

LANGUAGE AND AUDITORY
HALLUCINATIONS IN SCHIZOPHRENIA

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ABSTRACT

Historically, and more recently, language has been considered as a key feature in the description of schizophrenia. However, there is widespread dissatisfaction with currently available descriptions. In this study, a linguistic model is used to develop objective and comprehensive measures of the language of twelve individuals with schizophrenia as compared with twelve individuals without mental illness. The measures are shown to have high intra- and inter-rater reliability. Moreover, they are suitable for clinical practice due to the limited training required for their use, and the ease of administration of these measures.

In the literature on schizophrenia, it is proposed that language and auditory hallucinations may be related. Within the study, this relationship is investigated, with a finding of a number of correlations between measures of language as developed earlier in the study and aspects of study participants' hallucinatory experiences. Possible cognitive explanations for the findings are discussed.

Due to the significance of the linguistic difficulties and hallucinations for persons with schizophrenia, the linguistic measures developed earlier in the study are used as a basis for a therapy programme. Therapy is described for two of the study participants. The participants are shown to benefit from therapy as demonstrated in their improvement on the linguistic measures at the end of the therapy programme and in the comments by participants themselves as well as staff working with them. Participants retained some of the benefits at reassessment six weeks post therapy.

It is proposed that the measures developed in the study provide the basis for the description of spontaneous discourse samples of persons with schizophrenia and possibly related disorders. It is also suggested that these measures are potentially useful as a basis for hypothesis-driven therapy for the linguistic difficulties described in persons with schizophrenia.

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CHAPTER ONE - LITERATURE REVIEW

OUTLINE OF LITERATURE REVIEW

The literature review commences with a brief outline of the concept of schizophrenia (Section A.1). It is suggested that a communication difficulty or thought disorder has always been considered a defining feature of mental illness, and schizophrenia in particular (Section A.2). However, a variety of terms, including language, communication and thought are used, at times interchangeably (Section A.3). This leads to the question as to what constitutes the primary disorder in schizophrenia; language difficulties or thought disorder (Section A.4). Looking more closely at some of the descriptions available, it would seem that these different terms might reflect more the perspective of the investigator than the nature of the disorder (Section A.5). It is suggested that most descriptions in the literature reflect the narrow focus of individual investigators, so that a more comprehensive theoretically driven description of the language of people with schizophrenia is not available. The significance of such an investigation is addressed (Section A.6), with requirements of an adequate description listed in Section A.7. This leads to the first of the three objectives of this study: whether a description of the language in schizophrenia can satisfy these requirements, as described below:

I.e. OBJECTIVE ONE: an examination of the possibility that the thought disorder or communication disorder in patients with a diagnosis of schizophrenia can be described using objective terminology, as part of a theoretical framework, which enables repeated assessment/analysis on different occasions.

Objective one necessitates looking at the literature on thought disorder or communication disorder in schizophrenia to determine an appropriate theoretical framework with which to describe the disorder as any framework used must be broad enough to reflect difficulties in a range of areas described in the literature. For the purposes of this study, frameworks are divided into frameworks relating to cognitive areas of functioning (section B.1), linguistic areas of functioning (section B.2), neurological areas of functioning (section B.3) and physiological areas of functioning (section B.4). It is evident from a cursory examination of the most popular of these frameworks that primarily the difficulties with descriptions in terms of cognitive, neurological and physiological frameworks are difficulties in testing out hypotheses in terms of data observed in studies of persons with schizophrenia. Linguistic frameworks provide a more direct measure of data from individuals with schizophrenia. In contrast, difficulties with linguistic frameworks relate to the narrow nature of most studies currently available and the difficulty in defining accurately measures of language at a higher or more abstract level. This suggests the value of conducting a linguistic analysis using a broader framework. The framework would necessarily include satisfactory measures of higher level or more abstract areas of language as described in Section B.2. Such an analysis could provide a description of spontaneous language samples drawn from mentally ill patients (section B.5). Details of the linguistic framework and discourse samples are described in the methodological section of the literature review (Section E).

It is noted that the descriptive frameworks as discussed in the literature (outlined in Section B) have commonly been employed to explain a number of different aspects of the symptomatology of these patients, including the language of persons with schizophrenia and frequently also their auditory hallucinations. The explanations have involved hypotheses of linkages between the language of people with schizophrenia and other symptoms of these same individuals. This suggests the importance of investigating the relationship between the language of people with schizophrenia as described using the linguistic framework in this study and auditory hallucinations, leading to the second objective of the study:

OBJECTIVE TWO: an investigation of the relationship between overt language disorder and auditory hallucinations, with a suggestion that these may both reflect a single underlying deficit.

The significance of an understanding of the language of persons with schizophrenia has already been outlined (Sections A.2 and A.6). A brief description of the significance of an understanding of auditory hallucinations in those individuals diagnosed with schizophrenia is now provided in section C.1. A consideration of the impact of hallucinations on those who hallucinate (Section C.2) adds to the importance attached to understanding this symptom. It is evident that one of the ultimate objectives for an understanding of these areas must be the clinical consideration of remediation or amelioration of the impact of both the language difficulty and hallucinations on the individual with schizophrenia. Considering this objective, and the suggestions that the language difficulty and hallucinations in

schizophrenia are related (Section C.3) leads to the third objective in this study:

OBJECTIVE THREE: that the incidence of auditory hallucinations as well as the severity of the language disorder can be reduced by specific language therapy addressing an underlying deficit.

The particular significance of determining appropriate therapy for the language disorder and auditory hallucinations in schizophrenia is described in Sections D.1 and D.2 respectively.

SECTION A

THE PRESENCE OF A 'COMMUNICATION DISORDER OR THOUGHT DISORDER' IN SCHIZOPHRENIA

SECTION A.1

WHAT IS SCHIZOPHRENIA?

Incidents involving people with a diagnosis of schizophrenia make regular headlines in the tabloid and broad sheet newspapers, and scientific studies commonly refer to groups of study participants diagnosed as schizophrenic. Yet, there is no single manifestation or course for the disease (Frith, 1992). Neither is there a biological marker to confirm a diagnosis of schizophrenia, nor a single widely accepted theory regarding its causation. This has led some researchers to refer to the group of schizophrenias (e.g. Bleuler, 1911). Other researchers have noted that many similarities exist between those individuals diagnosed as schizophrenic and those with other diagnoses such as that of mania, suggesting the value of recognising a spectrum of disorders (e.g. Crow, 1986).

Modern classificatory systems (such as ICD 10, World Health Organisation, 1994, DSM IV, American Psychiatric Association, 1994) do, however, enable psychiatrists to identify, for the most part reliably and consistently, a group of patients who can be described as schizophrenic based on their symptoms and signs, time course and outcome. The patients described as schizophrenic report certain unusual experiences and beliefs (symptoms). They display behavioural disturbances (signs), and less frequently, their speech is difficult to understand, although depending on the individual and the particular point in time, there is a preponderance of certain symptoms and signs. Thus, despite the variability among people described as schizophrenic, it is possible to find such a group of people in which to study an aspect of their behaviour. Such a group has been identified for the majority of studies looking at language in psychotic illnesses (Newby, 1998). Within this study, all study participants with schizophrenia had consistently been diagnosed as schizophrenic in their medical notes, suggesting that despite the variability in their presentation they all fell within the remit for a classification of schizophrenia according to current diagnostic frameworks. It has frequently been suggested that psychiatrists base their diagnosis predominantly on the verbal interaction of the patients concerned. This finding is exemplified in Kendell's (1973) conclusions of a study investigating factors influencing psychiatrists' diagnoses of patients. Kendell states, "Using the final hospital diagnosis as a criterion of accuracy, both accuracy and interrater reliabilities were just as good using the soundtrack alone, or even the transcript, as with the full videotape, in spite of the fact that the transcript conveyed no information about the patient's appearance or behaviour" (p.444). Thus, it would be expected that the communication of the participants with schizophrenia in this study would include 'a marker' for schizophrenia. The suggestion of

a communication difficulty in mental illness, and more specifically in schizophrenia is outlined in the next section.

SECTION A.2

SUGGESTION OF A 'COMMUNICATION DIFFICULTY' OR 'THOUGHT DISORDER' IN MENTAL ILLNESS

Throughout the ages, language disorders have been considered one of the key diagnostic indicators of mental illness. Historically, as early as 1892, Seglas noted that although the diagnosis of mental illness is based on the identification of symptoms such as delusions, hallucinations and mood disorder, the process itself is mediated by language and by the analysis of linguistic expressions and gestures. Thus, for example, the diagnostic frameworks established by Bleuler (1911/1950) (who attempted a description of the central mechanisms of the disorder), and Kraepelin (1919) (who developed a descriptive delineation of the specific symptoms involved in the disorder) included language disorder as a key element.

More recent theories also converge in their claims that a deficit in language or discourse is central to schizophrenia. These theories derive from varied schools to include cognitive, psychoanalytic and existentialist sources (e.g. Bateson, 1971; Lacan, 1968; Klein, 1989; Laing, 1961). However, depending on the theory, the locus of the problem and the postulated causality vary. Thus, the language disorder constitutes a sign of schizophrenia, a cause of it, or even its substance. Allen (1985) comments that the speech of all participants in a study with a diagnosis of schizophrenia does indeed differ from that of 'normals',

although this is in 'as yet unspecified ways'. Similarly, Lorenz (1968) notes that it is possible to recognise schizophrenic language although it is still not possible to define it. This is reiterated in more recent accounts, with Newby (1995) commenting, "That there are oddities in the language produced by many patients with psychiatric disorder seems indisputable. Indeed, particularly with regard to the psychotic disorders, peculiar speech or communication is often one of the most tangible markers that there is something wrong." (p. 31). As Sims (1995) notes, "...It is through sounds, mostly words, that patients are able to tell us about their symptoms and reveal the signs of illness. The absence of speech is a symptom in itself. The doctor, also, uses words for communication, both in making inquiry in a psychiatric history, and in establishing a therapeutic relationship. Speech is a window for the mind. The speech of the patient informs both about symptoms - the nature of the complaint and the study participant's experience of distress - and about signs - the evidence to an outside observer that there is psychiatric disorder, whether or not the patient is aware of it as a complaint." (p. 3) Similarly, Rieber (1980) states, "Verbal interaction is an essential tool in medicine generally, but is indispensable in psychiatry, in which laboratory procedures cannot supplant history taking. There are no laboratory tests for belief systems." (pp. 3-4). In a more recent work, Rieber notes that verbal interaction still holds the same position with regard to its role in psychiatry (Rieber and Vetter, 1995). Thus, an understanding of the thought disorder or communication difficulty in schizophrenia could contribute to the understanding of schizophrenia itself. In addition, it contributes clinically to diagnostic decisions and is used as the medium for most therapy. Yet, despite the centrality of the term 'thought disorder' and the widespread acknowledgement of a language or communication difficulty in diagnosing mental illness,

it is unclear what the 'thought disorder' includes, and, as noted by Newby (1995), there is no accurate description of the precise nature of the language disorder.

Thus, both early and more recent theories of schizophrenia emphasise the involvement of a language difficulty as a symptom of mental illness, and clinically, language is used to identify schizophrenia and as a medium for therapy. Yet, the origin and nature of the language disorder are not currently understood, and, in fact, it is even unclear what the term language is sometimes seen to encompass. It is evident that at times the terms language disorder, communication disorder and thought disorder are being used interchangeably in the literature, but it is not clear whether these terms are also being used to denote various levels and types of disorder. Differential definitions for these terms are provided in the following section, providing an understanding of how these terms will be used within this study.

SECTION A.3

THE MEANING OF THE TERMS LANGUAGE DISORDER, COMMUNICATION DISORDER AND THOUGHT DISORDER

(1.) What does a language disorder, a communication disorder or a thought disorder mean?

'Language' refers to a system for the expression of thoughts, feelings, etc., by using spoken sounds or other conventional symbols. Commonly, it is at the level of discourse that the disorder becomes apparent in an individual's language. Language is one of a number of systems involved in communication. 'Communication' refers to the conveying of a

message (with communication involving areas such as 'proxemics' as well as language). This means that frequently a difficulty in terms of language is reflected in disordered communication, but it is possible for the language system to be intact, and communication to be impaired. Where communication is disturbed but language knowledge is intact, the person can be described as having a difficulty with pragmatics, or, alternatively, the person can be described as having a difficulty in his language performance despite having adequate language competence. In contrast, the term 'thought disorder' would appear to be describing a cognitive difficulty, although it is used in the literature to describe language, which results in confusion for the listener. This means that, despite the terminology, thought disorder relates to a judgement about language based on the listener's response.

It can therefore be seen that with reference to those people with a mental illness there may be considerable overlap and inconsistencies in the use of the terms 'language', 'communication', and 'thought', and yet some distinctions carried by the use of these same terms. An example is the use of the word 'communication' as a more inclusive term. The term is then used to describe the entire process of conveying a message. 'Language' is then used to refer to elements of the spoken message such as syntax and semantics. Where terminology is used in this way, 'thought disorder' is used to describe the language which results in listener confusion, with 'thought disorder' almost exclusively associated with persons diagnosed with a mental illness. For the purpose of this study, the terms will be used with the meanings as outlined above. It is, however, useful to consider how the above terms have been used in the literature, most importantly the term 'thought disorder' due to its significance in the discussion of individuals with schizophrenia.

(2.) What is meant by the use of the term ‘thought disorder’ in the literature?

As noted above, commonly, someone is described as ‘thought disordered’ if the listener is confused when attending to the speaker’s discourse. Within this section, it will be shown that current descriptions of thought disorder in the literature often fail to distinguish between various linguistic and cognitive difficulties, despite these distinctions being recognised already in the earliest descriptions of schizophrenia. The failure to distinguish between these two forms of abilities is also despite numerous and varied sources of evidence for the clear distinction between cognitive and linguistic abilities. There are a number of repercussions of a failure to discriminate between these aspects of thought disorder, as this section then posits (end of section A.3).

In other words, there are clear distinctions between terms such as communication and language, as outlined above in section A.3 (1.). However, current descriptions frequently use the term thought disorder to describe both a disorder in the form of thought (the language or manner in which the thoughts are expressed), and a disorder in thought content (the ideas expressed). Moreover, the distinction between the linguistic and cognitive elements of the disorder is not made explicit. This means that the diagnosis of thought disorder is frequently a judgement regarding cognitive processes. This judgement involves two inferences; a difficulty Rochester (1980) identifies in many studies. Firstly, language, rather than thought, is being evaluated, and the thought is merely inferred. Secondly, the designation of a failure in language is inferred on the basis of the listener’s feelings of confusion. When the concept of thought disorder is invoked, language should be distinguished from thought content. As Harvey and Neale (1983, p. 175) reiterate, “...the

term 'thought disorder' in its present use is misleading and should be split into two categories...discourse failure...deviant cognitive processes that relate to discourse failure..."

McGrath (1991) confirms that these two elements of thought disorder need to be distinguished. Thus, the term 'thought disorder' is not synonymous with discourse failure or language difficulties, although these terms are frequently used interchangeably.

As mentioned briefly above, the lack of clarity with respect to what is intended by the term 'thought disorder' is particularly interesting in view of the recognition of the elements involved in 'thought disorder' by investigators as early as Bleuler (1950). Bleuler, for example, notes that the speaker may appear confused with only his "manner of expression" "obscure", and equally, the speaker may demonstrate a "gap in associations" in his thoughts, bridged by grammatical forms (page 211). Similarly, Kraepelin (1919) describes a dissociation between language and thought disorder, although Kraepelin differed from Bleuler in that Kraepelin spoke of a language deficit, whilst Bleuler attributed the linguistic difficulties to a thought disturbance.

Maher (1972) explains very eloquently with an analogy the distinction between thought and language; the translation of thought into language might be likened to a typist copying from a script before her. Her copy may appear to be distorted because the script is distorted although the communication channel of the typist's eye and hand are functioning correctly. Alternatively, the original script may be perfect, but the typist may be unskilled, making typing errors in the copy and thus distorting it. Finally, it is possible for an inefficient typist to add errors to an already incoherent script. Unfortunately, the psychopathologist

can observe only the copy (language utterances): he cannot directly examine the script (the thought).

(3.) Support for the distinction between language and thought

Chaika (1990) provides extensive evidence to support the distinction between language output and thought. She notes, “even though speech is often spoken thought, it does not follow that all speech directly reflects an individual’s thoughts, nor that all thought is accompanied by speech, nor that all deviant speech proceeds from deviant thought processes” (p. 53). Chaika substantiates this distinction between thought and language (p. 56) with examples of students demonstrating errors in thought or language independently of each other. She also notes that ambiguous sentences involve two entirely different ideas from an identical sentence, and the same idea can be paraphrased in various ways, reinforcing the fact that thought and language output are not identical.

Other evidence for the distinction between thought and language includes studies of persons with deficient knowledge in their oral language. Studies of the deaf (e.g. Furth, 1966) and people with aphasia (e.g. Zangwill, 1964) provide examples of a dissociation between language level and intellectual abilities. In fact, one theory describing bilingual peoples’ sometimes differing competence in their two languages suggests that these people sometimes use a single cognitive base to pass freely from one language to another (Schank, 1977). However, their fluency in the two languages differs, as a consequence of deficiencies in one of the languages relative to the other language and their cognitive abilities. Goral (1999) discusses how differential fluency in a number of languages

demonstrates the difference between the concepts underlying spoken language and language performance.

Looking at child development, studies of normal development have provided evidence of pre-linguistic thought and 'non intellectual speech' (e.g. Vygotsky, 1962). Drawing on findings from incidents of abnormal child development, Curtis' (1977) study of Genie, brought up in isolation, provides further support for a disparity between language and cognitive processes. Genie is reported to have had the syntax of a two-year-old child, with cognitive processes, which were significantly superior to this.

The distinction between language and cognitive processes is also supported by studies making reference to metalinguistic knowledge. Reports by individuals with schizophrenia (Chapman, 1966) on the disparity between their intentions and their language output are consistent with the distinction between thought relating to language and language itself.

The distinction between language and cognitive processes is similarly supported by Kuczay's (1983) work on children's self-learning strategies. He notes that children's strategies are far more efficient in learning language than in other cognitive processes.

Considering evidence from 'normal' adults, Fromkin's (1971) studies of slips of the tongue suggest that they are commonly interpreted as the results of momentary lapses in the retrieval of correct sounds, or lapses in self monitoring, but not disruptions in thought processes. The ability to produce nonsense such as that in Lewis Carroll's 'Jabberwocky',

as well as the fact that some structurally intact sentences indicate impaired cognition provide yet further support for the distinction.

