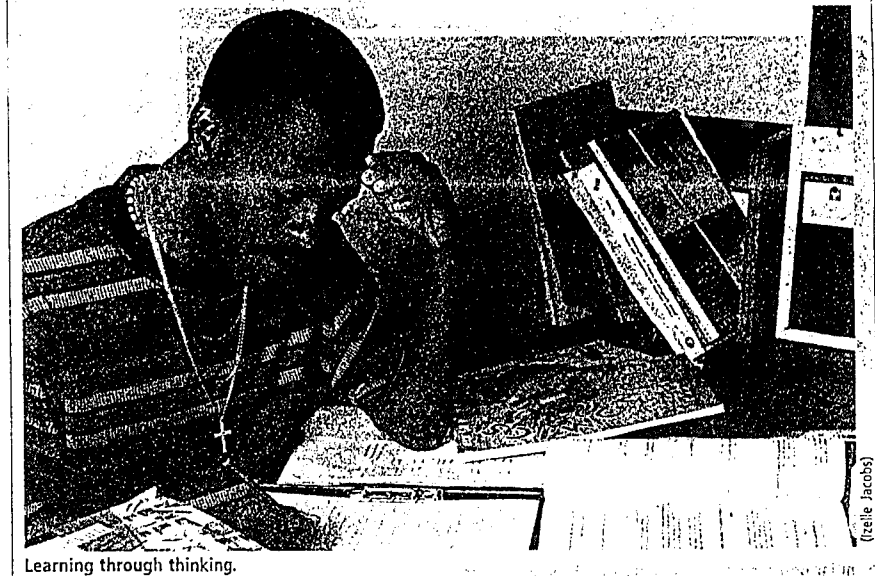


FIG. 8.1.: SAMPLES FROM PSYCHOLOGY TEXTBOOK, JORDAN & JORDAN (1998).

The book, like many other academic texts, reflects the tension between textual complexity and conceptual complexity. Reading research has shown that conceptual complexity affects text comprehension, especially when readers have very little prior knowledge of a topic. However, because skilled readers typically have wider vocabularies, a sounder linguistic base, greater familiarity with different genres of text and more effective reading strategies, they find it easier, in the learning context, to cope with conceptual complexity in the written mode, and they can bootstrap themselves into understanding new and complex information. For skilled readers the given prescribed textbook would certainly not be problematic in introducing them to the new knowledge domain of psychology, but for L2 readers with low levels of L2 proficiency, small vocabularies and poor reading skills, the book, like any other academic text, must represent an enormous obstacle for them. All five students said that although they didn't really find the book difficult to read, they often had problems understanding the contents of the course. However, during the sessions it became clear that much of what they read they didn't really understand. In other words, the conceptual complexity of the contents of the textbook posed problems for them and because they lacked reading skills, they had difficulty bootstrapping themselves into comprehending the information and this put severe constraints on their potential to become richer in the learning context.

We turn now to a brief biography and reading profile of each student.

### **8.3 Reading profiles of the students**

Although biographical information of each of the students was obtained, space does not permit going into individual personal details here. Thus some general statements will first be made concerning the commonalities in the students' backgrounds. Thereafter a brief sketch of each student will be given, followed by some of the main reading characteristics of each of the students and their general response to the reading sessions. Each sketch ends with a summary table of their reading and academic performance. To protect the identity of the students their real names are not given here. The information, as given here, was faithfully recorded from the stories that the students told me. In order to avoid repetition and because all five students displayed very similar approaches to their reading, a summary will then be given of some of the main problems and patterns that emerged from my observations of and interactions with the students.

- \* All of the students grew up in townships in Gauteng and attended township schools at primary and secondary level, except for Sibongile, who had attended high school at a former 'Model C' school in Brakpan (i.e. a former 'Whites only' school, where teachers are well qualified and standards of teaching are generally good). Four of the five students

attended a private college after matriculating in order to upgrade their matric symbols.

- \* None of them had had much exposure to book reading outside of their school textbooks, none of them had been taught any reading or comprehension strategies at school (except Sibongile), none of them went to libraries or read books for leisure, and none of them came from families in which the reading of books, magazines or newspapers played any significant role on a daily basis. They all said they sometimes read a newspaper or magazine, but none on a regular basis.
- \* Being first-year students, they had very little sense of what the academic world entailed, what research was and why it was conducted, what role books, journals and other sources of information played in the academic community, and although they studied in the library every day, they did not make use of its print-based or electronic resources.
- \* They all attended the Psychology tutorials at the Thuthong Centre, found them useful and had high praise for the tutor, who helped them understand the contents of specific chapters and assignment questions. They also discussed topics in their respective smaller study groups, with different students explaining what they thought was meant in a chapter, and they often had friendly arguments about the work. If someone didn't understand a chapter then someone else in the group who understood it better would explain it. They used English mainly because there were no terms in the African languages, but they code-switched quite often in the discussions.
- \* All the students stated that the objectives and the questions in the Study Guide helped them to focus on relevant information. They claimed to read a chapter at least 2-3 times when answering assignment questions. The common strategy seemed to be to find answers to multiple-choice questions as soon as possible, without first building up a bigger picture of what the chapter was about and how it related to previous chapters. One student, Sibongile, said "it wasted time" to read a whole chapter first to find out what was going on.
- \* The students all said that the ideas and concepts in the textbook were new and sometimes difficult to understand. On the whole, they attended to headings and subheadings, but not to the numerical indices. They also looked at the pictures but didn't always read the captions under them, and they didn't always understand the diagrams and graphs and often found it difficult to relate them to the information in the text. Three of the students liked to read the **Focus** sections, which they found interesting and helped to make a topic

clearer, but two of the students, Kedibone and Sibongile, said they ignored the **Focus** unless they were specifically directed to it in the text.

- \* The students admitted that sometimes they had problems understanding the language used in the textbook, and that there were many new words whose meanings they did not know. They all said they sometimes looked words up in a dictionary but it was a time consuming task. None had ever made use of a bilingual dictionary (e.g. North Sotho/English) and they did not see much purpose in using one.

### 8.3.1 Matshidiso

Matshidiso was a tall, attractive 19-year-old student with long braided hair and a somewhat wistful and abstracted air. She was studying psychology together with subjects for musicology. She came to study in the Unisa library every day during the week.

She said she found her first-year courses at university fairly “normal” but admitted that they involved a lot of reading. She said she had never read so much in her life and she remarked that she had read more in the first five months of the year than she had ever read in all her years of schooling. She found reading “OK”, and although she was not quite happy with her reading ability, she thought of herself as an average reader and rated herself 6 out of 10. She sometimes read through her material quickly only to find that she didn’t understand it and had to read it over again. Her performance on the inference tests suggests that her reading was not in fact “OK” and she was reading close to frustration level.

She stated that she didn’t have problems with the grammar of sentences she was reading, but said there were lots of new words, especially technical words, that she encountered and she had bought a psychology dictionary to help her with those words. She sometimes used a Collins Cobuild dictionary at home. When she used a dictionary she claimed to write the meaning of the new word in the appropriate place (i.e. above the word) in her textbook, but on paging through her textbook later I never saw much evidence of this. When she came across new words she said she also tried to “break it into pieces because sometimes a word comes from another word and I try to work that out”.

Although she had obtained 60% for the first Psychology assignment she submitted (Assignment 2), her marks had dropped to the 40s and 30s in subsequent assignments. She attributed this to her being in a hurry with her assignments and not reading the questions properly. Although she claimed not to have a problem with language, she stated that the topic was often difficult. She

returned to this point later, when she said she didn't really have a problem with the textbook, but found the contents difficult. Although she tried to find the meanings of new words that caused a problem, she felt that "it's not mainly words that cause a problem, it's mainly understanding. I have to, you know, take time to understand the work".

When preparing for an assignment, she said she first read the relevant chapters and the learning objectives to see whether she could understand the work before answering the questions. However, comments in subsequent sessions led me to suppose that these good intentions of first getting the overall picture were soon submerged by instrumental motives leading to what I term 'jig-saw puzzle activities without a picture', i.e. looking for individual bits of information to match up with individual questions, without first knowing what the bigger picture was that she was working on.

She had never been taught reading strategies at school, and had encountered references to terms such as skimming, scanning and study methods of reading for the first time at university, where they were discussed in the study material. She found them "sort of useful" but preferred to do things her own way. Sometimes she tried to apply the strategies in practice but found them quite hard and sometimes she didn't even really understand what they meant and had to ask other students or her tutor. On being asked whether re-reading a chapter made a difference, she confirmed that "repeating, re-reading and all that" made a difference. Even if it did not make a difference straightaway, she found that when she re-read the text the following day, she often started to understand things better.

Impressionistically, I would judge Matshidiso's oral conversational English proficiency as relatively fair and fluent for a mature L2 teenager. She certainly gave the impression of fluency. Because her English was only mildly accented my first impression was that she had attended a private or a former 'Model C' school. She scored 66% on the standardised L2 proficiency test, which put her on stanine 5 of the test, the 'average' level. Compared to the mean L2 proficiency score of 48% (the 'below average' level) of the 46 Sociology students I tested, this was a fairly good language score. However, from subsequent sessions with her it became clear that she had not yet developed an adequate academic English style of discourse or vocabulary to support her new learning ventures. There were many general academic words in the text whose meanings she did not know (e.g. *regulate*, *convert*, *pertaining to*, *premise*, *dimensions*, *integration*, *notion* ...). Her oral reading was fairly fluent and she did not seem to have decoding problems. During the second session I paged through her textbook and found that the pages were all clear, and there were no underlinings of text or notes in the margins or above words. She always brought notebooks with her, but they didn't seem to contain very detailed notes and no use of diagrams

or mindmaps, as suggested by the Study Guide. There were no overt signs of interacting with the text and extracting meaning from it. She brought her little black 'dictionary' notebook (LBB) with her to the sessions and she regularly wrote in new words, although she did not always get round to determining their meaning. She assured me that she was working on developing her vocabulary and by mid-September had added numerous entries to it.

She missed her appointment on two occasions but she could be contacted on a cell phone and alternative arrangements were made each time. Although she usually arrived late for her appointments and sometimes forgot her homework tasks, she kept to the arranged schedule.

In sum, Matshidiso attended the sessions regularly and seemed to want to improve her reading. Though reserved, she was always polite and friendly. She was compliant with regard to the tips and strategies I taught her but fairly noncommittal in her response. She didn't embrace the new strategies with enthusiasm as some of the other students did, and it was often difficult to know what she was really thinking. Although she thought she was an average reader, her marks in the tests were generally low and she had greater comprehension problems than she initially claimed. By the time our ways parted she may have learned a few things, such as the need to engage more with the text, to participate more actively in constructing meaning (e.g. via anaphoric resolution, mind mapping, diagramming structures and processes, etc.) and to take greater control of her vocabulary development. However, she is a student who, despite her average L2 proficiency level, is reading at frustration level and who really needs longer reading instructional exposure than eight one-hour sessions allow for. Based on her relatively low performance in the inference tests and the trends reflected in the quantitative component of the study, she was a likely At Risk or Fail candidate. Unhappily, she did fail the Psychology exam at the end of the year.

**TABLE 8.1: SUMMARY PROFILE OF MATSHIDISO'S READING AND ACADEMIC PERFORMANCE**

<b>Reading</b>		<b>Academic performance</b>	
Anaphoric inferences	59%	Assignment 2	60%
Vocabulary inferences	18%	Assignment 3	43%
Inferences about text-semantic relations	47%	Assignment 4	48%
Thematic inferences	50%	Assignment 5	36%
Reading speed (wpm)	100wpm	Examination	35%
Comprehension test	30%		
L2 proficiency test	66%		

### 8.3.2 Kedibone

Kedibone was the oldest of the five students, at 25 years. She was the only student who did not come to the campus regularly, although she was a regular attender of the Saturday classes at Thuthong. She had a rather serious mien and compared to the more carefree attitudes of the other students, she was more weighed down by the cares of the world. She came from a largely female household where they lived nine in a house (Kedibone, her mother, two sisters and a younger brother, her elder sister's two daughters, her second sister's son and Kedibone's own daughter).

In 1992 she fell pregnant and left school in Grade 11 to have the baby. She redid Grade 11 in 1993, and then completed her matric in 1994. There was very little money so she stayed at home in 1995. Kedibone applied for jobs but there were no vacancies and she helped her mother with sewing at home. She has always wanted to be a nurse and applied for that too, but her marks were too low to be accepted.

In 1998 she heard about bursaries at Unisa to help disadvantaged students so applied for one and enrolled for Psychology and Communication. She failed Psychology I and repeated it in 1999. In that year she also enrolled for Sociology I and Communication II. Although she said she found Psychology interesting, it was hard work and complicated:

*It becomes so difficult when I read that book. When you study at home, with no-one to talk to about the work, it is very difficult. When you look at our family background, no-one is working and there are lots of us at home.*

She felt that things were better in 1999 because she was attending tutorials at Thuthong for all her subjects. Her sense of isolation and loneliness as a distance tuition student was a strong theme in her early sessions. The previous year she just read by herself at home and didn't understand anything. Now she felt she was getting ideas from other students and had opportunities to discuss things: "When we are in class discussing things it becomes very much interesting, but when you are alone at home, reading and writing, it demands things you don't know how to do and it becomes tricky." She found that on the whole, studying was sometimes not so easy when it came to self discipline. She got ideas from her group, even though she didn't always actively participate in the discussions. She said she easily got lost if she didn't prepare beforehand. She liked to identify the new terms beforehand when she prepared and then she had a better chance of understanding them when they were used in class.

She claimed to like reading, but she only read for study purposes when she had to. She didn't think the Psychology textbook itself was difficult - "maybe it's hard work, and the ideas are

difficult, especially the biology part of the course". She rated herself as an average reader and she thought her main difficulty lay in not knowing enough words in English. However, her performance on the inference tests indicated that she was reading at frustration level. Sometimes she used her dictionary, but it took long to look up words sometimes, and often she had to look up three or four words to find the meaning of a single word. Sometimes she asked her sisters or friends the meanings of unknown words. She claimed to look up unfamiliar words straightaway because they might interfere with understanding what followed and she also claimed that when she looked up a word in a dictionary she wrote the word in her general notebook, or else underlined it in her textbook and wrote the meaning above it. However, there was very little evidence of this when we worked through specific chapters in later sessions - she seldom, of her own accord, asked me for the meanings of unfamiliar words when she read to me from her textbook, and her whole textbook was a fairly 'clean copy', with little underlining and no notes or word meanings written in anywhere - even in those chapters that she had already worked through.

When reading in preparation for doing an assignment, she used the jig-saw puzzle approach, trying to match up information in the questions with similar information in the textbook without first getting an overall view of the topics. She claimed that if you understood the summary, there was no need to go back through the whole chapter. I asked if she didn't think she'd miss some important information if she followed that strategy and she ruefully agreed that maybe she would.

On the whole, Kedibone's efforts at studying at home had been a dismal failure and during our first session it was clear that she felt quite overwhelmed by the enormity of her lack of understanding of the work, even though she had expected to do better as a result of her repeating the course. She was often disappointed with assignment results and couldn't seem to find a way out of the negative cycle of failure: "Sometimes you're sure that your answer is right and then you get it back and it's wrong and then you're confused". To her many of the questions were the same, and the nuances in meaning eluded her. She had never heard of mindmaps even though they are dealt with in the Study Guide - a response which suggests she was a selective reader of her study material. When asked what she thought went wrong in the assignment, she replied that although she believed that she gave enough time for preparation, she usually didn't understand the work:

*Sometimes when I'm reading, when I've finished a chapter, I can't remember a thing that I have read, not even a word. University studying takes lots of reading, more concentration, more time. Teachers just spoon feed you at school, and now you have to look for information yourself.*



Kedibone was depressed about her failure and although she knew she had a comprehension problem, her hard work and good intentions notwithstanding, she didn't know how to get herself out of it.

Her spoken English was adequate for ordinary conversations but certainly not adequate for comprehending texts at tertiary level. There were many general academic terms whose meanings she did not know, and she was totally unfamiliar with the world of science and research. She scored 50% in the L2 proficiency test, which put her at stanine 3, the 'below average' level. Initially her oral reading was not very fluent - she made numerous miscues, she stumbled over pronunciation, she paid scant attention to phrasing and punctuation. I think her oral dysfluency was due more to lack of practice in reading and in reading aloud than actual decoding problems. In fact, the more she read to me during the sessions, the less pronounced her dysfluency became.

Given Kedibone's poor reading comprehension skills and her past academic struggle, she had overloaded herself with too many subjects. Of all the students, I spent the most time with her, with the sessions lasting about two hours. Because lecture and seminar rooms that are not scheduled for use are locked at the Thuthong Centre, we found ourselves a 'permanent' nook in a passage where we fetched chairs and desks from a nearby lecture room to place under a window with a view of the courtyard below. There we would sit and work through psychological concepts and in between the psychology text she would weave episodes of her life while the rest of the world passed by. She worried about many things and often felt depressed - she worried about the future, about her failure at Unisa, about the prospect of being unemployed, about a neighbour who had died of Aids and she realised for the first time that "it is amongst us". As she picked up more reading tips from the sessions, her initial anxiety receded a bit, and she quietly gained confidence in her ability to grapple with the text and to engage more actively with it in a more focussed way. However, her performance in the inference tests showed responses typical of students in the Fail category. She was definitely a frustration level reader, had a big backlog to catch up on, and is a student who would have benefitted from intensive reading instruction throughout the year. Sadly, for the second year in a row, she did not pass her end-of-year Psychology examination.

TABLE 8.2.: SUMMARY PROFILE OF KEDIBONE'S READING AND ACADEMIC PERFORMANCE

Reading		Academic performance	
Anaphoric inferences	57%	Assignment 2	58%
Vocabulary inferences	38%	Assignment 3	30%
Inferences about text-semantic relations	41%	Assignment 4	38%
Thematic inferences	58%		
Reading speed	106wpm	Examination	33%
Comprehension test	20%		
L2 proficiency	50%		

### 8.3.3 Vusi

When I was recruiting volunteers for the sessions, Vusi immediately sprang up and practically demanded to be included in the study, yet he turned out to be quite a shy and diffident 21-year-old student. He was doing a BA and had registered for Psychology I, Sociology I, Philosophy I and Communication I. He thought he would eventually like to become a child psychologist, although he didn't seem to be sure what it entailed. He lived in a student commune in Atteridgeville (which, he said, often created a lot of stress because not every one pulled their weight) and came to study at the Unisa campus every day. On Saturdays he attended tutorial classes at the Thuthong Centre in all his subjects except Philosophy, for which there were no tutorials. He was an ardent football fan and read the sport sections in the newspaper.

He said he found studying at university difficult: "It involves lots of reading. At school, one can get away with lots of rote learning but at university one needs to read and understand the work". He felt he had some problems with reading because he read slowly and he didn't always understand what he was reading. He could remember things when he read about soccer, but he couldn't remember what he read in his textbooks. He found the textbooks difficult, with lots of new words, and his attention wandered after about fifteen minutes of reading. Although he felt he understood some of the work, he couldn't afterwards express the ideas in words. Because it was difficult to learn from the textbooks, he found the study groups helpful in some respects - if everyone did their work they could have fruitful discussions. He had been to the Bureau for Student Counselling and they had told him about time management but he admitted that he found it difficult to commit himself to a timetable.

He found the contents of his courses difficult, especially Philosophy and Psychology. Sociology

he found easier because he could identify with some of the themes (poverty, violence, etc) and saw their relevance to his everyday life. He said that the Psychology textbook was very thick and he felt he couldn't be expected to understand it all. He didn't make his own notes as he felt the Study Guide sufficed, and although he underlined quite a lot in the textbook, there were never any margin notes or meanings of words written in. He said that he sometimes used a dictionary, but never wrote the meanings of the words down anywhere - he relied on his memory. He had a prodigious memory and he relied a lot on it to remember the meanings of new words.

He was a casual, lanky lad. Although he regularly attended all the sessions, he was somewhat scatterbrained and seemed to get into scrapes. He forgot his psychology textbook in a supermarket one day and when he went back to look for it, it had disappeared, so he was without a textbook for the rest of the year as he could not afford a new one. He borrowed my textbook to make photocopies of certain chapters, and he borrowed it again two weeks before the psychology exams. He sometimes came in to borrow money for transport fare home or to ask for an advance on his stipend because he had run into financial difficulties. He usually forgot to bring his vocabulary book with him, he sometimes forgot to return his homework tasks, and he once lost the test I gave him to do at home. Yet, even though he often arrived at my office at unusual times because he had forgotten the appointment time, he never missed an appointment and of all the five students, seemed to gain the most from the sessions.

His spoken conversational English was hesitant, his articulation poor and he seemed to have trouble expressing himself. His oral reading was not very fluent - he read in a halting manner, had problems with word pronunciation and made numerous miscues. However, the poor impression conveyed by his oral reading skills and his hesitant speech style was misleading and belied his intellectual potential - he turned out to be a very bright student, but one lacking in self-confidence. Of all five students, he performed the best in all the reading and inferential tests he did for me, and his assignment marks on the whole were good. He obtained 83% in the L2 proficiency test, which put him at stanine 7, the 'above average' level. It was gratifying working with him because he usually caught on very quickly to new ways of reading and he seemed to soak up advice. After I had shown him how to draw a mindmap of a chapter as a previewing strategy, using headings and subheadings as organising devices, his face almost literally lit up with delight. When he returned two weeks later, he pronounced it "a super memory device". The anaphoric inference test consciously alerted him to the way in which these devices functioned in texts and he enjoyed tracing their referential links across a paragraph.

His scores on the inference tests indicated patterns of reading similar to high Pass students or even Distinction students, yet he was getting in the 50s for some of his assignments. Although he was

coping academically, and although of all five students he probably understood the course contents the best, it became evident in subsequent sessions that he was not always going about his reading effectively. He was undoubtedly bright and via his studies he was getting relatively 'richer' in the learning context, but his ineffective style of reading hampered his attempts at spreading his intellectual wings and imprisoned him in a cycle of despondence and low self-esteem. His brief exposure to reading instruction seemed to create major breakthroughs in his reading ability, and his confidence also increased. He had the potential to get so much richer, if he could but be shown how to exchange his inefficient reading style with a more empowering one that would enable him to construct meaning more accurately and effectively, and so access information independently so that he could become an autonomous learner.

He came to see me shortly after New Year and with a beaming face told me that he had obtained distinctions in three of his four subjects - Psychology, Sociology and Communication (he obtained 68% for Philosophy). He also told me that he had spent most of his holiday reading and had completed reading a biography on Mandela. At the tender age of 21 he discovered the power of reading, and in so doing found the key to his own intellectual growth.

**TABLE 8.3.: SUMMARY PROFILE OF VUSI'S READING AND ACADEMIC PERFORMANCE**

<b>Reading</b>		<b>Academic performance</b>	
Anaphoric inferences	86%	Assignment 1	53%
Vocabulary inferences	81%	Assignment 2	73%
Inferences about text-semantic relations	81%	Assignment 3	53%
Thematic inferences	75%	Assignment 4	65%
Reading speed	122 wpm	Assignment 5	77%
Comprehension test	70%		
L2 proficiency	83%	Examination	80%

#### **8.3.4 Zondi**

Zondi was a pretty, petite 20-year-old student with delicate features. She was soft-spoken and rather shy. After upgrading her matriculation symbols, she stayed at home during 1998 and in August of that year saw an advert for studying at Unisa. She wrote the access exam, for which she obtained 64%, and then registered for Psychology I and the Mathematics Access course. She had always wanted to become a doctor but her marks were never good enough. She came to the Unisa campus every day to study.

She said she was a slow reader (which was later confirmed by her reading rate score of 84 wpm) and she often read and re-read her textbook without understanding it. She had initially wanted to drop out of her Psychology course because it was so difficult and incomprehensible, but she later started to understand some of the things in it. She had registered too late to do the first assignment, but had obtained 65% and 58% respectively for the two subsequent ones. She didn't feel happy with the latter mark but hadn't prepared well for it because she had had a Mathematics assignment at the same time. She had looked at the questions and mainly guessed because she didn't really understand the work and didn't have time to sort it out. She found multiple choice questions tricky.

She admitted that she found the textbook difficult to understand at times, "especially when there are those bombastic words" (she used the word in the sense of 'big'). She sometimes used a Collins dictionary, but she found it time-consuming as she often went from word to word to word before she understood the meanings. She had a notebook in which she sometimes wrote up new words but she didn't write them in her textbook. She also did quite a lot of underlining in her textbook. She often read her texts over and over again to try to find the answer to a question, an activity she found frustrating "because time is going on".

Zondi's spoken conversational English was adequate, albeit somewhat limited. She obtained 52% on the L2 proficiency test, which put her on stanine 3, the 'below average' level. Her oral reading skills were quite good, and she did not have decoding problems. She sometimes stumbled over the pronunciation of unfamiliar terms such as *intrapsychic*, *interwoven*, but this had more to do with an L2 student encountering unfamiliar words than with decoding problems. It became evident early on that she lacked an adequate academic vocabulary - there were numerous words on each page whose meanings she did not know (*evaluation*, *core*, *integration*, *pose a problem*, *fulfills*, *tendency*), even words that by then should have been acquired because they regularly occurred in the textbook (*differentiate*, *transmitted*, *premise*, *perceptual*). Once I had alerted her to the importance of taking control of her vocabulary development, she became the most conscientious of all the five students in actively working on her vocabulary, writing down new words, looking up their meaning and learning them. Her LBB was full of entries by the time our sessions ended.

Zondi seemed to be a very conscientious and organised student. She was goal-oriented, wanted to do well in her studies and disliked obtaining low marks. She arrived punctually for each session, she never missed an appointment, she always returned her homework tasks at the following session, she always came prepared with the right books, a pencil and her notebooks, and there was a resolute look on her small face when she sat opposite me at the desk, as if she was

determined to get the most out of the sessions as possible. She always diligently adopted the strategies we had worked through in the sessions, and at the end she said she had learned some useful strategies, especially the mindmaps and anaphoric references.

In terms of her scores on the inference tests, she followed a similar pattern to students at the borderline between At Risk/Pass groups of students. I never saw her after the examination and so was unable to determine why she failed so dismally in her Psychology examination.

**TABLE 8.4.: SUMMARY PROFILE OF ZONDI'S READING AND ACADEMIC PERFORMANCE**

<b>Reading</b>		<b>Academic performance</b>	
Anaphoric inferences	62%	Assignment 2	65%
Vocabulary inferences	39%	Assignment 3	58%
Inferences about text-semantic relations	63%	Assignment 4	73%
Thematic inferences	67%	Assignment 5	64%
Reading speed	85 wpm	Examination	27%
Comprehension test	40%		
L2 proficiency	52%		

### 8.3.5 Sibongile

Sibongile at 18 was the youngest of the five students. She was bouncy, confident, sassy, streetwise and full of the exuberance of youth. She was expelled from Brakpan High School in Std 9 because she had got into a fight with someone. She had been in trouble before and “the principal got fed up with me”. She went to a private college in Benoni to complete her matric. She was registered for BA Social Science and was studying Sociology, Psychology, Social Work and Social Welfare. She went to the Thuthong Centre during the week to study, when she felt like it, and attended tutorials in all four subjects on Saturdays.

She emphatically didn't like reading. She said that ever since Std 6 she had been made to read lots and lots of books so now she didn't like reading. She used to read Sweet Valley High books in high school. She found them easy and enjoyed them - she could read a book in two days. There were lots of books she had been made to read and which she didn't like: “In Grade 11 we had to read *The Great Gatsby* and I really hated that book, it put me off reading!” She liked to page through magazines such as *You*, *Drum*, and *True Love* when she went home, and she sometimes liked reading romances. She read mainly in English and found it easier to read in

English than in Zulu, her home language:

*We were not taught big Zulu words at school, and I don't know them when I see them in Zulu books or magazines. When I read a magazine in Zulu I must ask questions all the time about the meanings of the words, and once my parents told me to stop reading in Zulu so that I would stop asking so many questions always!*

She found studying at Unisa difficult: "One has to do everything on one's own". She took it easy in the beginning but she soon started taking her studies more seriously when she saw how much work there was: "The work itself is not difficult, but there's just a lot of it". She said she could relate to all her subjects quite easily except for Psychology, which was difficult. There were lots of new psychology terms that had to be learned and she initially wanted to drop the whole course. She found the study group helpful and that is what helped her continue with the course. She didn't have any problems with the Psychology textbook itself.

She had failed Assignment 3 (38%) but she admitted that she had not prepared properly and had started working on it the day before the due date. She knew it was her fault, so didn't worry too much about the low mark. She said she had learned her lesson, so with the next assignment she set aside more time for it.

She used a dictionary when she got stuck on words. Although looking up a word sometimes took a long time, she felt it was worth the time spent. She said she wrote the meaning above the word in her textbook, but when I worked through her textbook with her in later sessions, there was little evidence of her having regularly done this. She underlined portions of text and sometimes uses highlighters for parts she felt were important. If she didn't understand the work, she asked someone in her study group to explain it, or tried to contact a psychology lecturer.

She said she was learning to become more disciplined with regard to time management. She had a timetable but it didn't always work out because she didn't always put enough pressure on herself: "I keep putting things off, you know". She had a strong functional attitude to her studies and was not interested in reading things that were not necessary. She read the headings, if they were part of the reading she had to do, but she didn't pay attention to the numerical index ("Why must I?"), and she also didn't look at figures, diagrams or charts:

*They are not really something I need to know. I understand enough from the text. I only concentrate on content. I don't even look at photographs. Anyway, they're black and white and old - not interesting.*

Of all the students, Sibongile was the most chatty and would readily ask me questions - about the

text, about words she didn't know, what I thought about things (ranging from political issues like the SASCO demands for hostels at Unisa to what I thought of multiple-choice questions). She was quite strongly politicised and concerned with issues of African identity. Unfortunately, she stopped coming after the seventh session. Her attendance had been rather erratic - she was often late for appointments or missed them and, unlike Matshidiso who always phoned me to explain why she had not kept an appointment, Sibongile never contacted me and after several unsuccessful attempts, I would finally get through to her at her apartment and make another appointment. She wanted to go on a SASCO tour to the University of Venda, although her father disapproved and said there would be too much drinking. She asked for an advance on her stipend so that she could have money for the tour. After that she never came back and after several unsuccessful attempts to contact her, I stopped trying.

Her years at an English high school stood her in good stead because her spoken conversational English was very fluent and she was never at a loss for words. Her oral reading was also fluent and of all the students, she was the only one who read with appropriate intonation and pauses. Because she dropped out of the sessions, I was unable to formally test her L2 proficiency level. Unlike the other students who had greater language and reading barriers to overcome, Sibongile had good language and reading infrastructures in place - she just needed to stretch herself and put them to good use. However, her social life seemed to take precedence over her studies. She had a rather cavalier and minimalist attitude to her reading and to her studies in general. She seemed to have a misguided idea of what skilled reading entailed - she thought it gave maximum comprehension with fast and minimum effort. The read-and-probe method revealed how superficial her reading of the text actually was - she was impatient to get through it quickly, she didn't pay attention to textual details, she didn't always actively engage in meaning construction, she didn't take the trouble to look at diagrams and check her understanding, and she ignored the words she didn't know and thus lost opportunities to actively expand her academic vocabulary. Because of her more advantaged past educational opportunities in relation to the other case study students, Sibongile was reading at instructional level, and was the kind of student who would readily have responded to reading instruction that could encourage her to adopt more effective reading strategies. Like Vusi, she too had potential, but it went untapped due to lack of awareness of the methods and benefits of strategic reading, and a basic lack of commitment to her studies. She seemed to be more interested in the political and social aspects of student life than applying herself diligently to her studies.



**TABLE 8.5.: SUMMARY PROFILE OF SIBONGILE'S READING AND ACADEMIC PERFORMANCE**

Reading		Academic performance	
Anaphoric inferences	75%	Assignment 2	74%
Vocabulary inferences	-	Assignment 3	38%
Inferences about text-semantic relations	-	Assignment 4	60%
Thematic inferences	-		
Reading speed Comprehension test	129 wpm 40%	Examination	36%
L2 proficiency	-		

#### 8.4 Constructing meaning during reading

Naturally, differences in individual skill and reading style exist between readers, and there is no one single way of properly coming to grips with a text. As Deegan (1995:167) remarked in her study of the reading practices of high and low performance law students, "...there were memorizers, text noters, mental integrators, information organizers, flexible readers and ...good strategy users". Yet, despite differences in reading style, there are certain cognitive-linguistic skills that are central to successful reading, such as anaphoric resolution. There are also some reading strategies that are more effective than others, which suggests that in specific contexts, some reading styles may lead to greater success than others.

Certain characteristics have emerged from reading research which typify good and poor comprehenders fairly consistently. An important characteristic of skilled reading involves the ability to construct meaning. Meaning construction can manifest itself in several overlapping ways and can rely on several different reading skills, ranging from resolving anaphoric devices to identifying successive ideas in a text and integrating them into a coherent picture (Palinscar & Brown 1984; Just & Carpenter 1987; Daneman 1991; Stothard 1991; Yuill & Oakhill 1991; Oakhill 1994). During the sessions I was particularly interested in observing in what kinds of ways the five students constructed meaning or had problems constructing meaning during reading. In this section I discuss some of these issues.

On the whole, all five students initially showed little engagement with the text, even Vusi, who scored well in his tests. This, I believe, is where the root of their reading problems lies. Lack of engagement with a text diminishes opportunities for meaning construction. The students tended to approach the reading task in a mechanical and passive way, starting at the beginning and wading their way through conceptually dense text to arrive exhausted, demotivated and largely

uninformed at the other end. They were particularly inactive with regard to the constant forward- and backward-routed activities that are associated with successful text comprehension. They seldom backtracked to check on a referent or a meaning, and they had difficulty making predictions about what was coming up. They could often identify the gist of a single paragraph but they had problems elaborating ideas across paragraph boundaries and integrating information across the text. Their overall lack of active engagement and meaning construction was evident in several ways and will be discussed in greater detail below.

#### 8.4.1 Anaphoric inferencing

As was discussed in Chapter 4, the ability to successfully resolve anaphoric references is associated with skilled reading. Because anaphoric inferencing is so central to reading, the anaphoric test was the first homework assignment that the students were given, and I was interested to see to what extent the students were aware of the way in which anaphoric devices functioned to link incoming information with already given information in texts. The results of the test for the five students are given below:

TABLE 8. 6: ANAPHORIC INFERENCING SCORES<sup>a</sup>

	Matshidiso	Kedibone	Vusi	Zondi	Sibongile
<i>Pronominals</i>	70	70	90	90	90
<i>Determiners</i>	50	38	63	50	50
<i>Lexical anaphors</i>	58	58	96	46	85
<i>Total for test<sup>b</sup></i>	59	55	83	62	75

<sup>a</sup> The scores are expressed as percentages

<sup>b</sup> The totals do not add up here because a separate percentage has been worked out for each category.

As can be seen, Vusi and Sibongile attained fairly high accuracy in resolving anaphors, while Matshidiso, Clair and Zondi fared moderately. As the prior quantitative results showed, pronominal anaphors were the least problematic to resolve, while the referents of determiners proved to be the most obscure to resolve. Afterwards, when I worked through the test individually with each student, it was clear that the explicit process of backtracking during reading to link up new with given information and to check which referent was in focus was a novel idea for them, even for Vusi and Sibongile, even though they had done well in the test. Matshidiso, Kedibone and Zondi initially found it difficult to identify the correct referents in the test items that they had previously got wrong, especially with the paraphrase and determiner anaphors. They also made similar kinds of errors to those that were discussed in §4.7 in Chapter 4, such as

erroneously looking for a referent in the first sentence, e.g. Zondi thought that the phrase *The general public...made their contribution* was the referent for *This expectation* in [A5] below (the incorrect anaphoric inference is indicated by the dotted arrow):

- A5. The general public usually view the elderly as people who have already made their contributions to society and have retired from productive activity. The old person is expected to ‘take it easy’ and to enjoy himself or herself. This expectation ignores the fact that one of the more important ways we all ‘enjoy’ ourselves is by being involved in activities that are socially valued.

Another common error was finding a referent that was underspecified in relation to the anaphoric referent, e.g. *such evidence* referring back to the first sentence only instead of to all the research cited in the paragraph in [A6].

- A6. Garrison (1979) found that female aspirations for high-status jobs rose by 7% between 1970 and 1976. During the same time, male aspirations for such jobs declined 5%. Lueptow (1981) found a similar decline in gender-typed occupational choices when he compared high school seniors of 1964 to high school seniors of 1975. Although such evidence is encouraging, we must bear in mind that women still tend to be heavily over represented in traditional female jobs.

What was particularly striking about their efforts during this exercise was the lack of attention that they gave to details in the text. For instance, they didn’t use syntactic cues (e.g. linking a singular anaphor with a singular antecedent) or semantic cues (e.g. looking for a synonymous antecedent) to make the links until I pointed these clues out to them. For example, in [A5] above Zondi said that *This expectation* referred back to the idea stated in the first sentence. When I asked her if ‘having a view about something’ and ‘having an expectation about something’ were the same thing, she said no, and then after looking at the paragraph again, conceded that *This expectation* could not refer back to the idea in the first sentence.

Of course, it is possible that lack of attention to text details might be a result of lack of proficiency in the L2 - the students have inadequate linguistic knowledge to pick up nuances from text details. However, it is also possible that lack of attention to details could be the result of lack of awareness of the need for precision in reading. The fact that the students tolerate a high level of vagueness in their reading suggests that attention to detail is sacrificed for a search for general meaning. Even though they read the text slowly, word-for-word, in a way that would suggest dependence on bottom-up processing, they actually seemed to tune out the textual details and instead engage in a kind of global search for meaning, seeming to hop from key word to key word in a paragraph - or what they perceive to be key words. For example, in [A9] below Matshidiso missed the main proposition about *the reduction in the developed world’s spending for military purposes* and said

instead that *America* and *defence expenditure* were key ideas in the paragraph, and thought that the determiner *this* referred back to these words.

- A9. In the light of the ending of the Cold War, we can anticipate a reduction in the developed world's spending for military purposes. Arms-related expenditure has dropped sharply in Russia. The United States and other Western countries are scaling back defence expenditure over the next few years. However, this will increase the pressure to export arms to make up for lost domestic markets.

As reflected in their inaccurate inferences of what they perceived to be referents in focus, this kind of top-down global strategy resulted in them building up inaccurate representations of what they thought the text was about, and these inaccurate representations were seldom checked by bottom-up processes that have the potential to provide textual details against which top-down processing can be checked or modified. They were groping at meaning and had no effective feedback loops to monitor their meaning construction. This idea will be taken up and argued again later.

In contrast, when going through their errors, Sibongile and Vusi quickly found the right antecedents, and linking up an anaphoric device with an antecedent was clearly not a problematic aspect of reading for them. Even so, the exercise seemed to have the advantage of consciously raising their awareness of these intersentential links and explicitly providing them with a backtracking strategy with which to check comprehension. Sibongile jokingly remarked, in a later session, that often, when she now came across anaphoric devices such as the determiner *this* + X, "I remember our session together when you showed me what these words did". Conscious awareness of the way in which anaphoric devices functioned also seemed to have the potential to make the students more receptive to acquiring new information. For instance, when Vusi did the vocabulary inferencing test, he got all the vocabulary items right that relied on anaphoric inferencing to resolve their meaning. He said that he might not have worked out the meanings of those words if he had not first done the test on the resolution of anaphoric inferences.

The interesting thing about the anaphoric test was that it seemed to have an 'ah-ha' effect on all the students (to a greater or lesser extent) - once they caught onto the backward referencing function of the anaphors during the feedback session, they seemed surprised they had previously missed perceiving these links. Afterwards they rather enjoyed linking up antecedents with their anaphoric referents. Zondi and Vusi in particular seemed to delight in their new-found skill. Several weeks after the sessions had ended Vusi paid me a visit after writing his exams, and he remarked that the previewing exercise in mind mapping the contents of a chapter (to be discussed in §8.4.5.1 below) and the anaphoric exercises had been most useful to him. Although he had performed well on the anaphoric test, having his attention explicitly drawn to these devices and the way they functioned heightened his metacognitive awareness and seemed to empower him as

a reader.

In the sessions following the anaphoric test, when we read sections of the textbook together I often asked the students to identify antecedents from anaphoric items and they started becoming more accurate in this form of text backtracking. I believe that simple exercises in anaphoric resolution can help passive students start paying more attention to details in a text and become more actively engaged with the text, which in turn leads to opportunities for better meaning construction.

#### 8.4.2 Vocabulary inferencing

Although it is readily acknowledged that a small vocabulary is a limiting factor in text comprehension, the position in this thesis, following Daneman (1991), and as argued previously in Chapter 5, is that a small vocabulary is a *symptom* of unskilled reading and of lack of exposure to the written word. The students by their own admission did very little reading outside of what they were required to do for their studies and, except for Sibongile who had had some exposure to books and reading at high school, they had a history of non-reading and hence little exposure to the written word, both within and without the school context. Further, one of the characteristics of unskilled reading is a non-strategic approach to reading. Paris, Wasik & Turner (1991:609) argue that strategic reading is fundamental to success in the learning context because it serves, amongst others, “to enhance attention, memory, communication and learning ... strategies are controllable by readers; they are personal cognitive tools that can be used selectively and flexibly”. During the sessions with the students I was keen to observe the strategies they adopted concerning the overwhelming amount of new academic and technical words that they encountered in the textbook. Not knowing all these words obviously had a deleterious effect on “attention, memory, communication and learning”, so how were they constructing meaning in the face of such obstacles?

It was clear right from the beginning that the students had problems with vocabulary and they themselves identified this as a problem area in the first interview. Most of the words in the textbook with which they had problems seemed to be academic words and low frequency words. It was also clear from the following sessions that the students were fairly passive and ineffective in their approach to doing something about this problem, both in terms of actively building up their vocabulary, actively seeking word meanings from ‘external’ sources, such as a dictionary, and in terms of using ‘internal’ textual clues to infer word meaning. Of all the students, Vusi knew the most academic words and was the most active in working out new word meanings, but rather than write new word meanings down, he relied on his memory for developing his vocabulary. Although Sibongile’s English was very fluent, I noticed that there were many

academic words whose meanings she did not know yet she did not seem to do much to resolve these semantic gaps. Of all the students, she probably had the best everyday communicative linguistic infrastructure to support new word meanings but she did not make use of it. Kedibone, Zondi and Matshidiso all had limited academic vocabularies.

Finding out word meaning was clearly an effortful and often frustrating activity for them. Because dictionary meanings often obfuscate rather than clarify word meanings, especially for L2 students, the students sometimes had to look up 3-4 entries before they could work out what a given word meant. I regularly asked them to tell me which words in a paragraph they didn't understand and they usually identified two or three, sometimes four, whose meanings I would then explain to them. On closer inspection, however, it sometimes turned out that there were also other words whose meanings they did not know. Perhaps they were reluctant to reveal their lack of word knowledge to me, but the fact that they sometimes knew so few general academic words was disquieting, and this in itself should have alerted them to the seriousness of their situation and driven them to take some action. Yet they continued to be passive and feel helpless.

There were also words whose meanings they *thought* they knew but to which they ascribed either (i) inaccurate or incorrect meanings (e.g. *constant* = ready), (ii) meanings inconsistent with the context (e.g. *premises*, used in the context of theories = basic idea, but they only knew the more common meaning = 'property, like of a building'), yet they were seemingly unaware of the inappropriacy of the supposed meaning, or (iii) meanings arrived at through misleading morphological clues (*withdrawn* = 'drawn together', *disposition* = 'wrong position'). Having inaccurate or contextually inconsistent meanings obviously did not help them construct a coherent representation of what the text was about.

The effortful and frustrating task of constantly learning new words resulted in diminished task persistence - they did not take the trouble because it was too much trouble. They claimed to look up words in dictionaries but even when they did so, there was little evidence that they adopted strategies for actively learning the meanings of new words because they seldom wrote the meanings of the words down for later memorisation or memory refreshment.

The students were tolerant of a lot of vagueness as they read in the sense that there were sometimes several words in a paragraph whose meaning they did not really know yet they continued to read in spite of these semantic gaps. There were also many words that had been used elsewhere in the chapter or textbook and despite the fact that they had encountered them before, they had not taken the trouble to learn their meaning. Six months into the psychology textbook and Matshidiso and Zondi still were not sure what *cognitive* and *perceptual* meant. The students

often asked me the meaning of a word, but then wouldn't write down the meaning. I often had to remind them to write the meanings in their textbook, above the unfamiliar word so that when they read the text again they would be reminded of the meaning. Zondi was the only one who regularly wrote word meanings into her textbook after I had impressed on her the need to take control of her vocabulary learning.

There were also small ways in which they revealed a non-strategic approach to their study reading. Some of these 'habits' were possibly partially a reflection of straightened financial circumstances and partially a reflection of passive literacy practices. For instance, some of them came to the sessions without a notebook, rough paper, a pen or pencil, or else the pencil had such a blunt point that writing the meaning of a word in the textbook became difficult. It's not easy to systematically build up one's vocabulary in an L2 when one doesn't have a serviceable writing instrument or a specific notebook in which new word meanings can be recorded for future reference and for learning. I always kept a pile of recyclable paper handy and a collection of sharp pencils on my desk available for their use, and I also took the paper and pencils along when I met Kedibone at Thuthong. In fact, one day she teased me about my fixation with sharp pencils, but I noticed that she started bringing more serviceable writing implements with her!

They also lacked awareness of and skill in using textual clues to make inferences about word meaning. Although Zondi and Matshidiso had both said that they tried to break an unfamiliar word up into components, they didn't actively do this with words we encountered while reading (e.g. *unstable*, *interwoven*, *intrapsychic*) and they needed prompting to try and work out the meaning from the morphology. With the exception of Vusi, their performance on the vocabulary test was not very good, as reflected in Table 8.7 below (Sibongile's results are not reflected here because I did not get the test back from her).

TABLE 8.7: VOCABULARY INFERENCE SCORES<sup>a</sup>

	Matshidiso	Kedibone	Vusi	Zondi
words claimed to be known	38	25	85	30
words inferred	18	35	63	36
use of clues	18	39	86	50

<sup>a</sup> Scores expressed as percentages

The students often used their background knowledge to simply guess the meaning of a word, or they gave 'intuitive' answers instead of attending to information provided in the text. Vusi was the only student who consistently noticed the relevant clues in the texts and used them to infer the

meaning of unfamiliar words. This dismissal of textual information in favour of their own general information is consistent with McCormick's (1992:73) findings concerning poor readers who have a tendency "of interpreting text content to conform to prior knowledge or giving an opinion rather than generating an inference". This tendency emerged clearly in the vocabulary inferencing test, but there was evidence of this throughout the sessions. Attention to textual information enables a reader to construct meaning more accurately during reading and so modify or expand an existing knowledge base - this is the process whereby learning occurs; dismissal of text information during reading means that a reader loses opportunities for acquiring new knowledge.

When we worked through the vocabulary tests, I showed the students how anaphoric devices, morphological clues, restatements (*i.e.*, *that is*, ...), punctuation clues (":" or "-" sometimes signalled that restatements or word definitions followed), and thematic clues could all be used to infer word meanings. The existence of these clues was an eye-opener for the students. Zondi expressed great surprise after we had worked through the vocabulary test and said she'd never before been aware of all the clues that occurred in a text. The anaphoric devices in particular later proved to be useful vocabulary triggers for Vusi, Zondi and Sibongile. The lack of awareness of textual clues provided further evidence to a growing realisation on my part that though they read in a word-by-word fashion, they in fact paid little attention to text details that could help them construct meaning.

I embarked on a vigorous vocabulary consciousness-raising campaign and impressed on all of them the need to take control of their vocabulary learning and to become active participants in the learning process. I encouraged them all to buy a small notebook (their LBB) or to use any other notebook that they had - preferably only for vocabulary (or to have a section of a general notebook devoted to vocabulary). The vocabulary notebook preferably needed to be pocket sized so that it could be carried with them everywhere, and taken out and studied in a train/taxi, while waiting for a bus or a friend, etc. I encouraged them to set a conservative goal of learning 200 new words within the next 4-5 months by writing in a minimum of two new words a day, five days a week. They were also asked to bring their LBB books every week and I checked their progress fairly regularly. Once again, Zondi was conscientious in her use of her LBB and by the end of the sessions she had numerous entries. She said she had been made far more aware of the importance of learning new words every day and she seemed quite ambitious to build up a more extensive vocabulary. Matshidiso carried hers around but although she wrote down many new words she encountered, she didn't always get round to finding out their meaning. Kedibone, Sibongile and Vusi were more forgetful about bringing their LBBs to the sessions, but whenever I got to see them there were more entries in them than the previous occasion, and they always assured me that they were writing in new words every week. Vusi seemed to rely far more than the others on his



good memory ability for remembering new meanings, and he seemed to have a wider conceptual network on which to hook the new word meanings.

The vocabulary exercise certainly raised their awareness of the importance of actively working on their vocabulary, and of not ignoring unfamiliar words, especially if they occurred more than once or twice in a chapter. The importance of building up a large vocabulary also seemed to change the attitude and motivation levels of some of the students to word meaning - rather than seeing new words as an effortful obstacle that made them feel powerless, students like Zondi and Vusi started seeing them as a challenge - here was an aspect of their 'study lives' over which they could gain greater power. Alerting students to the need to take control of their vocabulary development is clearly an area in which departments, individual lecturers and tutors can play a more active role.

#### 8.4.3 Text-semantic relations and thematic inferences

As discussed in Chapter 6, the ability to perceive the way in which propositions in a text are semantically related is an important component of text comprehension. The students were given Inference Tests 1 and 2 for homework, and then I worked through the tests individually with each student to see how they perceived text-semantic relations in the test paragraphs. The results are displayed in Table 8.8 below (Sibongile only did Test 1 but not Test 2 so her results are incomplete).

**TABLE 8.8: TEXT-SEMANTIC RELATIONS AND THEMATIC INFERENCE**

	Matshidiso	Kedibone	Vusi	Zondi	Sibongile
text-semantic relations	47%	41%	81%	63%	incomplete
thematic inferences	50%	58%	75%	67%	incomplete

The results from the quantitative component of this research study showed a robust relationship between inferring semantic and thematic relations on the one hand, and academic performance on the other hand. This pattern was also reflected in the case study students for, as can be seen from the table above, Matshidiso and Kedibone performed poorly in terms of the text-semantic relations that they inferred, and they were the also the weakest readers and academic performers in the group. Vusi was the only one who had few problems perceiving the way in which chunks of information were semantically related, and he was also the strongest comprehender and academic performer, while Zondi was in between.

The relative ease/difficulty with which the case study students inferred these text-semantic and thematic relations, as reflected in Table 8.9 below, was similar to the sequence observed amongst the Medunsa students (§Table 6.3) and the large group of Psychology I students (§Table 7.4).

**TABLE 8.9: RANK ORDER OF MEAN SCORES FOR SEMANTIC AND THEMATIC RELATIONS OF CASE STUDY STUDENTS**

Temporal	78%
Premise-conclusion	68%
Thematic	67%
Whole-part	56%
Exemplification	55%
Contrastive	48%
Causal	41%

The CHAID analysis used with the Medunsa data (§6.5.1) showed that the ability to infer contrastive and causal relations was a strong predictor of academic performance, and we see that same trend reflected here, with Kedibone and Matshidiso attaining 29% and 39% respectively for contrastive relations, and both attained 33% for causal relations, while Vusi obtained 93% and 66% respectively for these two relations. Although I did not undertake a detailed analysis of their responses to these two tests, my overall impression was that the students failed to pay attention to text details and this in turn resulted in them missing opportunities to pick up the conjunctive and other devices that writers use to signal the ‘chunking’ of information and the way in which those chunks are semantically related. For example, the students were not always sure what exactly conjunctives such as *however*, *although*, *therefore*, etc. meant or how they linked up items of information. Matshidiso and Kedibone did not always pick up the *contrastive* nature of contrastive relations, and they had problems following the cause-effect sequence of events or arguments, and Kedibone didn’t know that the phrase *for instance* was a synonym for *for example* and could not recognise this kind of exemplification relation. (It also transpired that none of the students except Sibongile knew what the abbreviation *i.e.* meant. Some thought it meant the same as *e.g.* However, they did not use the semantic content of restatement statements to infer their relation to prior statements.) After working through the tests with the students it became abundantly clear that the students need instruction in these aspects of reading. The instructional implications arising from the findings in this study will be taken up in the final chapter.

#### 8.4.4 Awareness of paragraph and text structure

Reading research has shown that an awareness of text structure distinguishes skilled from unskilled readers. Knowledge of expository text structure improves comprehension and memory of text and also makes summarising of information easier (Meyer, Brandt & Bluth 1980; Davis, Lange & Samuels 1988; Slater et al. 1988). During my sessions with the students I was interested to see whether they were aware of paragraph and text structures and whether they used this knowledge to help them follow a line of argument/discussion in the text. This was the focus in one of the sessions, and in the Psychology textbook sections of Chapter 32: *The nature of feelings* were used to explore this aspect of reading. Section §32.3.2 briefly referred to theories of emotion and two key concepts, viz. *cognitive context* and *physiological arousal*. The next part, §32.3.2.1, which elaborated on these concepts, had the following structure:

<b>32.3.2.1</b>	<b>Two-factor theory</b>
Paragraph 1:	General introduction to Schachter's hypothesis (involving physiological arousal and cognitive content);
Paragraph 2:	Illustration of the two key concepts in everyday life situations (functions as preview for the subsequent description of the research study);
Paragraph 3:	Description of Schachter's study- the three groups of subjects;
Paragraph 4-5:	Further description of research - subdivision of groups and intervention procedures;
Paragraph 6:	Results of study;
Paragraph 7-8:	Interpretation of results;
Paragraph 9:	Conclusions drawn by Schachter;
Paragraph 10:	Confirmation of Schachter's findings; also studies that challenge findings;
Paragraph 11:	Criticism of two-factor theory.