Insufficient recognition of the distinction between language and cognitive processes in definitions of thought disorder may underlie a number of the conclusions drawn in the literature:

a.) Chaika (1990, p. 51) notes, "Thought disorder is not necessarily accompanied by any of the speech disorders discussed, nor, so far as we know, does it necessarily indicate disordered thought." It is unclear in many studies how 'thought disorder' relates to language and thought processes. The abnormal features of thought disorder have not been identified.

b.) In many studies, the ultimate validating criterion of tests of thought disorder has been clinical judgement, and yet, as emphasised earlier in this section, the defining features are generally not specified, and would appear to vary between studies. This could partially underlie findings relating to clinician agreement on the diagnosis of thought disorder, which frequently include findings of low interrater reliability, e.g. Kreitman, Sainsburg, Morrissey, Towers, and Scrivener (1961). It is possible that the difficulty in achieving agreement about what constitutes thought disorder contributes to the difficulties of low interrater reliability as different studies are using thought disorder as a label for a variety of linguistic and cognitive difficulties (Maher, 1991; Schwartz, 1982).

The evidence as cited earlier in this section (section A.3) demonstrates the necessity for a distinction between thought and language when considering thought disorder. Acceptance of this distinction poses a further question; whether the primary disorder in 'thought disorder', as described in the literature about people with schizophrenia, is cognitive (relating to thought) or linguistic (relating to language abilities).

SECTION A.4

WHAT IS THE PRIMARY DISORDER IN SCHIZOPHRENIA - THOUGHT OR LANGUAGE?

As suggested by Hoffman and Sledge (1988) and Docherty *et al.* (1996), the distinction between thought and language allows for the differentiation of three distinct possibilities relating to what might constitute the primary disorder and secondary disorder in thought disorder:

1. It is possible that the disorders identified as thought disorder are reflections of primary cognitive difficulties, such as thought abnormalities (Brown, 1973; Fromkin, 1975), or deficits in information processing (Frith, 1987; Schwartz, 1982). An example of this is the suggestion of Lecours and Vanier-Clement (1976). They propose a purely cognitive problem of 'ideational bizarreness', which is reflected in the speech of these patients. They note that it is the cognitive difficulty, which is consistently a part of thought disorder, and thus the primary difficulty in thought disorder. Yet another example of thought disorder being considered as a primarily cognitive disorder is Chaika's (1990, p.209) suggestion, where Chaika interprets the intrusion of irrelevant memories in narrative samples as an

indication that the “psychotics were often unable to repress internal stimuli”. However, Chaika does not provide evidence to substantiate this possibility. Holzman, Shenton and Solovay (1986) note, in general, indirect support for the suggestion of a primary cognitive disorder underlying the language disorder in thought disorder. According to them, formulations, which involve a primary linguistic disorder, are inappropriate because of the variety of linguistic presentations observed in those persons with a diagnosis of schizophrenia. Holzman *et al.* (1986) suggest that this variety in presentations implies that the language observed is the secondary manifestation of a primary cognitive disorder.

2. Other theorists have suggested the possibility of either:

- a.) A variety of disorders of basic linguistic systems; or
- b.) Linguistic strategies as the primary deficit in thought disorder.

Thus, in theories included in 2a. thought disorder has been attributed to a primary difficulty in lexical encoding (e.g. Chapman, Chapman, and Muller, 1964; Spitzer, Braun, Hermle and Maier, 1993); a semantic integration deficit (Knight and Sims-Knight, 1979; Traupmann, 1975; Traupmann *et al.*, 1976; problems in editing (e.g. Chaika, 1990; Crosson and Hughes, 1987; Maher, 1983; McGrath, 1991; McGrath, 1996); monitoring deficiencies (e.g. Harvey, 1985; Rochester, 1978); and problems in generating discourse plans (e.g. Hoffman, 1986).

Alternatively, according to theories encompassed under 2b, the language presentation of people with schizophrenia represents a language strategy adopted in response to the individual’s current situation or past history. In an example of this approach, Laffal (1965) interprets one patient’s speech as avoidance of the therapeutic situation, noting that in view



of the intermittent nature of the language disorder, it is likely that the language of people with schizophrenia involves a deliberate language strategy. Yet another possibility, in which the language presentation of individuals with schizophrenia is interpreted as a language strategy, is the possibility suggested by Forrest (1965, 1976). He postulates that speech disordered patients are attempting a description of the schizophrenic experience, for which ordinary language is insufficient. Bateson (1972) provides another very different theory in which the language of people with schizophrenia represents a language strategy, in this case as a response to the person's past history. According to Bateson's developmental model, people with schizophrenia were caught in a double bind as children. These children did not learn to communicate properly because when these children accused their unloving parent, the parent denied lack of love, and the children were punished. However, there is a lack of evidence for this theory. The proposed situation involving conflicts during the individual's childhood is not true of all people with schizophrenia, and is equally true of some people without schizophrenia. In addition, sociolinguistic studies suggest that peer learning is the primary source of influence on the child's language. This is inconsistent with the large influence attributed to parental behaviour in Bateson's theory. The intermittent character of the speech disorder in schizophrenia would furthermore imply that the individual is able to communicate in certain contexts, so that the language presentation in schizophrenia cannot easily be described as a consequence of developmental factors. Abnormal development would generally suggest that the individual would adopt this language pattern in all language contexts indiscriminately or solely in communication with parental figures, which is not recorded in any of the literature on language behaviour in schizophrenia.

3. It is also possible that persons with schizophrenia have a difficulty which can equally be described as a cognitive or linguistic difficulty, with variants of this position including the theories espoused by Cutting (1998), Frith (1992) and Thomas and Fraser (1994).

Descriptions of a cognitive difficulty and descriptions of a linguistic difficulty are descriptions of the same primary difficulty, but described using different terminology to reflect different levels of processing.

Thus, it would appear that different theories suggest a primary cognitive or linguistic basis to what has been termed 'thought disorder' or the possibility that there is a disorder that can equally be described in cognitive or linguistic terms.

The above discussion leads to the suggestion that the consideration is not so much whether the primary difficulty in schizophrenia is a cognitive or linguistic difficulty. Similarly, it may be inappropriate to suggest that a cognitive or linguistic framework may be unsuitable for a description of schizophrenia. Rather, the question is which theoretical framework would be preferable.

SECTION A.5

SHOULD A DESCRIPTION BE IN TERMS OF LANGUAGE OR THOUGHT?

It is suggested that in view of the various possibilities outlined in the previous section (Section A.4) a preference for a linguistic or cognitive description would be dependent on the adequacy of current linguistic and cognitive frameworks to provide an adequate

description of the presentation of individuals with schizophrenia. This necessitates looking at the suitability of different existing frameworks for describing those individuals with a diagnosis of schizophrenia.

It would appear that much of what is included in behaviour described by the term 'thought disorder' can be described in terms of Hurlig's (1977) description of the extralinguistic constraints on language.

Hurlig lists these constraints as:

1. Gricean conversational postulates;
2. Truth conditions (pragmatic constraints);
3. Logical-scope relationships;
4. Social interaction variables which constrain both types and tokens of linguistic utterances as a function of context of the linguistic utterances, participants in the communication, and perhaps even study participant matter. These descriptive frameworks are arguably best situated in a linguistic, cognitive or sociological background, meaning that a similar description can be situated within a number of different frameworks and backgrounds.

An example of this overlap within different theoretical backgrounds is provided in the following descriptions. According to Chaika, a part of normal *linguistic* competence is being able to assess a situation so as to mention only what it is proper to utter overtly, therefore involving constraints relating to logical sequencing or social relevance. Fromkin (1975) argues for a similar difficulty but suggests that this cannot be discussed in terms of

linguistic competence but rather this represents *social* competence or *psychological* competence. Harrod (1986) suggests the term 'semiotic disorder' to account for the disorder displayed in schizophrenia. This suggests a disorder contained within the realm of communication but not limited to speech, using the definition of 'semiotic' as 'semantic' or 'of or pertaining to semantics' as described by Harrow, Prather and Lanin-Kettering (1986), perhaps suggesting a description at the interface of linguistic, social and psychological theories. Thus, Harrod suggests that linguistic research can be subdivided into two broad areas. The first area includes 'traditional linguistic areas' including phonological, semantic, syntactic and discursive structures, whilst the second includes those areas relating to language-in-use. These areas include those such as speech acts, pragmatics, comprehension of conflicting information and metaphor comprehension. Harrod suggests that the semantic domain includes the second area, and that this is relevant to communication in schizophrenia. It can be seen that the latter area sits easily within linguistic, social and psychological theories. This would seem to imply that the central difficulty here may not be so much whether thought disorder constitutes a cognitive or linguistic difficulty, as demonstrated in Section A.4, nor whether a cognitive or linguistic description is most appropriate, as demonstrated in Section A.5. Rather, it would appear that there is a difficulty in finding a suitable formulation for a communication difficulty identified in schizophrenia, which, depending on the background of the individual investigator, is most suitably described as a linguistic, cognitive or social difficulty. The value of a linguistic framework to describe the communication in schizophrenia is suggested by a number of factors. A linguistic framework offers a more concrete versus abstract description. This may reflect the fewer inferences necessary when adopting a linguistic approach, rather than

an approach positing cognitive or social variables (as seen in the discussion in Section A.3).

A linguistic framework would also appear appropriate due to the clinical significance of the patient's language for differential diagnosis (Please see reference to this in section A.1).

What is the significance of such a description within a more general description of schizophrenia?

SECTION A.6

SIGNIFICANCE OF AN UNDERSTANDING OF THE 'COMMUNICATION DIFFICULTY' OR 'THOUGHT DISORDER' RELATED TO MENTAL ILLNESS AND SCHIZOPHRENIA

Chapman and Chapman (1973, p. 9) note "The potential payoff of success in understanding schizophrenic thought disorder is great. Schizophrenia is the most massive unsolved puzzle in the whole field of psychopathology, and thought disorder is schizophrenia's most prominent symptom." Lorenz, 1961, quoted by Chaika (1974, p. 257) states, "we are faced with the paradox that while we recognise schizophrenic language when we see it, we cannot define it". Wittgenstein (1958, p. 153) comments similarly, "An 'inner process' stands in need of outward criteria". Vetter (1969) is in agreement, noting that research suggests "the rather obvious fact that schizophrenic study participants often differ strikingly from normal persons in what they talk about and how they talk about it" (p. 25). Chapman and Chapman (1973, p. 9) note the importance of determining the precise nature of the difficulty; "A true understanding of the nature of the thought disorder might illuminate the nature of schizophrenia itself" (p. 9). Newby (1995) notes in a similar vein, "A prodigious amount of research effort has gone into attempting to understand just what is the nature and

cause of the language disruption - if we can understand that, we may gain insights into the nature of the disorder itself.” (p. 31).

These statements of the significance of an understanding of the communication difficulty in schizophrenia are not surprising given that thought disorder constitutes one of the key diagnostic symptoms in schizophrenia (Section A.2). This symptom, arguably, persists in patients with a diagnosis of schizophrenia even during periods of remission, just varying in severity depending on clinical and medication status (Andreasen and Grove, 1986; Harrow and Marengo, 1986; Spohn *et al.*, 1986). Both at initial diagnosis (Thomas *et al.* 1996b) and in states of remission (Shenton *et al.* 1992), participants in the study with a diagnosis of chronic schizophrenia demonstrate ‘mild verbal and cognitive slippages’, also occurring in some members of the normal population, but with lesser frequency (Shenton *et al.*, 1991; Shenton *et al.* 1992). It behoves us to find a framework to describe the range of communication skills observed in these individuals. This leads to the question of what constitutes the requirements of such a framework.

SECTION A.7

REQUIREMENTS FOR A DEFINITION OF COMMUNICATION DISORDER IN SCHIZOPHRENIA

Kean (1980) comments that any definition of a communication disorder must:

a.) include those linguistic aspects that are intact as well as those which are disordered, rather than focusing entirely on the aspects of language differentiating participants with schizophrenia from other study participants. The deviant linguistic behaviour observed is

the consequence of an interaction between impaired and intact components of the language faculty, and not a consequence of the impaired components of language in isolation.

However, frequently those individual characteristics of study participants' communication which are intact are not specified as many studies focus purely on those areas of language postulated to be disordered e.g. participants' use of references. In this study, a linguistic model was used, thereby covering a range of processes involved in language production as described by Frederiksen *et al.* (1990);

b.) involve a clear framework for classification categories. Frequently, language samples are divided into linguistic categories requiring varied judgements from coders, which would require numerous unspecified decision making models to account for them. Within this study, definitions of measures including brief instructions were used as instructions for raters, ensuring clear categorical distinctions;

c.) include distinct categories. Commonly, these are found to have considerable overlap, without clear boundaries (Hirsch and Leff, 1975, p. 139) and to include global categories that incorporate numerous different language types. Specification of categories to enable interrater reliability similarly militated against the inclusion of categories without clear boundaries. Also, the results of language analyses are generally subjected to statistical analysis. Clark (1973), who demonstrated that the usual approaches to sampling and statistical analysis do not allow generalisations beyond the data of the particular experiment, exposes the limitations of statistical analysis in psycholinguistic research. The difficulty is exacerbated when the language analysis involves categories exemplifying the

problems outlined in a-c. An example is found in the study of Morice and Ingram (1982), where the researchers produced sophisticated statistics, concluding that participants in the study with a diagnosis of schizophrenia produce 'simpler' sentences than manic or other control study participants. However, they did not provide an adequate definition of 'simple', and neither did they provide the discourses upon which these judgements were made.

The difficulties in language descriptions and subsequent language analyses are further compounded by the finding that the language disorder may be episodic, as suggested by Harvey's (1985) study. The latter study involved using the Thought, Language and Communication Scale (Andreasen, 1979) to assess the language of 'manic', 'schizophrenic' and 'normal' participants. The findings suggested that the thought disordered patient used incompetent reference strategies and ineffective cohesive strategies to produce poorly integrated discourse as compared with the discourse of non thought disordered study participants and 'normals'. Harvey, asserted, in his conclusion, that the language disorder was an episodic phenomenon, with some perfectly competent segments, as previously proposed by Lecours and Vanier-Clement (1976), suggesting that findings regarding study participants' language would vary over time. For this reason, it was necessary to use a descriptive method that could be repeated over time with reliable and valid findings, as assessed using tests of intrarater reliability. Thus, the importance of a linguistic description and the difficulties with current descriptions suggested the importance of

Objective One: testing the possibility that the thought disorder or communication disorder in patients with schizophrenia can be described using objective terminology, as

part of a theoretical framework, which enables repeated assessment and analysis on different occasions. This requires a review of the literature addressing the question of schizophrenic dysfunction to determine an appropriate framework for describing the disorder and the required breadth of any framework used, as indicated in the discussion of the requirements of any framework within section A.7 (above).

SECTION B

FRAMEWORKS FOR A DESCRIPTION OF THOUGHT DISORDER OR COMMUNICATION DIFFICULTIES IN SCHIZOPHRENIA

Investigators in their quest to describe the disorders encountered in schizophrenia have suggested a wide variety of difficulties. It is of course possible that these are not mutually exclusive. Baltaxe and D'Angiola (1992, 1995) in their studies of referencing skills in autistic children conclude that a variety of developmental, linguistic, cognitive and social factors are possibly associated with the children's development and use of cohesive ties of reference. This may also reflect the situation with regard to the causation of the difficulties as described in the language of people with schizophrenia. For the purposes of this study, explanations of the disorder encountered in schizophrenia will be divided into cognitive (section B.1), linguistic (section B.2), neurological (section B.3) and physiological descriptions (section B.4), with a few of those theories most commonly suggested outlined within each section.

SECTION B.1

COGNITIVE FRAMEWORKS FOR THE DESCRIPTION OF THOUGHT DISORDER OR COMMUNICATION DISORDER IN SCHIZOPHRENIA

(1.) A difficulty in retrieval from semantic memory?

Studies of semantic memory include tasks requiring recall or recognition of semantic information, where recall requires an active search process and recognition is a more direct reflection of the contents of the memory store. Additional memory tasks relate to a variety of pieces of semantic information relating to the word(s). A number of studies have looked at the possibility of a difficulty with retrieval from semantic memory in some or all patients with a diagnosis of schizophrenia.

a.) Chen *et al.* (1994) used a paradigm in which study participants decided whether an exemplar belonged to a particular category. Patients with schizophrenia responded similarly to 'normal controls' most of the time to within category decisions, suggesting that the mental lexicon is probably not significantly degraded.

bi.) Chen *et al.* 's (1994) results are consistent with the findings of studies such as that by Allen (1983) with respect to participants with schizophrenia who present with positive symptoms. In their verbal fluency experiment, the study participants with schizophrenia presenting with positive symptoms did not make irrelevant intrusions, as would be expected if there was 'flooding of consciousness' (described in selective attention deficit hypotheses). This was demonstrated by the fact that neither the temporal characteristics (clustering) nor the content (category membership of words) differed from that of the

control study participants, who had predominantly negative symptoms. Thus, a selective attention deficit cannot account for schizophrenic positive symptoms.

bii.) However, in study participants with schizophrenia presenting with negative symptoms, there was a cluster constriction trend, with clusters terminating more rapidly, resulting in smaller and fewer large clusters, and more single item clusters. Thus, in study participants with schizophrenia presenting with negative symptoms, there was evidence of a specific word retrieval restriction.

c.) Chaika (1990) does not distinguish between study participants with positive and negative symptoms when discussing word finding deficits in study participants with schizophrenia. She notes instances of gibberish and neologisms that she describes as clear instances of word finding deficits, and states that they are pathological.

In support of her view, Chaika suggests that as human languages are constructed so that new words can be invented and old words can be employed in novel ways to effect new meaning, neologisms and gibberish are unlikely to be a reflection of creativity. In addition, ordinarily, people struggling to explain experiences do not produce gibberish or neologisms to accomplish this.

Chaika notes, in her experiments termed 'the ice cream stories' (Chaika, 1982e, 1983b; Chaika and Alexander, 1986), that study participants evidenced circumlocution reminiscent of mild anomia, reinforcing the suggestion that there is a word finding difficulty in

schizophrenia. Chaika (1990) also notes that neologisms cannot be equated with slips of the tongue, stating that slips of the tongue are easier to interpret, and are therefore distinguishable from neologisms, reinforcing the pathological nature of neologisms.

Fromkin, (1975) however, suggests that the gibberish and neologisms in schizophrenia are comparable with slips of the tongue, and are therefore not pathological. Thus, the presence or absence of a semantic memory difficulty in the lexicon in a subgroup or all participants with a diagnosis of schizophrenia is disputed.

(2.) A difficulty in verbal working memory?

A dysfunctional working memory system has been postulated as the cause of multiple deficits in schizophrenia, including language deficits (Goldman-Rakic, 1987; Goldman-Rakic *et al.*, 1987; Goldman-Rackic, 1990; Cohen and Serban-Schreiber, 1992; Weinberger, 1993; Fleming *et al.*, 1994). In these theories working memory refers to a limited capacity general purpose system and modality specific short term stores, with a central executive co-ordinating information and allocating processing resources (e.g. Baddeley, 1992).

The Brown-Peterson task (Brown, 1958; Peterson and Peterson, 1959; Baddely, 1986; Baddeley, 1990) is a measure of working memory. In this task, the study participant is presented with stimuli, and then performs some distractor task until required to recall the stimuli. The distractor task prevents maintenance rehearsal, causing decay of the target material. It is postulated that a distractor task detracts from the limited resources available

for maintenance rehearsal and task co-ordination, producing a decrease in performance to the extent that this is true (Posner and Rossman, 1965). However, the task is made more difficult by other factors inherent in the Brown-Peterson task such as the necessity for the study participant to distinguish between the target and distractor material.