The concepts and the theory that are explained in this section of text are quite complex and, as can be seen from the above structure, the text assumes some knowledge of how research works in the academic world. However, the information is systematically structured and an awareness of this underlying structure supports comprehension of the text.

I started off by telling the student that we were going to look at paragraph and text structure because knowledge of such structures aided text comprehension. After reading each paragraph aloud and working out what it was about, we were going to look for a suitable word that would summarise what the paragraph was about, e.g. *introduction/description of X or Y/conclusion, etc.* (as in the outline above). We would write these words in the margin next to each paragraph so that

we could see at a glance what the structure of the whole subsection was. I used the first paragraph as an example, and pointed out that in this paragraph the writer basically *introduces* the hypothesis in a very general way without actually giving any details. To summarise, this paragraph functioned as an *introduction*. At the end of the exercise, when a descriptor for each paragraph had been written in the margin, I got the students to go over the subsection again and tell me in their own words what it was about, using the text structure as a guide.

All five students initially found it difficult to understand what they were expected to do - a response that suggests low cognisance of text structure. It became clear on further probing that the students actually had very little awareness of paragraph structuring and they also lacked a ready reflective language to talk about the underlying text structure. Some of the paragraphs contained discourse markers to cue the reader as to what kind of information was coming up, e.g. “**Let us first look at a simple example...**” (Par. 2); “Schachter and his co-workers **concluded** that ...” (Par. 9); “Schachter’s research and conclusions were **confirmed** ... but were also **called into question** ...” (Par. 10); “The broad trend of the **criticism** was ...” (Par.11), while in the other paragraphs one needed to make an inference about the main thrust of the paragraph. Even when I drew their attention to the clues, the students still had difficulty using these clues to describe what the writer was doing in each paragraph. They read their text as disembodied information and had little awareness of the writer’s intent of structuring information in a specific way.

Even after reading the relevant text, the students still had problems relating the title of the subheading (Two-factor theory) to the two key concepts singled out for attention in 32.3.2 and to Schachter’s research described in 32.3.2.1. It was also clear that the students did not really understand what research entailed, what its purpose was, and how researchers went about their studies. All these factors contributed to the problems they had understanding this section of text. Yet the underlying structure adopted in this subsection of text is a very familiar one in human and social science texts. (Although it did not occur in Section 2 of the textbook dealing with the biological context of psychology where mainly descriptive passages prevailed, it was a common pattern in Sections 3 and 4 of the textbook, dealing with the intrapsychic and social contexts of psychology respectively.)

None of the students had ever done this type of exercise before. Paragraph structuring had never been taught to them at school, and because they did so little reading, they never constructed this knowledge on their own through exposure to texts. Sibongile said that she had been taught about main ideas at school, and she was aware that main ideas were usually expressed in the first sentence of a paragraph. However, as is so often the case, what had been taught at school was not readily transferred to the everyday demands of study reading at tertiary level. Matshidiso and

Kedibone in particular struggled through this session, and basically waited for me to tell them what to write in the margin after they had read each paragraph. Even though Zondi, Vusi and Sibongile seemed quite pleased with the end result and found it easy to summarise the contents of the text using this structure as a framework, all five students needed a lot of guided practice in this session, and it was clear that they would need more exposure to this kind of exercise before they appropriated it for themselves.

Readers who recognise information as having an underlying structure or pattern use this structure to help them construct meaning as they read, and it is also an aid in memory retention and recall. Clearly the case study students were not doing this. Their responses to and difficulty with this exercise confirmed my earlier impression that they read in a flat, linear like way that inhibits meaning construction, and they subsequently have difficulty in relating ideas in paragraphs to one another. Many of their comprehension problems seem to stem from a poor ability to recognise that the flow of words on a page comprise meaningful chunks of information that reflect what the writer is doing with the information and how it is being organised and presented. They seem to have problems forming a more abstract generalisation of information in a text, and the lack of a reflective language for describing text structure appeared to be a very real constraint in recognising and talking about such structures.

There is abundant evidence of the beneficial effects of instructing students in text structure. In their overview of comprehension instruction in this area, Pearson & Fielding (1991:832) state "... we have found incredibly positive support for just about any approach to text structure instruction for expository text". Students in a distance-learning situation could certainly benefit from explicit instruction in this important component of text comprehension. In addition, the basic aims and conventions of research should also be explained to students, so that they will have a conceptual schema that will aid their comprehension of texts describing research studies and their findings.

#### **8.4.5 The use of visual or graphic representations**

Since the mid to late seventies quite a lot of attention in reading research has been given to the role of the representation of key ideas in text in a visual format and its effects on comprehension, learning and memory. Various instructional techniques have emerged, such as *flowcharting* (Geva 1983), *conceptual mapping* (Draheim 1984, in Pearson & Fielding 1991:830), *networking* (Holley & Dansereau 1984, in Pearson & Fielding 1991:830), *mapping* and *conceptual frames* (Armbruster, Anderson & Ostertag 1987) and *graphic organisers* (Darch, Carnine & Kameenui 1986). Despite a proliferation of terminology (also *mindmaps*, *semantic mapping*, *cognitive webbing*, *semantic feature analysis*), all these techniques basically rely on some or other form of

visual array of textual information that displays the interrelationships between smaller and larger units of information.

In their review of research into the effects of such techniques, Pearson & Fielding (1991) found that groups of subjects who used these techniques generally outperformed groups who used more traditional non-visual techniques. In particular, the use of such techniques seems to lead to greater understanding of the way in which different ideas in a text are related. In my sessions with the students I was interested to see whether they made use of visual representations in any way to help them construct meaning during study reading. In the following subsections we look at the use of mindmapping as a previewing activity, attention to diagrams, and the use of time lines.

#### **8.4.5.1 Prereading/previewing activities**

Reading research has shown that when study reading is called for, effective readers use previewing strategies before reading to aid text comprehension. These prereading activities can take several forms, such as skimming the upcoming material, looking at pictures, reading titles and headings, or drawing mindmaps or graphic representations of the text from headings and subheadings before starting to read. Prereading activities have been shown to increase readers' comprehension of text because they provide readers with a schema of what is coming up, they help to activate prior knowledge, and they can also help to generate a more positive attitude to the text (Paris, Wasik & Turner 1991; Pearson & Fielding (1991).

The main aim of my interviews with the students in the second session was to see what kinds of prereading or previewing strategies they used when they started to read a new chapter in their textbook in preparation for answering assignment questions. In the first session the students had already told me that they often paged through the chapter before starting to read, and some read the summary to find out what the chapter was about. They therefore had some kind of previewing strategy but it clearly was not wholly effective because they still seemed to have problems understanding the text. They had a fragmentary approach to knowledge: it seemed that their primary concern, when they started reading a chapter, was to find answers to the assignment questions as soon as possible, without first building up an idea of what the chapter was about. In the second session I told them that they would be given about 8-10 minutes to review Chapter 36: *The Self* so that they could tell me afterwards, in very broad outline, what it was about. I stressed that I didn't mind how they went about the task. I then proceeded to get on with my own work but observed them surreptitiously to see how they went about the task. They all looked rather dismayed at the task instruction (Kedibone and Zondi in particular seemed quite distressed), some quickly flipped through the pages to the end of the chapter to see how long it was (23 pages) and

sighed, or commented, half jocularly, that they would *never* be able to read all that in eight minutes. Sibongile started reading the summary while the other four started reading at the start of the chapter. Even though they seemed to try to skim through the contents, none of them got further than the second or third page of the chapter, and Sibongile didn't finish reading the summary.

It was clear from the few minutes in which I observed the students that none of them had a clear forward-routed strategy for previewing the new material. Even though Sibongile had gone to the summary, she couldn't really say more than the others, which was basically that the chapter was about the concept of 'self'. None of the students had looked at the headings or subheadings to get an overview of the contents of the chapter.

I then showed them how to draw a mindmap or visual schema of the chapter, using headings and subheadings as key constructs in the mindmap. We looked at differences in numerical indices between headings and subheadings and how they signalled hierarchical levels of information. I started the mindmap on the chalkboard and then asked each student to continue with it and complete it on a sheet of paper, while I guided them. Time was spent on showing how the mindmap reflected the chapter as a unified organisation of ideas, and how the ideas related to one another. I also tried to stress the value of adopting this strategy, by pointing out that it was easier to follow a text and to maintain focus if one had an idea beforehand of what it was about and how the visualisation process helped in memory and recall. Attention was also paid to the importance of active reader involvement/engagement in the reading process. I suggested that in future they always draw a mindmap of a chapter before reading it, and that they could also use such mindmaps for study purposes.

The exercise was a revelation to the students. The notion that they could adopt a strategy that would enable them to preview the chapter in a fairly effective manner in a few minutes without actually reading a paragraph of text was clearly a novel idea. Kedibone had looked very sceptical when I said she could get an idea of what the chapter was about without first reading it and she didn't have a clue as to how one could go about doing such a thing. Once she cottoned on to the idea, she drew her own mindmap quite enthusiastically. Although the textbook provides a summary of headings at the start of each chapter, and although the psychology Study Guide provides guidelines on the use of mindmaps and encourages the students to use them, the students did not seem to have made use of these strategies. Kedibone ignored them because they looked so involved. Zondi said that although she had read about the mindmaps in the guide and had tried to do one, it hadn't worked as she didn't know what kind of details to put in or to leave out. Matshidiso said she had seen the reference to mindmaps but it looked quite complicated, she

didn't have time to work it out, and she preferred to do things her way.

The overriding impression that I gained from my interactions with the students during this session (and confirmed in subsequent ones) was the way in which they approached the reading task in a passive, linear and non-strategically effective way. It is not that they didn't use previewing strategies, but rather that their strategies were ineffective and inadequate for study reading and that they didn't have a strong enough motive to use previewing strategies consistently before reading. Their primary motive for reading a chapter was instrumental - to find answers to the assignment questions as quickly as possible. To achieve this they read a portion of text from point a to point b in a linear fashion. They didn't seem to perceive a need to first find their way about a chapter and to understand what it was about, in relation to previous chapters or in relation to the course as a whole. In other words, they didn't seem to feel a need for first building up a bigger picture or schema before filling in the details. They seemed to perceive information in a text as being a 'flat', list-like myriad of detailed information that they were expected to read and remember in a linear-like fashion. There was little sense of engaging with the text, of putting the information into relief, so to speak, and identifying the underlying hierarchical organisation of ideas in terms of the writer's own use of headings and subheadings. It was not surprising that they had problems remembering what they took so long to read. The lack of a hierarchical perspective on information puts a burden on memory because there is no systematic way of chunking information into memorable bits.

Paris, Wasik & Wade (1991) point out that unsuccessful readers often do not understand the value of previewing and dismiss it as time consuming or unnecessary. Although the students had been exposed to the concept of mindmapping in their study material, the common response was one of uncertainty, insecurity and scepticism - they didn't know how it worked, or if they tried it on their own, they didn't know which concepts to include in the mindmap, it seemed complex and time-consuming and these factors overrode the potential value of their learning a new strategy. Having someone model the strategy for them and then guide them in their own construction of a mindmap, paying attention to the significance of numerical indices to signal key concepts and shifts in topic, and to the use of headings and subheadings, provided a structured way for the students to learn the basic principles of hierarchical organisation of information. They could then apply and practice their emergent mindmapping skills, and become convinced of the benefits of using them.

Although individual factors came into play, in general, the response to the mindmapping exercise was very positive. In later sessions Zondi and Vusi in particular had high praise for the effectiveness of the strategy. Zondi broke into a smile in the next session when she told me that



she had been using it and that it really made a difference to her reading and understanding. She showed me examples of what she'd worked out herself, and said that she didn't take so long to read a chapter if she mapped out the contents beforehand, and that knowing beforehand what to expect helped keep her focussed during her reading. Both students spontaneously remarked that not only did it help them understand the chapter, but they were also able to remember quite a lot of the information afterwards. Vusi pronounced it a "super memory device" and said that for the first time that year he could remember information that he had read two weeks previously. (In his first session he had remarked that although he spent a lot of time reading chapters in his textbook, he had difficulty remembering afterwards what he had read.) When next we met, Sibongile showed me the mindmap she'd worked out for the chapter on stress, and said that she was also using them for her social work modules. Although Kedibone didn't articulate her responses as verbally as Zondi and Vusi, she used mindmaps regularly afterwards, and showed me her efforts at each session. Whenever we started reading a new chapter she would first mindmap the territory, at first laboriously but later with increasing confidence. Although her mindmaps were untidily scrawled across endless pages of loose paper, her increased appropriation of the strategy seemed to give her a feeling of control over the information she was reading. Of all the students, Matshidiso was more muted in her response. She said that the strategy helped but she didn't show much enthusiasm, and she didn't show me examples of what she'd done on her own, although she claimed to use the strategy when she studied for her music subjects.

Paris, Wasik & Wade (1991:611) comment that previewing "may be a particularly useful strategy for unsuccessful readers who do not engage in strategies spontaneously". This certainly seemed to be the case with my case study group of students. They didn't have effective forward-routed strategies for organising information into semantic chunks for enhancing attention, memory and learning. The particular kind of mindmap I showed them, using headings and subheadings as a scaffold for constructing meaning, enabled them to get 'the big picture' but at the same time it also provided a graphic depiction of relations between key concepts in the text. Their appropriation of this strategy seemed to generate a more positive attitude to their reading tasks and to result in claims of better text understanding.

#### **8.4.5.2 Constructing meaning through diagrams**

It became increasingly clear to me as we progressed through the sessions that, besides their newly acquired mindmapping skills, the students seldom if ever used visual strategies while reading their textbook. As was pointed out earlier, some of the students admitted that they didn't always attend to diagrams or sketches, and all of them mentioned that they had problems understanding them or relating them to the information in the text. Although I had got them to draw mindmaps

of each new chapter, using headings and subheadings, none of the students spontaneously diagrammed important concepts or processes while they read, and the practice of reinforcing comprehension and memory through diagramming was clearly unfamiliar to them. The drawbacks of not utilising visual strategies became particularly evident when we read through sections of descriptive text dealing with biological and neurological information, for example, in sections of Chapter 10: *Impulse conduction in the nervous system*. Although the text was amply supported by diagrams and pictures, the students didn't seem to benefit from them - they would look at them, but they seemed somehow not to engage with them. As a result of this, I started directing their attention more actively to diagrams. After they had read a section of text, I would ask them to look at the diagram, read the caption aloud, identify words in the caption they didn't understand, explain to me what was in the diagram and, using a pencil, to indicate position and direction of structures or processes, where necessary. For example:

EP: *What's that there?* (pointing to something in the diagram)

S: *That's er... that's an ... an efferent nerve tract.*

EP: *What does it do?*

S: *It takes messages from the brain and the... er...ja, spinal cord to the muscles.*

EP: *Show me on the diagram how this happens.*

Afterwards they had to say in what way the diagram repeated and exemplified information in the text, identifying in which paragraphs reference to specific items identified in the diagram occurred.

This continuous backward and forward reference between text and diagram seemed to have a positive effect on their comprehension of the text. Even if a diagram was already given, I often made them draw their own diagram and label all the key features that had been mentioned in the text, even though it was an exact copy of what was given in the text. The actual act of drawing their own diagram resulted in more active participation in constructing meaning from the text and, in a way, appropriating the information in the text for themselves. Because they became more actively engaged in wresting meaning from the text, they started understanding the information better. I often didn't actually need to explain the contents to them - simply by encouraging them to transfer it into a more visual format they themselves started to understand it better. As they became more actively absorbed in the contents of their textbook, they seemed to show greater interest in the topic.

It was often difficult for me to understand why they didn't spontaneously engage in this kind of text-diagram interaction when they read on their own. In study reading it is such an automatic and indeed 'logical' strategy for a skilled reader that it is difficult to imagine not doing it when study

reading, especially when dealing with fairly complex information, such as is in the biological/neurological chapters, that needs to be worked through carefully in a step-by-step way. Perhaps the reason for their passive and largely linear reading style lies in their years of inert learning styles, failed reading experiences and low expectations about the actual benefits of reading. They took so long to get through a text and the end result was usually poor comprehension, so they were reluctant to adopt any strategy that in their mind would take them even longer to get through the text. In order to break out of their passive reading style they needed to be convinced of the value of a particular strategy use through modelling and guided practice. When I worked through these sections of texts with them and forced them to engage in a more active visual construction of meaning, they saw for themselves that the strategy was not difficult, and although it initially took longer to get through a section, the benefits were obvious.

#### **8.4.5.3 Time lines**

Another striking feature was the limited general background knowledge of the students. They no doubt had a rich background knowledge of their families and communities, their sociopolitical circumstances, and the stuff that made up the fabric of their lives, but none of that personal knowledge was necessarily useful in helping them understand and acquire knowledge of the world of human science that they had now entered. References in the textbook to historical world events, to other countries or cities, to historical periods, to geophysical trends, etc. were often lost on the students because they did not have the appropriate frame of reference, nor did they seem to acquire new knowledge on encountering such information. In particular, their awareness of the temporal dimension of human history was rather fragile, and they had meagre knowledge of time periods such as medieval times, the renaissance, the industrial revolution, the first and second world wars, etc. (More than 80% of the sociology students in Test 1 said that medieval times was “in olden times, 100 years ago”. Some said it was “long ago, in apartheid years”. ) Admittedly, many of these temporal references are very Eurocentric, but at tertiary level it does help to have a temporal schema of human events, even if it is not absolutely precise.

The first chapter in the psychology textbook traces the history of psychological thought in Europe, India, China and Africa, and the subsequent two chapters describe various schools of thought and current trends in psychology from the mid nineteenth century till contemporary times. In order to place these ideas in their proper perspective one needs to develop a temporal perspective. Zondi and Vusi had both asked if they could work through these chapters with me as they were starting to revise all their work again in preparation for their examinations in November. While reading through the first chapter with them individually, it became clear that they were not effectively developing a temporal perspective from their reading of these chapters. I therefore decided to

introduce them to the notion of time lines, and got them to construct their own time lines by skimming through each chapter, looking out for historical temporal references and indicating their position on the time line. The different historical events were colour-coded according to the particular continent/culture in which they occurred, e.g. temporal references to Indian events were marked red on the time line, the Chinese temporal references were marked green, etc. Once they had constructed the time line and explained it to me, we worked through sections of the chapter again and they constantly referred to the time line to check their temporal progress through history.

Once again, a fairly simple technique had the power to improve their understanding of the text in a fairly dramatic way. It worked because it engaged their attention and made them construct a representation of the textual information in a way that simply reading through the text in a passive way never did. Through engaging with the text, they started processing text at a deeper level. I also showed the technique to the other three students and, with all the students, tried to encourage them to use it in their other subjects. Most surprising of all, Matshidiso took to it best of all. One or two sessions later she reported to me that she was using time lines with her music subjects, and for the first time she was starting to get a clearer picture of where the different composers and musicians fitted into the historical picture. Vusi also said that he was using time lines in philosophy to get a historical perspective on the different philosophers.

## 8.5 Interest and motivation

Research in reading is increasingly directing attention to the affective dimensions of reading and to the way in which attitudes, interest and motivation levels influence successful reading. This aspect came out quite clearly in the case studies. Although all the students seemed to be aware, at a kind of superficial level, that it was important to be able to read well, none of them really knew what this entailed, and so they found it difficult to break out of their old established habits of ineffective reading. I tried to impress on them the simple adage that practice begets skill - that the more they read, the better they would become. Because they did not read for pleasure, I wanted them to practise their reading skills through pleasure rather than study reading, so I encouraged them to read as much as they could - newspapers, magazines, and any kind of non-fiction or fiction - romances, comics, science fiction, detective novels, whatever took their fancy. (Because they did so little leisure reading, they did not seem to be aware of the existence of different genres of fiction.)

The students dutifully read their textbook, but without much interest or enthusiasm. They often found it difficult to see the relevance of what they were learning in the textbook to life around

them. This was something that troubled Kedibone in particular. Although I encouraged her to read more, for leisure, I soon realised that my early exhortations were too general and unfocused. Thus, after some forward planning on my part and after we had dealt with neurotransmitters in one reading session, I gave her a copy of a Reader's Digest in which there was an article on Carole Charlewood's diagnosis of Parkinson's disease and the subsequent brain operation that she underwent without anaesthesia. In the article the role of dopamine (a neurotransmitter) in Parkinson's disease was discussed. I told Kedibone to read the article and to explain to me, in the next session, what Parkinson's disease was, what role dopamine played in it, and what the operation entailed. At the next session I was amazed at the trouble she had taken - she said she found the article interesting, had read it carefully, made notes, was able to explain the relevant parts to me fairly accurately (some facts went awry), and commented on the courage it takes to be conscious during an operation to one's brain. (What is more, of her own accord she had read two other articles in the Reader's Digest, one of which she said was even more interesting than the Charlewood one!) We then used the index in the textbook (she had never noticed the index before, let alone use it) to look up all the references to dopamine and to Parkinson's disease. For the first time she started seeing the relevance of what she was so laboriously trying to read in her textbook to life in general, and she became interested and quite animated. I did the same with the other students and got a similar response in each case, although they did not read the article with as much care as Kedibone had, nor did they respond with the same level of curiosity and interest that she had.

Although the students came to the campus regularly, they didn't see the library as an information resource centre and none of them had taken books out of the library until I started exhorting them to read more and to make use of the vast text resources on their doorstep. Vusi, for example, had never taken a book out of the library and did not know how to access information on the library computer system. Despite all the information points within the library, he said he was too shy and embarrassed to ask for help. One day I showed him how to use the system on my office computer. He said he would like to do a search for books on child psychology and soccer, so he sat in front of the computer and together we went through the search steps. I explained briefly how the Dewey system worked, how to do key word and author searches, how to mark selected items, how to look for specific information (e.g. date of publication, shelf number, etc) and how to print out the items. This brief introduction to the convenience of technology opened up a whole new dimension for him, and with a big smile he informed me at his next visit that he now made use of the computers in the library, he had found specific books on the shelves, he had taken out some of the books on soccer and had even read a biography on one of the black English soccer players over the weekend. Because he had expressed interest in becoming a child psychologist one day, I introduced him to the books of Torey Hayden, a remedial teacher who specialises in the

treatment of elective mutism amongst abused and traumatised children, and who has written several books of her experiences. She writes well, captures her reader from the beginning, and makes the world of clinical child psychology accessible to lay people. Vusi took a book of hers out of the library, and I also lent him a book from the municipal branch library. He discussed the books with me and seemed to enjoy them very much and through them, seemed to see the relevance of what he was doing in psychology and was starting to develop a better understanding of what it means to be a practising psychologist.

Because Sibongile was involved in student politics and interested in issues relating to African identity, in order to motivate her to read more, I encouraged her to read books on the topic. After the second session, she got two books out of the Unisa library (the first time she'd taken books out of the library), one on African literature and the other the novel *Petals of Blood*. I also lent her a copy of *Things fall apart* and drew her attention to the photograph of Achebe in the first chapter of the psychology textbook. Although she didn't get around to reading all these books, she read the latter novel and sometimes referred to it during the sessions. However, I hoped that once she had broken the ice and taken out her first books from the Unisa library, the seeds of future book reading activity would be laid. Matshidiso said she had too much work to do to read books, so I tried to encourage her to at least read magazines or the Reader's Digest. Zondi's leisure reading also revolved around magazines and the Reader's Digest, which she said she was starting to buy on a regular basis. She liked the *Test your Word Power* in the Reader's Digest and found it a useful way to learn new words. She always assured me she was making an effort to read more in her spare time, over the weekends or in the evenings.

In our sessions we also consulted the index and bibliography - sections of the textbook that they had never consulted before and of whose functions they were not clear. I also made them check cross-references while we read through sections of text (e.g. references back to concepts that had already been dealt with and were important for a current section of text). On being asked, they would often confirm they remembered coming across the concept, but they forgot what it entailed. Instead of checking, they would continue to read, and so they lost opportunities to anchor prior information to current information.

## 8.6 Summary

None of the five students I worked with were skilled, strategic, independent readers. They were, I believe, fairly representative of the many L2 students who study through Unisa, most of whom have come through a disadvantaged educational system, do not do much reading outside their study demands, and who have problems accessing information effectively and meaningfully from

print-based material. None of them had a strong reading history, except Sibongile, who had had greater reading exposure in her secondary school years than the other students but who disliked reading and had an attitude problem towards her studies. With regard to reading skills in particular, the case study students' results on the inferential tests reflect a similar pattern to what emerged from the quantitative findings of this study, namely that students who perform poorly on reading inferential tests are also students who struggle academically. These students have problems perceiving how information in a text is linked, and hence they have problems constructing meaning during reading. This limits their understanding of print-based material, and hence their difficulty in constructing new knowledge in the learning context.

None of them had a sense of what reading in the academic context entailed, the role, functions and conventions of the academic world, what role research played, the contested nature of knowledge, and way in which new information and knowledge were disseminated via seminars, conferences, articles and books and the central role that reading played in this new world that they had entered. They were seemingly unaware of the vast number of books and other print- and electronic based information stored in the Unisa library, where they went to study everyday.

All of them felt that they had reading problems in the sense that understanding their textbooks was a slow and laborious process. They all seemed to work quite hard and conscientiously at their studies during the week, and they were obviously concerned about their low marks. However, they were locked in a constant battle for understanding, they did not know how to break out of the cycle of failure or underachievement that dogged them, and they revealed feelings of helplessness and confusion. When I first met them they all said it was important to be able to read properly and with understanding, but paradoxically they also seemed to undervalue or devalue reading as a powerful learning tool. They all wanted to "learn well and get good marks" but failed to appreciate (with the exception perhaps of Vusi) that reading was the very process through which learning occurs. They compensated by investing greater effort in oral forms of discourse, in their study groups and tutorial sessions, in the hope that their problems with understanding the contents of the psychology course could be sorted out there. They seemed to 'try harder' to make a go of their studies rather than 'try effectively'. Although such default strategies are undoubtedly useful, they are not empowering in the long run for they do not help students to become independent learners by constructing meaning through reading. In essence, they lacked strategic knowledge as to what they could do to control their reading outcomes. As Paris, Wasik & Turner (1991:625) argue, unsuccessful readers find it difficult to break out of their pattern of reading failure "because their behaviour exacerbates their ineffective reading and leads to greater failure".

Although they did not readily make inferences during reading, this does not mean that they could

not make inferences. They did not have a global reasoning problem, and in fact there was plenty of evidence throughout the sessions that they engaged in the making of inferences. The problem that they had was making inferences within a text-based context, i.e. during text comprehension. This is consistent with research into differences between skilled and unskilled readers (e.g. Holmes 1987; Winne et al. 1993). Because they paid so little attention to textual details, they had no effective basis from which to make inferences. They had a passive, linear approach to reading and failed to really engage with the text, even Vusi and Sibongile. They seemed to engage minimally in the forward- and backward routed activities that are so central to skilled reading, and as a result they had difficulty in integrating information across paragraphs and larger sections of text and organising the information hierarchically in their mental representations of what the text was about. On the whole they seemed to tolerate a high level of vagueness and loss of text meaning. There were many words whose meaning they did not know, yet these were general academic words with which they had already had several encounters in previous chapters and whose meanings they did not check. There were descriptions of processes or structures that they didn't understand yet they continued to read on. Because they did not always check the accuracy of referents, they sometimes lost the topic or were unaware that there had been a shift in topic and that the focus in a subsequent paragraph had changed. Although they read everything laboriously in a way that suggests over reliance on bottom-up processing, Matshidiso, Zondi and Kedibone in particular actually seemed to proceed by a globally-driven process of concept hopping - trying to follow explanations of key concepts in a gist-like way and skipping all the details in between. This way of reading naturally allows for a very wide margin of error with few opportunities or strategies to update their representation of the text in the light of incoming information or to check the accuracy of their interpretation.

These students have a legacy of inert learning (cf. Macdonald 1990) and there are no quick fixes for reading problems, nor do miracles happen overnight. Individual students also respond differentially to reading instruction, depending on their level of reading, their attitudes to reading and their studies, their interests and motivation. Although Vusi and Sibongile could cope with the reading, Vusi did so in a laborious and ineffective way and Sibongile in a superficial and ineffective way respectively. Vusi in particular seemed to benefit quite substantially from the relatively brief amount of reading instruction to which he was exposed. He was bright and strongly motivated, and these factors helped him become a more strategic reader during this relatively short period. Because he experienced qualitative changes in text comprehension, attention and recall when he adopted new reading strategies, he readily appropriated those strategies. Sibongile's competence in English, her prior exposure to greater reading experiences than her peers, and her fluent decoding skills provided a scaffold for accessing the course material more readily than students who do not have such L2 proficiency or relative reading ease.



However, this made her overconfident, she was surprisingly careless and ineffective in her reading practices, and also had an attitude problem towards her studies. Both Vusi and Sibongile were similar to the kind of readers who are regarded as being at the instructional level of reading - they understand their texts to some extent, but they benefit from additional instruction.

Matshidiso and Kedibone leaned more to the frustration reading level - they were slow readers who had more serious comprehension problems and who were not doing well, academically. Although they seemed to engage more with the text and gain greater confidence in their reading ability during the sessions, the short period of reading instruction to which they were exposed was not sufficient to make a substantial difference to their comprehension levels, nor to their meaningful acquisition of new knowledge. They, most of all, really needed intensive reading instruction over a longer period of time and greater practice in developing their reading skills through exposure to texts pitched at their level. Zondi was somewhere in-between - although she lacked effective reading strategies, she had the determination and motivation to empower herself as a reader, and my impression was that she was starting off on the road to becoming a more strategic reader than she had been when first we met.

The reading strategies and methods that I showed them were not particularly unique or original - they are standard fare in reading textbooks or courses designed to enhance text comprehension, especially in content reading (i.e. across the curriculum). Yet even the little reading instruction that these students received from me seemed to make a difference to their reading, and seemed, above all, to help them engage more actively with the text. In reflecting on the sessions with the students, there were two factors which, I believe, made an important difference, viz. **role modelling** and **perceptions** about reading and the value of a particular reading strategy.

The students did not really know what it meant to be a good reader. The read-and-probe method that I used, whereby I got them to read a paragraph at a time, asked them to identify unfamiliar words, check anaphoric references, look at text structure, adopt visual format to illustrate contents, etc. seemed to provide a role model for study reading for all of them. As Kedibone remarked to me in her second last session, "You showed me how to read carefully. I know now that I must stop and check things, not just read, read, read, like I used to". Zondi also said that she was starting to pay far more attention to text details than she had in the past. When we worked through the mindmaps, anaphoric references, text structure, time lines, etc. I acted as guide and facilitator and showed them how they could incorporate these strategies into their reading. Even though the use of mindmaps had been explained and illustrated in the Study Guide, the students didn't adopt them because they did not really know how to go about constructing them. Once they had me to model the procedure for them, they readily adopted it.

L2 students who have a history of reading failure and who take a long time to read texts may be disinclined to adopt strategies that take up more of their reading time, for which they see no particular value and of whose importance they remain unconvinced. When showing the students how to use a particular strategy, I always tried to explain to them in what way the strategy made a difference to their reading and why it was important to use it. However, the old adage ‘the proof of the pudding is in the eating’ certainly applied here - once they had used a strategy and saw that it did indeed make a difference, they adopted it readily into their reading practices. The comprehension and memory effects that the previewing mindmaps had on Zondi and Vusi resulted in them embracing this strategy with enthusiasm. Matshidiso, who liked doing things in her own way and who was usually reserved in her adoption of new approaches, found the time lines useful and so she applied them when reading her music texts.

The affective benefits gained from reading instruction should also not be overlooked. The overall positive response of the case study students suggests that students are indeed ‘hungry’ for advice and are receptive to adopting effective reading strategies if they can be persuaded of the value of such strategies and have the use of the strategy modelled for them, via both print-based mediums and via lecturer-student interaction. The reading strategies the students picked up gave them greater confidence and a feeling of control over their reading - they had acquired a few tools that they could use during reading to pry open some of the incomprehensibility of the text. There were now some aspects of their study lives over which they could exert control and make a difference. However, skill in reading needs time to develop and there are not quick fixes or miracle cures. Given their history of underperformance and failure, they needed encouragement and they were pleased that someone was taking an interest in their problems. During the first few sessions Kedibone in particular showed extreme anxiety over her studies and strong teacher dependence behaviour. Although she ‘bunked’ her Psychology and Sociology lectures on two occasions, she still came through to the Thuthong Centre and waited for me so that I could help her with her reading problems. She wanted the reassurance that channels would be open for her. She said students were often too shy to say they had a problem and to ask for help and she couldn’t believe her luck that there was a researcher who was prepared to sit with her for two hours a week and go through the textbook with her - and pay *her* for it too! (She had initially thought that *she* had to pay *me* R10 per session.) Vusi, too, blossomed from the extra attention he was receiving as a result of the interview sessions. He often came to my office in between sessions “for a chat” and he seemed to flourish under the mentorship of a guide who could facilitate his entry into the world of academic discourse and conventions and who took an interest in his progress and encouraged him to stretch himself.

Of what value was this case-study component of the study? Although this more qualitative

component of the study reflected similar patterns to those of the quantitative component of the study, my interactions with the students provided a personal glimpse into their daily struggle to make sense of their textbooks, their feelings of anxiety and floundering, and their difficulty in breaking out of the negative cycle of unsuccessful reading outcomes in which they were caught. The quantitative results of the inferential tests robustly indicated that the weaker students were having problems constructing meaning during reading, and the sessions with the case study students certainly provided further ample evidence of this. It also became clear that the students have limited vocabularies, especially with regard to academic discourse, but their legacy of inert learning and passive styles of reading result in them not taking active control of their vocabulary development.

The results of the quantitative study as well as my observations of the five students' reading problems underscore the fact that our attempts at tertiary level at producing quality learning material and developing independent learners are failure-prone unless we can improve the reading ability of our students. In the distance-learning situation where many largely unskilled L2 readers depend almost entirely on their course material for information, we need to find ways of convincing students of the powerful effects of reading on learning, of the necessity of acquiring effective reading strategies, of taking the time and trouble to learn how to use and apply such strategies, and of adopting proactive approaches to their vocabulary development. The fact that the case study students largely ignored the guidelines provided in the study material is disquieting. However, the fact that they benefitted from having a role model and facilitator who showed them how to use the strategy suggests that we need to take the trouble to convince students of the value of reading strategies for comprehension, attention and recall. The time allocated for discussion groups to discuss the course contents should also - or rather - be used for reading strategy instruction and for raising awareness of the importance of reading. The learning centres such as the Thuthong centre should also provide courses in reading instruction on a continuous basis.

Whether or not the five students would continue to use their new-found strategies, and whether they would continue to take active control of their reading and vocabulary development, were issues beyond my control. The long term effects of reading instruction are also intimately tied to attitudinal and motivational factors. I sincerely hoped that the brief period in which our lives intersected somehow made a small difference to the reading practices of the students. My work with them, brief as it was, convinced me more than ever of the pressing need for tertiary institutions to acknowledge the fact that many - if not most - of our L2 students have reading problems that do not go away if ignored, and to act on that admission of fact. The longer we ignore the problem, the more the intellectual potential of current and future generations of students goes untapped.

## **CHAPTER 9**

### **CONCLUSION**

#### **9.0 Introduction**

The purpose of this chapter is to revisit the aims of the study, to review the different components of the study and highlight their main findings, and to draw the different threads from each component together. Finally, consideration will be given to the theoretical, methodological and educational implications that follow from the study.

#### **9.1 Revisiting the aims of the study**

The widespread and continued underperformance, at primary, secondary and tertiary level, of many students in South Africa who study through the medium of an L2 is a worrisome situation. Naturally, there are many contributory factors to this situation, several of which are rooted in the country's socio-political history. Whatever the causes, the consequences are an educational system that fails to produce skilled readers who can read to learn and hence become independent learners, and a socio-cultural environment that fails to support and value the role of reading in the learning context. Reading is important in the learning context not only because it affords readers independent access to information in an increasingly information-driven society, but more importantly because it is a powerful learning tool, a means of constructing meaning and acquiring new knowledge. If students have not properly mastered this learning tool, then their potential for success in the learning context is handicapped from the start. In other words, the Matthew effect in reading - the developmental process in reading that Stanovich (1986) describes whereby good readers get rich and poor readers get poorer in relation to their skilled peers - seems to have spill-over effects into the learning context in general, such that weak students get weaker.

But in what sense, fundamentally, is reading a learning tool, and what does it really mean to construct meaning? These are questions that are central to this study and it is hoped that answers to these questions can contribute to a better understanding of the dynamics of tenacious underperformance in this country. This study works within a constructivist theory of reading, where the successful understanding of text is seen to involve the construction of a mental representation of what the text is about. The study starts off by assuming that inferencing is important for constructing meaning and understanding a text, and then seeks empirical support

for this position. If inferencing is “the core of the understanding process” (Schank 1976) and if text comprehension itself is “an inferential activity” (Rickheit et al. 1985), then we should be able to find evidence of this in the way in which students construct meaning when they read their textbooks to learn. The study thus looks at context-dependent inference generation during the reading of expository texts in relation to academic performance.

In the study, the definition of inferencing is broadened to include not just processes that fill in implicit information, but also backward- and forward-routed processes that link up information in the text. In an attempt to better understand the cognitive-linguistic processes that underlie academic performance and underperformance, the focus is on meaning construction. What is important in this study, therefore, is not whether the inference is made on-line or not, but whether the inference is made at all. What is also important is not what the students know beforehand (i.e. their background knowledge) but how they come to construct meaning and acquire new knowledge on the basis of the information in the text. The focus is thus on *text-based* inferences.

Although inferencing has been the focus of much research, the research lens has typically been focussed on inferencing in L1 readers. Far less attention has been given to inferencing in L2 readers. By studying the role of inferencing during the reading of expository texts by undergraduate L2 students, this study attempts to throw more light on this “core” process and the way in which it contributes to meaning construction during reading and the extent to which it impacts on L2 reading to learn in the learning context. To this end, the research problem was defined by four main research questions (cf. §1.1) which subsequently gave direction to the study, viz.:

- \* *To what extent do L2 students make inferences while they read expository texts? Are there differences in the number of inferences generated during the reading of expository texts by undergraduate L2 students in different academic groups?*
- \* *Are there differences in terms of different kinds of inferences generated during the reading of expository texts?*
- \* *What is the relationship between language proficiency, inferencing and academic performance amongst undergraduate L2 students?*
- \* *Which inferences best predict academic performance?*

These main research questions generated yet further research questions relating to different types of inferences. In order to realise these research aims, a taxonomy of text-based inferences was

drawn up to serve as a framework within which the systematic examination of inferences during the reading of expository texts could be conducted. In reviewing the chapters in the next section, we shall see what answers or partial answers, on the basis of the research findings, can be given to the above questions.

## 9.2 Overview of chapters

In this section the focal point of each chapter is reviewed, the main findings of the data-bearing chapters are summarised, and their relevance to the main aims of the study are identified.

Because this study examined the role of inferencing in reading within the learning context, the relevant literature incorporated two related fields of fairly vast and well documented research, namely reading, specifically reading in the learning context, and inferencing. The literature surveys were thus unavoidably wide in scope and spanned Chapters 2 and 3 respectively. An attempt was made to identify main issues within each field and to situate the current study within a broader theoretical and empirical framework, without oversimplifying the integrity and complexity of each of the domains.

### 9.2.1 Chapter 1

Some of the ground covered in this chapter has already been alluded to above. The focus of inquiry, namely inferencing, was identified and the main research aims that gave it direction were described. The role of reading in the learning context, and the role of inferencing within this context, was briefly discussed, and a short sketch given of the development of reading skills within the South African schooling context. Some methodological background to the study was provided by a brief description of the quantitative and qualitative components of the study, the subjects, and ethical considerations in the study.

### 9.2.2 Chapter 2

The main focus in this chapter was on **reading**. Chapter 2 briefly sketched the shifts in theoretical perspective and research trends in the domain of language comprehension in general and reading in particular in order to show where and how the study of inferencing fits into the larger picture. The chapter also identified some of the features of written language that impact on reading to learn, and provided a brief developmental perspective on reading by tracing the qualitative

changes in skill development that have implications for reading in the learning context and identifying some of the factors underlying reading problems in the learning context. This chapter essentially served to provide some theoretical and developmental details to the reading matrix within which inferencing is embedded.

### 9.2.3 Chapter 3

The focus in this chapter moved back to the central construct in this study, namely **inferencing**. This chapter looked at some of the issues, arguments and evidence relating to relevant questions that have informed much of inference research, such as *What is an inference? What kinds of inferences typically occur in reading? When are inferences made? How are inferences made and what constrains them? How are inferences studied?* The review of these theoretical and methodological issues found that much of the work done on inferencing has focussed primarily on what skilled adult readers infer on-line when they read a short narrative text and was therefore not really of direct relevance to a study that focuses on L2 reading in the learning context, where readers are not necessarily skilled readers and where expository texts are read several times for maximum comprehension and remembrance.

This chapter essentially identified the conceptual and methodological framework that evolved in this study to examine inferencing during expository text reading. While attention to highly theoretical issues is vital in any discipline, this study essentially needed to have relevance to the needs and problems inherent to the learning context in South Africa. The data elicitation and collection needed to be practical and cost-effective, suitable for testing large groups of students on several occasions, yet be valid, effective and have psychometric value. The conceptual and methodological framework that consequently evolved here included the following features:

- \* A definition of the concept 'inferencing' that referred to meaning construction involving processes that link information in a text such that new semantic information beyond what is given in the text is assumed to have been added to the mental representation that the reader constructs during reading. This new semantic information gives coherence (i.e. unity or connectedness of meaning) to the constructed mental representation. Information in the text provides grounds for inducing the new semantic information. Inferential activity thus involves continuous links being established between newly encountered information and information encountered elsewhere in the text.

- \* The ability of students to make inferential links was assessed by means of question answering techniques applied after the reading of a text. In order to eliminate memory effects and replicate the conditions under which subjects typically read their expository texts (i.e. repeated readings to check for comprehension), the subjects were allowed to read through their texts as often as they wished and could consult them to answer the inference questions. If, under such conditions, subjects still do not make inferences, then we can be reasonably sure that they do not readily engage in inferential activity during the reading of expository texts.
- \* Because inferences are difficult to access directly, the question asking techniques only indirectly test whether readers make inferences between items of information. The questions included a variety of tasks, such as answering multiple-choice questions, completing fill-in questions, deciding whether specific information can be validly inferred from the text by answering True/False questions, inferring word meanings from textual clues, showing how textual entities are linked within a text, inserting omitted information or re-arranging the sequence of sentences in a text. It is nevertheless clear from Chapter 3 that this is valid data within the paradigm adopted for this study.

#### 9.2.4 Chapter 4

Chapter 4 focuses on **anaphoric inferencing**. The role of anaphora in language was first briefly discussed, a brief survey of research into factors that affect anaphoric resolution was sketched, the aims of this component of the study were then identified, the analytic framework described, and the results of the anaphoric test presented and discussed. The main findings were as follows:

- \* The overall means in anaphoric inferencing for the Unisa student groups were roughly similar (54,9% and 57,5% for the Sociology and Psychology students respectively), while the Medunsa students, as could be expected, attained somewhat higher scores, at 64%. These results indicate that there is still a high degree of error and inaccuracy in the resolution of anaphoric inferences.
- \* Of the different types of anaphoric ties, pronominals proved to be the easiest, and determiners the most difficult to resolve. The relative ease of inferring anaphoric ties was of the order: *pronominal* > *synonym* > *repetition* > *paraphrase* > *determiner*, across the student groups. This order was also maintained on the whole across the different



academic groups. The unexpected finding here was that the students did not necessarily find anaphoric ties involving repetition easier to resolve than ties involving synonymy. This finding could bear further investigation.

- \* The resolution of anaphoric inferences was robustly related to L2 proficiency  $r = .73$  amongst the Medunsa students. However, in the results of the CHAID analysis, presented in Chapter 7, the independent variable L2 proficiency did not emerge as a predictor of academic performance. This finding is not so surprising within a constructivist model. L2 proficiency does not guarantee that a reader will construct meaning during reading (and hence reading to learn), whereas anaphoric inferencing, because it serves to link incoming information with already given information, necessarily entails meaning construction.
- \* There were very clear differences in anaphoric inferencing across the different academic groups, with students who score low on anaphoric inferencing also performing poorly academically. In the results of the CHAID analysis, presented in Chapter 7, the independent variable anaphoric inferencing emerged as the strongest predictor of academic performance of all the independent variables fed into the analysis. This was one of the major findings of the research.
- \* Anaphoric ties that involved lower levels of inferencing (low inference category) were significantly easier to resolve than those involving greater inferencing (high inference category). This pattern was also consistently repeated across the different academic groups. This result is consistent with the literature in the field.
- \* Although there were incremental differences in resolving the different types of anaphoric inferences across the different academic groups, there was a significant difference in anaphoric ability between At Risk and Pass students, and there was a further marked increase in skill amongst students in the Distinction group, compared to their Pass peers. Furthermore, Distinction students fared equally well in inferring all the different types of anaphoric tie. In other words, the more skilled the reader becomes in anaphoric inferencing, the less effect the type of anaphoric tie has on successful resolution. This pattern was consistent with Pakenham's finding (1980).
- \* The most common anaphoric error was searching for an antecedent in the first sentence of the paragraph. This search strategy is reminiscent of a main idea search - looking to the

first sentence to identify the main idea, on the erroneous assumption that the main idea will contain the referent for the anaphor.

- \* Two other common errors were not identifying the full antecedent but identifying only a part of it (i.e. underspecification), or else identifying a more generic idea for the antecedent when in fact the antecedent idea was more constrained and specific (i.e. overspecification). These latter two types of error suggest that students have not yet mastered the skill of chunking stretches of discourse into appropriate 'units of thought' consistent with the anaphoric device.
- \* The anaphoric errors reflecting grammatical mismatching and ungrammatical chunking of prior clauses or sentences as antecedents, suggest failure to attend to and utilise linguistic details to aid the linking of given information with new, incoming information. Students with poor reading skills underutilise linguistic clues in the text that aid in constructing meaning. This may explain why there was not a strong relationship between L2 proficiency and anaphoric inferencing amongst the weaker students in the pilot study.

This component of the study identifies anaphoric inferencing as a very real problem in reading comprehension and sheds light on the way in which anaphoric inferencing contributes to meaning construction in reading. As discussed in Chapter 4, successful anaphoric inferencing enables new information to be integrated with given information, via backward inferencing. This in turn enables a reader to keep track of referents that have been introduced into the discourse and also to keep track of shifts in topic focus (§4.2.2). Webber's assertion (1980:142) that "if a reader cannot handle an anaphoric expression the way the writer intended it, there is no way that he or she can correctly update his or her discourse model" finds strong empirical support in this study. The findings here indicate that although many of the students in this study engage in low levels of anaphoric inferential activity, they have problems with more demanding, high-level inferences and this has deleterious consequences on text comprehension because many anaphoric ties require high level inferential activity, especially in the resolution of lexical and determiner anaphoric ties. Many of the students have problems backtracking through a given passage, they have difficulty identifying which units of information are relevant to their backward search, and they often fail to attend to and utilise existing cues in the text that would facilitate their search and help them make inferences between meaningful units of information. As a result, they construct a faulty and fragmented representation of the meaning of the text, and this ultimately has academic consequences for their understanding of new knowledge in subject-specific domains. This point

will be taken up again in the course of this chapter.

On the basis of the findings relating to anaphoric inferencing, it is argued that L2 proficiency may be an important factor in L2 reading but alone, it is not a sufficient condition for higher-order reading. The weaker students in this study clearly lack reading skills and the procedural knowledge on which successful reading comprehension depends. The findings suggest that when students are not skilled readers, then the relationship between anaphoric inferencing ability and L2 proficiency seems to be more tenuous.

### 9.2.5 Vocabulary inferencing

Chapter 5 focuses on **vocabulary inferencing**. The role of vocabulary in reading comprehension was discussed and a brief survey of research into vocabulary inferencing during reading was presented. The aims of this component of the study were then identified, the nature of the vocabulary inferencing test described, and the results of the test presented and discussed. The test was not a vocabulary test but a test of the students' inferencing potential to acquire new word meanings from context. The main findings are summarised as follows:

- \* There was a significant positive correlation of  $r = .78$  between ability to infer the meaning of words from context and overall inference ability. In other words, the better students were at inferencing in general, as reflected in their scores in the other inference tests, the better they were at inferring the meaning of words from context, as reflected in their vocabulary inferencing score.
- \* There was a significant positive correlation of  $r = .72$  between ability to infer the meaning of words from context and ability to make anaphoric inferences. This is an important finding because anaphors are potential sources for vocabulary learning, and if students are attentive to such devices, then they can make use of these opportunities to increase their L2 vocabulary.
- \* There was a significant positive correlation of  $r = .68$  between ability to infer the meaning of words from context and academic performance. The academically weaker students engaged in lower levels of inferential activity compared to their academically stronger peers. They thus miss opportunities for incidental word learning while they read.

- \* There was a significant positive correlation of  $r = .72$  between ability to infer the meaning of words from context and L2 proficiency. Although low levels of vocabulary and low levels of language proficiency traditionally go hand-in-hand, the findings in this study could be interpreted to show that students who are able to infer new word meanings from context have greater opportunities to acquire new linguistic knowledge and hence to increase their level of L2 proficiency.
- \* The five words whose meanings the students found easiest to infer were all words that had at least two clues that helped create a rich context to support vocabulary inferencing. This suggests that simple revisions can be made to texts to enhance vocabulary learning without the revisions being too intrusive or lengthy, e.g. inserting a brief definitional clause or short explanatory sentence.
- \* Clues that preceded the given word were less effective in cueing the reader to infer the meaning of the word than clues that followed the given word. This suggests that when an unknown word is put in working memory, the reader may be more alert to searching for clues to its meaning in new, incoming information than to search back in the text for possible meaning clues. This suggests that possible text revisions should include clues after the word, and not before.
- \* The notion of looking for clues in a text to help infer word meaning seemed to be a novel one for many of the subjects, and many of the weaker students did not seem to know what to look for to help them infer word meaning. The errors in vocabulary inferencing that occurred suggested that many of the weaker students selected inappropriate clues or did not pay attention to textual details that could have aided them in constructing meaning for the given words. These tendencies mirror those that emerged in the analysis of anaphoric inferencing, suggesting a pattern of low level processing amongst less skilled readers and a lack of attention to textual clues. This pattern of reading behaviour shows up in various component skills (e.g. anaphoric inferencing and vocabulary inferencing), manifesting themselves in faulty and fragmented meaning construction, as has been pointed out above.

The significance of this component of the study lies in the relationship that it establishes between anaphoric inferencing, vocabulary inferencing and academic performance in general, and the contribution it thus makes to our understanding of meaning construction. The findings from the vocabulary inferencing test indicate that the ability to infer word meaning from context is strongly

related to the ability to recognise and use contextual clues to generate new meanings. This pattern occurred in both the anaphoric and vocabulary inferencing tests. This enables us to make a more general statement about meaning construction in reading, namely that the successful comprehension of expository texts, where so much of the information is new and unfamiliar, relies on the accuracy and precision with which one can utilise linguistic and text-based devices in the context as a basis for establishing links between text entities and so construct meaning that approximates what the author intended. Inferential ability confers a decided advantage in building new meaning. Engaging in inferential activity, searching for links, necessitates alertness to textual clues that can serve as ‘pegs’ around which inferential loops can be woven to construct a web of meaning. This leads to the construction of referential continuity, via anaphoric inferences, and to the construction of new word meanings, via vocabulary inferencing.

The findings from the vocabulary inferencing test provide counterevidence to the argument that poor text comprehension stems from low vocabulary levels. The findings here suggest rather that poor text comprehension stems to a large degree from poor inferential activity which, inter alia, diminishes potential opportunities for acquiring new word meaning and hence inhibits a student from growing richer through reading. The findings thus support Daneman’s argument (1988) that low vocabulary levels are an index of unskilled reading. In the South African context, low vocabulary levels, after eight years of L2 as medium of instruction, do seem to be an index of unskilled reading.