In a study by Fleming *et al.* (1995) using a Brown-Peterson model, a group of participants in the study with a diagnosis of schizophrenia performed particularly poorly on a semiautomatic articulatory task, consistent with a hypothesis of a malfunctioning in the overall co-ordinator (the central executive in working memory). However, there are other possible interpretations for the results. It is possible that study participants with schizophrenia encoded target words inadequately, as has been documented by e.g. Calev *et al.*, 1987, so that the material was more vulnerable to disruption, especially when the task was verbal. It is equally possible that study participants were defective in maintenance rehearsal, and were more reliant on subvocal rehearsal, which, when disrupted, led to poor performance.

Extrapolating from these results, we would expect to find that when attending to internal or external stimuli, momentary distractions would frequently disrupt the cognitive processes of individuals with schizophrenia during the course of everyday interactions including their language production. This would be reflected in language features such as incoherence, where the speaker can be described as speaking about tangentially related or unrelated topics. These results would not provide an understanding of many other aspects of the language presentation of participants with schizophrenia.

(3.) An attentional deficit?

Attention difficulties have long been postulated as a factor in schizophrenic disorder, with Kraepelin (1919) and Bleuler (1911/1950) already suggesting this possibility. Many investigators have since described an attentional deficit as an underlying factor in the symptoms of schizophrenia (Shakow, 1962; McGhie, 1969; Allan and Kristofferson, 1974).

Attentional models are described in terms of information processing. Broadbent (1958) published the first general model of human information processing. This involved a limited capacity channel, processing a continuous flow of information. A hypothetical filter gated out from the many sources of stimulation a limited amount of information at a speed that the system could handle. The possibilities suggested by this model initiated great interest in the hypothesis of selective attention as an explanatory factor in psychopathology.

Payne, Matussek, and George (1959) described the first formal hypothesis involving a schizophrenic perceptual filter problem. This hypothesis is described in more detail in Payne and Hewlett (1960). Weckowicz and Blewett (1959) also attributed schizophrenic symptoms to a failure to attend selectively to relevant information. This was followed by McGhie and Chapman (1961) suggesting that the primary disturbance in schizophrenia is a difficulty in the control of the direction of attention. Support for this theory was predominantly in the form of study participants' reports including large numbers of personal accounts. This source of information was supplemented by information derived from a number of other paradigms. These include (a.) - d.)):

- a.) reaction time (RT) experiments;
- b.) competing information studies;

c.) size estimation; and

d.) size constancy studies.

a.) The prototype RT procedure involves study participants pressing a key at the onset of a preparatory signal, and then lifting their finger off the key as quickly as possible after the presentation of a critical stimulus. The reaction time measure is the time interval between the second stimulus and the study participant's response. An example of the disparity between performance in participants considered 'normal' and study participants with a diagnosis of schizophrenia is the effect termed the crossover effect. Most 'normal' study participants demonstrate faster RTs when preparatory intervals are regular rather than irregular for preparatory intervals of up to twenty seconds. Study participants with schizophrenia benefit from regular series at short preparatory intervals (less than three to five seconds), whilst at longer preparatory intervals regular series impair their performance. This, together with other results in RT studies, has been interpreted as a reflection of attentional dysfunction, with various constructs such as selective inhibition and vigilance, and noncognitive variables such as motivation being proposed. However, there is no direct relationship between the findings and the constructs postulated.

b.) In competing information tasks, where study participants were asked to perform a variety of psychomotor and cognitive tasks both in the presence and in the absence of distracting stimuli, study participants with schizophrenia, as compared with 'normal' study participants, were more distracted by irrelevant stimuli, with, for example, impaired

selectivity. However, other hypotheses could account for the results, for example, slower processing of information.

c.) In size estimation tasks, study participants were asked to adjust a comparison stimulus to equal the remembered size of the initial stimulus. Schizophrenic poor size estimation has been described as involving abnormally minimal scanning for the subgroup with schizophrenia, who underestimated sizes, and excessive scanning in the schizophrenic subgroup, who overestimated sizes. Extrapolations from this data include the possibility that participants with schizophrenia either pay too much or too little attention to aspects of environmental stimuli.

d.) In size constancy tasks, two stimuli, a standard stimulus (ST) and a comparison stimulus (CO), are simultaneously presented at different distances from the study participant. The study participant adjusts the size of the CO to match that of the ST. An underestimate of the ST size is interpreted as undue emphasis on the retinal image as compared with the environmental stimuli, reflecting narrowed attention. However, the schizophrenic underestimates could also be attributed to other causes, including ambiguous instructions. Clearer instructions did in fact obliterate the underestimation previously found. Similar comments are applicable to the other early measures of attention.

Difficulties with all these attentional theories include:

- i.)* These studies presumed that language parallels all other behaviour, which is evidently incorrect.**
- ii.)* Simple observations about schizophrenic speech were not integrated into a meaningful theory of language that could explain and predict the disorder (Pisoni, 1969).**
- iii.)* Theories of schizophrenic language must account for current knowledge about language structure, rather than involving simple notions of association... “as the meaning of an utterance is not the linear sum of the meanings of the words that comprise it. This implies that studies which restrict themselves to the meanings of isolated words are dealing with a quite unnatural situation and are probably of very limited value.” (Pavy, 1969, p. 172)**

Thus, although some phenomenological reports and some laboratory data provide support for the proposal that study participants with schizophrenia suffer from a defective perceptual filter, the measures represent rather broad phenomena. It is necessary to define the deficit more specifically, and to understand how the problems are related to a verbal communication difficulty. Attempts have been made to specify the precise deficit:

- a.) McGhie and his colleagues (1969) demonstrated that the performance of participants with schizophrenia was particularly vulnerable to the introduction of competing, irrelevant information. They suggested that the filtering of irrelevant information by participants with schizophrenia was impaired so that short term memory was overloaded and recall impaired.**

b.) Yates (1966) argued that the problem was situated immediately after the peripheral reception of the stimulus and reflected a slowness in the initial stages of processing. However, the rate of processing for relevant information is insufficient to account for the observed results.

Although not obviously applicable to the distraction data, the difficulties outlined in relation to the above studies do demonstrate the uncertainty surrounding these models. Due to the problems with construct validity and the presence of contradictory data, many investigators have focused on selective attention, as described below.

ci.) Within dichotic listening tasks, designed to assess selective attention, the study participant listens to words presented in both ears, together with other information (shadows) in either the right or left ear or both ears. Study participants with schizophrenia, in comparison with 'normal controls', skip more words than controls, although they do not generally intrude irrelevant stimuli into their shadowing performance. This is contrary to expectations based on the Broadbent filtering model (e.g. Schneider, 1976). The study participants with schizophrenia also experience difficulty in distinguishing between relevant and irrelevant stimuli (e.g. Hemsley and Zawada, 1976).

To investigate whether the problem experienced by participants with schizophrenia is a sensory level phenomenon or a problem that involves higher level processes the recall of participants with schizophrenia has been assessed. The recall by participants with schizophrenia of the more recently presented items, presumably still available in sensory storage, was unimpaired, whilst the difficulty appeared to lie with the earlier stimuli

(reflected in the lack of a primacy effect). This was taken to suggest a difficulty at an advanced level involving control operations (Oltmanns, 1978).

cii.) Maher and colleagues (Maher, 1983; Manschreck *et al.*, 1988) postulated that because of attentional fluctuations, study participants with schizophrenia are deficient in their ability to inhibit words or phrases after they are activated, later appearing as loose associations.

The semantic priming technique allows the investigation of the semantic memory system. The technique involves presenting the study participant with two successive stimuli; the prime and the target. The speed and accuracy of the study participant's response to the target are measured. It has been suggested that the study participant's responses in semantic priming paradigm reflect the semantic memory system, which can be described as a network of nodes representing concepts (Collins and Loftus, 1975). Activation at one node spreads to other nodes in the semantic network, with the spread of activation decaying over time. As the network is organised on the basis of semantic or associative relatedness the activation affects most of the nodes which are closer together because they are semantically closely related.

Maher and his colleagues (Maher, 1983; Manschreck *et al.*, 1988) have suggested that in persons with schizophrenia activated units are not inhibited or decay more slowly than in other individuals, leading to loose associations. This would suggest a relatively large priming effect would be obtained in study participants with schizophrenia presenting with a thought disorder (where a priming effect is the greater speed and accuracy of a person's

response to a target word when it follows a semantically or associatively related prime as compared with when it follows an unrelated prime).

There are a number of priming studies with study participants diagnosed as schizophrenic.

di.) Manschreck and his colleagues (1988) studied thought-disordered and non thought disordered patients with a diagnosis of schizophrenia, unipolar affective patients, and 'normal' controls. The difference in reaction time between related and unrelated trials was greater for thought disordered study participants than the other groups of study participants with a stimulus onset asynchrony (SOA) of 250 ms.

dii.) Kwapil, Hegley, Chapman and Chapman (1990) found a hyperpriming effect for study participants with schizophrenia as compared with 'controls' when looking at their accuracy with a 500 ms SOA.

diii.) Spitzer, Braun, Hermle and Maier (1993) replicated Kwapil *et al.*'s (1990) study using 200 ms and 700 ms SOAs.

div.) Spitzer *et al.* (1993) also found hyperpriming for mediated priming in study participants with schizophrenia, where mediated priming refers to the situation in which the prime and target are indirectly related in that they are both associated with a third concept which mediates the relation between them.

There are, however, several other studies that demonstrate no augmented priming in study participants with schizophrenia.

ei.) Vinogradov, Ober, and Shenaut (1992; Ober, Vinogradov, and Shenaut, 1995) found no significant difference between study participants with schizophrenia and 'control' study participants using a 250 ms SOA and a low proportion of related trials.

eii.) Henik, Priel, and Umansky (1992) found no significant differences in priming effects between study participants with schizophrenia and 'normal' controls in a block of trials including short and long SOAs.

eiii.) Chapin, McCown, Vann, Kenney, and Yousseff (1992) presented primes and targets simultaneously, producing a large priming effect, but this did not differ between patients with schizophrenia and 'normal' study participants.

The underlying limited resources needed to execute the tasks described above and other cognitive tasks are referred to as attention, capacity or mental resources (Broadbent, 1971; Kahneman, 1973; LaBerge, 1990; Posner, 1978; Wickens, 1984). It is possible that thought disorder is related to distractibility (Maher, 1983). It has been suggested that irrelevant dimensions could distract study participants with schizophrenia, or, when required to divide their attention, these participants could allocate a disproportionate amount of their limited pool of resources to peripheral aspects of the stimuli. This possibility has been tested via a number of paradigms.

f.) Traditionally, the concurrent task paradigm has been used to reduce the allocation of resources to a cognitive process (LaBerge, 1990). Empirical support for a reduced ability to inhibit irrelevant stimuli is found in studies using the Stroop task. Study participants with schizophrenia have shown larger Stroop interference than a control group of study participants (Abramczyk, Jordan, and Hegel, 1983; Buchanan and Heinrichs, 1994; Langer, Stein, and Rosenberg, 1969; Peixotto and Rowe, 1969).

g.) Alternative methodologies have included studies of negative priming (Beech, Powell, McWilliam, and Claridge, 1989) and latent inhibition (Baruch, Hemsley and Gray, 1988), although, for example, schizophrenic disrupted latent inhibition has been shown to be limited to acute patients. It is also important to note that automatic processes, such as the spread of activation under short SOA conditions (Neely, 1977; Posner, 1978) are purported to be resource free, so that a concurrent cognitive load should not affect their performance (Jonides, 1981; Yantis and Jonides, 1984, 1990).

h.) A study by Henik, Nissimov, Priel, and Umansky (1995) set out to clarify the contradictory findings of some of the above studies. Whereas control study participants demonstrated significant priming effects, not modulated by SOA or distractor presence, study participants with schizophrenia demonstrated almost insignificant priming when performing a secondary task, regardless of the probe modality or SOA. However, when not required to respond to the probe, only the visual probe reduced priming.

i.) Looking at an alternative response measure, study participants with and without schizophrenia responded faster with long rather than short SOAs, with a particularly marked effect for the study participants with schizophrenia. In competing tasks, study participants with schizophrenia showed diminished performance on semantic processing where there was a nonlexical secondary stimulus, including a visual probe with no necessity for attending to the probe. It has been postulated that priming effects are a function of reaction time. However, a number of studies (Chapin *et al.*, 1992; Henik *et al.*,

1992, 1995; Kwapil *et al.*, 1990; Manschreck *et al.*, 1988; Ober *et al.*, 1995; Vinogradov *et al.*, 1992) have demonstrated that this is not supported empirically.

Henik *et al.* (1995) suggest in their conclusion that hyperpriming may be an evasive phenomenon, being demonstrated even when short and long SOAs were mixed in the same block of trials in one study, yet being reduced when an interfering event was introduced, although not with an auditory probe. They suggest that these results may reflect reduced control. This could involve an uncontrolled spread of activation or uninhibited activation in the semantic network, reflected in hyperpriming, and distractibility by irrelevant stimuli, reflected in reduced priming.

It would seem particularly difficult to extrapolate from these studies to expectations with regard to these subjects' language presentation in that it would appear that there are two dissociable aspects of control over action. These are control of response speed and control of semantic processing. They may involve different stages of processing, with the possibility of internal monitoring of action being carried out at multiple levels, which can be differentially intact or disturbed. There are few studies addressing this issue, with most studies using largely subjective accounts as evidence for a 'lack of control' which remains largely unspecified.

(4.) A 'lack of control'?

The possibility of a 'lack of control' as an explanation for a broad range of symptoms is suggested by theories in which there is a postulated 'chasm' between intentions and a range of actions. This theory has been used to explain very varied schizophrenic symptomatology. One example of where such an explanation has been suggested is the frequent preoccupation by some individuals with schizophrenia with religious ideation. This preoccupation has been interpreted as a method of imposing a rational explanation on a difficulty resulting from an underlying lack of control (here a disparity between intentions and speech output).

Maher (1983) offers corroboration for the above theory in the form of first person accounts of study participants with schizophrenia, who report a lack of control. Chapman (1966) reports on interviews with study participants with schizophrenia following their psychotic episode. They describe attempting to talk, but discovering that their output is not what was intended. However, there are no forms of evidence to substantiate this theory.

(5.) 'Concrete thinking'?

Other theories, following Vygotsky, suggest that study participants with schizophrenia only think concretely. This could be used to suggest that the language of study participants with schizophrenia might similarly reflect a lack of abstract thought. Harrow and Quinlan (1985) are among those concurring with this theory. However, others have argued that this concrete thinking is an artefact of available tasks, and not consistent with much of the data from study participants with schizophrenia.

(6.) The reflection of a planning disruption?

There have been a number of theories suggesting a particular cognitive difficulty with planning as a basis for some schizophrenic symptomatology. This could be reflected at a number of levels, as McGrath (1991, 1996) notes in his comments with respect to language, that whether at the level of words or at the highest level of discourse planning, thought-disordered speech would appear to lack executive planning and editing.

According to Shallice (1982) there are two levels of information processing involving different planning requirements:

- a.) Contention scheduling includes a store of over-learned sequences for quick use, with or without conscious awareness;
- b.) The 'supervisory attentional system' operates at a more conscious and less immediate level for complex, novel planning tasks. This could edit material for speech and thoughts to avoid the intrusion of irrelevant material, resulting in perseveration and distractibility.

According to Shallice, the monitoring by the supervisory attentional system would involve two levels of error monitoring: an internal monitoring of output for errors; and monitoring listener response for communication failure.

It is suggested within these theories that processes controlled by the supervisory attentional system may interfere with the more automatic processes involving contention scheduling (Stilling, Feinstein, Garfield, Rissland, Rosenbaum, Weisler and Bakerward, 1987). In Stilling *et al.*'s (1987) experiments, study participants, typically learned an automatic procedure, and then performed controlled tasks involving the supervisory attentional

system. It was suggested that the automatic task could interfere with controlled task performance if “they (study participants) redirect (ed) attention from it” (p.60). Stilling *et al.* (1987) concluded as a result of their studies that “optimal skilled performance seems to balance the speed and high capacity of automatic processes with the goal directedness and flexibility of controlled processes. A system that acted only by allowing the currently most active automatic procedure to carry through to completion without any influence by goals would be incoherently impulsive without consciousness as we know it” (Stillings *et al.*, pp. 59-60).

In a related theory, Chaika (1990) suggests that schizophrenic language samples provide examples of the interference of more automatic processes in tasks where it is postulated that there is more extensive control by the supervisory attentional system. Chaika states that schizophrenic speech appears as though word and syntactic selection has gone ‘on automatic pilot’. She proposes that this is consistent with findings that schizophrenic speech conforms to the phonotactics (acceptable phonological structure) of the language, but doesn’t happen to form words. Chaika also cites narratives where personal memories are interspersed, as examples of automatic processes dominating processes under more conscious control. She suggests that this can explain findings that schizophrenic discourse level difficulties are more prevalent than lower level deficits, such as phonological difficulties as the latter would represent more automatic processes. However, the examples Chaika cites could as easily be explained by theories suggesting an underlying attentional disorder, as suggested by other authors (see section B.1 in 3.).

The relative deficiency in less automatic planned processes relative to more automatic processes can be equally accounted for by theories describing a planning deficit. Examples of these theories include those proposed by Hoffman (1986) and Frith (1987). Such theories are outlined in this section and can be seen to complement theories describing a monitoring or editing deficit. The latter are described later in this section. An example of the interaction between theories of planning and monitoring or editing follows:

Hoffman (1986b, 1991) elaborates on descriptions of preconscious planning (Deese, 1975) to describe a planning difficulty as the basis for some positive and negative symptoms of schizophrenia.

Frith (1987) and Frith and Done (1988) provide a specification of this model, relating positive and negative symptoms of schizophrenia to planning problems. They suggest that positive symptoms are a reflection of internal plan and action monitoring deficiencies, whilst negative symptoms reflect difficulties in plan and action initiation. Indirect evidence includes similarities between symptoms of patients with prominent negative symptoms and those with frontal lobe dysfunction. The language or thought disorder observed in study participants with schizophrenia can also be described in terms of frontal lobe dysfunction, with frontal lobe dysfunction being associated with aspects of behaviour planning including language planning.

(7.) The reflection of classical frontal lobe dysfunction?

The classic neuropsychological features of frontal lobe dysfunction can be categorised in four broad functional categories or cognitive abilities (McGrath, 1991):

a.) The inability to establish a set: poverty of speech and poverty of content:

Speech requires an intention to talk, and the generation of a topic about which to talk. A lack of these is reflected in poverty of speech and poverty of content of speech. Various forms of these symptoms have been noted in study participants with schizophrenia.

ai.) Siegel et al. (1975) documented a link between chronic schizophrenia and poverty of speech.

aii.) Allen (1983) noted fewer and 'shorter' ideas with low speech variability in thought-disordered study participants.

aiii.) Poverty of speech has also been linked to the type-token ratio in written language (Manschreck et al., 1987), the cloze score (Ragin and Oltmanns, 1987), and poor reference behaviour in thought-disordered speakers (Harvey and Brault, 1986; Docherty et al., 1988).

b.) The inability to change sets: perseveration:

Andreasen's (1979) definition of perseveration is persistent repetition of words or ideas by affected individuals. Minimally, mild perseveration is found in eight percent of 'normals', twenty four percent of study participants with schizophrenia, and thirty four percent of study participants with a diagnosis of a manic illness (Andreasen et al., 1985).