### 9.2.6 Chapter 6

Chapter 6 deals with two main categories of inferences, namely, **text-semantic and thematic inferences**. In the first part of this chapter, the focus shifted away from the more familiar and traditional domains of inference research involving anaphoric resolution and vocabulary inferencing, and moved towards relatively new territory involving the categorisation of inferences according to work done in text linguistic research. The argument was put forward that if, as research into coherence in writing shows, such relations are crucial in creating coherence in writing, then the ability to infer such relations must be equally important in constructing representations of the meaning of such texts during reading. Six text-semantic relations, which occurred regularly in the expository texts that were used as a basis for the design of the inference tests, were selected to test the students’ ability to make inferences which crossed clause, sentence or paragraph boundaries and which were important for the understanding of expository passages. The second part of the chapter moves back to a more familiar domain in inference research,

namely the ability to infer main ideas in texts, and research into this aspect of inferencing was briefly reviewed. The main findings are summarised below:

- \* The students were better at answering literal and paraphrase questions than inferential questions. This is consistent with what has been found in other studies. Literal questions were not good discriminators of ability level because even the students in the Fail and At Risk groups scored well on the literal questions.
- \* The ability to infer text-semantic relations showed significant and strong correlations with four independent variables, namely anaphoric inferencing, vocabulary inferencing, academic performance and L2 proficiency. The results showed consistent differences in semantic inferencing skills between the academic groups, with academic performance increasing with increased skill in inferencing.
- \* Temporal relations were the easiest to infer, while causal and contrastive relations proved to be more challenging. This pattern was repeated fairly consistently across the different academic groups. This finding is consistent with research in developmental psycholinguistics, and suggests that students who have difficulty inferring contrastive and causal relations in expository texts are immature readers.
- \* Surprisingly, exemplification and whole-part text-semantic relations, which are characteristic features of instructional texts, also proved to be challenging inferences for the students to make, despite their ubiquity in expository texts. Taken together, these findings suggest that complex interactions of different types of inferential skills are needed to construct meaning during the reading of expository texts.
- \* The ability to infer thematic relations showed significant yet moderate correlations with other independent variables such as anaphoric inferencing, vocabulary inferencing, academic performance and L2 proficiency.
- \* Of the 14 independent variables that were factored into the CHAID analysis, the variables that best predicted academic performance were the ability to make anaphoric inferences, followed by local contrastive and causal inferences. Given the South African context, it was surprising that variables more commonly assumed to affect academic performance, such as school attended (e.g. township or 'model C' school) or L2 proficiency, did not

emerge as strong predictors of academic performance.

- \* The results of the reading questionnaire suggest that the weaker students do not readily enjoy reading, and tend to associate their reading problems with vocabulary problems whereas their difficulty in comprehending their texts stems from a deeper source, that of constructing meaning in general. They also tend to rely on authority figures or peers to clarify or resolve their comprehension problems. The stronger readers, on the other hand, seemed to enjoy reading, saw their comprehension problems in broader terms, and relied on their own resources to wrest meaning from the text. These responses reflect patterns that other research has associated with unskilled and skilled readers respectively.

The most striking finding from this component of the study was the display of the academically stronger students consistently outperforming the academically weak students on all the inferential reading measures, especially those inferences which reflect rich and active meaning construction processes during reading. The ability to answer literal questions and, to a lesser degree, paraphrase questions, does not involve constructing meaning at a deeper level of processing; rather, it involves locating details and recognising textual information. A deeper level of processing involves integrating information, so that semantic information in the mental representation is not only matched with semantic information in the text, but new semantic information is actually added to the mental representation to construct meaning, and the mental representation becomes more differentiated and hierarchical.

The fact that, in this study, the ability to infer text-semantic relations emerged as an important factor in expository text reading is consistent with the research literature in reading and text linguistics which shows that meaning consists of making relationships. Based on his research into the development of comprehension and representation, Van den Broek (1997:321) states that “(o)ne of the most essential aspects of our understanding of the world we live in is the ability to recognise the relations between the events that we encounter”. The same principle applies to reading - successful comprehension relies on the ability to recognise the relations between units of information in the texts we encounter. This principle is vividly and consistently reflected in the above findings: the students who demonstrated an ability to infer the relations between the events they encountered in their texts were the students who understood their text world. Not only did they understand their text world better than their peers who inferred fewer such relations, they were also performing better academically because they were also more successful in integrating this text world into their knowledge bases and thereby acquiring new knowledge.

### 9.2.7 Chapter 7

Chapter 7 is a recapitulation, in a sense, of the more detailed testing of inferential activity during reading done elsewhere in the study. However, this time the empirical basis was much broader, involving over a thousand subjects, and the test was shorter and less detailed than the previous in-depth tests (roughly, an hour test as opposed to the, cumulatively, minimum of 4½ hours of testing time, spread over several tests sessions, with the Sociology and Medunsa students). Furthermore, although the researcher designed the test and was involved with the Department of Psychology in the planning of the overall study, she was not directly involved in the marking and coding of the tests or in the application of the statistical procedures to the raw data on the SPSS package. This component of the study was therefore important in that it was a test, so to speak, of the findings of the previous inference tests.

The research context and the aims of the general inference test were identified, the inference categories identified, the methodological procedures described, and the results presented and discussed. In order to sketch a slightly broader picture of the students than the one provided by the quantitative data, responses to selected questionnaire items were also included in this chapter. Finally, the chapter rounded off the quantitative component of the study with findings from the speed reading tests administered to 25 volunteer students. The main findings from this chapter are summarised below.

- \* The overall mean inference score derived for the Psychology group as a whole was remarkably similar to the overall inference scores derived for the Sociology and Medunsa students, at 52,8%, 52,9% and 57% respectively. As expected, the Medunsa students had slightly higher inference scores, but only marginally so.
- \* What was striking about the results from this component of the study was the remarkable incremental consistency in inferencing ability across the different academic groups, even amongst the Fail group which, because of its size, had been further subcategorised into two Fail groups. In other words, students who were failing academically below 40% were also students who had lower inferencing scores than students who failed in the 40-49% category. These findings mirror the findings obtained in the more detailed, in-depth inference tests done with the Sociology and Medunsa students.
- \* The results of the Multiple Regression analysis also showed that inferencing ability during



reading was a predictor of academic performance. As discussed in Chapter 7 (§7.3.1), of the eight independent variables that were included in the linear regression model, the scores on the reading inference test emerged as the strongest predictor of academic performance. These findings generally support the findings from the CHAID analysis applied to the Medunsa data, where non-inferential independent variables such as type of school attended, L2 proficiency, and literal and paraphrase questions were included in the analysis together with specific inference categories. There, too, it was inferential ability that emerged as a determinant of academic performance.

- \* The responses to selected questionnaire items indicate that more than half the students were potentially academically underprepared because they did not have university exemption and the average matric symbol was an E. These are students who, pedagogic experience shows, typically do not have strong reading skills. Many of these students also come from homes where books and reading do not play a central role - about 50% of them have 50 or less books at home (barely two shelves in a small bookcase). Almost 42% of the Fail students have fewer than 20 books at home, while about 40% of the distinction students have more than 100 books at home.
- \* The majority of students *claimed* to enjoy reading, although their results in the inference reading tests suggest that they are actually reading at frustration level, which suggests that reading must be effortful and burdensome for them. Although more than 60% of the respondents *claimed* to read all the prescribed material with relative ease, the low scores on the inference reading tests and the high failure rate amongst the respondents suggest that this can hardly be the case. More telling was the final exam mark that they expected to achieve - the average expected mark was 70%. The discrepancy in the picture that is projected from largely positive responses such as these and the largely negative performance in both the inference reading test and the examination may be due to a weakness inherent in questionnaire studies, namely a tendency by respondents to provide what they perceive to be socially acceptable responses. However, this discrepancy between perception and performance is also consistent with the picture of unskilled readers found in the reading research literature, namely that they have poor metacognitive skills. These include difficulty in recognising the nature and extent of their reading problems and difficulty in applying repair strategies.
- \* The findings from the speed reading tests showed that the students generally had slow

reading speeds and poor comprehension levels. In fact, the average reading speed of 96,9 words per minute was below the speed recommended for L2 readers in the academic context (roughly, between 150-180 words per minute). Considering the amount of reading that the students have to do at tertiary level, such slow reading speeds not only put a burden on the time and effort expended for reading to learn, but also compromise comprehension.

The significance of the findings from this component of the study lies in the empirical confidence it bestows on the findings that have emerged from the inference tests in general, namely that inferential activity confers a decided advantage on meaning construction in component areas of reading, and that this activity is a strong determinant of academic performance in the learning context.

### **9.2.8 Chapter 8**

Chapter 8 shifts away from the quantitative component of the study to the qualitative component, and reports on the observations that emerged from my sessions with the five case study students. The main focus of this component of the study was to observe how the students went about gaining meaning from their textbook and what inferences they made during reading. The rich and arresting data that the sessions yielded revealed a tapestry of interwoven factors of past socio-educational histories, individual ability levels, and personality and motivational factors that played out in the daily lives of the students and kept them trapped in a cycle of ineffective reading styles and failed reading outcomes. These were described at some length in Chapter 8, so only some of the main points will be summarised below.

- \* The students on the whole had been through a disadvantaged school system which left them with a legacy of passive and inert learning styles. They had adequate decoding skills but totally inadequate comprehension skills, and this hampered them in constructing meaning effectively during reading and using reading as a learning tool.
- \* They had had little exposure to books and reading before they came to university and were unfamiliar with the role that reading and books play in an academic context. They were unaware of academic conventions, of the purpose of research in the academic context, of the contested nature of information and knowledge, and of tried and tested knowledge versus new and updated information. The Unisa library, which is the biggest academic

library on the African continent, was simply a convenient place to sit and study. They were seemingly unaware of the vast informational resources a few steps away.

- \* The profiles that emerged from their performance on the inferential tests were similar in many respects to the patterns that had emerged from the quantitative findings. Although they often re-read their texts, they read in such a passive way and seldom attempted to wrest meaning from the text, so their re-readings did not necessarily result in greater understanding. It was hard to find evidence of attempts on their part of trying to gain meaning from their texts. As a result of their passive reading style, they engaged little in inferential activity that is so necessary for establishing relationships and integrating information across texts, and were seemingly unaware that they needed to engage in such activity.
- \* They made half-hearted or else no use of graphic or visual representations to help them construct meaning, and because they had little awareness of text structure or author intention, they saw their text largely as disembodied, linear, uniform information. They made little effort to actively build up their limited vocabulary even though they encountered the same unknown words repeatedly in the textbook. They tolerated a high level of vagueness and meaning loss and so missed nuances in descriptions and arguments, and this resulted in them building up partial and fragmented representations of what they thought the text was about.
- \* On going through the inference tests with them afterwards, it was clear that, with the exception of Vusi, they paid little attention to clues in the text that could facilitate meaning construction and were seemingly unaware that attention to details was important. They therefore had few 'pegs' around which to weave inferential links to construct a web of meaning.
- \* Because reading was so effortful and time-consuming, they adopted 'time-saving' strategies to answer assignment questions by trying to find answers to multiple choice questions, without first building up a schema of the topics that were covered in each chapter (what I term 'jig-saw puzzle activities' without the benefit of a picture). The result was a simplistic, partial and fragmented understanding of their subject.
- \* Although they paid lip-service to the importance of reading and put a lot of effort into

studying, they were unaware that their reading behaviours exacerbated their comprehension problems. They relied largely on their tutor and other students in their study groups to negotiate their textbook meaning via oral discourse, a short term strategy that made them feel that they were getting somewhere, but in the long-term not an empowering strategy on its own because it did not help them to become learners who could access information in textbooks independently and effectively. They appeared not to have realised the implications of these preferred, oral-based learning strategies on their academic performance.

The main contribution of this component of the study was that it confirmed the importance of incorporating qualitative perspectives into largely quantitative research, and affirmed the richness and complementarity of findings from both approaches. The case studies in many respects confirmed the findings from the quantitative research and shed some interesting light on the reading behaviours and attitudes that underlie those findings. The case studies also provided a glimpse into the personal lives of the students and their daily struggle in grappling to construct meaning within the immediate context of their textbook and the broader context of the academic environment which they have chosen to enter. Universities can no longer afford the luxury of ignoring the reading problems of their students, for reading is the fundamental medium through which learning occurs at tertiary level. This applies to universities both local and abroad, although the socio-political consequences for South Africa are particularly pressing. The dissemination of the findings of this research is therefore an urgent necessity.

#### **9.2.9 Revisiting the main research questions**

Having reviewed the theoretical and methodological basis of this study, and having reviewed the main foci and findings in each of the chapters, we can best draw the different threads of the study together by summarising the answers to the four main research questions that informed this study.

- \* *To what extent do L2 students make inferences while they read expository texts? Are there differences in the number of inferences generated during the reading of expository texts by undergraduate L2 students in different academic groups?*

On the whole, the inferential activity of the L2 students during the reading of expository texts was not extensive, even when the task prompted the inference and the students had access to the texts at all times. This suggests that many students have low levels of meaning construction during reading and immature reading skills.

And yes, there are indeed differences in the number of inferences generated during the reading of expository texts by undergraduate students. There are in fact consistent incremental differences in inferential activity between students in different academic groups - the more students engage in inferential activity during reading, the more they are likely to succeed academically.

\* *Are there differences in terms of different kinds of inferences generated during the reading of expository texts?*

Yes, there are differences in the kinds of inferences generated during the reading of expository texts. Low level inferences are naturally the easiest and students from across all the academic groups engage in low level inferential activity during reading. Anaphoric inferences involving pronouns and temporal text-semantic relations were inferences that were most readily generated. Pronominal anaphors are common in all kinds of texts and this may explain why the L2 students found them least problematic. Developmentally, temporal text-semantic relations emerge early and because they are an integral aspect of events in our lives, provide a more readily accessible frame of reference for constructing meaning. This pattern seems to be repeated in L2 reading. The watershed for meaning construction lies in the ability to generate more demanding high level inferences, and this is where differences between students in different academic groups emerge most markedly, especially between the At Risk and Pass groups, and again even more markedly between Pass and Distinction groups. Students who have problems making high level inferences are typically students who fall in the Fail and At Risk academic groups.

\* *What is the relationship between language proficiency, inferencing and academic performance amongst undergraduate L2 students?*

L2 proficiency, inferencing ability and academic performance are all strongly interrelated. However, inferencing ability seems to emerge as a stronger predictor of academic performance than L2 proficiency. There is thus empirical support for the argument put forward in this thesis that reading develops specific cognitive-linguistic processing skills that are needed for meaning construction in the written medium. One of these processing skills is inferential processes whereby links are established across a text to construct a coherent representation of the meaning of a text. Although some degree of L2 proficiency is necessary for reading, it is not sufficient for successful reading. It is inferential ability that confers an advantage in meaning construction rather than L2 proficiency. This study provides tentative evidence for the position that inferential activity influences both L2 proficiency and academic performance. The ability to perceive connections between

linguistic entities in the L2 fosters L2 learning in the same way that the ability to make connections during reading fosters text comprehension, and hence also academic performance.

\* *Which inferences best predict academic performance?*

The ability to make anaphoric, contrastive and causal inferences seem to be the strongest predictors of academic performance. All these inferences are pervasive features of expository texts and seem to provide a base matrix for meaning construction in the learning context.

### 9.2.10 Main contributions of study

By way of concluding this section, the main contributions of the study will now briefly be highlighted.

\* This study has, hopefully, contributed to the research on inferencing in reading by providing compelling evidence that inferencing ability confers a decided advantage in the reading of expository texts and hence also in the learning context. The remarkably consistent pattern across the different groups of increased academic performance with incremental inferential activity went far beyond the cautiously optimistic expectations hypothesised initially by the researcher. Inferencing seems to provide an essential basis or “core” for meaning construction because it involves a search for relationships and forms text-connecting functions during reading that contribute to the construction of a coherent mental representation of the text.

\* Although many of the more formal approaches to inference research have elevated the status of on-line inferencing to what almost amounts to a methodological priority, the findings from this study confirm the importance and legitimacy of studying off-line inferences. Because this study focuses on reading in the learning context, its main interest lies in establishing not *when* readers make inferences, but *whether/if* they make them. If we find that readers have problems making inferences despite question prompts, despite the opportunity for repeated readings, and despite having access to the texts at all times, then these findings contribute significantly to our understanding of the way in which meaning is constructed - or not - during expository text reading.

- \* Although this is essentially a psycholinguistic study, by using text linguistic tools of analysis in setting up a taxonomy of inferences with which to study inference generation during the reading of expository text, the study uses an interdisciplinary approach towards the ongoing research into text comprehension. Both psycholinguistic and text linguistic perspectives have been brought to bear on examining the way in which inferential ability contributes to meaning construction during expository text reading.
  
- \* Although inference taxonomies have been drawn up in the well-charted research domain of narrative text comprehension (cf. Graesser, Singer & Trabasso (1994) in §3.2), the research domain of expository text comprehension is a less well-charted terrain. The text linguistic taxonomy of inferences used in this study provides a systematic framework for studying inferences in expository texts. Text-semantic relations have been used extensively in comparative studies to uncover differences between coherent and incoherent student writing. By incorporating some of these relations into the inference taxonomy, this study extends the usefulness of text linguistic tools of analysis into the domain of reading. This taxonomic framework can be modified or extended in future reading research and would allow for useful comparisons across different studies.
  
- \* The inclusion of the text-semantic relations and main ideas into the inference taxonomy helps us better understand the way in which linear information in a text gets constructed into a hierarchy of interrelationships. If students have difficulty making text-semantic inferences, then they have difficulty perceiving the way in which 'units of thought' are linked in sub- or superordinate relations.
  
- \* The study establishes the important role of anaphoric inferencing during reading, and makes a taxonomic contribution to the study of anaphoric errors.
  
- \* The design of the vocabulary inferencing component of the study provides a means for identifying a student's potential to infer word meaning from textual clues as opposed to simply guessing new word meanings or passing them by. The findings from this test together with the anaphoric inferencing test throw light on the relationship between reading and L2 proficiency. By utilising clues in the text from which to make inferences, students can increase their overall proficiency in the L2, and especially their lexical knowledge.

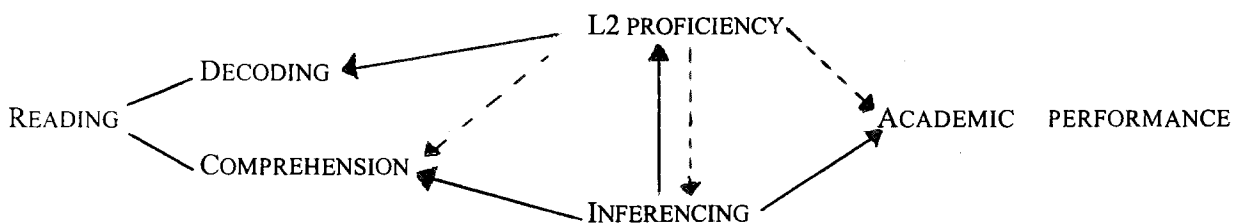
- \* Although this study did not set out to establish a hierarchy of inferential skills, it contributes to the ongoing discussion on skill hierarchies in reading. Whether or not the hierarchy of the relative ease/difficulty with which the students inferred different kinds of text-semantic relations points to an inherent skill difficulty in these relations themselves was not an issue that this study explicitly pursued. This hierarchy might have arisen due to a complex interplay of text processing factors, text linguistic factors, task factors and factors relating to conceptual complexity inherent in these specific relations. It cannot be that the students who had difficulty with the more complex forms of inferential reasoning do not reason. As discussed in Chapter 3 (§3.7), research has already indicated (e.g. Holmes 1987) that difficulty with inferencing does not reflect a global processing problem but more specifically a text-processing problem. It could be that skill in inferring some of these relations in expository texts only emerges when more advanced stages of reading and L2 proficiency are attained. This argument may certainly apply to contrastive text-semantic relations which have been shown to be more difficult to process than continuatives and developmentally, are also late to emerge. The issue of a possible inferential skill hierarchy is an interesting area for future research, as is research into the complex interaction between inferential ability, task demands, topic familiarity and conceptual complexity, and text based factors such as text difficulty and the 'reader friendliness' of texts.
- \* The study contributes to the cumulating evidence in research into differences between skilled and unskilled readers of the importance of attending to relevant clues in the text (Hansen & Pearson 1983; Oakhill 1984; Holmes 1987; McCormick 1992; Winne et al. 1993). The findings from both the quantitative and the qualitative components of the current study indicate that inferential activity relies crucially on attention to the linguistic details in a text to use as meaning clues on which to build links and form relationships between text entities and link up incoming information with already stated information.
- \* By comparing the role of both inferencing and L2 proficiency in L2 reading, the study makes a contribution to the ongoing debate on the intricate interrelationship between these variables in L2 reading and whether problems in L2 reading reflect language problems or reading problems. The findings in this study suggest that, in the South African context, where tertiary level students have been studying through the medium of the L2 for a minimum of eight years, it is low levels of inferencing rather than low levels of L2 proficiency that are indicative of poor comprehension and poor academic performance.



This relationship is represented in Fig.9.1. below.

At the beginning of the study it was suggested that the Matthew effect in reading spills over into academic performance in general, and that many students, despite their efforts, never really grow rich in the learning context. This study provides findings that go some way in throwing light on the dynamics behind this phenomenon. The findings of this study confirm the findings from other studies that even when clues are available, unskilled readers are less likely to use them for making inferences. Due to the time and effort involved, and an inert style of reading, unskilled readers are less likely to search back in the text for clues from which to construct meaning. This helps to explain why, despite repeated readings of their expository texts, weak readers fail to construct meaning and remain lexically poor. If we relate these findings to Matthew effects, it is not surprising that the good readers get rich in the academic context - they actively engage in meaning construction processes that enable them to link new, incoming information with information that has already gone before in a text and to update and modify their mental representations during the reading process. This enables them not only to understand what they are reading but thereby to add new knowledge or to modify existing knowledge in long term memory for storage and retrieval. This, in essence, is what successful learning entails. Figure 9.1. sketches the relationship between inferencing, L2 proficiency and reading comprehension. The dotted arrows indicate an indirect link, while the black arrows indicate a direct link.

**FIG. 9.1:** THE RELATIONSHIP BETWEEN INFERENCING, L2 PROFICIENCY AND READING COMPREHENSION



### 9.3. Limitations of the study

As Rickheit et al. (1985:8) point out, definitions of concepts are not necessarily right or wrong, but rather “more or less productive for the inquiry into a certain subject”. This study on inferences during the reading of expository texts by L2 readers in the learning context was not conducted within the more formal psycholinguistic paradigm of traditional inference research. Such studies

are concerned with highly theoretical issues revolving around on-line inferences, and activation and latency measures, and they use increasingly sophisticated computer-based technology to trace on-line inferential activity during reading. Direct comparisons of findings between this particular study and such studies are therefore not possible.

In line with the needs and problems that this study addresses, a broader definition of inference was adopted as not *only* a process that fills in implicit information, but *also* as a linking operation that integrates information across text units. This broader definition of inferences, it could be argued, is a theoretically justifiable expansion of research terrain. The study also relied mainly on the question-answering method of data elicitation, although every attempt was made to vary the question answering tasks.

As pointed out in Chapter 4, the vocabulary inferencing test consisted only of 14 items and this may be considered too short a test from which to make generalisations. Although 14 items are not adequate to make confident text linguistic generalisations about the effects of context, different types of words and contextual clues on ease of inferencing, the overall results that were obtained were consistent with the other results relating to inferencing skills and academic performance.

#### **9.4 Educational and instructional implications of the study**

On the assumption that “research has value in contributing to knowledge” (Tuckman 1988:14), it was hoped that by examining the role of inferencing in reading, and thereby also in reading to learn, we would be in a stronger position to understand the cognitive-linguistic dynamics of meaning construction and also of academic performance and underperformance, and be in a better position to make pedagogical decisions and implement instructional practices to address problems in this area from an informed platform. This final section of the study thus discusses the educational and instructional implications of the study.

Having a better understanding of the nature of the reading problems experienced by students permits us greater insight into the dynamics of academic performance, especially the continued poor academic performance of many students, which in turn enables us to make more informed decisions about the short- and long-term solutions we seek to address these problems. The findings have important implications for those involved with L2 students at tertiary level.

Studying becomes a tremendous burden when reading is slow and comprehension poor. It leads to a cycle of failed outcomes, poor marks, poor self-esteem and high drop out rates. In the modern world driven by print information, reading is an essential tool for meaning construction which develops into a skill for independently accessing, understanding and acquiring new knowledge and consolidating prior knowledge. Because written language is a permanent visual representation, reading allows the reader to refer back, check for understanding, reflect on the contents, and construct a coherent mental representation of the text so that meaningful study can occur in a way that oral transmissions of information or oral discussions do not allow.

When one considers the broader South African socio-political and educational context through which many of these L2 students have moved, it is clear that they start off with poorly developed reading skills and they continue to read at a suboptimal level throughout their schooling career, never catching up. They seldom associate reading with reading for pleasure or relaxation, and they generally experience reading as an effortful task, thus developing negative attitudes towards it. As they progress through the schooling system, they experience problems understanding the language and conventions of the textbooks they read, and because they experience reading as effortful, they have little motivation to read, so they do little reading beyond what they are required to do. As a result, they have difficulty reading to learn and they never seem to 'get richer' from the little reading that they do manage. Typical responses at tertiary level to the poor academic performance of these students have included the reduction and simplification of course contents, the introduction of academic development programmes to promote language and study skills for academically vulnerable students, and a strong onus on lecturers to write or select less complex, more reader-friendly texts for their students. While all these measures are not without their merit, it is important not to simply treat the symptoms of poor reading ability, but also to treat the cognitive causes. Reading is not an additional tool that students need to master in the learning context- it constitutes the very process whereby learning occurs.

It is interesting to note that in *The South African Journal for Higher Education*, an important bi-annual journal forum that specifically addresses issues relevant to tertiary level learning and teaching in South Africa, and which publishes an average of 25 articles per edition, not a single article between 1992 and 1999 (about 400 published articles) has appeared on reading in the tertiary level context. There have been numerous articles that describe, discuss and debate issues relating to academic literacy and academic development in general (e.g. Boughey 1998; Amos 1999; von Gruenewaldt 1999). In the South African context, 'academic development' is a two-way business, involving capacity building amongst both students and tertiary level lecturers. In

the journal there are several articles that critically assess the skills and abilities of undergraduate students (e.g. Miller 1997; Kilfoil 1999) or the efficacy of specific academic development programmes that have been implemented at various universities or technikons around the country (e.g. Miller, Bradbury & Wessels 1997; de Villiers & Rwigema 1998). There are also several articles outlining how English courses have changed in response to the needs of L2 students (e.g. Wood 1997), shifting from a strong literary emphasis to a language emphasis in which reading, writing, text and discourse skills appropriate to the academic context are developed or critical language awareness promoted. There are some articles that deal specifically with the teaching of writing (e.g. Moyo 1995; Orr 1995) or the importance of teaching Critical Language Awareness or literacy as critical social practice (e.g. Boughey 1998; von Gruenewaldt 1999). But in none of these articles is there even a heading or a subheading dealing with reading. Many of these articles certainly refer to the fact that students lack reading skills, and many refer to the importance of reading at tertiary level, but they do so almost in passing. Miller (1997:17) comes closest to hitting the nail on the head when he states, in his final paragraph, that the results of his study suggest that “before we embark on programmes that teach students how to write, we need to ensure that they know how to read”.

Judging from the articles in this journal, the debate on the nature of academic literacy and the various directions that academic development programmes should take is certainly alive and well. The numerous external factors that contribute to and cause academic underpreparedness are readily acknowledged, such as historical, socio-political, cultural and economic factors, the low levels of literacy and high levels of poverty, the poor schooling during apartheid and the highly politicised and disrupted schooling during the 1980s until political liberation in 1994. Several of the articles also deal with the numerous variables that typically make up the profile of an underachieving student, such as personal circumstances, study methods and habits, time management, use of the library and computers, motivation, interest, past schooling experiences, performance in the final matriculation examination, and L2 proficiency.

Although more communicative and text-based approaches to L2 pedagogy are to be welcomed, they do not necessarily improve reading skills. While writing is integral to the academic context, students cannot become better writers unless their reading skills improve. And although Critical Language Awareness has an important role to play in the academic world, expecting students to develop critical language skills when they are probably reading at frustration level is putting the cart before the horse. What is striking from a cursory survey of the articles in this journal during the past eight years is the general, almost perfunctory, acceptance that reading is important, but

an absence of close empirical investigation and, concomitantly, meaningful debate and discussion at a theoretical, methodological and pedagogical level as to the nature of reading problems and consideration of what is being, and should be, done about them. To reiterate, reading is not simply an additional tool that students need to master in an academic development programme - it constitutes the very process whereby learning occurs.

In the South African learning context, L2 poor academic performers are also usually poor readers, and if we wish to help these students then we need to recognise at a very profound level that such students have reading problems, and therewith also inferencing problems. In this study it is argued that unless the reading levels of such students are improved, they will not develop the requisite linguistic-cognitive skills for constructing meaning so that they can read to learn, Matthew effects will continue to dog their attempts at becoming academically literate, and they will continue to have limited and ineffective access to the rich sources of information from which they are supposed learn.

Students with reading problems get caught in a negative cycle of failed reading outcomes and non-strategic reading styles, and if they are reading at frustration level and have to deal with texts well above their reading ability level, then leaving them to their own devices in the hope that problems will sort themselves out amounts to an abdication of educational responsibility. If the socio-economic and cultural context of the students fails to support the acquisition of literacy practices that result in skilled reading, and if the primary and secondary school contexts have failed to ensure the development of these skills, then tertiary institutions are hard pressed to justify turning a blind eye to the reading problems of their students, especially distance education institutions that rely *par excellence* on print-based material as a means of learning and acquiring new skills and knowledge. With the ever-increasing trend towards distance learning institutions that is emerging all over the country, the need for skilled reading is particularly compelling, given that most of the learning occurs through the medium of the printed word rather than the spoken word. Are such institutions attending to the reading needs of their students? They need to move beyond the stage of paying lip-service to the importance of developing independent learners and actually implement core instructional programmes in reading, for independent learning only takes place when independent reading occurs. All the literature on reading instruction in general and inferencing instruction in particular has shown that reading instruction can and does make a difference (cf. for example Bridge 1987; Pearson & Fielding 1992; Ruddell 1994). It is not the intention of this section to provide detailed information on instructional procedures and methods to address reading problems but rather to make a few general suggestions in this direction.

A first step in attending to the reading needs and problems of students at tertiary level is the launching of **reading awareness campaigns** at all levels within the tertiary institution in order to foster a culture of reading and to make students aware of the important role it plays, and of the severe academic consequences that poor reading ability carries. Despite financial constraints, the university should provide services that can help students test their reading abilities and develop their reading skills. Reading awareness and the development of reading skills should be a core component of foundation courses, of academic development programmes and of English L2 courses. Ancillary reading 'clinics' should also be available to help students on an individual level. Consideration should also be given to designing diagnostic reading tests suitable for assessing the reading levels of tertiary level students in the learning context. These tests should not be seen as gate-keeping devices but as tools for making students aware of their reading level and what needs to be done to develop their reading skills. Reading awareness and skill development should also be built into individual content courses. Building capacity in this way can prevent academic failure in the long term and so justify expenditure in this area. Whatever form this capacity building takes, it should involve practical, hands-on ways of developing reading skills, and make use of authentic expository texts that relate to the subjects that the students are studying.

With regard to more specific areas within reading, the findings from this study indicate that attention needs to be given to skill development in **anaphoric inferencing**. Because the resolution of anaphoric inferences is an essential component of skilled reading, the students' attention needs to be drawn to the way in which anaphoric devices function in texts, and how they form backward ties between an already stated antecedent and an incoming anaphoric referent. It has the benefit of raising reader awareness, which in turn may help weaker readers attend to text details and so help them construct meaning. Synonymous and paraphrase anaphoric ties also have the potential to be rich and fairly accurate sources for vocabulary development. Chapter 4 has already dealt with some of these instructional issues in greater detail (§4.8).

Urgent attention needs to be given to developing L2 students' **vocabulary**, especially their academic vocabulary. While course developers can help in this area by compiling bilingual glossaries of core words in each module or course and drawing up lists of basic academic words (cf. Cooper 1999; Kilfoil 1999), students need to be made aware of the importance of taking control of their vocabulary development and be given advice on how to do this. At the same time, they need to be shown how they can **infer word meaning** from context, and have their attention drawn to the different ways in which text information can help them infer word meaning. Chapter

5 has already dealt with some of these instructional issues, and there are numerous sources that deal fairly extensively with the topic of L2 vocabulary instruction (cf. Coady & Huckin 1997; Nation & Newton 1997; Cooper 1999).

Because **text-semantic relations** play such a central role, students need to be made aware of the way in which (and the extent to which) such text-semantic relations function within the context of their expository textbooks and the way in which writers signal such relations. Particular attention could be paid to text-semantic relations that occur regularly in expository texts, such as temporal, exemplification, whole-part, causal and contrastive relations. The effective teaching of such relations within a reading programme is an area that needs urgent attention in the future.

Teaching students to identify **main ideas** is also an important area and in fact has always been a traditional component of skill development in study reading. The research in this well-trodden area indicates that instruction in main idea identification does seem to make a difference (Pearson & Fielding 1992; Dolgoy-Kaplan 1999).

Because inferencing is an integral component of skilled reading, it should naturally form an integral component of any reading instruction programme. As the review in Chapter 3 indicated (§3.7.), instructional intervention can help passive and less skilled readers engage in greater inferential activity during reading. Throughout reading instructional programmes, attention should especially be given to helping students attend to information provided in the text and to showing them how to use such information as a basis for inferencing to construct meaning. As the discussion in Chapter 3 indicated (§3.7), research indicates that unskilled readers do not have a global inferencing problem but a more specific problem identifying relevant clues in texts as a basis for inferencing. Weak readers should be made aware that precision is required in reading and that attention to textual details fosters greater precision and inferencing potential. Although attention has been given to fostering inferencing skills amongst students at primary and secondary level, inference instruction within content reading programmes is an area that could benefit from closer scrutiny in the future.

Students should also be made aware of their **reading speed**, how to test and monitor it and what kinds of exercises and tasks help to improve it. As mentioned in Chapter 7 (§7.4), research in this field indicates that activities which increase the speed at which students read help not only to push up their reading rate but also their comprehension level.

Although much has been done in the field of reading instruction in content areas, there is still plenty of room for local research into efficacious ways of improving L2 students' reading skills at tertiary level within the South African context. Given the absence of attention to this area, every effort should be made to stimulate interest in and debate and research on this topic.

Finally, a word of caution is in order: comprehension effects only emerge after fairly extensive training, especially with unskilled readers. The students also have a legacy of passive behaviours within the literacy and learning context, and new strategies and skills are not learned overnight. There are no miracles or quick fixes, but the long-term benefits of developing skilled readers, and hence independent learners, are worth the time, effort and cost.

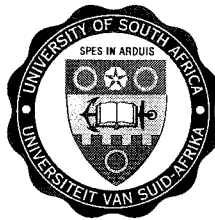
## 9.5 Conclusion

The purpose of this study was to focus on the commonplace and pervasive phenomenon of inferencing in reading, to explore the role it plays in understanding expository texts, which are the kinds of texts that students need to read in order to learn, and to examine its relationship to academic performance. Even though inferencing is pervasive and commonplace, it is typically not a directly observable phenomenon, and so its role and importance tends to be overlooked. To study inferences, one needs to undertake the more risky enterprise of delving beneath the surface outcomes of reading. As Olson et al. (1984:253) have stated:

The events we wish to examine are internal to the mind, with only occasional observable correlates, ... and yet ... a deep understanding of how to remedy reading difficulties will require the analysis of the process of cognition.

By analysing inferencing during reading, this study attempts to make a contribution to a better understanding of the cognitive-linguistic conditions and processes of cognition that underlie and generate academic performance - and underperformance. At the beginning of the study (cf. §1.1) several general questions about inferencing were posed. One of these questions was: *What happens if we don't make inferences?* The answer is: *In the learning context, we fail if we don't make inferences.* It is hoped that the necessary inferences can be drawn from this research so that aspirant tertiary learners may benefit.





University of South Africa

UNISA

Universiteit van Suid-Afrika

Department of Linguistics  
4 July 1997

Office of the Vice Principal (Tuition)  
Administration Building  
UNISA

Dear Prof. Maimela

I am at present conducting research on reading difficulties for my doctoral studies. I am specifically focussing on the inferences that mature readers (e.g. tertiary level students) make while reading expository texts. I am hoping that the results obtained from my study will provide some insights into the comprehension problems that readers have while reading, and that the results will also serve as useful feedback to Unisa lecturers in the design and writing of reader-friendly tutorial material.

After consulting with lecturers from various teaching departments, I am hoping to be able to conduct some reading tests with students enrolled for the first-year English and Sociology courses respectively. These tests will be conducted during July and August, after Saturday morning group discussions, and student participation will be entirely voluntary.

I am enclosing a document that provides more information on the nature of my research.

I hope that these arrangements will meet with your approval.

Yours faithfully

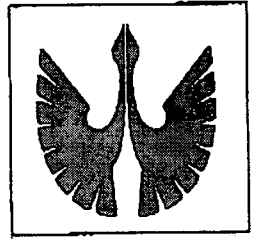
  
Ms E.J. Pretorius

**MEDICAL UNIVERSITY OF SOUTHERN AFRICA**

Our ref.

DEPARTMENT

Tel.

**MEDUNSA**

**English Language Department**  
**16 March 1999**

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Dear Rachel

Because the focus of the MBChB I: English Language/Human Science course is Reading Comprehension, Lilli Pretorius at Unisa, who is involved in PhD research in Reading Comprehension has offered to help us to develop our course in exchange for being able to use Medunsa first-year English Language course data.

This collaborative research undertaking will take some time, and hopefully we'll be able to give feedback and present our findings at one of our Academic Days within the next year or so. Lilli will therefore be coming in periodically to facilitate the research.

I will keep you informed of all developments.

Regards,  
 Jane Campbell

*JCampbell*

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**MISSION STATEMENT OF MEDUNSA**

"We empower the educationally disadvantaged community of Southern Africa by providing excellent community orientated tertiary education, training and research in the health and related sciences and we promote services at all levels of health care in our community"


## APPENDIX B

## READING COMPREHENSION TEST 1

NAME AND SURNAME: \_\_\_\_\_


This reading comprehension test consists of 8 pages. You are given several paragraphs or short texts to read, and a series of questions or instructions follows the reading of each paragraph or text. Please answer the questions and follow the instructions as carefully and honestly as possible. If you do not understand what to do, please put up your hand and you will be assisted.

Thank you for your cooperation.

- A. Read each of the paragraphs below. In each case, a sentence has been omitted (left out) of the paragraph. The omitted sentence is given at the bottom of each paragraph. Indicate in the paragraph, by means of an arrow like this , where in the paragraph you would insert the omitted sentence.

**NB:** The sentence can be inserted at the beginning, anywhere in the body, or at the end of the paragraph.

For example:

The second phase in cognitive development is called the pre-operational stage. This stage lasts from two to seven. During this stage children acquire mastery of language and use words in a symbolic fashion. During this stage children are not yet able to use their developing mental capabilities systematically. Children in this stage are egocentric.  The child does not understand, for instance, that others see objects from a different perspective from his/her own.

**Omitted sentence:** As Piaget uses it, this term does not refer to selfishness but to the tendency of the child to interpret the world in terms of its own perspective.

1. In medieval times, the major diseases were infectious diseases such as tuberculosis, cholera, malaria and plague. Infectious diseases have now become relatively minor causes of death in industrialised societies. Today, the most common causes of death in these societies are non-infectious illnesses such as cancer and heart disease.

**Omitted sentence:** In 1348, for instance, a plague called the Black Death killed a quarter of the population of England and devastated large area of Europe.

2. Why should the environment be a concern for sociologists? Is this not an issue that is the domain of scientists or technologists? The impact of human beings on nature is a physical one. This impact is the result of modern technologies of industrial production. The origins of our impact on the environment are therefore social, and so are many of its consequences.

**Omitted sentence:** However, modern technology and industry have come into being in relation to distinctive social institutions.

3. The nature of deviant behaviour varies from the past to the present, and from one society to the other, and this is something we must seek to explain. Some attempts to explain crime and other forms of deviance are based on biological factors. According to these views, biological factors may have some influence on *certain types* of crime. This could be reflected, in some contexts, in crimes of physical assault on others. However, there is no decisive evidence that such personality traits are connected to criminality in any direct way.

**Omitted sentence:** For example, some individuals might have a genetic make-up that inclines them towards irritability and aggressiveness.

4. Education has consistently been seen as a means of equalizing differences in society. For example, it has been argued that universal education will help reduce differences of wealth and power by providing young people with skills to enable them to find a valued place in society. To what extent has this happened? Much sociological research has been devoted to answering this question. Its findings are clear.

**Omitted sentence:** They point to the conclusion that education tends to express and reaffirm existing inequalities more than it acts to change them.

5. A vast amount of research has been carried out in an attempt to analyse the influence of television programmes on the attitudes of children and adults. Most of this research is not conclusive in its implications. But it cannot be doubted that the media profoundly influence people's attitudes. They provide a whole array of information which individuals would not otherwise acquire.

**Omitted sentence:** It is still not agreed, for instance, how far the portrayal of violence promotes aggressive behaviour among children.

6. All normal babies smile, in certain circumstances, after about a month or six weeks. An infant will smile if presented with a face-like shape simply containing two dots in place of eyes. Smiling seems to be an inborn response, not learned, and not even triggered by seeing another smiling face. The contexts in which smiling is considered appropriate, however, varies between cultures. Infants do not have to learn how to smile, but they have to learn when and where it is proper to do so.

**Omitted sentence:** One reason why we can be sure of this is that children born blind begin smiling at the same age as sighted children.

7. The major Latin American cities are surrounded by large-scale shanty neighbourhoods. In Mexico City, over a third of the population live in dwellings without running water and sewerage. The city contains an old centre, business districts and affluent housing areas. Almost all the outer perimeter, however, is occupied by shanty or slum dwellings. There is a large amount of state-subsidized housing, but no more than 40% of the city's population can afford it. Most housing is provided by the occupants themselves, who have cleared the land and built their own homes.

**Omitted sentence:** The majority of the city's population, therefore, are excluded from access to available housing.

8. Numerous psychologists and sociologists have sought to explain the differences in achievement amongst school children. Some of these explanations suggest that pupils' progress in education is strongly influenced by factors over which individuals have little control. Yet the most obvious place to look for an explanation of differential achievement is within the educational system itself. Interactionists, far more than any other type of sociologist, have researched the details of day-to-day life in the school system. They have found that the processes *within* the education system rather than external to it, result in different levels of achievement.

**Omitted sentence:** For example, intelligence and home background are presented as largely determining the performance of pupils within the educational system.

9. From our everyday experience we know that people often try to arrange their environment in such a way that there is a place where they can sometimes be alone and private. In other words, they want a place where they can, for whatever reason, be isolated from other people for a while. The term *privacy* expresses this human tendency. It is much more a case of the person feeling that he or she wants to control when and to what extent he or she will interact with other people. (JJ718)

**Omitted sentence:** But this does not mean that the person wants no interaction with other people.

10. Pastoral societies usually migrate between different areas according to seasonal changes. Unlike hunting societies, they have animal transport. Given their nomadic habits, people in pastoral societies do not normally accumulate many material possessions, although their way of life is more complex in material terms than hunting and gathering communities. (G48)

**Omitted sentence:** As a result, they move across much larger distances than the hunting and gathering peoples, who usually go about on foot.

**B. In each of the paragraphs below, underline the sentence (only one) that you think forms the main idea of the paragraph.**

- a. Agencies of socialisation are structured groups or contexts within which significant processes of socialisation occur. In all cultures, the family is the principal socialising agency of the child during infancy. But at later stages of an individual's life, many other socialising agencies come into play. These other influences include peer groups, schools and the mass media.
- b. In Western culture, on most occasions, people maintain a distance of at least three feet when engaged in interaction with other people. When standing side by side, they may stand more closely together. There are cultural differences in the definition of personal space. In the Middle East, for example, people often stand closer to one another than is thought acceptable in the West. Westerners visiting that part of the world are likely to find themselves disconcerted by this unexpected physical closeness.
- c. The most obvious characteristic of the brain is its complexity. The brain is estimated to contain considerably more than 10 billion neurons. A single brain neuron can have several thousand synapses with other brain neurons. The number of brain synapses is estimated at ten trillion. Two fistfuls of pink-grey tissue, wrinkled like a walnut and with the consistency of porridge, store more information than all the computers and the libraries of the world can hold.

**C. The sentences below all belong in the same paragraph but unfortunately their order has been scrambled (i.e. mixed up). You must try to make sense of each paragraph. A first step in this direction is to decide which sentence you think expresses the main idea of the paragraph and should therefore come first.**

1.
  - a. However, the majority of people who work in such organisations occupy positions near or at the bottom of the pyramid.
  - b. In such organisations, power is concentrated at the top of the organisation.
  - c. Large organisations tend to have a pyramid structure.
  - d. This means that most people in such organisations are in relatively powerless positions.

**The first sentence in Paragraph 1 should be sentence \_\_\_\_ because it expresses the main idea.**

2.
  - a. According to Durkheim, the totem is sacred because it is a symbol of the group itself; it stands for the values central to the group.
  - b. As a sacred object, it is believed to have divine properties which separate it completely from other animals or plants.
  - c. A totem was originally an animal or plant believed to have particular symbolic significance for a group.
  - d. It is a sacred object, regarded with veneration and surrounded by various ritual activities.

**The first sentence in Paragraph 2 should be sentence \_\_\_\_ because it expresses the main idea.**

3.
  - a. A clan is a group in which all members believe themselves to be descended from a common ancestor several generations back.
  - b. One important grouping of this sort is the clan.
  - c. They see themselves as a collectivity with a distinct identity.
  - d. In most traditional societies there are large kinship groupings which go well beyond immediate family relationships.
  - e. The clans in Scotland were groups of this kind, and there are also clans in many African and Pacific societies.

**The first sentence in Paragraph 3 should be sentence \_\_\_\_ because it expresses the main idea.**

---

**D. The sentences below all belong in the same paragraph but unfortunately their order has been scrambled (i.e. mixed up). You must try to make sense of each paragraph by re-arranging the sentences into their correct order. Write down the correct order of the sentences, as indicated below. (N.B. Do not write out the sentences.)**

1.
  - a. Within the first month, perceptual abilities are still weak, and images more than a foot away are still out of focus.
  - b. By the age of about four months, a baby will be able to focus more clearly on a person moving about the room.
  - c. From the age of one week, a patterned surface (e.g. stripes or circles) is looked at more often than a coloured plain surface.
  - d. Thereafter, visual abilities develop rapidly.
  - e. All infants are born with the ability to make certain perceptual distinctions and respond to them.

**This paragraph should be re-ordered in the following way:**

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ 4. \_\_\_\_\_ 5. \_\_\_\_\_

2.
  - a. The most important factor is the rise of more complex state-based societies, from traditional societies to the nation-states of today.
  - b. The fighting of war does not derive directly from human aggression.
  - c. From that time onwards, thousands of men fighting in regiments met on the fields of battle.
  - d. Armies were established and military discipline introduced.
  - e. The origins of war must be traced to other factors.
  - f. With the development of more complex societies, things changed.

**This paragraph should be re-ordered in the following way:**

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ 4. \_\_\_\_\_ 5. \_\_\_\_\_ 6. \_\_\_\_\_

**TEXT D**

1. Receiving, processing and storing information is only one aspect of our cognitive processes. Another important aspect is the organisation of mental activity and purposeful activity. After all, we do not respond passively to incoming information. We develop and formulate intentions and plans, we direct and regulate our behaviour in accordance with our intentions and plans, and we verify our mental activity by comparing the outcome of our actions with our original intentions and plans.
2. According to Luria (1978), the prefrontal lobes and the prefrontal cortex are very closely involved in this subsystem of organising and regulating mental activity and behaviour. In phylogenetic development (i.e. the order of development stretching from the lowest form of life to modern humans) the frontal lobes were the latest addition to the brain. Similarly, in ontogenetic development, (i.e. an individual's development from conception to death), it is again the frontal lobes which develop last. In lower animals the frontal lobes are relatively insignificant, but in humans they can make up as much as one quarter of the brain's mass. Maturation of the frontal lobes does not occur until between the fourth and the seventh year of the child. This late development gave rise to the idea that the frontal lobes are possibly involved in humans' highest forms of mental activity.
3. Luria (1978) regards the frontal lobes as the brain area responsible for forming intentions and plans which help to regulate behaviour in order to maintain its purposefulness. Patients with frontal lesions fail to complete tasks because they react to inappropriate stimuli. While such a patient is being examined by a doctor, he or she will immediately be distracted by a nurse entering the room and will even answer involuntarily if the nurse asks another patient a question. Such a patient's behaviour does not show voluntary purposefulness, but is instead characterised by inappropriate, involuntary responses. Such patients also have difficulty regulating their behaviour in accordance with their intentions. Luria mentions the example of a patient who was asked to light a candle. He lit the candle easily enough. He then began smoking the candle as though it were a cigar. Similarly, when a patient with a frontal lesion is asked to imitate a simple action made by an investigator (e.g. raise a finger), he is able to do it. However, when a conflicting element is introduced, such as asking the patient to raise a finger when the investigator clenches her fist, then the patient finds it difficult to follow the instructions.

1. **Circle the option below that you think is an appropriate title for the text.**

- a. The regulation of behaviour in brain-damaged patients.
- b. Cortical structures in the brain.
- c. Frontal lobes and the regulation of behaviour.
- d. Frontal lesions in patients and purposelessness.

2. **The sentence below was left out of paragraph 3 by mistake. Indicate, by means of an arrow like this  $\swarrow$  where in paragraph 3 you think this sentence belongs.**

**Omitted sentence:** However, he followed this action with an inappropriate response.

3. **Complete the following sentence:**

Ontogenetic development refers to \_\_\_\_\_.



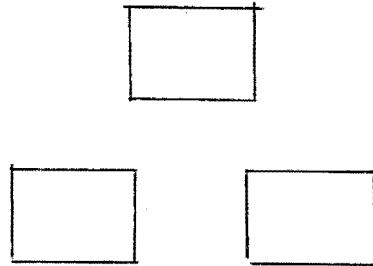
4. **Read the following carefully.**

Students are often advised to draw diagrams of the contents of their work to help them understand and remember the information. Below are two options for summarising the information in the first paragraph. Indicate which option you think is the best by filling in the boxes with the appropriate phrases provided below, and drawing lines to show how the boxes are linked.

Option A



Option B



Cognitive processes  
Retrieval and storage  
Organisation and regulation

Cognitive processes  
Retrieval and storage  
Organisation and regulation

5. **Select the correct option.**

If, as humans, “we verify our mental activity by comparing the outcome of our actions with our original intentions and plans”, this means that we ...

- have the ability to check our actions for mistakes in the light of the purpose of our actions.
- have the ability to understand and find our way around spatial dimensions.
- have the ability to determine if things are true or not in the real world.
- have the ability to develop ontogenetically.

6. **Select the correct option.**

If we compare the development of the human brain with that of primates (e.g. apes), then our comparison will be \_\_\_\_\_.

- phylogenetic
- ontogenetic

7. **If a patient has a “frontal lesion” it means that the patient \_\_\_\_\_**

---

8. **Who is the person who has made a study of frontal lobes?**

---

9. In Paragraph 3 it is stated that "Patients with frontal lesions fail to complete tasks because they react to inappropriate stimuli". Give an example mentioned in this paragraph of a patient's reaction to an inappropriate stimuli.
- 
- 

10. On reading the information in the above text, indicate by means of **X** in the appropriate box, whether the following statements relating to the paragraph are true or false.

- a. Patients with frontal lesions suffer from a certain type of brain damage.  
 TRUE                                  FALSE
- b. Children start regulating their behaviour from about the age of three years.  
 TRUE                                  FALSE
- c. The frontal lobes belong to an early part of the development of the human brain.  
 TRUE                                  FALSE
- d. Patients with frontal lesions are not able to check their actions for mistakes.  
 TRUE                                  FALSE
- e. Patients with frontal lesions respond passively to incoming information.  
 TRUE                                  FALSE

11. **Underline all the words in paragraph 3 above whose meanings you are not sure of. Put a tick ✓ in the appropriate block below to indicate that you have completed this question.**

- I have underlined all the words in Paragraph 3 whose meanings I don't understand.
- I have not underlined any words in Paragraph 3 because I understand the meaning of all the words in the paragraph.

**Total: 40**

**Thank you**

## APPENDIX C

## READING COMPREHENSION TEST 2

Name and surname: \_\_\_\_\_

**This reading comprehension test consists of 9 pages. You are given several paragraphs or short texts to read, and a series of questions or instructions follows the reading of each paragraph or text. Please answer the questions and follow the instructions as carefully and honestly as possible. If you do not understand what to do, please put up your hand and you will be assisted.**

**Thank you for your cooperation.**

---

A. Carceral organizations were rare in medieval times. Jails and dungeons sometimes existed, but they were few and far between, and were not places where convicted criminals served fixed sentences. People were kept in them as a means of stifling political opposition, to be tortured in order to extract information, or to await trial. The mentally ill either lived within the community, or were forced to roam the countryside. There were no asylums or mental hospitals. The situation has changed considerably in the intervening eight centuries. Carceral institutions have been built in great numbers since the turn of the nineteenth century.

1. What were jails used for in the olden days?

---

---

2. What does *medieval times* in line 1 mean?

---

---

3. What happened to mentally ill people in medieval times?

---

---

4. Which of the options below (a-d) would be an appropriate heading for Paragraph A?

- a. Political oppression in medieval times.
- b. Carceral organisations.
- c. Carceral organisations and mental institutions.
- d. Differences between medieval and modern times.

5. Which one of the following statements is correct?

- a The information in the paragraph describes carceral aspects of life about 100 years ago.
- b The information in the paragraph describes carceral aspects of life about 300 years ago.
- c The information in the paragraph describes carceral aspects of life about 800 years ago.
- d The information in the paragraph describes carceral aspects of life about 2000 years ago.

6. Indicate, by means of **X** in the appropriate box, whether the following statements relating to the paragraph are true or false.