Perseveration in thought disordered speech can be found at various levels.

bi.) At the phonological level,perseveration includes the perseveration of phonological features of previous words, as in ‘clang associations’, but these are rare (Chaika, 1974).

bii.) At the lexical level there can be word repetitions as reflected in low type:token ratios, where the type:token ratio involves dividing the gross word count in a speech sample by the number of different words in the sample.

biii.) At the level of clauses and sentences, there can be a repetition of phrases, as found by Manschreck *et al.* (1985) in thought disordered speakers as compared with non thought disordered study participants and ‘normals’.

biv.) It is also possible to fail to edit and suppress a recurring theme that is inappropriate to the topic focus.

Theories of thought disorder as a problem with perseveration have been proposed in historical accounts of the disorder such as that by Cameron (1944), and more recent models such as those reviewed by Barr *et al.* (1989).

c.) The ability to sequence: planning and editing:

There are many levels of planning and editing in speech production, some of which are postulated to be disrupted in thought disordered speech.

ci.) At the level of grammar Morice and Ingram (1982) noted that study participants with schizophrenia produced speech of reduced complexity, with fewer clauses and less complex

clausal embedding, when compared with study participants with a diagnosis of a manic illness and 'normal' controls. Comparable findings were reported in a different cultural group (Fraser *et al.*, 1986; King *et al.*, 1990). The results were congruent with Kacmarek's (1980) findings concerning patients with dorsolateral pre-frontal lesions, who used more simple sentences.

cii.) At the level of cohesion in discourse, where cohesion describes the links between clauses, Harvey (1985) noted that thought disordered schizophrenic speakers used unclear referents and less effective cohesion and reference strategies. Docherty *et al.* (1988), studying participants with a diagnosis of a manic illness or schizophrenia, demonstrated a correlation between incompetent references and poverty in the form and content of speech.

ciii.) An alternative method of assessing planning and editing of language, devised by Hoffman *et al.* (1986), involves deconstructing language into constituent hierarchies, where the hierarchies are descriptions of the parsing of utterances into 'linguistic trees' indicating features such as levels of embedding and right versus left embedding. Study participants with schizophrenia were unable to construct 'strong hierarchies' (representing complex utterances) while study participants with a manic illness went from one 'strong hierarchy' to another without adequate links between different hierarchies. This correlated with a defect in planning and editing.

civ.) Cloze analysis has been used for examining the predictability of discourse, which is therefore a reflection of planning, where cloze analysis involves the deletion of every fourth or fifth word. This is guessed by the reader to gauge the predictability of the speaker's discourse to a reader. Higher predictability, reflecting more extensive planning, reduces short term memory demand on the listener.

Manschreck *et al.* (1980) noted less predictable and therefore less well planned spoken language in thought disordered versus non thought disordered study participants and normal controls. This difference was not present in written language samples (Manschreck *et al.*, 1980), possibly because writing provides more executive control.

However, although the cloze procedure has been extensively used, there are a number of difficulties with studies using the procedure. An example of this is provided in the study of Salzinger, Portnoy, and Feldman (1966, 1970). To validate the cloze procedure they administered it to patients admitted to hospital without any psychiatric illness, eliciting the language by asking why the study participants were admitted to hospital. The nature of the incidents precipitating admission to mental hospital would generally involve less predictable behaviours than would incidents prior to entering hospital for physical ailments. The investigators then noted that those patients whose speech samples were related to lower cloze scores were hospitalised for lengthier periods than those whose speech gave rise to higher cloze scores. They conclude that patients who were more effective communicators recovered faster. However, as discharge would be based on verbally mediated interviews... this does not necessarily imply that these patients' overall recovery was faster.

d.) Failure to monitor errors:

Chaika (1974) notes that the majority of thought disordered study participants, as compared with aphasic study participants rarely make an effort to correct their errors. Harrow *et al.* (1989), studying aspects of error monitoring, have looked at 'impaired perspective' in thought disordered study participants, where this involves the ability to recognise communication appropriateness. This reflects self monitoring and world knowledge, and is

deficient in thought disordered study participants. It would seem possible that the difficulty observed in study participants with schizophrenia is a reflection of difficulties with monitoring or editing.

(8.) A problem with monitoring or editing?

Self repair of discourse involves a range of social cognitive abilities related to planning (sections B.1 6 and B.2 6) and to a consideration of contextual demands (section B.2).

Thus, effective repair requires an ability to monitor one's own and others' contributions to discourse, to detect message problems, and to notice, for example, that one is speaking over somebody's head. It involves recognising when self repair is appropriate, planning and monitoring plan execution, and changing plans in context, as well as being sensitive to other individuals' beliefs and ignorance. There are thus many aspects of monitoring or editing that may be defective in schizophrenia.

(8.1) Relationship between cognitive arousal and inhibitory activity

Harrow, Lanin-Kettering, and Miller (1989) describe monitoring of multiple competing ideas just below the level of awareness. They suggest the possibility of increased cognitive arousal and reduced inhibitory activity in individuals with schizophrenia, producing a range of factors, summarised in a-d:

- a.) disruption in the regulation of ideas, reflected in interference with message planning;
- b.) personal concerns interfering with conscious thinking;
- c.) disorganisation, increased arousal, greater emotional intensity, and decreased regulation of competing thoughts causing a disruption of multiple cognitive processes;

d.) impaired perspective.

Harrow *et al.* quote a number of different sources of evidence for the above model.

Examples include the following:

i.) Increased numbers of false starts and reformulation by both patients with schizophrenia and patients with thought disorder (Kahn, 1987; Kahn and Harrow, 1988). Harrow *et al.* (1989) interpret the false starts and reformulation as a product of multiple competing thoughts.

ii.) Inclusion by study participants with schizophrenia of a combination or fusion of elements of original subject matter and aspects of the speaker's personal, internal, and more idiosyncratic concerns, which Harrow *et al.* (1983a) cite as evidence for a difficulty in regulating multiple ideas.

Additional theories implicating difficulties with different aspects of self monitoring abound. Looking at their ability to describe findings relating to schizophrenic discourse in the literature can assess these theories.

i.) Hoffman's model (as outlined in section B.1 6) predicts that all 'schizophrenic discourse' should be badly designed, particularly in the discourse of those study participants with schizophrenia who experience auditory hallucinations (which according to Hoffman's model is an effect of disturbed planning). In support of this, Hoffman (1986b) and Andreasen *et al.* (1985) report a partial correlation between severity of discourse disorganisation and the occurrence of auditory hallucinations. Although there is not a complete correlation, it is possible that the incomplete correlation is a consequence of

patients adopting compensatory strategies for discourse planning deficits. These could include a reduction in discourse length and complexity, as reflected in the characteristics of a negative thought disorder, or the reliance on well rehearsed discourse fragments with resulting poverty of content, or a delusional 'idee fixe'. Hoffman does not, however, analyse the planning process, or provide sufficient detail to define the planning process. Similarly, the design of Hoffman and Satel's (1993) language therapy study does not provide sufficient specification to demonstrate that therapy for discourse planning deficits reduces the severity of language difficulties and auditory hallucinations.

ii.) Frith (1987) and Frith and Done (1988) suggest that deficiencies in the internal monitoring of plans would contribute to poorly designed discourse. Frith and Frith's 1991 model of the theory of mind does not specify clearly implications in terms of language. Where the study participant is merely encoding his or her visual experience in words, this does not require second order representations, suggesting that Frith and Frith's model is irrelevant to this situation. However, when considering peoples' discourse contributions as formulations designed for the other discourse partner, second order representations may be involved. If this is correct, a theory of mind model would make specific predictions. In a task where subjects are asked to provide instructions, individuals with schizophrenia with a preponderance of negative symptoms should produce an increased number of incomplete instructions. In contrast, individuals with schizophrenia experiencing auditory hallucinations should produce an increased number of wrong instructions. It would seem that there is no study as yet providing support for or refuting this suggestion.

(8.2) recognition of message errors

When considering the recognition of message errors, Hoffman's (1986) model does not specify the locus of the planning disruption, and Frith (1987) as well as Frith and Done (1988) focus on the internal monitoring of activity plans, without discussing their external monitoring, so that there are no clear predictions.

In contrast, Frith and Frith (1991) predict that external message monitoring should be particularly inadequate for study participants with schizophrenia experiencing many auditory hallucinations and negative symptoms. It would appear that there are no studies to support or refute this suggestion.

(8.3) Self repair and external monitoring

Self repair frequently entails plan revision. Barch and Berenbaum (1994, 1996) postulate that derailments and non-sequiturs may be related to monitoring performance due to a difficulty tracking previous discourse information and hence revising plans. In Barch and Berenbaum's studies, there were a large number of derailments and non sequiturs in the absence of an impairment in monitoring, with derailments and non sequiturs showing a non-significant association with monitoring performance. As Barch and Berenbaum suggest, it is possible that tests of reality-monitoring tasks do not give a full picture of the complex skills underlying language performance monitoring, with its measures relating only to single externally presented words. However, it remains true that there is no superior support for this hypothesis in the form of data.

Looking at a variant of this model, according to Hoffman's (1986) theory, individuals with schizophrenia experiencing auditory hallucinations should have particular problems with self repair as both auditory hallucinations and self repair are related in this model to processes involving internal monitoring (Frith, 1987; Frith and Done, 1988). Message inadequacies are frequent in schizophrenic discourse as predicted by Hoffman and Frith's models. However, the frequency of message inadequacies is not dependent on presence of hallucinations or negative symptoms. In addition, wrong messages are more frequently detected than incomplete messages in both study participants with schizophrenia and 'controls', suggesting that external monitoring for discourse inadequacies is not deficient in schizophrenia. These findings are consistent with Hoffman's (1986) model, whilst not relating to the theories of Frith (1987) or Frith and Done (1988), whose models do not make predictions in this respect.

It is of course possible that the findings described above are due to compensatory strategies so that difficulties with self repair are not necessarily reflected in more errors. One possible example is the discourse of study participants with marked negative symptoms. Thomas *et al.* (1987) describe the discourse of study participants with schizophrenia presenting with marked negative symptoms as being of low complexity. Frith (1987) and Frith and Done (1988) relate negative symptoms to problems in initiating plans and actions. It is possible that these two descriptions are related in certain persons. Perhaps some individuals with difficulties initiating plans and actions produce discourse of low complexity, where this is their strategy for producing discourse with a limited number of errors.

There are a number of additional possibilities that could account for the varied findings described in the literature. As an example, study participants with schizophrenia experiencing auditory hallucinations found it more difficult to self repair wrong instructions, although they detected wrong instructions as frequently as other study participants did. These study participants were better at repairing incomplete instructions, suggesting that plan revision is not necessary when repairing incomplete instructions. It is, however, equally possible that the difficulty experienced by these study participants is related to a difficulty in integrating information contrary to the self. Thus, it remains unclear at present which theory of planning and self repair can describe most accurately the different findings with respect to discourse produced by people with schizophrenia. It is of course possible that the most appropriate explanation varies between individuals, or even in fact within individuals at different points in time.

(9.) A problem in recognising other participants' knowledge?

In theories related to those described in Section B.1 8, Rutter (1985), among other investigators, states that study participants with schizophrenia fail in conveying their message effectively because they do not take into consideration the needs of the listener. Leslie (1987) discusses the possession of a theory of mind as involving people being aware that other people have minds, with different contents from their own. This enables the possibility of forming second order representations, including beliefs about beliefs and beliefs about intentions, making an ability to use a theory of mind necessary for effective consideration of listener needs.

Chaika (1990) suggests that a 'theory of mind model' cannot account for 'schizophrenic discourse' as psychotics' linguistic behaviour is frequently perceived as bizarre by both laypersons and scholars, whilst, commonly, conversational participants do not address adequately their listeners without appearing bizarre. However, the response to that comment may be that a judgement of bizarre is dependent on the level at which the participant fails to consider the listener. This level is specified in a number of models.

As an example, Frith and Frith (1991) suggest a specific form of this theory, demonstrating how a problem in constructing second order representations in schizophrenia results in difficulties in the following ;

- a.) inferring the mental state of others,
- b.) distinguishing between other people's and their own mental states, and
- c.) distinguishing between mental states and real states of the world.

It is then possible to look at whether these difficulties are reflected in the data on individuals with schizophrenia.

i.) Frith and Frith (1991) consider that a failure in the theory of mind could underlie some schizophrenic symptoms, outlining a possible process through which the symptoms could occur.

ii.) Consistent with Frith and Frith (1991), Rutter (1985) suggests that a failure or an inability to take on the role of another person is central to schizophrenia. Rutter supports this view with empirical evidence from an experiment using a discourse reconstruction method. He attributes the difficulties reconstructing 'schizophrenic discourse' to social

versus cognitive shortcomings, describing a schizophrenic difficulty in expressing and communicating thoughts in a way that the listener can understand. This is the result of a cognitive deficit in second order representations, according to the theory of mind.

iii.) Although used to draw different conclusions, Cohen and Camhi (1967) utilised a word communication task, where the findings could be seen as a schizophrenic difficulty in the ability to consider the listener's needs, as described by Frith and Frith (1991). The task involved a speaker producing a one word clue to allow a listener to determine which word in a pair was the referent. Study participants with schizophrenia were involved in this study both as the speaker and the listener. They were efficient as listeners, but, according to Cohen and Camhi, they demonstrated a difficulty in disregarding, or editing, inappropriate clue words that they generated as associates to the referent word.

iv.) A study by Smith (1970) provided support for a difficulty with editing as suggested by Cohen and Camhi (1967). In their study, study participants were required to select the better clue word, from a choice of two, for one of a pair of stimuli. In some of the samples the relative associative strengths between the clues and both the referents and non-referents needed to be considered to determine which of two possible clues was superior. Study participants with schizophrenia were inefficient at considering the listener to determine the superior clue.

v.) Similarly, but in tasks involving clauses and sentences rather than words, Cohen, Nachmani, and Rosenberg (1974) found that schizophrenic responses repetitively emphasised dominant stimulus characteristics, but they failed to consider the subtle distinctions necessary for accurate listener comprehension. Cohen *et al.* (1974) interpreted the data in terms of a perseverative chaining model, with study participants with

schizophrenia inappropriately continuing to sample already rejected responses during the editing process. They suggested that the probability of emitting the inappropriate response increased as perseverative sampling proceeded. According to the authors, the participants with schizophrenia responded, and then continued to produce associates of this word in preference to the original referent. Equally, this performance could be interpreted in terms of a failure to adequately consider the listener. Considering adequately the listener can include a number of dimensions. De Decker and Van de Craen (1987) address this possibility in a description of the discourse of study participants with schizophrenia in terms of Grice's (1975) maxims, where they describe similar difficulties in terms of a 'social' problem.

(10.) A 'social' problem?

De Decker and Van de Craen (1987) suggest on the basis of a number of conversations with study participants with schizophrenia that they violate Grice's maxims of Quantity, Quality, Relation and Manner. They note, with respect to the co-operative maxim, that the study participant with schizophrenia shows an 'unwillingness' to follow the clinician's directions. They argue that, in considering the maxim of quality, the notions of truth and falsity are not easily applicable, in "that schizophrenic speakers do not necessarily hold the same values and the same frame of reference as 'normal' speakers do" (p. 255). However, their analysis and interpretation are not entirely consistent with Grice's theoretical framework.

(11.) Recent social-cognitive approaches

A number of studies have examined in greater detail the relationship between the discourse of people with schizophrenia and their 'theory of mind'. Corcoran *et al.* (1995) demonstrated poor performance by people with negative symptoms and those with paranoia on a hinting task, where people with schizophrenia were unable to infer the intentions underlying indirect speech. However, the severity of their deficit differed, with a possible explanation involving the memory and inferential requirements of the various tasks used.

Frith and Corcoran (1996) examined more specifically the nature of the cognitive deficit, demonstrating that different subgroups of schizophrenic patient differed in the depth of their theory of mind deficits. People with negative symptoms were not able to understand the notions of false belief and deception at a first order level. In contrast, paranoid patients demonstrated difficulties only where second order representations were required.

In a study examining in more detail the relationship between patients' theory of mind and their current symptomatology by considering the patients' appreciation of Gricean maxims, Corcoran and Frith (1996) asked people with schizophrenia to select the probable ending to a piece of speech. The people with negative symptoms selected endings which violated Grice's maxims, excepting the maxim of relation. In contrast, people with paranoid delusions selected endings which did not violate Grice's maxims, excepting a frequent failure to select a polite ending. These findings were largely independent of current intellectual level. Corcoran and Frith explained the results as suggesting that people with negative symptoms possess a deficit in 'theory

of mind', whereas people with paranoid symptoms have a specific 'on-line' mentalising deficit which is evident when context-dependent behaviour requires an appreciation of the listener's mental state.

Sarfati *et al.* (1997a) examined the relationship between patients' theory of mind and a different aspect of patients' symptomatology; their thought and language disorders. Schizophrenic patients with thought and language disorders were unable to attribute intentions to characters' behaviour, selecting the behaviour consistent with a more socially familiar experience, or, occasionally, selecting a behaviour according to a self-referenced logic. Within a false belief task, schizophrenic patients with thought and language disorder selected the true belief or false belief at chance level.

Similar difficulties were exhibited when the experiment involved pictorial and/or verbal material, with schizophrenic patients with thought and language disorder performing significantly worse than other schizophrenic patients, depressed patients and normal controls (Sarfati *et al.*, 1999a). Although replacing pictorial material with verbal material aided the schizophrenic patients, this did not alter the relative performance of the different clinical groups.

More recent studies are providing increased specification about the relationship between patients' theory of mind and their thought and language disorder. This is exemplified in the study of Sarfati *et al.* (1999b). They demonstrated that schizophrenic patients with thought and language disorder had difficulties in attributing desires and intentions to others.

Further, as yet unpublished, studies are currently investigating the relationships described above in more detail by evaluating additional subjects including subjects with different patterns of symptomatology and diagnoses, such as people with thought and language disorders but without schizophrenia. Yet other studies are considering patients' performance on a wider range of similar tasks. It is expected that these studies will reveal more information about both the impaired and intact cognitive processes in people with schizophrenia.

SECTION B.2

LINGUISTIC THEORIES

(1.) Broken associative threads?

Bleuler (1950) attributed all schizophrenic symptoms to a breaking of associative threads. During the period between 1920 and the mid 1950s language was commonly viewed as strings of individual words linked together by loose associations, and Bleuler believed that normal cognitive processes were also governed by associations. The notion of schizophrenic symptoms as the breaking of associative threads was initially tested with word association tasks.