- a. In medieval times, mentally ill people were usually put in jails or dungeons.  
TRUE  FALSE  NOT SURE
- b. Jails still serve the same function that they served in medieval times.  
TRUE  FALSE  NOT SURE
- c. A mental hospital can be categorised as part of a carceral organization.  
TRUE  FALSE  NOT SURE
- d. In medieval times, people who didn't support their leaders were usually put in jail.  
TRUE  FALSE  NOT SURE
- e. Carceral organizations are not rare in modern times.  
TRUE  FALSE  NOT SURE
- f. In today's world, carceral organizations include jails.  
TRUE  FALSE  NOT SURE
- g. In medieval times there were systematic and organised ways of caring for mentally ill people.  
TRUE  FALSE  NOT SURE

7. Look again at the second sentence in the paragraph and then select the option below which best paraphrases this sentence:

*Jails and dungeons sometimes existed, but they were few and far between, and were not places where convicted criminals served fixed sentences.*

- a. There were a few jails and dungeons. However, they were not numerous. Furthermore, they were not used to lock up prisoners who had been found guilty of wrong-doing.
- b. There were sometimes jails and dungeons and because they were not numerous, they were not used to lock up prisoners who had been found guilty of wrong-doing.
- c. However there were a few jails and dungeons and they were a long distance from one another and so they were not used to lock up prisoners who had been found guilty of wrong-doing.
- d. There were some jails and dungeons that were far apart, and likewise they were not used to lock up prisoners who had been found guilty of wrong-doing.

8. **Underline all the words in the above paragraph whose meanings you are not sure of. Put a tick ✓ in the appropriate block below to indicate that you have completed this question.**

- I have underlined all the words in Paragraph A whose meanings I don't understand.
- I have not underlined any words in Paragraph A because I understand the meaning of all the words in the paragraph.

- B. There have been various theories to explain how the brain functions, and also explanations for the various dysfunctions resulting from brain damage. The localization theory proposes that the brain has specialised faculties, situated in different parts of the brain. According to this theory, then, an injury in the area of the brain controlling reading skills should manifest as dyslexia (the inability to read), while an injury in the area of the brain controlling writing skills should manifest as dysgraphia (the inability to write). The symptoms of patients with brain damage showed, however, that this is not always the case. This led to the formulation of an alternative theory by Luria (1978). He distinguishes between three neurophysiological subsystems and his model has wider explanatory power than previous theories. (JJ228)

1. **Complete the following sentence by filling in the missing word.**

People who have problems with writing skills suffer from \_\_\_\_\_.

2. **On reading the information in the above paragraph, indicate by means of X in the appropriate box, whether the following statements relating to the paragraph are true or false.**

- a. According to the localization theory, different brain functions and skills are situated in different parts of the brain.  
 TRUE  FALSE  NOT SURE
- b. Luria's theory is part of localization theory.  
 TRUE  FALSE  NOT SURE
- c. Research on brain damaged patients supports the localization theory.  
 TRUE  FALSE  NOT SURE

3. **Complete the following sentence.**

The theory of neurophysiological subsystems came \_\_\_\_\_ the theory of localization (before/after).

4. **Consider the statement below, and then decide which option is correct:**

The symptoms of patients with brain damage will be better explained by .....

- a. the theory of localization.
- b. the theory of neurophysiological subsystems.

5. Which of the options below (a-d) would be an appropriate heading for Paragraph B?

- a. Accounts of brain functions and dysfunctions.
- b. The localization theory.
- c. Patients with brain damage.
- d. Anatomy of the brain.

C. Exactly how the continents of the earth were formed is a question which has not yet been satisfactorily answered. One theory originated in 1910. Sabine Island, near Greenland, was first discovered and mapped by the British geographer, Sabine in 1823. However, another map, drawn in 1869, showed that the island was 400 metres further west than Sabine had indicated on his map. A young geologist working in Greenland in 1910 suggested that this inconsistency was not simply the result of an error in measurement. He then proposed the theory of floating continents.

1. Which theory of the origin of continents originated in 1910?

---



---

2. Where is Sabine Island?

---



---

3. When was the second map of Sabine Island drawn?

---

4. On reading the information in the above paragraph, indicate by means of **X** in the appropriate box, whether the following statements relating to the paragraph are true or false.

- a. The information in the paragraph suggests that within a period of about 50 years, Sabine Island had drifted about 400 metres further away from Greenland.  
 TRUE  FALSE  NOT SURE

b. What caused the difference in distance between Sabine Island and Greenland?

---



---

- c. The young geologist said that Sabine had made a mistake when he measured the distance between Sabine Island and Greenland in 1823.  
 TRUE  FALSE  NOT SURE

d. The British geographer, Sabine, proposed the theory of the floating continents.

TRUE            FALSE            NOT SURE     

5. **Look at line 5 in the paragraph. What is this inconsistency that is referred to in line 5?**
- 
6. **Circle the option below (a-d) that you think would be an appropriate heading for the paragraph.**
- a. Errors in map drawing  
 b. Sabine the geographer  
 c. Floating islands  
 d. Continent formation
7. **Underline all the words in the above paragraph whose meanings you are not sure of. Put a tick ✓ in the appropriate block below to indicate that you have completed this question.**
- I have underlined all the words in Paragraph C whose meanings I don't understand.  
 I have not underlined any words in Paragraph C because I understand the meaning of all the words in the paragraph.

**D.** Schools are supposedly a means whereby children can escape from the restricting aspects of their social backgrounds. Children from poor circumstances have the chance to move up the social and economic ladder if they are successful at school. Mass education in modern societies is linked to ideals of equality of opportunity. Research findings, however, indicate that education often reinforces existing inequalities rather than overcomes them. There are several reasons for this. One reason, for example, is that some children from poorer homes may receive little encouragement from their parents to try to do well at school.

1. **What makes it possible for children from poor circumstances 'to move up the social and economic ladder'?**
- 
- 

2. **What ideals underlie mass education today?**
- 

3. **On reading the information in the above paragraph, indicate by means of X in the appropriate box, whether the following statements relating to the paragraph are true or false.**

- a. Some children run away to school to escape from their homes.
- TRUE            FALSE            NOT SURE

- b. Research findings into what happens in schools support the ideals of mass education of equality of opportunity.  
TRUE  FALSE  NOT SURE
- c. Children from poor backgrounds who move up the economic ladder will tend to have the same kind of jobs as their parents had.  
TRUE  FALSE  NOT SURE
- d. Parental support is an important factor for a child's success at school.  
TRUE  FALSE  NOT SURE

**4. Select the option below which best summarises the contents of the paragraph.**

- a. Schools are supposedly places where children who do well can better themselves socially and economically. In practice, likewise, this does happen.
- b. Schools are supposedly places which provide equality of opportunity to all students, therefore schools are places that reinforce inequalities in practice.
- c. Although schools are supposedly places which provide equality of opportunity to all students, this does not always occur in reality.
- d. Schools are supposedly places which provide equality of opportunity to all students and so research suggests that they are often places that reinforce inequalities between students.

**5. Select the option below which does NOT apply to the paragraph.**

- a. The information in the paragraph shows us how research findings are used to support theories.
- b. The information in the paragraph shows us how research findings are used to test theories.
- c. The information in the paragraph shows us something about the relationship between theory and research.
- d. The information in the paragraph shows us that research is important for testing our assumptions about what is happening in the real world.
-



- E.** Wilder Penfield (1959) administered cortical stimulation to patients who were awake and who were undergoing an operation for epilepsy caused by damage to the temporal lobes. For such an operation a local anaesthetic is used, so that the patient remains fully conscious. In order to locate the injured area it is necessary to stimulate the temporal cortex point by point with an electrode. During the electrical stimulation, the patient reports on what she or he is experiencing. During the operation the stimulation caused different memories to emerge in the patients' conscious mind. The patients were aware all the time of their immediate environment, and yet vivid memories of the past and forgotten events were recalled during stimulation. When the electrode was moved to different areas in the temporal cortex, different memories surfaced. These research findings of Penfield are taken as confirmation of the viewpoint that a person's long-term memory has unlimited capacity and that all personal experiences are stored in the brain's memory bank. (JJ196)

- 1.** The sentence below was left out of the paragraph by mistake. Indicate, by means of an arrow like this  $\swarrow$  where in the paragraph you think this sentence belongs.

**Omitted sentence:** However, this is not painful since the brain is not equipped with pain receptors.

- 2.** Circle the option below that you think is an appropriate heading for the paragraph.
- a. Stimulation of the temporal cortex.
  - b. The temporal lobes.
  - c. Staying awake during a brain operation.
  - d. An epileptic patient.

- 3.** Why must patients stay awake during this operation?

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- 4.** In which year did Penfield publish his findings about cortical stimulation as reported in the paragraph above?

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- 5.** Why is only a local anaesthetic used for this brain operation?

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6. On reading the information in the above paragraph, indicate by means of **X** in the appropriate box, whether the following statements relating to the paragraph are true or false.

a. The operation reported on in the paragraph was performed on patients who had been epileptics from birth.

TRUE  FALSE  NOT SURE

b. When performing the operation reported on in the paragraph, the doctors don't know beforehand in which part of the temporal lobe the brain has been injured.

TRUE  FALSE  NOT SURE

c. On the basis of findings from cortical stimulation, we can conclude that the temporal lobes only store information from the past and block out information dealing with the present.

TRUE  FALSE  NOT SURE

d. Penfield's findings support the argument that the brain selects only certain information from our everyday lives to store in memory.

TRUE  FALSE  NOT SURE

e. If a part of the temporal lobe is stimulated with an electrode but the patient can't remember anything, then the doctor concludes that that part of the brain is damaged.

TRUE  FALSE  NOT SURE

F. "Over the past thirty years or so, in most Western countries, there have been major changes affecting inmates of mental institutions. The mentally and physically handicapped have been released in large numbers, with the objective of replacing confinement with community care. These reforms have been prompted largely by humanitarian motives, combined to some extent with a desire to cut costs, since the expense of maintaining custodial institutions is very considerable. Many mental patients now seem worse off than they were before. Many live in poverty and isolation, and without the security they previously had in the mental institutions" (Giddens 1993).

1. The sentence below was left out of Paragraph F by mistake. Indicate, by means of an arrow like this  $\swarrow$ , where in the paragraph you think this sentence belongs.

Omitted sentence: But the effects of these reforms seem to be unfortunate.

2. Complete the sentence below by selecting the correct option.

According to Giddens (1993), changes in mental institutions were introduced during the \_\_\_\_\_.

- |    |       |    |        |
|----|-------|----|--------|
| a. | 1990s | d. | 1960s  |
| b. | 1980s | e. | 1950s. |
| c. | 1970s |    |        |

3. Select the correct option.

- a. Mental institutions are part of custodial institutions.  
 b. Custodial institutions are part of mental institutions.

4. On reading the information in the above paragraph, indicate by means of **X** in the appropriate box, whether the following statements relating to the paragraph are true or false.

- a. Many mentally ill people now have better security than they had thirty years ago.  
 TRUE            FALSE            NOT SURE
- b. The main reasons for the reforms in mental institutions were driven by economic/financial factors.  
 TRUE            FALSE            NOT SURE
- c. It costs a lot of money to run mental institutions.  
 TRUE            FALSE            NOT SURE
- d. According to the author, the reforms in mental institutions have been successful.  
 TRUE            FALSE            NOT SURE

5. Select the option that is an accurate reflection of the contents of the paragraph.

- a. In the paragraph above, Giddens argues that although the reforms were humanitarian and were meant to benefit mentally handicapped people, they in fact did not benefit them.
- b. In the paragraph above, Giddens argues that the reforms in mental institutions were successful because they replaced confinement with community care.
- c. In the paragraph above, Giddens argues that the mentally handicapped lived in poverty and isolation in mental institutions, therefore reforms were necessary.
- d. In the paragraph above, Giddens argues that the reforms were prompted by humanitarian reasons and consequently they benefitted the mentally handicapped

6. **Underline, in Paragraph F, another phrase whose meaning is more or less the same as *mental institutions*. Put a tick ✓ in the appropriate block below to indicate that you have completed this question.**

- I have underlined a phrase in Paragraph F whose meaning is more or less the same as *mental institutions*.
- I did not underline anything in Paragraph F because I could not find another phrase whose meaning is more or less the same as *mental institutions*.

**Thank you for your patience and co-operation!**

## APPENDIX D

NAME: \_\_\_\_\_

## SECTION A

Each of the paragraphs in A below has a pronoun or noun phrase that is underlined. Each of these underlined pronouns or nouns refers to something that is mentioned in the paragraph. Here is an example:

*The German psychologist Karl Duncker first proposed the concept of functional fixity in about 1930, and he illustrated it with a few simple experiments. Because these experiments were done with so few subjects, several American psychologists repeated them and they obtained similar results to Duncker's.*

Now, in the paragraphs below, underline the words/phrases/sentences that you think the underlined pronoun or noun refers to, and put in an arrow to link them, as shown in the example above.

1. Global environmental threats are of several basic sorts: the creation of waste that cannot be recycled or disposed of in the short term; pollution; and the depletion of resources. We tend to think of 'waste' as what goes into our dustbins - and in fact domestic waste is a significant environmental problem. The amount of this refuse produced each day in industrialised countries is staggering. These countries have sometimes been called the 'throw-away societies' because of the large volume of items discarded.
2. The social democratic view on education is not simply a sociological theory. According to the Centre for Contemporary Cultural Studies at Birmingham University, this perspective has been developed by a number of individual groups. In the Centre's opinion, social democratic thinking has been reflected in the works of sociologists, economists, Labour Party politicians, and the teaching profession. For most of the post-war period British educational policies have been dominated by this approach.
3. How far are differences in the behaviour of women and men due to biological differences? Opinions are radically opposed on this issue. Many authors hold that there are inbuilt differences of behaviour between men and women which appear in all cultures. Some writers believe that the findings of sociobiology point strongly in this direction. They are likely to draw attention to the fact, for example, that in almost all cultures, men rather than women take part in hunting and warfare.
4. It has been widely known for some time that the natural milk of a healthy mother constitutes a complete diet for a new-born child. Recently it has been found that mothers' milk also gives babies a natural resistance to certain diseases. Doctors in developing countries where standards of health care are lower and where advertising encourages mothers to turn from breast to bottle-feeding by claiming that artificial milk is superior, hope that this discovery will be widely publicized by the governments of these countries.
5. The general public usually view the elderly as people who have already made their contributions to society and have retired from productive activity. The old person is expected to 'take it easy'

and to enjoy himself or herself. This expectation ignores the fact that one of the more important ways we all 'enjoy' ourselves is by being involved in activities that are socially valued.

6. Garrison (1979) found that female aspirations for high-status jobs rose by 7% between 1970 and 1976. During the same time, male aspirations for such jobs declined 5%. Lueptow (1981) found a similar decline in gender-typed occupational choices when he compared high school seniors of 1964 to high school seniors of 1975. Although such evidence is encouraging, we must bear in mind that women still tend to be heavily over represented in traditional female jobs.
7. Depending on the environment in which they live, pastoralists rear and herd animals such as sheep, cattle, goats, camels or horses. Many pastoral societies still exist in the modern world. These societies are usually found in regions where there are dense grasslands, or in deserts or mountainous areas. These regions are not amenable to fruitful agriculture, but may support various types of livestock.
8. America's poverty must be evaluated in terms of the standard of living attained by the majority of Americans. The government's definition of poverty is based on the cost of a basic diet called the "economy food plan". It is revised to account for inflation and varies according to the location, size of the family, and sex and age of the head of the family.
9. In the light of the ending of the Cold War, we can anticipate a reduction in the developed world's spending for military purposes. Arms-related expenditure has dropped sharply in Russia. The United States and other Western countries are scaling back defence expenditure over the next few years. However, this will increase the pressure to export arms to make up for lost domestic markets.
10. There have long been a variety of voluntary associations, charities and self-help organizations. Self-help groups are made up of people who are in a similar situation and who come together to assist one another in pursuing shared interests or coping with common problems. Such groups tend to be non-hierarchical and lack the fixed positions associated with bureaucracies.
11. A variety of measures can address the problem of job dissatisfaction and alienation. Having identified the causes of the problem, we can deduce what is needed to resolve them: more challenging work, greater worker participation and control, and more worker autonomy. A number of programs that provide such conditions are already operating, but they are not yet widespread. (Lauer 402)
12. As understood in biology and sociology, an instinct is a complex pattern of behaviour that is genetically determined. The courtship rituals of many of the lower animals are instinctive in this sense. The stickleback (a small freshwater fish), for example, has an extremely complicated ritual which has to be followed by both male and female if mating is to occur. Each fish produces an elaborate series of movements, creating a 'mating dance'. This is genetically patterned for the whole species.
13. Agrarian societies seem to have originated at about the same date as pastoral ones. At some point, hunting and gathering groups began to sow their own crops rather than simply collect those growing in the wild. This practice first developed as what is usually called 'horticulture', in which small gardens are cultivated by the use of hoes or simple digging instruments.
14. As a result of upbringing and personality, everyone in a society has preconceptions - positive or negative - about their fellow citizens. Usually these are based on emotion rather than on reason. People are hostile to other social groups who are easily identifiable because they are different racially, religiously or politically. In fact, modern history is full of examples which show how

politicians, in order to divide people and realize their own selfish ambitions, have exploited this hostility.

15. The ultimate objective of empirical scientific research is the creation of a body of knowledge which will enable us to understand the phenomena studied in a specific science in such a way that we are able to understand them. If one can give an explanation for a phenomenon then one is able to make certain predictions about it.
16. It seems logical to assume that our periods of sleep must have some function. Moreover, since we spend so much time sleeping, it is reasonable to suppose that the function of sleep must be of considerable importance for us. The phenomenon of sleep has interested people for thousands of years. The idea that sleep gives the brain a rest is quite widespread. But modern research into sleep, which offers no strong evidence that brain activity decreases during sleep, apparently does not support this hypothesis.
17. Some time after the radio was invented, it was observed that radio waves bounced back off solid objects in their path. Since the speed of radio waves is known, by recording the time between the transmission of the wave and its return, one can estimate the distance to an obstruction. Knowing this, the British manufactured an instrument which detected enemy planes in the air long before they were near the places they were going to attack. This device has since proved extremely valuable in peace and war. (P)
18. In the 1930s, many educated people in Britain began to criticise the British government. They accused it of exploiting the workers. They began to look for alternative systems of government, and many were attracted by what was happening in the Soviet Union. A number of English intellectuals believed that Russian socialism was the answer to England's problems. However, the events which took place in the following years convinced many of them that this belief was false.
19. People have long appreciated education because of the advantages it can bring to an individual. However, the idea of education for everyone has only become popular within the last 100 years. In fact, politicians only began supporting the idea of making education available to a wider range of people when they recognised that the needs which society had were rapidly changing. These requirements had to be met if a modern industrial nation were to compete successfully in the world.
20. Nancy Chodorow has been influential in the study of gender development. She argues that learning to feel male or female is a very early experience, deriving from the infant's attachment to its parents. She emphasises the importance of the mother. Children tend to become emotionally involved with the mother, since the mother is easily the most dominant influence in their early lives. This attachment at some point has to be broken in order to achieve a separate sense of self.
21. According to psychoanalysts, factual knowledge about human functioning is obtained through informal introspection carried out by people in the psychoanalytic situation and through dream analysis. Inferences about how people function are made on the basis of such accumulated data. The validity of these inferences are then tested against other data obtained through informal introspection and dream revelations.
22. The integrated functioning of the nervous system at different levels of complexity in animals and humans, as shown by experimental findings, is extremely interesting. Experiments with animals have provided us with a great deal of information. We can now ask whether or not this information enables us to develop theories about human emotional behaviour. This question can only be answered by considering the phylogenetic development of the human brain.

23. According to the localization theory, an injury in the area of the brain controlling reading skills should manifest as dyslexia (the inability to read), while an injury in the area of the brain controlling writing skills should manifest as dysgraphia (the inability to write). The symptoms of patients with brain damage showed, however, that this is not always the case. This led to the formulation of an alternative theory.
24. Schools are supposedly a means whereby children can escape from the restricting aspects of their social backgrounds. Children from poor circumstances have the chance to move up the social and economic ladder if they are successful at school. Mass education in modern societies is linked to ideals of equality of opportunity. In practice, however, education often reinforces existing inequalities rather than overcomes them. There are several reasons for this. One reason, for example, is that some children from poorer homes may receive little encouragement from their parents to try to do well at school.
25. Although little has been written about it, there was some organised but ineffective resistance to Hitler in Germany during World War II. By far the best known group consisted of some army officers who attempted a number of times to end the war and save Germany from ruin by killing the man whom they held totally responsible for the war. However, the members of the group were traditional army officers and were not trained in terrorist techniques, and all of these attempts failed.
26. The concept of 'teenager' seems to be specific to modern societies. The biological changes involved in puberty (the age at which a person becomes capable of sexual activity and reproduction) are universal. Yet in many cultures these do not produce the degree of turmoil and uncertainty often found among young people in modern societies.
27. American children watch five hours of television daily. Many programmes contain extremely violent scenes and educators are worried about how such scenes might affect children. We may later be faced with the prospect of having a generation of people who are so accustomed to violence that they accept it as normal and even consider it a desirable way to solve problems. Many people who are aware of the considerable influence that television exerts are alarmed by this prospect.
28. The British sociologist, Barry Sugarman, related certain aspects of middle- and working-class subcultures to differences in educational achievement. He claims that many middle-class occupations provide an opportunity for continuous advancement in income and status. This encourages planning for the future, for example, the investment of time, energy and money in training to meet the requirements of higher-status jobs. By comparison, working-class jobs reach full earning capacity relatively quickly, but provide fewer promotion prospects and less income for investment. In addition, they are less secure.
29. As insanity came to be seen more and more as a sickness, attempts were made to understand its physical origins in the body. The majority of psychiatrists today hold that at least some forms of mental illness have physical causes. They also work with standardised manuals of diagnostic criteria for identifying different types of mental disorder. Psychiatrists divide these into two main categories, the psychotic and the neurotic.



**APPENDIX E**  
**VOCABULARY TEST**

Read each paragraph and then, in each case, do the following **THREE** things:

- \* answer either (a) OR (b)
- \* answer (c)
- \* draw a circle around any other words in the paragraphs whose meanings you are not sure of.

1. For many years, people accepted technological advances uncritically, assuming that they could only improve their lives. The car, for example, was seen only as an efficient and convenient method of transportation. It was not recognised as a source of noise and pollution. But it is now clear that technology brings many drawbacks with it. Of course, those that argue that we should reject all technology are extremists, but there are many other people who are aware that these disadvantages can be enough to outweigh the potential benefits.

Answer either (a) or (b).

(a) I know for sure that the word <b>drawbacks</b> , as used in this context, means ... <hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/> <hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/> <hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/>	(b) Although I'm not absolutely sure, I <i>think</i> that the word <b>drawbacks</b> , as used in this context, means <hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/> <hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/> <hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/>
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- (c) Underline the words/phrases/sentence in the paragraph that provide clues, if any, to the meaning of this word, or else write down, in the space below, possible clues in the context that suggest the meaning of **drawbacks**.

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2. A small amount of alcohol can result in changes in a person's mood and behaviour. A blood alcohol level of about .05% can make a person feel a sense of release from tension and inhibitions. This mild euphoria is the aim of many people who drink moderately. However, this feeling of happiness drops as the alcohol level increases; there is an increasing loss of control because alcohol acts as a depressant on functions of the brain.

Answer either (a) or (b).

<p>(a) I know for sure that the word <b>euphoria</b>, as used in this context, means</p> <hr/> <hr/> <hr/>	<p>(b) Although I'm not absolutely sure, I <i>think</i> that the word <b>euphoria</b>, as used in this context, means</p> <hr/> <hr/> <hr/>
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- (c) Underline the words/phrases/sentence in the paragraph that provide clues, if any, to the meaning of this word, or else write down, in the space below, possible clues in the context that suggest the meaning of **euphoria**.

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3. From the age of one week, newborn babies will look at a patterned surface (e.g. stripes or circles) more often than even a brightly coloured plain surface. Under the age of one month, a baby's perceptual capacities are still weak, and images more than about a foot away are blurred. Thereafter, visual abilities increase rapidly and images become more focused. By the age of about four months, a baby will keep in sight a person moving about the room.

Answer either (a) or (b).

<p>(a) I know for sure that the word <b>blurred</b>, as used in this context, means ...</p> <hr/> <hr/> <hr/>	<p>(b) Although I'm not absolutely sure, I <i>think</i> that the word <b>blurred</b>, as used in this context, means ..</p> <hr/> <hr/> <hr/>
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- (c) Underline the words/phrases/sentence in the paragraph that provide clues, if any, to the meaning of this word, or else write down, in the space below, possible clues in the context that suggest the meaning of **blurred**.

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4. Is the world becoming a safer place as a result of the decline of the Cold War? A major problem facing world peace is how to contain nuclear proliferation - the spread of nuclear weapons to states that do not have them. It is hard to argue that global security would be improved if thirty, forty or more states had nuclear weapons. But the Western powers, who justify their nuclear arsenals on the grounds that they deter aggression, can hardly be surprised if other countries seek to obtain them for the same reason. And if one state acquires the capability, its rival will seek to do likewise. The likelihood of proliferation thus increases.

Answer either (a) or (b).

<p>(a) I know for sure that the word <b>proliferation</b>, as used in this context, means ...</p> <hr/> <hr/> <hr/>	<p>(b) Although I'm not absolutely sure, I <i>think</i> that the word <b>proliferation</b>, as used in this context, means ...</p> <hr/> <hr/> <hr/>
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- (c) Underline the words/phrases/sentence in the paragraph that provide clues, if any, to the meaning of this word, or else write down, in the space below, possible clues in the context that suggest the meaning of **proliferation**.

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5. From our everyday experience we know that people often try to arrange their environment in such a way that there is somewhere a place where they can be alone and private, where they can, for whatever reason, be isolated from other people for a period of time. The term privacy expresses this human inclination. However, this tendency towards being alone does not mean that the person wants no interaction with other people. (JJ718)

Answer either (a) or (b).

<p>(a) I know for sure that the word <b>inclination</b>, as used in this context, means ...</p> <hr/> <hr/> <hr/>	<p>(b) Although I'm not absolutely sure, I <i>think</i> that the word <b>inclination</b>, as used in this context, means</p> <hr/> <hr/> <hr/>
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- (c) Underline the words/phrases/sentence in the paragraph that provide clues, if any, to the meaning of this word, or else write down, in the space below, possible clues in the context that suggest the meaning of **inclination**.

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6. The modern world is characterised by an increase in the means of communication and in opportunities to come into contact with other people. Yet in spite of all these things, there are many people who suffer from loneliness. This experience is painful and may serve as a source for a whole range of negative emotions such as self-pity, fear, timidity, anger, aggression and depression. Such emotions can in turn lead to all kinds of destructive behaviour which may sever a person's contact with other people even more. Being cut off from social contact in this way serves to place such people in a vicious circle of ever-increasing loneliness.

Answer either (a) or (b).

<p>(a) I know for sure that the word <b>sever</b>, as used in this context, means ...</p> <hr/> <hr/> <hr/>	<p>(b) Although I'm not absolutely sure, I <i>think</i> that the word <b>sever</b>, as used in this context, means ...</p> <hr/> <hr/> <hr/>
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- (c) Underline the words/phrases/sentence in the paragraph that provide clues, if any, to the meaning of this word, or else write down, in the space below, possible clues in the context that suggest the meaning of **sever**.

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7. There has been little work on female members of youth gangs, or on female gangs where these exist. Numerous accounts of male street groups and male gangs have been written, but in these reports women appear only fleetingly. Anne Campbell (1986), however, has studied girls in New York street gangs. She selected three gangs for intensive study: one was ethnically mixed, one Puerto Rican, and the third black. Campbell spent six months living with each gang, focusing especially on the gang leaders.

Answer either (a) or (b).

<p>(a) I know for sure that the word <b>accounts</b>, as used in this context, means ...</p> <hr/> <hr/> <hr/>	<p>(b) Although I'm not absolutely sure, I <i>think</i> that the word <b>accounts</b>, as used in this context, means</p> <hr/> <hr/> <hr/>
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- (c) Underline the words/phrases/sentence in the paragraph that provide clues, if any, to the meaning of this word, or else write down, in the space below, possible clues in the context that suggest the meaning of **accounts**.

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8. Before the late 1980s, the arms race and other forms of military competition between the United States and the Soviet Union dominated world military rivals. The ending of the Cold War between these two states and their allies is leading to cutbacks on military spending in most of the industrialised countries. Although many forms of disastrous war are still possible, it is no longer completely utopian to imagine a world without large-scale war in future.

Answer either (a) or (b).

<p>(a) I know for sure that the word <b>Cold War</b>, as used in this context, means ...</p> <hr/> <hr/> <hr/>	<p>(b) Although I'm not absolutely sure, I <i>think</i> that the word <b>Cold War</b>, as used in this context, means</p> <hr/> <hr/> <hr/>
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- (c) Underline the words/phrases/sentence in the paragraph that provide clues, if any, to the meaning of this word, or else write down, in the space below, possible clues in the context that suggest the meaning of **Cold War**.

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9. The relationship between the mind and body is a thorny and problematic issue. The problem stems partly from the way in which the terms *body* and *mind* are used in everyday language. When we speak of our body we generally mean something which is our own, which is tangible and has form, colour and texture - something which can be touched and felt. We use mind to refer to something intangible but which, like the body, is still a part of oneself. It is, amongst other things, the storehouse of your private and personal experiences.

Answer either (a) or (b).

<p>(a) I know for sure that the word <b>intangible</b>, as used in this context, means ...</p> <hr/> <hr/> <hr/>	<p>(b) Although I'm not absolutely sure, I <i>think</i> that the word <b>intangible</b>, as used in this context, means</p> <hr/> <hr/> <hr/>
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- (c) Underline the words/phrases/sentence in the paragraph that provide clues, if any, to the meaning of this word, or else write down, in the space below, possible clues in the context that suggest the meaning of **intangible**.

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10. In most traditional societies, the family into which a person is born largely determines the individual's social position for the rest of his or her life. In modern Western societies, social position is not influenced to the same extent in this way and there is greater social mobility. Yet the region and social class of the family into which an individual is born affect patterns of socialisation quite sharply. Children pick up ways of behaviour characteristic of their parents or others in the neighbourhood or community.

Answer either (a) or (b).

<p>(a) I know for sure that the word <b>determines</b>, as used in this context, means ...</p> <hr/> <hr/> <hr/>	<p>(b) Although I'm not absolutely sure, I <i>think</i> that the word <b>determines</b>, as used in this context, means</p> <hr/> <hr/> <hr/>
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- (c) Underline the words/phrases/sentence in the paragraph that provide clues, if any, to the meaning of this word, or else write down, in the space below, possible clues in this context that suggest the meaning of **determines**.

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11. Many apparently trivial aspects of our day-to-day behaviour turn out on close examination to be important - and complex - aspects of social interaction. An example is the gaze - looking at other people. In most social interaction, eye contact is fairly fleeting. To stare at another person could be taken as a sign of hostility - or, on some occasions, of love. (G113)

Answer either (a) or (b).

<p>(a) I know for sure that the word <b>trivial</b>, as used in this context, means ...</p> <hr/> <hr/> <hr/>	<p>(b) Although I'm not absolutely sure, I <i>think</i> that the word <b>trivial</b>, as used in this context, means ...</p> <hr/> <hr/> <hr/>
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- (c) Underline the words/phrases/sentence in the paragraph that provide clues, if any, to the meaning of this word, or else write down, in the space below, possible clues in the context that suggest the meaning of **trivial**.

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12. In medical terms, AIDS is a moving target, new and elusive. Medical knowledge about the illness dates very fast, and new information about the illness is constantly being discovered. What is known for certain is that AIDS is a condition which causes the body's immune system to collapse; it does not cause death itself, but the sufferer becomes prey to a range of illnesses, including cancers, which are fatal.

Answer either (a) or (b).

<p>(a) I know for sure that the word <b>dates</b>, as used in this context, means ...</p> <hr/> <hr/> <hr/>	<p>(b) Although I'm not absolutely sure, I <i>think</i> that the word <b>dates</b>, as used in this context, means ...</p> <hr/> <hr/> <hr/>
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- (c) Underline the words/phrases/sentence in the paragraph that provide clues, if any, to the meaning of this word, or else write down, in the space below, possible clues in the context that suggest the meaning of **dates**.

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13. Appeal is made to the Bible by both those who support and those who oppose capital punishment and by both those who castigate and those who advocate help for the poor. Supporters of capital punishment point out that the Bible, particularly the Old Testament, decreed death for certain offences. Opponents counter that the death penalty contradicts New Testament notions of Christian love. Those who criticize the poor call attention to St Paul's idea that he who does not work should not eat. Those who advocate help for the poor refer us to Christ's words about ministering to the needy and feeding the hungry. (L43)

Answer either (a) or (b).

<p>(a) I know for sure that the word <b>counter</b>, as used in this context, means ...</p> <hr/> <hr/> <hr/>	<p>(b) Although I'm not absolutely sure, I <i>think</i> that the word <b>counter</b>, as used in this context, means</p> <hr/> <hr/> <hr/>
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- (c) Underline the words/phrases/sentence in the paragraph that provide clues, if any, to the meaning of this word, or else write down, in the space below, possible clues in the context that suggest the meaning of **counter**.

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14. Carceral organizations were rare in medieval times. Jails and dungeons sometimes existed, but they were few and far between, and were not places where convicted criminals served fixed sentences. People were kept in them as a means of stifling political opposition, to be tortured in order to extract information, or to await trial. The mentally ill either lived within the community, or were forced to roam the countryside. There were no asylums or mental hospitals.

Answer either (a) or (b).

<p>(a) I know for sure that the word <b>carceral</b>, as used in this context, means ...</p> <hr/> <hr/> <hr/>	<p>(b) Although I'm not absolutely sure, I <i>think</i> that the word <b>carceral</b>, as used in this context, means</p> <hr/> <hr/> <hr/>
--	---

- (c) Underline the words/phrases/sentence in the paragraph that provide clues, if any, to the meaning of this word, or else write down, in the space below, possible clues in the context that suggest the meaning of **carceral**.

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**Thank you very much for participating in this task!**



41. ... you can prove that you were ill, I cannot believe it.
- A. If                                      B. As soon as                                      C. However                                      D. Unless
42. To keep your family healthy and to . . . your children's steady growth, you need to give them a balanced diet.
- A. produce                                      B. profess                                      C. project                                      D. promote
43. I am most excited . . . of attending university next year.
- A. with the notion  
B. at the prospect  
C. with the purpose  
D. by the concept
44. If a man is tired of the **daily grind**, it means he is tired of ...
- A. monotonous, hard work.  
B. daily bread.  
C. daily quarrels.  
D. uninteresting, boring days.

Which underlined part is wrong? (questions 45 to 48)?

45. The split-second decisions that a modern jet pilot <sup>A</sup> has to make <sup>B</sup> may soon involve linking up the pilot's brain with the mechanics of his aircraft — via a computer. The pilot <sup>C</sup> would only have to think of an action — and the plane <sup>D</sup> would have obeyed immediately.
46. A. The exhibition in the museum is well worth seeing.  
B. The boss dismissed the lazy worker because he had become tired of hearing excuses.  
C. I had no means to crossing the swirling river.  
D. She began scolding me the moment I entered the house.
47. <sup>A</sup> Cleared his throat, Sipho <sup>B</sup> thanked Mandla for <sup>C</sup> having prepared lunch. Mandla said he <sup>D</sup> would do it again.
48. In the Middle Ages it <sup>A</sup> was firmly believed one's enemy <sup>B</sup> was condemned to sudden death if his name was spoken while tearing out a root of parsley, and as a legacy of this old practice <sup>C</sup> of witchcraft the superstition <sup>D</sup> is still prevalent that it was bad luck to transplant parsley from one garden to another.

49. Which completion of the following sentence is **wrong**?  
If Mr Monsa had been there ...

- A. we did not have this trouble we're having now.
- B. he would have supplied the information.
- C. he might have influenced the decision taken.
- D. we would have been properly informed.

50. Which sentence is **wrongly** punctuated?

- A. David didn't see the lion on the first day.
- B. His yacht wasn't structurally damaged.
- C. I'm well aware that David's proved himself.
- D. He's a very brave and resourceful man.

Which sentence is **wrong**? (questions 51 to 53)

51. A. From the bank they watched the waters rushing past.  
B. The Council will impose water restrictions.  
C. It happened while Mr Stern was keeping them after school.  
D. As soon as he left, the assembly rose from its chairs like a man.
52. A. Mrs Taylor consulted a doctor who was an excellent physician.  
B. The doctor was an excellent physician whom Mrs Taylor consulted.  
C. The doctor, who was an excellent physician, was consulted by Mrs Taylor.  
D. The doctor whom Mrs Taylor consulted, was an excellent physician.
53. A. He was very depressed, but I didn't thought he had reason to be.  
B. None of us were consulted on this important matter.  
C. In a restaurant I never know where to put my handbag.  
D. Neither the dog nor the cat has had an injection.

Read the following passage from which words have been omitted and decide on the correct word for each space. (questions 54 to 60)

The most interesting and perhaps the most obvious aspect of non-verbal communication is our body language. You probably connect it with flashing eyes and swinging hips. But it refers to more than

this. All our movements and expressions give out messages 54.

- |   |
|---|
| <ul style="list-style-type: none"> <li>A. of</li> <li>B. about</li> <li>C. from</li> <li>D. by</li> </ul> |
|---|

ourselves. Most

of our body language is not 55.

- |  |
|--|
| <ul style="list-style-type: none"> <li>A. considerate</li> <li>B. exposed</li> <li>C. revealed</li> <li>D. deliberate</li> </ul> |
|--|

- we are unaware of the impressions we make

**SECTION C**

Please read the following passage consisting of 5 numbered passages and then answer the questions that follow.

**The interactionist theory of education**

*Paragraph 1*

To interactionists, the explanation of human behaviour needs to take account of the subjective states of individuals, and the meanings that individuals attach to the words and actions of people around them. To interactionists, your view of yourself, or self-concept, is produced in interaction with others. The self concept of the pupil is influenced by the other pupils and by the teachers with whom she or he interacts.

*Paragraph 2*

One of the most important aspects of the interactionist theory of education concerns the ways that teachers make sense of and respond to the behaviour of their pupils. Two closely related theories, the self-fulfilling prophecy and the labelling theory, both suggest that pupil behaviour can be changed by the way that teachers react to them.

*Paragraph 3*

Proponents of the self-fulfilling prophecy argue that predictions made by teachers about the future success or failure of pupils will tend to come true because the prediction has been made. Supporters of the theory point out that a teacher may define a pupil in a particular way, such as 'bright' or 'dull'. Based on this definition, the teacher then makes predictions about the behaviour of the pupil, for example, she or he will get high or low grades. The teachers' interactions with their pupils will be influenced by their classifying of the pupils. They may, for example, expect higher quality work from and give greater encouragement to the 'bright' pupils. The pupils' self-concepts will tend to be shaped by their teacher's definition. Pupils will tend to see themselves as 'bright' or 'dull' and act accordingly. Their actions will, in part, be a reflection of what the teacher expects from them. In this way the prophecy is fulfilled.

*Paragraph 4*

There have been a number of attempts to test the validity of the labelling theory and the self-fulfilling prophecy theory. As a result of this research, some interactionists have come to realise that not all pupils will live up to their labels. In a study of a group of black girls in a London school, Fuller found that the girls resented the negative stereotypes associated with being both female and black. They felt that many people expected them to fail, but far from living up to their expectations, they tried to prove them wrong. The girls devoted themselves to school work in order to try to ensure their success.

*Paragraph 5*

This interactionist then recognises that negative labels can have a variety of effects. However, this observation weakens the forcefulness of the labelling theory. It seems that labels will usually have an effect, but the type of effect they have is not predictable.

1. Underline, in the passage above, the sentence that you think introduces the main idea of this passage to the reader.
2. "The self concept of the pupil is influenced by the other pupils and by the teachers with whom *she or he* interacts."

2-3

To whom does *she or he* refer in this last sentence of paragraph 1?

.....  
 .....

4-5

3. Students are often advised to draw diagrams of the contents of their work to help them understand and remember the information. Below are two options (Option A and Option B) for summarising the first two paragraphs. Indicate which option you think is best by filling in the three boxes with the three words provided below, and drawing lines to show how the boxes are linked.

<p><u>Option A</u></p> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="border: 1px solid black; width: 40px; height: 20px;"></div> <div style="border: 1px solid black; width: 40px; height: 20px;"></div> <div style="border: 1px solid black; width: 40px; height: 20px;"></div> </div> <p style="margin-top: 20px;">interactionist theory labelling theory self-fulfilling prophecy</p>	<p>-----</p>	<p><u>Option B</u></p> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="border: 1px solid black; width: 40px; height: 20px;"></div> <div style="border: 1px solid black; width: 40px; height: 20px;"></div> </div> <p style="margin-top: 20px;">interactionist theory labelling theory self-fulfilling prophecy</p>	<div style="margin-bottom: 10px;"><input type="checkbox"/> 6</div> <div style="margin-bottom: 10px;"><input type="checkbox"/> <input type="checkbox"/> 7-8</div> <div><input type="checkbox"/> <input type="checkbox"/> 9-10</div>
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4. Look at the sentence below and then answer either option (a) or (b).

“Proponents of the self-fulfilling prophecy argue that predictions made by teachers about the future success or failure of pupils will tend to come true because the prediction has been made.”

<p>(a) I know for sure that the word <b>proponents</b> means ...</p>	<p>(b) Although I'm not absolutely sure, I <i>think</i> that the word <b>proponents</b> means ...</p>

11-12

13-14

5. What clues, if any, are there in the rest of Paragraph 3 that suggest the possible meaning of **proponents**?

.....  
.....  
.....  
.....

15-16

6. Select the option below that best completes this sentence:

The self-fulfilling prophecy claims that ...

- a. if teachers believe that their pupils are not clever, then those pupils will definitely fail.
- b. if teachers think that some pupils are not clever, then those pupils might start working very hard and so weaken the forcefulness of the theory.
- c. teachers' expectations about their pupils will in turn have an influence on the pupils' expectations about themselves.
- d. if pupils know that their teachers expect them to do well and believe that they can do well, then the pupils will become brighter.

17

7. Please read the following sentence quoted from Paragraph 3: "Supporters of the theory point out that a teacher may define a pupil in a particular way, such as 'bright' or 'dull'. Based on this definition, the teacher then makes predictions about the behaviour of the pupil, for example, she or he will get high or low grades. The teachers' interactions with their pupils will be influenced by their classifying of the pupils."

Underline two words in the extract above that have more or less the same meaning, in this context, as the verb *to label*.

18-19

8. What does it mean if a pupil is "dull"?

.....  
.....

20-21

9. What clues, if any, are there in Paragraph 3 that can help a reader try to work out what "dull" means in this passage?

.....  
.....  
.....

22-23

10. Please read the following sentence quoted from Paragraph 3: "The self-fulfilling prophecy argues that predictions made by teachers about the future success or failure of pupils will tend to come true because the prediction has been made. The teacher defines the pupil in a particular way, such as 'bright' or 'dull'. Based on this definition, the teacher makes predictions about the behaviour of the pupil, for example, she or he will get high or low grades. The teachers' interactions with their pupils will be influenced by their classifying of the pupils."

To what does this definition refer? Underline the word/words/sentence in the extract above to show to which part of the paragraph this definition refers.

24-25

11. Read Paragraphs 2 and 3 again. There is an important piece of information that the writer has left out. This omission may cause the reader some confusion. What does this piece of missing information concern?

.....  
.....  
.....

26-27

12. How is the validity of sociology theories, such as the labelling and the self-fulfilling prophecy theories, tested?

.....  
.....  
.....

28-29

13. Who do you think Margaret Fuller is?

.....  
.....

30-31

14. What label do you think the black girls in this school had?

.....  
.....  
.....

32-33

15. Please read the following sentence quoted from Paragraph 4: "As a result of this research, some interactionists have come to realise that not all pupils will live up to their labels."

From this sentence we can infer that the writer is now going to tell us about ....

- a. research that shows how some pupils behave in ways that are expected of them.
- b. research that shows how some pupils don't behave in ways that are expected of them.
- c. research that shows that some pupils have no labels and so cannot live.
- d. research that shows that some teachers do not give their pupils labels.

34

16. Please read the following sentence quoted from Paragraph 4: "They felt that many people expected them to fail, but far from living up to *their* expectations, *they* tried to prove *them* wrong."

To whom does '*their* expectations' refer in the sentence above?

.....  
.....  
.....

35-36

17. To whom does '*they*' refer to here, in the sentence quoted in question 16?

.....  
.....

37-38

18. To whom does '*them*' refer to here, in the sentence quoted in question 16?

.....  
.....

39-40

19. Was the behaviour of the girls at the London school expected or unexpected in terms of the labelling and self-fulfilling prophecy theories?

- 1  expected                      2  unexpected

41

20. Look at Paragraph 4 again. In order to make this paragraph more reader-friendly, it would help to insert the phrase "For example, ..." at the beginning of one of these sentences in order to illustrate to the reader that a statement has just been made. In front of which of these sentences in Paragraph 4 would you insert this phrase?

- a. There have been a number of attempts to test the validity of the labelling theory and the self-fulfilling prophecy theory.
- b. As a result of this research, some interactionists have come to realise that not all pupils will live up to their labels.
- c. In a study of a group of black girls in a London school, Fuller found that the girls resented the negative stereotypes associated with being both female and black.
- d. They felt that many people expected them to fail, but far from living up to their expectations, they tried to prove them wrong.
- e. The girls devoted themselves to school work in order to try to ensure their success.

42

21. Please read the following sentence quoted from Paragraph 5: "This interactionist then recognises that negative labels can have a variety of effects."

Who is "This interactionist" to whom reference is made here?

.....  
 .....

43-44

22. After reading the last two paragraphs (Paragraphs 4 and 5), one can come to the conclusion that ...

- a. Fuller's work supports the claims made by the labelling theory.
- b. Fuller's work does not support the claims made by the labelling theory.
- c. the validity of claims made by the labelling theory cannot be tested by research.
- d. negative labels always have a negative influence on people's behaviour.

45

23. Please read the following sentence quoted from Paragraph 5: "This interactionist then recognises that negative labels can have a variety of effects. However, this observation weakens the forcefulness of the labelling theory. It seems that labels will usually have an effect, but the type of effect they have is not predictable."

To what does this observation refer? Underline the word/words/sentence in the extract above to show to which part of the paragraph this observation refers.

46-47

24. In the light of what you have read in the passage above, indicate whether the following statements are True or False.

a. Interactionism is a specific theory of education which includes explanations of human behaviour in general.

True

False

48



<p>b. The self-fulfilling prophecy theory and the labelling theory are two different kinds of interactionist theories.</p> <p><input type="checkbox"/> True <input type="checkbox"/> False</p>	<p><input type="checkbox"/> 49</p>
<p>c. Although labels do influence people's behaviour, it is difficult to predict whether their influence will be positive or negative.</p> <p><input type="checkbox"/> True <input type="checkbox"/> False</p>	<p><input type="checkbox"/> 50</p>
<p>25. The statement below is incomplete. In each case, underline the word in each option that you think is right, in order for the statement to make sense with regard to the Paragraphs 4 and 5 of this passage.</p> <p>"Paragraphs 4 and 5 tell us something about the relationship between theory and research. For example, the paragraphs show us how research findings provide _____ (a) _____ for researchers about the validity of theories. In this way, researchers can _____ (b) _____ a theory so that it provides a more accurate explanation of a phenomenon."</p> <p>(25.1) The answer to (a) is.....: <input type="checkbox"/> 1. definitions  <input type="checkbox"/> 2. the truth  <input type="checkbox"/> 3. labels  <input type="checkbox"/> 4. feedback</p>	
<p>(25.2) The answer to (b) is.....: <input type="checkbox"/> 1. modify  <input type="checkbox"/> 2. dismiss  <input type="checkbox"/> 3. predict  <input type="checkbox"/> 4. interpret</p>	<p><input type="checkbox"/> 51</p>
<p>26. The writer of the passage gave his work to an editor for checking. The editor suggested that the writer put in a subheading between paragraphs 3 and 4. What subheading do you think would be suitable for the writer to put in here?</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p><input type="checkbox"/> 52</p>
<p>27. The editor also suggested that the writer include a final sentence in Paragraph 4, to round off the description of Fuller's study. Following the editor's suggestions, which of the sentences below do you think would be suitable for this purpose?</p> <p><input type="checkbox"/> a In other words, the girls did not live up to their labels.</p> <p><input type="checkbox"/> b However, the girls did not live up to their labels.</p> <p><input type="checkbox"/> c Consequently, the girls lived up to the labelling theory.</p> <p><input type="checkbox"/> d From this we can conclude that the girls lived up to the labelling theory.</p>	<p><input type="checkbox"/> <input type="checkbox"/> 53-54</p> <p><input type="checkbox"/> 55</p> <p>[ END ]</p>

BEFORE YOU POST THIS ASSIGNMENT, CHECK THAT YOU HAVE DONE THE FOLLOWING!

- Placed this assignment (number 9) in a separate unisa assignment cover.
- Mark the assignment cover, "assignment 09", and fill in your surname, initials, course code and address.
- (Don't put assignments 8 and 9 in the same assignment cover, use a separate assignment cover for each.)
- Put this assignment in the addressed envelope provided and post it to Unisa! *Many thanks !*

## APPENDIX H

STUDENT NAME: \_\_\_\_\_

1. Please circle the description that you feel is most applicable to yourself.

- a I enjoy reading and I don't usually have problems understanding the texts I read.
- b I enjoy reading but I find it a bit slow and difficult sometimes, especially with my textbooks.
- c I don't really like reading because it takes too long and the texts are difficult.

2. For what reasons do you mainly read? Circle ALL the options that are applicable.

- a for study purposes
- b for enjoyment
- c for work-related purposes
- d for religious purposes.

3. In which language(s) do you do most of your reading in the following situations?

for study purposes \_\_\_\_\_  
 for enjoyment \_\_\_\_\_  
 for work-related purposes \_\_\_\_\_  
 for religious purposes \_\_\_\_\_

4. How many times do you generally read through a text (e.g. an article/chapter in a textbook, etc) that is prescribed or recommended for an assignment?

- a *once*
- b twice
- c 3-4 times
- d 5 or more times

5. Circle all those areas that you feel you sometimes have problems with when reading:

- a understanding the grammar of the sentences
- b the meaning of many words
- c understanding the overall meaning/arguments in a text
- d the background knowledge assumed by the text
- e other problems, (specify below):for example: \_\_\_\_\_

6. What do you usually do when there is a section of the text that you don't understand?

\_\_\_\_\_  
 \_\_\_\_\_

At what speed do you normally read? Here is a passage for you to test your own reading speed. Read through the passage once at a speed with which you feel comfortable and that enables you to understand the passage. Time yourself with a watch that indicates seconds. Write down, in the space provided below, the time you took, in minutes and seconds, to read the passage.

Do not skip parts of the passage - you are going to answer questions on it afterwards!

### The Princess and the Crone

1. About 80 km north-west of the Chinese city of Sian a cluster of 17 flat-topped pyramids rises boldly from the surrounding fields. This is the great burial field of T'ang royalty and here, nearly 1 300 years ago, a young princess was buried.
2. She was Princess Yung T'ai — meaning Eternal Peace — who lived during the T'ang dynasty of AD 618–907, often described as China's golden age. The story of her life and death rings a tragic note, even after the passage of so many centuries.
3. In the year AD 700, the 16-year-old Princess Yung T'ai was married to a high-born member of the T'ang court, a commander of the second rank of Imperial carriages. Soon after her marriage she became pregnant and her future in a brilliant world of pomp, extravagance and exquisite works of art, seemed secure.
4. But it was also a world that was dominated by Yung T'ai's grandmother, the Empress Wu, who had clawed her way to the Dragon Throne of China by murdering the former empress and pickling her limbs in wine as a warning to any would-be rivals. Not without cause, she distrusted the entire court and imagined plots on every side.
5. One day, in the year 701, one of the palace's many informers overheard the young Princess Yung T'ai laughing with her husband and brother at some aspect of court life they found absurd. The informer took the story to the empress, who saw in it the birth of a palace intrigue. At once, she ordered that the three young people must die.
6. Imperial decrees of this nature were backed by a strict protocol. All three knew what they must do, and on October 8, 701, they committed suicide.
7. The princess and her story faded from human memory until, one day in 1969, the Chinese authorities decided to excavate at least one of the pyramid tombs in the T'ang burial ground near Sian. They did not know the names of any of the occupants, only that they were members of the T'ang dynasty. One tomb was picked at random, and with their choice the long-forgotten princess took her place once more on the world's stage.
8. When the archeologists made their first soil survey around the pyramid to determine where the entrance shaft lay, they discovered another shaft running vertically through the right-hand side of the pyramid. It was obvious that tomb robbers had dug their way in to plunder the tombs that lay below.
9. The tomb chamber had been ransacked — it is thought, within 20 years of the burial — and the great stone sarcophagus had been scarred by crowbars, its heavy lid split, its contents rifled. Only the bones of the dead had been left. But they had also left untouched the niches that lined the passage to the chamber. These were crammed with T'ang pottery — items that to the robbers were without value, but to modern eyes are priceless. Their entry had also left undisturbed wall-paintings depicting many aspects of life in the T'ang court.
10. The archaeologists still did not know who the occupants of the robbed tomb had been, until they came across a great stone slab lying in the passageway. This slab was inscribed with the epitaph of the Princess Yung T'ai.

(Reader's Digest, *Strange Stories, Amazing Facts*, 1975: 259–61)



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