Word association tasks involve study participants producing words that come to mind when hearing a stimulus word. One basic finding has been replicated a number of times, although not consistently, in a free response setting. This finding is that the specific associations produced by the participants in the study with a diagnosis of schizophrenia were significantly less common than those of 'normal' study participants. It is possible that the variable finding in similar studies reflects differences in study participant selection, data analysis and identification of appropriate normative samples.

There have been other studies suggesting broken associative threads in schizophrenia.

These include (*i.* - *iv.*):

i.) Studies identifying usage of inappropriate words in context: Commonly, individuals with schizophrenia are reported as using inappropriate words, with substitutions of words by related words, which are unsuitable in the context.

ii.) Tests of similarities between words:

Individuals with schizophrenia have been reported as displaying an accentuated normal response bias, with them indicating these words were conceptually similar on the basis of mere association more frequently than controls. These results have been replicated in a number of studies e.g. Chapman's (1958) study using cards with single words and Rattan and Chapman's (1973) study using multiple choice vocabulary tests. Chapman *et al.* (1964) also found a schizophrenic exaggerated normal response bias in that drug free study participants with chronic schizophrenia showed a stronger preference for the use of the more common meaning of words regardless of context. This preference has been interpreted as a schizophrenic preponderance to respond without an accurate consideration of the contextual requirements.

A decreased consideration of context would suggest a schizophrenic inefficiency in benefiting from verbal redundancies. The ability of study participants with schizophrenia to encode and decode verbal redundancies has been investigated via cloze analysis (Taylor, 1953) (please refer to iii below) and statistical approximations to English (Miller and Selfridge, 1950) (please refer to iv below).

iii.) The cloze procedure measures the degree of redundancy in speech samples by allowing a judge to guess what words belong in the blank spaces corresponding to deleted words in a verbal passage. The accuracy of predictions provides an index of passage redundancy or the linguistic competence of the judge.

iv.) The technique of statistical approximations to English involves passages generated with varying degrees of contextual constraint, ranging from strings of random words (zero order

approximations) to normal English prose. In a recall task, beyond a minimal level of improvement, study participants with schizophrenia were unable to benefit from increasing levels of linguistic organisation. In a 'reversal of the procedure' study participants were given different root phrases. 'Normal study participants' produced passages with progressively higher cloze scores as the root passages increased, demonstrating the utilisation of contextual information. In contrast, the passages produced by individuals with schizophrenia resulted in lower root scores with increasingly long root phrases.

The studies outlined above were cited as evidence of individuals with schizophrenia displaying broken loose associations. However, theories of language no longer view language as a string of associated words. Rather, some more complex theories describing difficulties relating to the activation of associations have suggested that schizophrenic language pathology may be a result of abnormally fast or far-reaching activation of associations (Spitzer *et al.*, 1993) or a failure to inhibit inappropriate associations (Cohen and Serban-Schreiber, 1992). These, and any other plausible theories must acknowledge that linguistic units are seen to be associated in more complex ways, with the relationship between lexical items involving various degrees of complexity. Currently, there are no theories describing difficulties in word associations that can account for the language symptomatology in schizophrenia.

(2.) A problem with embedded language?

It is possible that linguistic difficulties observed in study participants with schizophrenia reflect a problem with more complex language. Thomas (1990) describes a difficulty with the understanding and use of embedded utterances by individuals with schizophrenia.

Thomas (1990) notes that the effect of 'embedding' is to make a sentence more 'parenthetical'.

In a study by Thomas and Huff (1971), study participants with schizophrenia were more vulnerable than normal controls to parenthetical load. The results were most compatible (determined by best fit) with a model where one or more uncompleted tasks are held in separate mental compartments, insulated as much as possible from other mental activity. This hypothesis suggests that within embedded sentences, clauses are interpolated parenthetically by other clauses, with a new temporary store being opened in memory for each new clause while previous stores remain open but quiescent. It is suggested that while material is being placed in an active store this generates interference in any previously opened, quiescent stores. According to this theory, 'noise', resulting from the handling of the sentence structure, introduces errors, and extends the time taken in comprehension and production of these sentences. Individuals with intrinsically 'noisy' minds are most vulnerable, although it is unclear how 'noise in the mind' is measured... It is possible that individuals with schizophrenia, particularly those with cognitive difficulties, struggle with the extra parenthetical load imposed by embedded sentences. It is also suggested that, in addition, individuals with schizophrenia may have a particular difficulty with more complex syntactic structures. Of course, it is also possible to explain this difficulty with

complex language in terms of a general language difficulty among persons with schizophrenia, which would be most evident in more complex language. However, studies of language in schizophrenia would suggest that the language of individuals with schizophrenia differs from that described as a general language delay.

(3.) A syntactic problem?

Chaika (1990) notes that syntactic deviations have been observed in a large number of participants in the study with a diagnosis of schizophrenia at least some of the time.

Looking at detailed linguistic analyses of discourse samples from individuals with schizophrenia, Hoffman and Sledge (1988), King *et al.*, (1990), and Morice and Ingram (1982) suggest that the discourse samples are characterised by predominantly syntactic and cohesion deficits with some semantic deficits, consistent with a frontal lobe disturbance.

The existence of a syntactic problem is not, however, without dispute. Researchers such as Maher (1972), Fromkin (1975), Cohen (1978) and Herbert and Waltensperger (1980, 1982) assert there is no syntactic or structural deviance in schizophrenic speech, whilst Anand *et al.* (1994) and Annand and Wales (1994) describe a pattern of predominantly semantic and metaphorical deficits in early psychosis, with some difficulties with syntax and cohesion.

Anand *et al.* suggest that the profile in schizophrenia is more compatible with a temporal or fronto-temporal lobe disturbance as described by Caplan and Chertkow (1989). More recently, Thomas (1997) and Crow (1998) outline theories in which they explicitly state the inadequacy of a syntactic description as a description of language in schizophrenia. Rather, they make reference to what could be described as a semantic or pragmatic framework.

(4.) A problem with the use of reference?

It is possible that what is termed a syntactic difficulty may relate to semantic and pragmatic considerations. Various studies have suggested a difficulty with the use of references as contributing to listener difficulties. However, the difficulty with referential language has been attributed to different groups of study participants in different studies. Thus,

i.) Rochester, Martin, and Thurston (1977) found that study participants with schizophrenia who were thought disordered used significantly more unclear and ambiguous references than study participants with schizophrenia who were not thought disordered. Cutting and Murphy (1988), basing their work on that of Rochester, Martin and Thurston's (1977), similarly described a difficulty with references in the language of individuals with schizophrenia who were thought disordered.

ii.) Harvey (1985) suggested that the difficulties in the correct usage of references were associated with thought disorder, regardless of psychiatric diagnosis. Both individuals with a manic diagnosis and individuals with schizophrenia who were thought disordered produced more incompetent references than non thought disordered study participants, and there was no difference between individuals with these two groups in the types of cohesive categories they used. In addition, thought disordered study participants used significantly fewer of the most effective types of cohesive ties as compared with non thought disordered study participants and 'normals'.

iii.) Bartolucci and Fine (1987) reported difficulties with effective use of referential terms not only in individuals with schizophrenia who were thought disordered and individuals with other psychiatric diagnoses, but noted that these difficulties were also apparent in

individuals without thought disorder. There was only one factor distinguishing the use of references by individuals with schizophrenia from that of individuals with other psychiatric diagnoses. This was the proportion of noun phrases that were uninterpretable cohesive items.

iv.) Weintraub and Mesulam (1987) noted that the difficulty with referential terms is not restricted to those with a psychiatric diagnosis. He noted similar difficulties to those reported by Rochester and Martin (1979) in children of individuals with schizophrenia.

It would thus seem that a difficulty with using references characterises schizophrenic thought disorder, but that the difficulty in using references is possibly also characteristic of other psychiatric illness. It is possible that the contradictory results of the available studies may reflect methodological considerations such as those described below:

i.) Rochester and Martin (1979) compared language samples considered by judges to be the most incoherent with language samples from 'normal study participants' where they selected samples to exclude any language samples considered incoherent (produced by ten per cent of their normal sample). This implies that they compared the most disrupted schizophrenic passages with a random sample of normal utterances.

ii.) Rochester and Martin's (1979) selected thought disordered and non thought disordered study participants on the basis of an index where the study participant is classified as thought disordered when displaying "some aberration in the flow, or coherence of talk" (Rochester and Martin, 1979, p. 58). This would suggest that the thought disordered study

participants' speech would be interpreted as more incoherent... as compared with non thought disordered and normal study participants, representing a circular argument.

iii.) Positive and negative thought disorders differentiate study participants with a diagnosis of manic illness and those with schizophrenia (Harvey *et al.*, 1984). Unclear references are involved in positive signs such as derailment, tangentiality and incoherence. Incompetent references are related to the negative sign poverty of content in that ambiguity is seen to reflect poverty of content. This would suggest that manic incompetent references would correlate with positive thought disorders whilst schizophrenic incompetent references would correlate with measures of poverty of content. These are not distinguished in some studies.

iv.) Some studies such as that of Bartolucci and Fine (1987) included only small sample sizes and related their discussion only to group data.

v.) Although studies specify the aspect of language studied, it is still not clear whether the judgement relates to a difficulty due to the speaker or the listener or a combination of the speaker and listener.

vi.) The studies described are based on the work of Halliday and Hasan (1976). However, Halliday and Hasan emphasise that no component of the linguistic code can be understood apart from its cultural, situational, and intentional context of deployment. Rochester and Martin study components of cohesion in isolation with Rochester and Martin merely referring to other elements of discourse cohesion; "for a text to be coherent, it must be situationally relevant as well as internally cohesive" (1979, p. 78). The omission of less overt elements of discourse cohesion is particularly significant as discourse, particularly spontaneous or unrehearsed discourse includes minimal overtly marked signals of cohesion,

yet retains its coherence and interpretability (Brown and Yule, 1983; Labov and Fanshel, 1977). Sociolinguists such as Stubbs (1980) and Brown and Yule (1983) even suggest that coherence is attributed to utterances on the strength of the hearers' belief that speakers have intended their utterances as coherent, without regard to textual markers of that coherence. In fact, post hoc examinations suggested that, for example, thought disordered study participants sometimes linked clauses via rhythm and intonation, paralleled by grammatical structures, whereas the study was based on transcriptions. The emerging consensus as to a schizophrenic loss of communicative competence could reflect an artefact of this approach.

Investigators using this approach have:

- a.) Discarded discourse data such as that provided by voice quality and a knowledge of the speaker's social background and history.
- b.) Not expanded the text into a full set of stated and implied sentences.
- c.) Not considered the register of the discourse samples included in the study.
- vii.) Normal variation as a function of the purpose of the discourse, study participant matter, interpersonal relations, social identities of speakers and situational context directly affect linguistic variables including those of cohesion and coherence (Halliday, 1978; Hymes, 1972a; Hymes, 1972b; Hymes, 1972c). This situational variation is exemplified by Bernstein's (1964) finding of a 'restricted code' (with a surface appearance of incoherence, ellipses, fragmented structure, and lack of referentiality) in settings where substantial mutual knowledge is assumed. Alverson and Rosenberg (1990) point out that reduced cohesive structure in schizophrenia could be a function of similar factors to those operating in 'normals'. The individuals with schizophrenia may assume that the listener

shares mutual background knowledge of topic, theme, situation, and speaker intention, even where this is not correct. Alternatively, the individuals with schizophrenia may be communicating with a reduced cohesive structure to phatically communicate something, even where this is ineffective. Alverson and Rosenberg (1990) suggest that Rochester and Martin (1979) attempt to examine schizophrenic language coherence with a form of analysis which involves isolated segments of speech... without considering the 'interpersonal component', therefore deeming it unsuitable for a consideration of coherence properties. In fact, their system does not assume coherence in the language samples, with context aiding in their comprehension, unlike the situation with 'normal' participants. It is however possible that the incompetent use of reference may be associated with discourse planning deficits rather than reflecting a strategy which is misunderstood by listeners. Levelt, (1989) suggests that discourse plan development and maintenance is essential for adequate reference and coherent language output. Barch and Berenbaum (1996) describe difficulties using, integrating and maintaining the complex information necessary for coherent speech as resulting in a difficulty with using references effectively. Pratt, Boyes, Robins, and Manchester (1989) note that individuals without a psychiatric diagnosis with low working memory capacity who experience difficulty maintaining discourse information also experience difficulty producing clear references. It would seem possible that a difficulty with referential language may be part of a broader syntactic difficulty. This illustrates the importance of investigating a broader range of language measures rather than measures relating to referential language in isolation.

(5.) A problem of deictics?

A broader syntactic difficulty that has been described relates to 'deictics', where this term refers to words whose meaning is defined by context. These words are important in reducing linguistic redundancy and in contributing to contextual cohesion. Wrobel (1990) suggests that the communication of individuals with schizophrenia is inadequate because they do not let context contribute to the definitions of the words they use. Rather, according to Wrobel, they:

- a.) restore the primary meaning to words (possibly in a parallel way to the individuals with schizophrenia described by Chapman *et al.*, 1964, who displayed an increased bias towards choosing the most common associate rather than the most appropriate associate for a word within a given context);
- b.) are unwilling to observe the conventions of linguistic behaviour;
- c.) and do not edit thoughts that are inappropriate to their discourse (as reported e.g. by Cohen and Camhi, 1967, and described in section B.1 9).

From Wrobel's definition of the conventions of linguistic behaviour, it is evident that these are defined broadly. Wrobel's description encompasses a syntactic element in that Wrobel describes the inappropriate use of deictal items his description encompasses a pragmatic element in that Wrobel describes the insufficient consideration by individuals with schizophrenia of contextual demands. Wrobel notes that communicative competence requires "the means to be able to select from the system inventory of communication behaviours, such forms of behaviour which could be most correct from the point of view of the interlocutor (social competence), the communication situation (situational competence) and the purpose which we wish to achieve (pragmatic competence)" (p. 24). He suggests

that applying communication norms, rituals and conventions facilitates effective communication.

Wrobel elaborates on the interaction between the syntactic and pragmatic elements of the linguistic deficit at the 'deictical level' in schizophrenic utterances. He suggests that a message first refers to the primary determinants of the speech act, where these can be summarised by the pronouns 'I-here-now'. The message next refers to the secondary determinants, that is to the receiver (I in relation to you, him, or her), and the contents of the message may refer to other locations (here in relation to there) and other times (now in relation to before or after). Wrobel suggests that whereas generally in language the initial situation of the speech act is defined by the scheme: 'I-here-now', in schizophrenic language it can be stated as "not necessarily I-not necessarily here-not necessarily now" (Wrobel, 1990, p.36).

Wrobel then discusses how his ideas fit into a number of linguistic frameworks. He suggests, that in terms of the linguistic theory of de Saussure (1966), schizophrenic language entails a discontinuity between the external features of language (Signifiant) and reality (Referent), with the discontinuity even at times becoming an 'identity' between 'signifiant' and 'schizophrenic reality'. He argues that in schizophrenia there is an individual schizophrenic semantic system underlying the incoherence of schizophrenic communication. It would appear that Wrobel's framework could complement that referring to an underdeveloped theory of mind in participants in the study with a diagnosis of schizophrenia (see section B.1 9., entitled language or thought disorder as a problem in

recognising other participants' knowledge), and that involving inadequate use of phoric references in schizophrenia (see section B.2 4., entitled language or thought disorder as a problem with references). Thus, according to Wrobel, participants in the study with a diagnosis of schizophrenia do not comply with conventions about the normal use of referents, displaying inadequate consideration of listener expectations.

(6.) A problem with coherence?

It has also been suggested that people with schizophrenia may have more widespread difficulties in establishing coherence (appropriate semantic networks) in their utterances. Hoffman, Kirstein, Stopek and Cicchetti (1982) define coherence as the possibility for the listener to undertake some interpretative synthesis to link the constituent statements of a text. This contrasts with incoherence, which results in a listener's failed or incomplete synthesis of statements. Hoffman *et al.* (1982) comment that coherent discourse requires links both between non adjacent and adjacent statements. The links can involve information from more distant loci within the text and non-linguistic sources, and evidently involve textual planning (see section B.1 6).

Deese (1978, 1980) discusses an analysis of discourse coherence in which propositions are arranged into some mental geometry based on dependency relations which relate to the particular interpretation of the text. Thus, according to Deese, coherence requires the possibility for the generation of propositional geometries conforming to a strong hierarchy (defined as a tree form with no repeated elements). Incoherence corresponds to a weak hierarchy or more generalised network. Determining what constitutes a strong or weak

hierarchy respectively, however, is difficult as demonstrated in the elaborations of the approach described by Hoffman *et al.* (1982), in their linguistic analysis. Difficulties they describe include:

- i.)* In the linguistic analysis ungrammatical sentences were interpreted according to what seemed most consistent with the surrounding text, with, for example, implicit statements incorporated into text bases. There is no model to account for this.
- ii.)* When the text included adjacent statements requiring the reader to jump from one branch of the base hierarchy to a low node in another branch, this was considered as resulting in incoherence. Describing this in another way, the texts included adjacent statements that were mediated by other statements distantly located with respect to the adjacent statements. It is suggested that interspersing some locutions in the above texts can result in a removal of incoherence that would otherwise be generated. There is no model to account for the resultant coherence. Also, although the study by Hoffman cited above is a valuable study of semantic structure in schizophrenic and manic speech, language is held together and made coherent by factors other than presupposition. These other factors are not considered within the theory.

Other frameworks relating to coherence include those of Sperber and Wilson (1986, 1987) and Halliday and Hasan (1976; 1985). Sperber and Wilson discuss the general principle of 'relevance' in language, and Halliday and Hasan refer to a 'text' that unifies language in context. These frameworks offer a more comprehensive method than Hoffman's (1986) dichotomy of coherent and incoherent, to demonstrate the relationship of one stretch of

language to another. They are also more compatible with the more complex way in which parts of language are related to each other, for example, in topic continuity.

(7.) A problem in topic continuity?

There are semantic descriptions of discourse which are constructed in terms of the shared topic structure (shared semantic readings of constituents). However, it is difficult to specify the notion of a topic. Hurtig (1977) defined a set of operational procedures for topics.

- a.) Topics can consist of one or more related propositions.
- b.) Topics can consist of discontinuous or contiguous sets of one or more utterances.
- c.) Topic shifts incorporate utilising propositions which are not part of the original propositional set (idea).
- d.) Topic shading involves the expansion of the domain or scope of the original propositional set.
- e.) Topic fading involves the establishment of a new propositional set with a link to either a predicate or argument in an antecedent propositional set.

Defined differently, Van Dijk (1980) suggested that a proposition is irrelevant, i.e. not consistent with topic continuity if "... it is not an interpretation condition of a following proposition in the sequence" (p. 215). He remarks that this is a 'bidirectional relationship', so that "... for any sentence in a discourse, we can determine relevance either by its (the proposition's) influence on a subsequent sentence or by determining that it (the proposition) has been influenced by a prior one (proposition)" (p. 225). Van Dijk notes that comments

referring to previous contributions can be chartered just as the topic producing ones can be so that where no linkages can be ascertained the speaker is considered 'rambling, drunk, or crazy'. According to him the macroproposition (overall semantic structure of a text) is inferred from the sequence of propositions in the discourse.

A similar notion is paraphrased by Carlson (1983). He discusses 'aboutness', where, in coherent discourse, a statement of topic should be able to complete the phrase 'This is about...'. However, when considering spoken interactions, or extended pieces of writing, it is frequently not so easy to determine a single global proposition. More typically, a series of summaries are necessary to account for the changes of topics (Brown and Yule, 1983). In the oral and written texts of normal study participants these changes are introduced in orderly ways. The difficulties in describing discourse texts objectively means that it is not currently possible to compare objectively the discourse text of individuals with schizophrenia with that of other study participants.

SECTION B.3

NEUROLOGICAL THEORIES

(1.) A reflection of reduced information exchange between cortical neurones?

A number of empirical findings suggest a difficulty with the bidirectional exchange of information between large numbers of different cortical areas in individuals with schizophrenia.

Evidence for this bidirectional exchange of information in normals includes regional cerebral blood flow studies of study participants during mental exercises and language processing (e.g. Petersen *et al.*, 1988), where there is simultaneous multidirectional flow of information in the cortex.

Similarly, intracranial recordings in humans provide evidence of simultaneous reciprocal exchange of neuronal information during language production.

Neurones compete with each other for connections with other neurones, the less competitive neurones being pruned away (e.g. Nelson *et al.*, 1990). Where excessive synaptic pruning takes place, there are three possible negative consequences (described overleaf):

- a.) Information may flow into amalgamations of unrelated memory fragments, producing bizarre output;
- b.) Some neurone sub-populations may become functionally autonomous;
- c.) Some neural modules may be encapsulated in output independent of information from other parts of the system, which may not reflect any particular previous memory. These output modules are referred to as a parasitic focus.

The functional transformations effected by these changes in neuronal connections may result in a number of experiences. An example is schizophrenic loose associations as a result of the amalgamation of multiple disparate memory fragments. This possibility is supported by individuals with schizophrenia frequently reporting an overabundance of

idiosyncratically clustered ideas in their associations. This reduces their ability to retain their focus.

It is also possible for there to be reduced exchange of information on a philosophical level between cortical neurones involving more abstract information processing modules and neurones relating to lower order sensory input. This is termed the intentional stance (Dennett, 1991). Clinical observations of pathologies similar to schizophrenia suggest that what is termed the intentional stance results in orderly events outside our control being experienced as intended by another agent. The philosophical notion of intentional stance, together with parasitic foci can offer an explanation for many of the symptoms in schizophrenia (as described in Section C.3 5).

(2.) A reflection of ‘random travel along associative networks’?

Another possibility is that ‘random travel along associative networks’ results in the symptomatology present in schizophrenia.

Holzman *et al.* (1978) studied eye tracking movements in individuals with schizophrenia who participated in their study. They note that when study participants look at a pendulum voluntarily a pursuit system is triggered so that the eyes follow the pendulum in an involuntary movement, therefore unaffected by motivation. Sixty five to eighty five percent of individuals with schizophrenia, as compared with six percent of ‘normals’ demonstrated disordered eye pursuit movements.

Chaika (1990) describes parallels between eye tracking movements and other aspects of schizophrenic dysfunctioning. With respect to speech, Chaika (1990, p. 44) describes perseverations of syntactic frames or words and phrases which she likens to the 'spiky-type' eye movements observed by Holzman *et al.* (1978). She suggests that random travel along associative networks of linguistic material can be likened to the spikes, whilst the triggering of associated words not relevant to the context is an instance of interference, with previously uttered words, not switching off. However, Chaika does not explain this relationship any further.

Chaika also draws parallels between individuals with schizophrenia and other populations, noting that Holzman *et al.* (1978) reports a similar eye tracking dysfunction in the elderly, Parkinson's disease, multiple sclerosis, brain stem and hemispheric lesions as well as alcohol or barbiturate intoxication. However, she does not suggest why the language of these groups differs if all the groups have a similar difficulty with eye tracking movements. Thus, this theory has not been elaborated sufficiently to explain current findings with respect to the discourse of study participants with schizophrenia or the discourse of other populations.

(3.) A problem of heightened cognitive arousal or an overactive or overstimulated central nervous system with diminished inhibitory function?

Frith *et al.* (1995) suggest a range of symptoms as a consequence of a failure in cortical areas concerned with word representation. They postulate that both negative and positive behavioural signs, including those involving language, can be a reflection of a failure in

cortical areas. This is supported by Friston *et al.*'s (1991a; 1991b; 1991c; 1992) finding that retrieval of words in categories, and rejection of the inappropriate words, is superior when overall activity in the network for word representations is reduced.

The findings with respect to word representations in the above studies imply that poor verbal fluency is reflected in abnormal activity in the superior temporal cortex. This is consistent with Gold and Weinbergers' (1991) suggestion, based on structural and functional brain imaging studies, that schizophrenic symptoms reflect a fronto-temporal disconnection. The findings are also consistent with Frith's (1992) conclusions, based on neuropsychological data, that schizophrenic symptoms reflect temporal over-activity as a result of fronto-temporal disconnections. In support of this, Frith *et al.* (1995) observe that activation of particular areas in individuals with schizophrenia was not associated with a relative decrease in blood flow in the left superior temporal gyrus, as observed in normal volunteers.

SECTION B.4

PHYSIOLOGICAL THEORIES

(1.) A physiological basis for problems of executive planning and editing i.e. frontal lobe lesions?

According to Shallice (1982) the supervisory attentional system (as described in section B.1 6) is largely a function of frontal lobe action. Aside from Broca's aphasia there is sparse literature on the effects of frontal damage on language. This literature includes the

following studies :

- a.) Kaczmarek (1984) reported that the left dorsolateral frontal region was involved in planning and sequential organisation of linguistic information. Study participants with frontal lobe damage perseverated and were distracted by accidental associations.
- b.) Kaczmarek (1987) reported that study participants with dorsolateral cortical lesions perseverated, used simple sentences, and had poverty of speech, whilst the group of study participants with orbito-frontal lesions digressed frequently and did not appear to monitor their errors.
- c.) Novoa and Ardila (1987) noted that pre-frontal lobe study participants displayed perseveration, free association of ideas as well as apathy and adynamia, interpreted as a consequence of impaired executive functions required for complex or conceptual verbal activities.
- d.) Alexander *et al.* (1989) emphasised the importance of the frontal lobe to avoid poverty of speech, and a disorganisation of language in the social and situational context. Consequences of frontal lesions include tangentiality, unanticipated changes of topic, socially inappropriate discourse, and humour, with, in severe cases, confabulations or delusions.

Thus, a large number of functional deficits, commonly described in individuals with schizophrenia, have been postulated as arising from frontal lobe lesions. However, the precise relationship between structure and function of brain areas is not known.

More recently, evidence from functional brain imaging can provide support for frontal lobe deficits in individuals with schizophrenia. Frith, Friston, Herold, Silbersweig, Fletcher, Cahill, Dolan, Frackowiak, and Liddle (1995) summarise the literature on functional brain imaging in schizophrenia. They note that approximately sixty percent of studies have demonstrated relative hypofrontality in individuals with chronic schizophrenia scanned at rest. However, approximately forty percent recorded no hypofrontality, or even hyperfrontality.

Frith *et al.* (1995) suggest that the disparity in findings results from the varied mental state of participants in the study with a diagnosis of schizophrenia, with mental activity associated with brain activity. Liddle *et al.* (1992) confirmed that current symptoms and regional cerebral blood flow are related.

Psychological tasks sensitive to damage in particular mental processes could potentially highlight the associated brain areas, if methodological concerns are adequately addressed.

Examples include:

a.) Price *et al.* (1992) note that positron emission tomography (PET) involves integrating all activity during the scan period. This means that the results reflect the rate of stimuli presentation.

b.) Frith *et al.* (1995) used three paced tasks, varying in task requirements. (Frith *et al.* (1991a, b) demonstrated a similar pattern of brain activity for unpaced and paced versions of verbal activity.)

The first task consisted of a paced form of orthographic verbal fluency, in which the study participant is given a letter, to which he responds with a word with that initial letter.

The second task involved classification of a series of nouns into those man-made and those natural, requiring semantic analysis, but no self generation.

The third task involved repetition of a series of nouns involving complete stimulus specification by the experimenter, with therefore minimal processing by the participant.

c.) Raichle *et al.* (1994) demonstrated two different neural systems in verb generation in normal volunteers, corresponding to when the task was novel and practised respectively.

Adequate task constraints enforced the adoption of appropriate strategies by study participants.

Findings have included:

a.) Weinberger *et al.*'s (1986) findings that in certain tasks, normal volunteers demonstrate an increase in frontal blood flow, but individuals with schizophrenia, deficient in these tasks, have reduced or absent increases. Andreasen *et al.* (1992) note that the absence of an increase in frontal blood flow in these tasks is particularly noticeable in individuals with negative features of schizophrenia. These relate on a cognitive level to self-generated or willed tasks (Frith, 1992). However, the findings could reflect fewer responses, associated with poor performance and varied strategies.

b.) In the Wisconsin Card Sorting Test, which requires sorting according to varied criteria, typically, the poor performance by individual with schizophrenia involved perseveration on a response that was no longer appropriate. The response of individuals

with schizophrenia was similar to that demonstrated by 'normal' study participants when the task has been practised, rather than when it was a novel task.

c.) Andreasen *et al.* (1992) demonstrated that the behaviour of study participants with chronic schizophrenia reflected the attainment of short term goals, incompatible with the final goal, consonant with the lack of activation seen in the anterior cingulate cortex.

d.) Frith *et al.* (1995) noted during paced word generation tasks that left dorsolateral prefrontal cortex (DLPFC) activity in individuals with schizophrenia was of similar location and magnitude to that observed in 'normals'. These findings contrast with findings in many other studies, where participants with schizophrenia have demonstrated reduced DLPFC activity at rest. The latter findings have been attributed to a lack of spontaneous mental activity. It is probable that due to the constraints imposed, the paced verbal fluency task enabled even the study participants with chronic schizophrenia and pronounced negative features to activate the left DLPFC.

Thus, a number of initial findings using functional brain imaging support a frontal lobe deficit, but, possibly as a result of methodological variation, a number of inconsistencies remain.

(2.) A right hemisphere dysfunction?

It has also been suggested that schizophrenic symptomatology may reflect a right hemisphere dysfunction. Cutting (1985), in a literature review, notes that individuals with schizophrenia are particularly impaired with respect to their pragmatics and prosody. He argues that these findings suggest an underlying right hemisphere dysfunction. However,

there is a lack of definitive support for a right hemisphere dysfunction in the literature on schizophrenia.

SECTION B.5

FRAMEWORK FOR ANALYSIS AS SUGGESTED BY THE LITERATURE

REVIEW

Analysing the findings from cognitive, linguistic, neurological and physiological studies as above, it is evident that the linguistic theories provide a direct method of measuring thought disorder or communication difficulties in schizophrenia, whilst relating at a different level to cognitive, physiological and neurological descriptions. Fine et al. (1994) and Fine (1995) note that the language used by psychiatric patients is relevant data in itself regardless of the availability of information relating the language data to problems at cognitive or biological levels. This is due to the fact that the patient's interaction with others constitutes the issue to be studied. It is the conversational interaction or language in use that constructs the speaker's place in society, and this is worthy of investigation. However, linguistic theories are interrelated, with different frameworks providing descriptions of different elements of the language of mentally ill patients. Adopting a linguistic framework such as that of Frederiksen *et al.* (1990) could enable a relatively comprehensive description of the thought disorder or communication disorder to be evaluated. This would overcome the difficulties identified in linguistic frameworks described above, by including a broader range of measures, including measures of higher level language.

Further support for a linguistic description rather than a description in terms of other frameworks is drawn from the discriminatory element of linguistic features in the communication of individuals with schizophrenia, unlike other symptoms which have been found not to discriminate as well between different diagnostic groups. Despite the widespread retention of the term 'thought disorder' to describe a characteristic of many patients with schizophrenia, it is noteworthy that several investigators have shown that 'thought disorder', or what has been termed 'thought disorder', does not distinguish between patient populations. Thus, for example, Harvey, Earle-boyer and Wielgus (1984) demonstrated that the concept of thought disorder was not useful for discriminating between groups of patients with schizophrenia or a manic illness. In contrast, the Thought, Language, and Communication Scale (TLC, Andreasen, 1979) was a reliable discriminator for patients with a diagnosis of schizophrenia and those with a manic illness. It would appear that "the majority of the differences between the two groups were apparently due to verbal productivity and not other aspects of thought disorder" (Harvey *et al.*, 1984, p. 462). Furthermore, 'thought disorder' varied in its stability between patients. Harvey *et al.* (1984) found evidence for this in their study. They noted that thought disorder was somewhat more stable in those patients with schizophrenia as compared with the patients with a manic illness. Simpson and Davis (1985) questioned the value of using the term 'thought disorder' in schizophrenia due a different reason. They remarked that in fact those patients with a manic illness are more likely to be thought disordered than are patients with schizophrenia, therefore questioning the value of a study of thought disorder in

schizophrenia. They noted that, in contrast, linguistic descriptions of individuals with schizophrenia, were extremely valuable.

However, it is important not to disregard the descriptions of schizophrenic symptomatology in terms of other frameworks. In fact, the overlaps between descriptions in terms of many of the cognitive frameworks suggest that there are linkages between the language performance of patients with a diagnosis of schizophrenia and other aspects of their symptomatology, including most commonly their auditory hallucinations. This suggests the second objective of the study:

OBJECTIVE TWO: an investigation of the relationship between overt language disorder and auditory hallucinations, with a suggestion that these may both reflect a single underlying deficit.

Literature relating to this area is reviewed in Section C.

SECTION C

THE RELATIONSHIP BETWEEN OVERT LANGUAGE DISORDER (SECTIONS A AND B) AND AUDITORY HALLUCINATIONS

The significance of an understanding of auditory hallucinations in those individuals diagnosed with schizophrenia is outlined in section C.1. This significance is increased when considering the impact of hallucinations on those who hallucinate (Section C.2). It is suggested that an understanding of the auditory hallucinations may relate to an understanding of the language disorder in schizophrenia (Section C.3).

SECTION C.1

SIGNIFICANCE OF AUDITORY HALLUCINATIONS

Auditory hallucinations occur in approximately seventy per cent of individuals with a diagnosis of schizophrenia at any time (Slade and Bentall, 1988; Wing, Cooper and Sartorius, 1974). The auditory hallucination frequently takes the form of a voice, speaking to or about the individual with schizophrenia. Auditory hallucinations are considered diagnostically significant, with Szasz asserting that, even without confirmation, claims of auditory hallucinations result in the psychiatrist inferring a diagnosis of schizophrenia. Other psychiatrists, such as Roth, Kerr and Howorth (1996), suggest that auditory hallucinations contribute to a diagnosis of schizophrenia only when considered with other aspects of medical history and concurrent symptoms. According to these psychiatrists, the response to the patient by significant others reinforces a diagnosis of the presence of hallucinations. Roth *et al.* note that there are qualitative distinctions between auditory hallucinations as part of a diagnosis of schizophrenia and hallucinations of individuals free from other symptoms of mental illness. The hallucinations also vary in their course, and response to treatment. Furthermore, patients suffering from mental illness do not possess the same insight as that attributed to people suffering from hallucinations in isolation. It is clear from the latter discussion that hallucinations are not a social construct dependent on society's labelling of the experiences of individuals with schizophrenia as 'deviant', and, regardless of which view people ascribe to, auditory hallucinations are diagnostically significant in schizophrenia. Furthermore, auditory hallucinations have a powerful although not uniform impact on the lives of those who experience them (Falloon and Talbot, 1981)

SECTION C.2

EFFECT OF VOICES ON HALLUCINATORS

Romme and Escher (1989) demonstrated that the particular response to voices is dependent on an appraisal of the voices. The relationship between hallucinations and affect or behaviour parallels the way in which people generally respond to comments and advice. Recently, it has been suggested that a similar process, based on beliefs is involved in the formation of delusional ideas (Maher, 1988), and recovery from delusional ideas (Brett-Jones *et al.*, 1987). There are other possibilities in which responses to hallucinations are the result of normal processes (Falloon and Talbot, 1981; Tarrier, 1987). As an example, Benjamin and Watts (1969) first postulate that voice content (predominantly negative) is 'directly responsible' for the hallucinators' behavioural and affective response, although peoples' beliefs about the voices may not always be congruous with voice content. Their hypothesis is reiterated by others in more recent works, such as that of Ron and David (1998).

Chadwick and Birchwood (1994) and Chadwick *et al.* (1996) describe other normal processes involved in peoples' perceptions of hallucinations. They note that all behaviours, affect and beliefs evolve continuously, accounting for the variability in peoples' reports of hallucinations. However, despite the variability, there are consistencies in individuals' pattern of response to hallucinations. Chadwick and Birchwood note in their 1994 study that all hallucinators saw their voices as omnipotent, predominantly with a presumed identity. The voice identities were in addition perceived as superhuman in that they were also viewed as omniscient. Thus, voices were viewed as very powerful. Chadwick and

Birchwood also describe verbal regulation of behaviour as a normal process in which strongly held beliefs can determine our behaviour, affect, and interpretation of events (Vygotsky, 1962). They suggest compliance is determined more by severity of the instructions in the hallucinations than by the beliefs of those hallucinating. Possible reasons for this include the possible influence of perceived consequences such as the protection of self-esteem, structure and involvement with the world (Strauss, 1989), or the result of people questioning the effects if their voices are wrong. Chadwick and Birchwoods' comments demonstrate a possible model for the involvement of the voices in peoples' everyday life.

SECTION C.3

MECHANISM UNDERLYING AUDITORY HALLUCINATIONS

It has been suggested that the mechanism involved in auditory hallucinations and that of inner speech may be similar, implying that auditory hallucinations and speech may be related. Theories involving the above suggestion are in part a result of the detection of subvocal muscular activity during hallucinations, as first observed by Gould (1948). The phenomenon of inner speech is presumed to be a reflection of phonological (or articulatory loop activity. It is generally accepted that inner speech is an integral part of short-term or working memory, and that this is necessary for certain phonological judgements and memorising of phonological information.

Findings of subvocal muscular activity during hallucinations have been replicated several times in some patients, as reviewed by Green and Kinsbourne (1990). Also, engaging the

vocal musculature in another activity can abolish the hallucinations (Bick and Kinsbourne, 1987; Green and Kinsbourne, 1989). However, it is still possible that articulation is not necessary for the occurrence of hallucinations. Subvocal activity could be a by-product of the hallucinations.

There are a number of interrelated possibilities that could explain the results.

1. It is possible that there is more than one loop or that the abnormality arises from the input store itself. If this is true, the proposed abnormality is not a problem that prevents subvocal articulatory functioning under usual circumstances. Rather, there is a failure in the regulation of various forms of unwanted inputs allowing them to become activated involuntarily.
2. Alternatively, it is possible that auditory hallucinations are due to an effect similar to that involved in the 'verbal summator's' response to the ambient environment.
3. It has also been postulated that individuals with schizophrenia may be talking to themselves covertly as in for example the theories of Gould (1950) and McGuigan (1966).
4. Yet another possibility is that a functional analysis of delusional speech and hallucinatory behaviour could demonstrate that both are successful operants, although the general validity of this hypothesis is questionable.
5. Underlying biochemical or other organic disorders have also been proposed as the disorders underlying a cognitive defect in filtering of irrelevant information (e.g. Freedman, 1974), or covert sensor 'noise' resulting from an organic disturbance. According to Broadbent (1958) we constantly filter out from the huge amounts of information confronting us that information which is relevant to us. A frequent suggestion, e.g. that

proposed by Venables (1964), is that individuals with schizophrenia suffer from an overload of information due to difficulties filtering out the relevant information. However, the relationship between a defective filter and the positive symptoms displayed in schizophrenia is not clear, and similarly, the relationship between a defective filter and the brain is unclear. Difficulties with this theory include:

- a.) Done and Frith (1984) reported findings that individuals with schizophrenia perceived single words in a similar manner to 'normals' when these were embedded in noise.
- b.) Hemsley (1975), using reaction time and dichotic listening tasks, demonstrated that study participants with schizophrenia were impaired on output filtering rather than input filtering.

As a result of these difficulties, Frith and Done (1988) suggest an alternative mechanism for the difficulties demonstrated by study participants with schizophrenia. They postulate an internal monitoring system for all voluntary actions. Frith and Done suggest, as initially proposed by Frith (1987), that the internal monitoring of actions and thoughts provides information that the action is about to occur, together with information as to the source of the action. This means that a breakdown of the monitoring could result in confusion about the source of the action or thought, and its perception as alien.

According to Frith and Done (1988) there are two routes to action. These are supported by anatomical and behavioural evidence reviewed by Goldberg (1985). In the first route to action, action is spontaneously generated on the basis of some internally generated initiation. In contrast, in stimulus-driven action, the action is directly elicited by an

environmental stimulus. Frith and Done (1988) postulate the presence of a monitor of information regarding:

- i.)* Actions derived from current short-term goals (willed intentions);
- ii.)* Actions derived from current stimuli (stimulus meaning)
- iii.)* Actions currently being initiated.

This allows the comparison of information from these different sources, indicating mismatches so that current goals, stimulus meanings, and actions can be modified. The 'monitor' is similar to the 'comparator' suggested by Gray (1982), but Gray does not differentiate between stimulus-driven and self-initiated responses. Frith and Done's (1988) theory describes how a defect in the postulated monitor can give rise to positive symptoms. As an example of this, a person may experience auditory hallucinations when he does not recognise his thoughts as his own or as elicited by an external unknown agent, rather attributing them to an external stimulus.

6. Hoffman (1986) describes another possibility to account for auditory hallucinations. Hoffman (1986) notes that despite the individual with a diagnosis of schizophrenia generally considering the auditory hallucinations as not being the product of his own mind, the hallucinations must at some point derive from his cognitive processes, and subsequently become incorrectly labelled as non-self. It is interesting that many patients complain less of their auditory hallucinations than of a lack of control of the experiences (Persaud and Marks, 1995), possibly suggesting that their presence is not considered as abnormal as the patients' relative inability to control their hallucinatory experiences.

Our thoughts often constitute a form of inner speech. Hoffman (1986) describes the domination of speech production centres by a parasitic focus, resulting in the experience of inner speech as unintended. This could then be interpreted in terms of hallucinations. Due to these thoughts emanating from a parasitic focus, they would be expected to be orderly or stereotyped. The intentional stance would lead to an interpretation that these were the result of an alien nonself force introducing thoughts into the person's head. Interestingly, these hallucinations are habitually attributed to agents whose presence cannot be directly confirmed.

If, in contrast, speech perception centres are dominated by a parasitic focus, 'voices' could result, or alternatively, they could influence speech perception in a top-down fashion.

Speech sounds are inherently ambiguous, with clarity further reduced at times. A parasitic focus involving speech perception could influence the perception of ambiguous acoustic stimuli so that the person would repeatedly hear the same word or phrase when e.g. listening to the radio. This would be experienced as receiving messages from the radio.

Another possibility would be a parasitic focus functionally located between speech production and speech perception processes. This would mean the periodic experience of self-derived but stereotyped thoughts, and episodic auditory misperceptions. This combination could lead the person to conclude that other people can read his or her mind.

The above all involve the parasitic focus in reproducing output that is consciously meaningful. However, computer simulations would suggest that at times the outputs are not meaningful. This could result in having one's thoughts involuntarily emptied out or

experiencing thoughts that are not meaningful. Possibly, this is a reason why actions do not always reflect hallucinations. This would also mean the possibility of producing non-meaningful hallucinations. The experiences above, alone or in combination, could be reflected in thought blocking or alogia. Avolition or passivity could be a result of the loss of intentionality that is part of most positive symptoms.

The prevalence of a language disorder and auditory hallucinations in schizophrenia, together with their accumulative effect, would demand the development of appropriate therapy should this be a possibility. The various undisputed suggestions in the literature that these symptoms are related via a similar underlying difficulty imply that therapy for the language disorder may result in improvements in both the experience of language disorder and auditory hallucinations by individuals with a diagnosis of schizophrenia. This suggested the third objective in this study:

OBJECTIVE THREE: that the incidence of auditory hallucinations as well as the severity of the language disorder can be reduced by specific language therapy addressing an underlying deficit.

This is particularly important given the significance of determining appropriate therapy for the language disorder and auditory hallucinations in schizophrenia (Sections D.1 and D.2 respectively).

SECTION D.1

SIGNIFICANCE OF THERAPY FOR LANGUAGE OR COMMUNICATION DISORDER IN SCHIZOPHRENIA

As noted by Monti and Fingeret (1987), recent clinical research is increasingly recognising the importance of communication skills training approaches with participants in the study with a diagnosis of schizophrenia, but it is necessary to improve the maintenance and generalisation of treatment effects (Curran, Monti and Corriveau, 1982). This would suggest the importance of hypothesis driven therapy, with detailed linguistic analysis leading to targeted therapy.

SECTION D.2

THERAPY FOR AUDITORY HALLUCINATIONS

Allen and Allen (1985) review a number of studies reporting on aims to reduce auditory hallucinations. They describe a few studies in a behavioural framework, involving thought stopping. These are reliant on dismissal tactics, and truncating thoughts, thereby affecting the hallucination's duration. Reports included a few studies with successful reduction of hallucinations, but the benefit of this form of approach is not supported by the majority of controlled studies, as reported in Ron and David (1998). Allen and Allen (1985) point out that negative findings in studies using this approach are not surprising as the therapy would be expected to reduce the duration of hallucinations but not their frequency. Allen and Allen (1985) suggest that auditory hallucinations can be understood at a descriptive level as persistent intrusive thoughts. In a similar manner to intrusive thoughts their production and removal are not under the study participant's conscious voluntary control. However, they

are disowned, as compared with intrusive thoughts, which are ascribed to the self. Thus, despite many varied attempts, therapy for auditory hallucinations has generally not been successful in reducing the frequency of their occurrence, suggesting the importance of developing a different form of therapy. This is described in chapter 5.

CHAPTER TWO – METHODOLOGY

OUTLINE OF CHAPTER ON METHODOLOGY

The methodological design of this study can be described in terms of decisions relating to a number of methodological variables, including choices such as those relating to naturalistic versus experimental studies and cross-sectional versus longitudinal studies. These determine the nature of the ‘experimental material’. These issues are discussed in Section E. This is followed by a consideration of the necessity for comparative data (Section F.1), and issues relating to how the data is gathered (Section F.2). Difficulties with the experimental data and comparative data within this study are outlined in Section F.3.

The rationale for the particular assessments employed within the study is then outlined, including the ‘background assessments’ (Section G.1), the language samples obtained (Section G.2), and the method of analysis which was applied to the language data (Section G.3).

A section in which the methodology employed in the study is described follows this. Thus, in section H.1, the design of the study is delineated, and participation selection and recruitment is considered in Section H.2. Details of the research interviews are described in Section H.3, and the tasks included in the interviews are outlined in Section H.4. The linguistic model used to analyse the discourse samples follows in Section H.5, after which transcript preparation and the stages of the analysis are described in Sections H.6 and H.7 respectively.

This is followed by a description of the variables employed for the analysis as part of a pilot study (Section H.8). Next, the variables used for the analysis of all discourse samples in the study are outlined (Section H.9). The protocol which was used for the analysis by both the researcher and the rater employed to re-rate discourse samples for the determination of interrater reliability is documented in the following section (Section H.10). This is followed by an outline of The Krawiecka Scale, used as a measure of mental health for participants in the study (Section H.11), after which the scoring of the interviews is described (in Section H.12).

SECTION E.1

THE BENEFITS OF A NATURALISTIC VERSUS EXPERIMENTAL STUDY

Experimental methodologies involve studies in which the relationship between dependent and independent variables are investigated. Although experimental premises permit tests of particular hypotheses, the tests tend to be very narrow. Naturalistic methodologies, by contrast, involve the study of more naturally occurring situations. These enable broader

descriptions of situations of interest, although they have been criticised for being less systematic and more intuitive.

Naturalistic methodologies are advantageous in that they provide more representative data, with the skills evaluated being more representative of the skills of study participants than tasks which are dissimilar to those involved in everyday tasks. The role and social class differences between individual study participants or between participants and investigators within naturalistic studies are similarly more representative of those involved in study participants' routine experience. Thus, this study used language tasks 'similar to those involved in everyday discourse', as advised by Chaika (1982 a, b), where she notes that if we wish to understand the nature of linguistic dysfunction in schizophrenia, experimental data must include the behaviours and skills actually involved in linguistic production. The relevance of this is demonstrated by Labov's (1970) study of verbal behaviour of black children with white investigators and sympathetic black investigators. In that study participants' language did not show linguistic sophistication except when black investigators were involved in the study, where the black children were more accustomed to black adults.

SECTION E.2

LIMITATIONS IN THE VALIDITY OF LANGUAGE SAMPLES IN A NATURALISTIC STUDY

It must be remembered, though, that although spontaneous language samples are more representative of language in use, they are not representative of all the study participants'

language use. Indeed, the necessity for comparative data within this study dictated that 'completely natural language samples' could not be used. Furthermore, individual language samples cannot be considered representative of all the study participants' language use. This point is illustrated in studies such as that by Seeman (1970, 1980). In fact, Gallagher (1981, 1983, 1991) notes that it has been increasingly recognised that all language is context bound, and she therefore questions what constitutes a 'representative' sample. A common solution to this dilemma has been to examine a sample within a 'standardised language sampling context', as carried out within this study. This implies that the interactive effects of contextual variables can be pre-defined and yet it is difficult to predict what interactive contexts would be most revealing of a particular individual's language. Commonly, researchers have relied heavily on spontaneous language sampling, whilst recommending that samples be collected in more than one context.

Alternatively, obtaining a 'representative' sample can be taken to refer to the obtaining of a sample of 'typical' behaviour. However, a language sample cannot be assumed to represent simultaneously both 'typical' behaviour and or 'comprehensive' or 'idealised' behaviours, where these are also commonly viewed as important meanings of the term 'representative'. A goal of comprehensiveness requires that the sample obtained be large enough to be interpretable and reliable but of a reasonable length to be efficient. In contrast, 'idealised performance' requires that one "evoke the best possible sample of (his abilities)" (McLean and Snyder-McLean, 1988, p. 127). This differs from a 'typical language sample', where it is necessary to obtain a sample that portrays an individual's

'usual', 'habitual', 'most frequent', or 'daily' language performance. Evidently, it is not possible to obtain a sample that simultaneously fulfils these three attributes.

The common solution, as identified for this study, of obtaining language samples in multiple contexts to accommodate the various possible interpretations of the term 'representative' does not resolve the difficulty of taking into consideration variability in language use. There are infinite possible combinations of stimulus materials, conversational partners, and settings. In addition, any combination of contextual variables is merely arbitrary or the result of trial and error sampling of a pre-selected subset of possible combinations. Even more fundamentally, the assertion that multiple context language sampling effectively overcomes the difficulties of language assessment due to language variability is based on an unfounded assumption. The assertion is dependent on being able to predict the interaction of a particular context and an individual study participant and the assumption that this interaction will be consistent across study participants. Yet, the effects of context variations are widely recognised, reinforcing the difficulty in obtaining any form of 'representative' sample.

SECTION E.3

DESIGN CHOSEN FOR THIS STUDY IN TERMS OF AN EXPERIMENTAL OR NATURALISTIC STUDY

For the purposes of this study, a number of stimulus materials and conversational partners were employed to provide an indication of the range of discourse behaviours displayed by the study participants within situations resembling those they may encounter in their

everyday life at a particular point in time. The investigation could then focus on the behavioural differences between groups of study participants, or between study participants at one point in time, followed by those same study participants at (a) later point(s) in time. This was carried out in the second part of this study (chapter 5). Additional information could be derived from looking at correlations between the various factors considered within the study. This was also carried out, for example, in the consideration of the relationship between participants' scores on standardised language assessments and the language measures developed in this study.

SECTION E.4

CROSS-SECTIONAL VERSUS LONGITUDINAL DESIGN

A longitudinal design involves looking at participant changes over time, whereas a cross-sectional study requires the study of differences between participants at any one moment in time. A cross-sectional approach was chosen for this study primarily due to the time involved in a longitudinal study, which would not have been possible in the time allocated for this study. However, there are limitations inherent in cross-sectional studies. As noted by Strauss (1973), conclusions regarding intra individual changes based on inter individual differences are hazardous. Strauss (1973) states with reference to psychotic patients, "The study of changes in psychological processes during the course of this psychosis requires the longitudinal investigation of first admission cohorts, not the cross-sectional comparison of inpatient samples." (P.277)

An additional difficulty encountered with cross-sectional studies of this population is that stated by Mednick and McNeil (1968). Studying individuals who are already diagnosed as schizophrenic does not clarify whether the behaviours observed are antecedents of the disorder or the result of factors associated with the identification and treatment of schizophrenia. This suggests the value of a longitudinal study with study participants identified at high risk of developing schizophrenia. However, other complications could result. The rate of attrition within study participant samples could introduce biases in what were originally representative groups. Over time, any number of events, known and unknown to the investigator, may occur. Significant variables such as medication regime are likely to change over an extended period. Thus, attributing observed performance changes to a particular cause is difficult (Campbell and Ross, 1968). Yet another difficulty involves the confounding of a developmental variable, e.g. level of pathology with the time of testing. As mentioned earlier in this section (Section E.4), a practical difficulty related to the time available for the study. This study therefore looked at the discourse of twelve individuals with schizophrenia at a particular point in time. Discussion focused on any patterns observed when comparing the performance of these study participants and study participants without a diagnosis of mental illness. This discussion was followed by observations of trends within the group data, providing an indication of individual participants' performance.

SECTION E.5

GROUP STUDY OR INDIVIDUAL CASE STUDIES

Studies can focus on groups of study participants or individuals. Those involving large numbers of study participants as part of groups are more popular, as these are seen to provide powerful indications as to the behaviour representative of these groups. Individual case studies or small group studies are, more recently, becoming increasingly accepted as a valid mode of study.

In part the increasing acceptance of single-case studies is due to the increasing awareness that group data can obscure individually significant results. This is demonstrated by a study involving fourteen males with schizophrenia, all of whom were asked to speak about both their reasons for being in the hospital and things they enjoy doing. Taken individually, statistics on the cloze procedure applied to this data showed significant differences in most patients, with half favouring the 'hospital' topic, and half the 'enjoyable things' topic. When looking at statistical analyses of the group data there were no significant differences (Salzinger *et al.*, 1966). This explains why researchers, such as Elliott and Sahakian (1995), note that group means of a very heterogeneous group may not reflect the behaviour of any individual in the group. Wide individual variation between participants with schizophrenia is one of Shallice *et al.*'s (1991) main arguments to justify the use of a single case study approach to schizophrenia as a complementary approach to group studies.

Yet another difficulty of group studies is posed by the problem of determining what constitutes a group. What individual characteristics should be included in group membership criteria? Might the characteristics chosen be symptoms of various different underlying difficulties? Individual characteristics generally vary along a continuum rather than presenting as all-or-none phenomena. What should constitute the baseline values above which characteristics are considered as symptoms present in individual study participants? These are issues that militate against the adoption of group studies as the sole method for investigating any group of study participants. Similar issues need to be addressed when choosing individuals to be studied as part of a case study approach, as described below (section E.6). The approach adopted here has the advantage of recognising individual patterns of performance rather than obscuring all data in group norms. The data can be examined for correlations between characteristics or symptoms of the individual study participants.

The adoption of studies involving small numbers of participants, with analysis as described above introduces different difficulties (Shallice, 1988). It is not possible to be certain that the participants in any study represent a complete or typical cross-section of the pathology encountered in that illness, particularly where small numbers of participants are involved. In addition, characteristics of individual patients unrelated to disease process may influence significantly the findings, particularly where small numbers of participants are included in a study. This study looked at the data from twelve individuals with schizophrenia as a group, compared with twelve individuals without mental illness, where all findings were checked for 'exceptions' to these findings ('outliers') in the data. Patterns within the data were then

examined using correlational statistics, providing an indication of patterns of individual performance. This allows the consideration of which interpretation of the results best describes both methods of data analysis; comparison of data from the two groups of participants and correlations between individual characteristics. Where findings are derived from two different methods of analysis, additional weight is given to the findings relating to the group of participants and the individuals themselves, but the findings do not provide information on which criteria should define the individual study participants.

SECTION E.6

USE OF PARTICIPANTS WITH A DIAGNOSIS OF SCHIZOPHRENIA OR PARTICIPANTS WITH A PARTICULAR GROUP OF SYMPTOMS

As schizophrenia is currently an open construct, it is not evident which symptoms are included in the definition, or what symptoms are most significant for the determination of the diagnosis, and therefore which participants should be included in a study where participants are included on the basis of particular symptoms. This is relevant to both the selection of a group of participants and the selection of a group of single case studies.

Some authors, such as Bannister (1968), suggest that schizophrenia is a 'disjunctive concept', leading to the grouping of study participants with heterogeneous symptoms, with little in common. Bannister advises that study participants should therefore be selected for studies on the basis of a specific symptom, such as hallucinations or disordered speech. This could suggest relationships that would otherwise be hidden within symptom clusters. Faber and Reichstein's (1981) findings that a subgroup of patients with schizophrenia

presented with formal thought disorder and significant language dysfunction exemplify the advantages of such considerations. This contrasted with patients with a diagnosis of schizophrenia without formal thought disorder and controls, all of whom did not exhibit language dysfunction. In this vein, Faber and Reichstein propose that similar mechanisms could be responsible for particular symptoms, regardless of other concomitant behaviours, even suggesting the study of groups of study participants with different diagnoses, but all sharing a particular symptom. However, there is a difficulty, in that for example, similar processes may cause auditory hallucinations, but it is equally possible that there may be different underlying causes so that symptom classes may not be homogeneous. Similar symptoms cannot necessarily be considered as identical entities.

In addition, symptoms are not all-or-nothing discrete entities. Strauss (1969) describes how symptoms such as delusions are continuously distributed phenomena that shade into normal experience. This would mean an arbitrary distinction between study participants considered to be delusional or not, and thus who should be included within a particular group of study participants. Furthermore, the existence of, for example, formal thought disorder is variable over time so a single correlation between formal thought disorder and a dependent variable would be very difficult to interpret (Depue and Woodburn, 1975).

Even were it possible to select a group of participants with a particular symptom such as thought disorder, the significance of the individual symptom is questioned by the findings of authors such as Bartolucci and Fine (1987) and Dawson, Bartolucci and Blum (1980). These authors described a linguistic problem in relation to cohesive weakness in

participants with schizophrenia regardless of whether participants presented with clinically apparent thought disorder or not. This was despite some suggestions that the linguistic problem is only present in participants with schizophrenia who present with a formal thought disorder. Similarly, although people with schizophrenia are frequently divided into positive and negative subtypes, Peralta *et al.* (1992) reported that a positive/negative dichotomy for 'speech disorders' was unhelpful in subtyping people with schizophrenia, as the positive disturbances were multifactorial. They concur with Allen (1983) that a further difficulty with the subdivision is that people with schizophrenia who present with 'positive thought disorder' frequently exhibit reduced speech production and content, considered symptoms of a negative thought disorder. Using factor analysis to assess several different theoretical models relating to the factorial structure of thought disorders, Harvey *et al.* (1992) reiterated that the results did not support a positive/negative dichotomy.

Other subdivisions of people with schizophrenia are equally fraught. A number of related but diagnostically distinct subtypes are described in DSM IV (American Psychiatric Association, 1994). The existence of different subtypes implies that they must have some defining features in common, to allow for a relationship between the various subtypes. However, in addition, the subtypes must have defining features that differ from each other in at least one respect, so that the subtypes can be differentially diagnosed. Thus, there are important differences in the characteristics of different study participants diagnosed as schizophrenic.

The existence of different schizophrenic subtypes also requires that there are minimally partially distinct causal mechanisms. It would otherwise not be possible to answer the questions relating to the causes of the similarities among people identified as schizophrenic and the causes of the differences among people with different subtypes of schizophrenia. This suggests limitations on the application of conclusions relating to any study of participants with schizophrenia as a group, and it also leads to questions relating to what individual characteristics should be chosen as criteria for the participants' inclusion in the study. Yet, participants can still be chosen so that they have particular characteristics in common, for example whether they are chronic or acutely ill. Due to these difficulties, participants in this study were not chosen on the basis of their inclusion in any subgroups of schizophrenia. Rather, a group of participants with schizophrenia was chosen to include male patients with a diagnosis of schizophrenia, where all participants with schizophrenia in this study had an undisputed history of being diagnosed as schizophrenic by all psychiatrists involved in their assessment and care. This would suggest that their diagnosis was broadly consistent with DSM IV criteria. The participants all spoke English as their first language. Analysis involved an examination of group data, followed by a consideration of any correlations between individual variables. Any interpretation was consistent with the accumulative data from the participants when they were considered as a group and the indications regarding individual participants as seen in correlations between individual variables or factors. Those factors that were considered as potentially particularly important included whether participants could be included in one of the following categories:

(1.) Participants with a documented language difficulty

It has been suggested that studies of the discourse of people with schizophrenia should include study participants who have a documented language disorder (e.g. Chaika, 1990) when studying language in schizophrenia. This characteristic has been reported in a subset of persons with schizophrenia (Chaika 1974, 1977; Andreasen and Grove, 1979; Neale; JM, Oltmanns, T.F., and Harvey, P.D., 1985; Allen and Allen, 1985). Within those study participants diagnosed as schizophrenic and described as having disordered language, errors may be evident at the different levels of language processing (phonological, morphological, lexical, syntactic, and discourse). This could create the impression that there is no pattern to the language presentation of participants with schizophrenia. Equally, this could lead to difficulties in deciding which language presentation warrants the study participant's inclusion within the study. At a subsequent stage, difficulties may arise in generalising from a group of study participants with very different patterns of language disorder in much the same way that it would be difficult to generalise from a heterogeneous group of study participants, with or without a documented language disorder. Further, as individuals vary in these different forms of language processing in a continuous manner, an arbitrary decision would be necessary when deciding which study participants would be considered as abnormal and which study participants would be considered as functioning within normal limits.

An additional difficulty is introduced by the fact that language performance in study participants with schizophrenia may be typically outside normal limits, but their language performance varies with fluctuations such as exacerbations in symptomatology or changes

in medication status (Nuechterlein and Dawson, 1984). This would parallel the findings regarding variations in clinical thought disorder in study participants with schizophrenia, as described by Andreasen and Grove (1986) and Harrow and Marengo (1986). Acceptance of this issue would increase the difficulty in selecting study participants with 'a language difficulty', and would lead to questions regarding any selection criteria on the basis of a language disorder. It was therefore decided to include study participants whether or not they would be described as language disordered by individual members of the clinical team.

(2.) Participants who are labelled as 'acute or chronic schizophrenic patients'

A commonly described factor determining the language of study participants is that of the chronicity of study participants. Within a special hospital setting, it is expected that the majority of patients are chronically ill with schizophrenia or some other form of mental illness. King *et al.* (1990), in a study of the differences between acute and more chronic cases of schizophrenia, exclude the possible contributions of institutionalisation, testing the impact of relapse and the effects of medication. They concluded that people with chronic schizophrenia produce speech that is less complex and fluent as well as more error ridden than that of people with acute schizophrenia. However, there is a difficulty in determining when study participants first suffer from schizophrenia. It is unclear how this relates to dates such as that of participants' initial presentation to psychiatric services and study participants' initial diagnosis as mentally ill, particularly where there has been a change in diagnostic label. For the purposes of this study, the number of years since diagnosis were recorded for each patient, who all had an initial primary diagnosis of schizophrenia.

SECTION F

COMPARATIVE DATA

SECTION F.1

THE NECESSITY FOR COMPARATIVE DATA

Where study participants have been diagnosed as schizophrenic, designation of their performance as abnormal or deficient on any measure requires some appropriate or meaningful standard of comparison on the measures described (Lezak, 1988). Studies such as those conducted by Menn and Obler (1990) consistently demonstrate that there is overlap between the speech errors of normal adults and errors construed as aphasic in an aphasic population. Thus, for example, Obler *et al.* (1994) emphasise the importance of a control group to take into account inter subject variability in adult normal discourse, and compare the language of 'clinical populations' with a standard derived from 'control study participants'. In this study, twelve prison inmates without a history of mental illness were involved in the study to provide comparative data for those participants with schizophrenia.

SECTION F.2

OBTAINING COMPARATIVE DATA

There are well-documented associations between demographic variables such as age, education and neuropsychological measures (Heaton *et al.*, 1991), dictating the importance of matching along these variables, as carried out in this study. It is also important to note that differences in premorbid functioning have been reported for male and female persons with schizophrenia (Haas *et al.*, 1990). This suggests the importance of restricting such a

small study to a single sex. It also imposes constraints for the generalisation of the findings of any such study. All participants in the study were male.

Frequently, comparative data for patients with schizophrenia is drawn from individuals without lifetime psychiatric disorder. In a study by Condray *et al.* (1995, 1996) the majority of the group of study participants with schizophrenia did not fall in the abnormal range when the norms reported by Golden *et al.* (1981, 1985) were used as a standard for comparison. These norms are based on standardisation studies that incorporated individuals with general medical conditions and individuals with known brain injury. However, when using as a standard of comparison individuals without any known history of general medical conditions or brain injury the group of participants with schizophrenia was markedly impaired. This would suggest that possibly some of the variance observed is related to conditions other than schizophrenia, suggesting the value of studying participants with schizophrenia and two other groups of participants as a comparison: those with and without a general medical condition. These were included in that participants included in the study for comparative data were people who were not known to have had a head injury according to medical reports, but at times the presence of a head injury in their case history became apparent on questioning. In this study, questions were designed to elicit this information.

In addition, the finding that a subset of study participants with schizophrenia differs from what is in some senses a heterogeneous control group might mean that the same phenomena are common to both groups. It is possible that an existing relationship is not detected

because of study participants who are part of a larger group where the effect of interest is masked. It is also possible that a dependent measure such as poor performance on particular variables is a function of a number of different factors. Some of these factors may be true of both groups of participants, for example the level of emotional disturbance or institutionalisation. This may result in similarities between the groups on a dependent measure. However, it is also possible for both groups of participants in a study to manifest a similar behaviour but for different reasons.

It is not possible to match on all variables, and the lack of a match for particular variables may introduce difficulties so that the results are uninformative. Maher (1974) notes, "With the hypothesis that bulls are characterised by a desire to break Royal Worcester china, we stock a shop exclusively with that item, turn the bulls loose, and watch the ensuing destruction. Our hypothesis is duly confirmed - especially if our control group is composed of mice" (p.2). Thus, the demonstration that study participants with schizophrenia were relatively poor in any aspect of language may be of little interest, unless there are other dependent measures such as other language and neuropsychological measures and the results are interpreted together with the measures postulated to show significant differences. In this study, a broad range of language measures was used.

Even matching on a large number of traits and behaviours raises questions relating to the representativeness of the matched group samples. As an example, study participants without schizophrenia who have been institutionalised for as long as a group of study participants with schizophrenia are probably not representative of all individuals without

schizophrenia, and vice versa (Neale and Oltmanns, 1980). For the purpose of this study, comparative data was obtained from the prison population, enabling a match with respect to age, probable socioeconomic background and current institutionalisation (as discussed below). It was evidently not possible to match on other potentially relevant variables, such as the length of participants' institutionalisation prior to the study. Also, it is acknowledged that both the group of participants with schizophrenia and the group of participants without schizophrenia should not be regarded as representative of the population of persons with schizophrenia and the population of persons without schizophrenia respectively.

(1.) age of participants in the study

Despite the early acquisition of many aspects of language, it is now recognised that people continue to develop aspects of their discourse skills as they 'acquire adulthood' with its associated experiences. At the other end of the age spectrum it is known that people experience language changes associated with a decline in skills as they show changes associated with 'aging'. Accordingly, it was considered appropriate to include in the study participants between the ages of twenty and sixty years (arbitrary cut off points), to avoid including individuals still developing their basic language skills or individuals experiencing changes in language skills associated with aging. The group of participants without mental illness was chosen to match the group of participants with schizophrenia in terms of age.

(2.) Socioeconomic background

It was also considered important to match study participants for socioeconomic background, as a strong determiner of language style. Due to the generally lower social class of a population of persons with mental illness as a result of mental illness, it is possible to consider the social class of parents of participants as being possibly more indicative of an individual's social class. Unfortunately, this was not available for all participants, and, therefore, social class of participants was used within this study.

Supporting evidence for the influence of socioeconomic background on language style comes from studies such as those by Bernstein (1971) and Schatzman and Strauss (1972). They reported deficient narratives in a group of working class study participants. More recently, this has been challenged with investigators noting differences in techniques rather than deficiencies (e.g. Chaika, 1982b). It would also appear that the differences are most dependent on the culture's orality/literacy, frequently correlated with social class (Tannen, 1984). This would suggest that matching on orality/literacy is more significant than matching on socioeconomic background, where these two variables differ. A common measure of this is the examinations attempted or passed by participants. Unfortunately, this was not available for all participants. When an attempt was made to obtain this information via a semi-structured interview, inconsistencies were noted within some individuals' reporting, and between their reports and suggestions by staff. It was therefore not possible to use this measure in the study. However, comparing more generally the experimental and comparative sample in the study on the basis of their self-report, it is probable that the majority of both the groups had disrupted education, with relatively inferior literacy. This

is consistent with Rochester and Martin's (1979) findings that all study participants with schizophrenia performed in a similar way to Bernstein's (1971) working class group.

(3.) Institutionalisation

Although all participants were matched in terms of being resident within institutions (special hospital or prison) it was not possible to match them in terms of the length of uninterrupted residency within an institution or length of time since first admission to an institution as this data was not available. However, it is commonly suggested that negative symptoms, for example, may largely reflect differences in volition and motivation associated with institutionalisation and lack of control over the environment rather than length of institutionalisation or primary intellectual impairment. It would be expected that this would be broadly similar in the two locations (special hospital and prison).

It is also particularly important to match participants in terms of residency within an institution due to the probable influence of various residential contexts on study participants' language. Wertz (1984) notes that as language is conditioned by social context; 'if you don't use it, you lose it'. Penn (1987) supports this by drawing upon observations of the elderly in an institutional context, where she suggests that there is a reversion to egocentric styles together with gradually ceasing attempts to convey and seek information. This observation is reinforced by Obler and Alberts' (1981) reports of a reduction in compensatory strategies for word-finding difficulties in institutionalised patients. These findings all imply that the study participants' accommodation within an institution could have a major negative influence on their discourse. This suggests the

importance of comparing these study participants with other study participants also resident in an institution. Such a comparison could help separate as far as possible the influence of the institutional environment from the effects of schizophrenia on the individual. There is some evidence that suggests that many aspects of chronic schizophrenia are associated with institutionalisation (Wing and Brown, 1970; Wing, 1972).

In addition to reducing some of the variability of different environments by choosing 'experimental study participants' and 'control study participants' from secure institutions, this would, at least theoretically, facilitate access to the study participants, and to other information about them.

SECTION F.3

DIFFICULTIES WITH THE 'EXPERIMENTAL' AND 'CONTROL' POPULATIONS IN THIS STUDY

There are difficulties with the populations chosen for this study. A special hospital population is a biased population of patients with schizophrenia in that these are generally the people with the most severe and treatment resistant schizophrenia and a prison population is also a biased population and therefore not representative of all non-schizophrenic persons.

In addition, the defining criteria for the study participants may further bias the sample chosen so that they are also atypical of the populations from which they are drawn. In this particular instance, choosing study participants without any history of mental illness is possibly atypical of the population within some prisons. This is illustrated when examining

the incidence of the category of mental illness category of personality disorder in isolation, i.e. one category of mental disorder. Gunn, Maden and Swinton (1991) estimated that out of a prison population of under forty thousand at any one time in 1988/89, about three thousand people merited a clinical diagnosis of personality disorder due to the severity of their symptoms, and their histories. Two thirds of all the adult men within the prison population and nearly half of all the male youths within this population were described as needing psychiatric assessment or treatment outside the prison service. This gives an indication of the prevalence of mental illness within prisons.

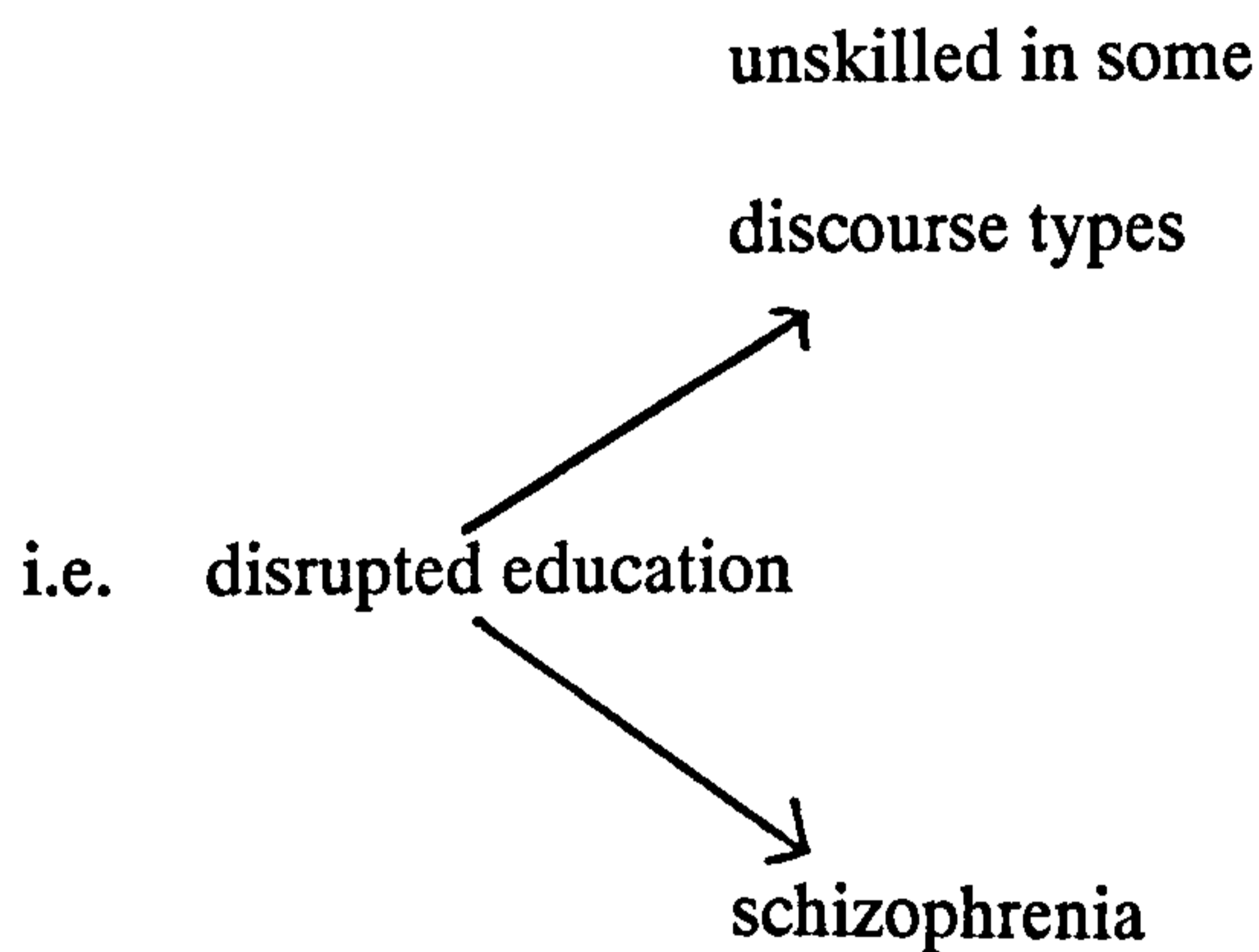
Furthermore, it is possible that matching the populations on the above mentioned dimensions may 'unmatch' them on further dimensions. It is methodologically impossible to simultaneously control for all the conceivable variables, and additional factors could always be logically proposed. An example is provided by the fact that the majority of the study participants with schizophrenia had committed homicide and other 'serious' offences including causing grievous bodily harm on, frequently, a number of occasions. In contrast, the majority of the participants involved in the study to provide comparative data had histories of having committed burglaries and driving offences, without other convictions. However, finding 'control' study participants with similar criminal histories would have been difficult due to the security implications, and due to the prevalence of mental illness in —prisons with such a population.

Any decisions about controlling for particular factors should be based on an explicit model of the way the variables operate to avoid spurious relationships between chosen constructs,

which are only related through a mediating factor, as would result if controlling for disrupted education in 'Example A' (Diagram 1) below. However, in 'Example B' (Diagram 2), any control for disrupted education would reduce the probability of demonstrating a valid association between the two other variables.

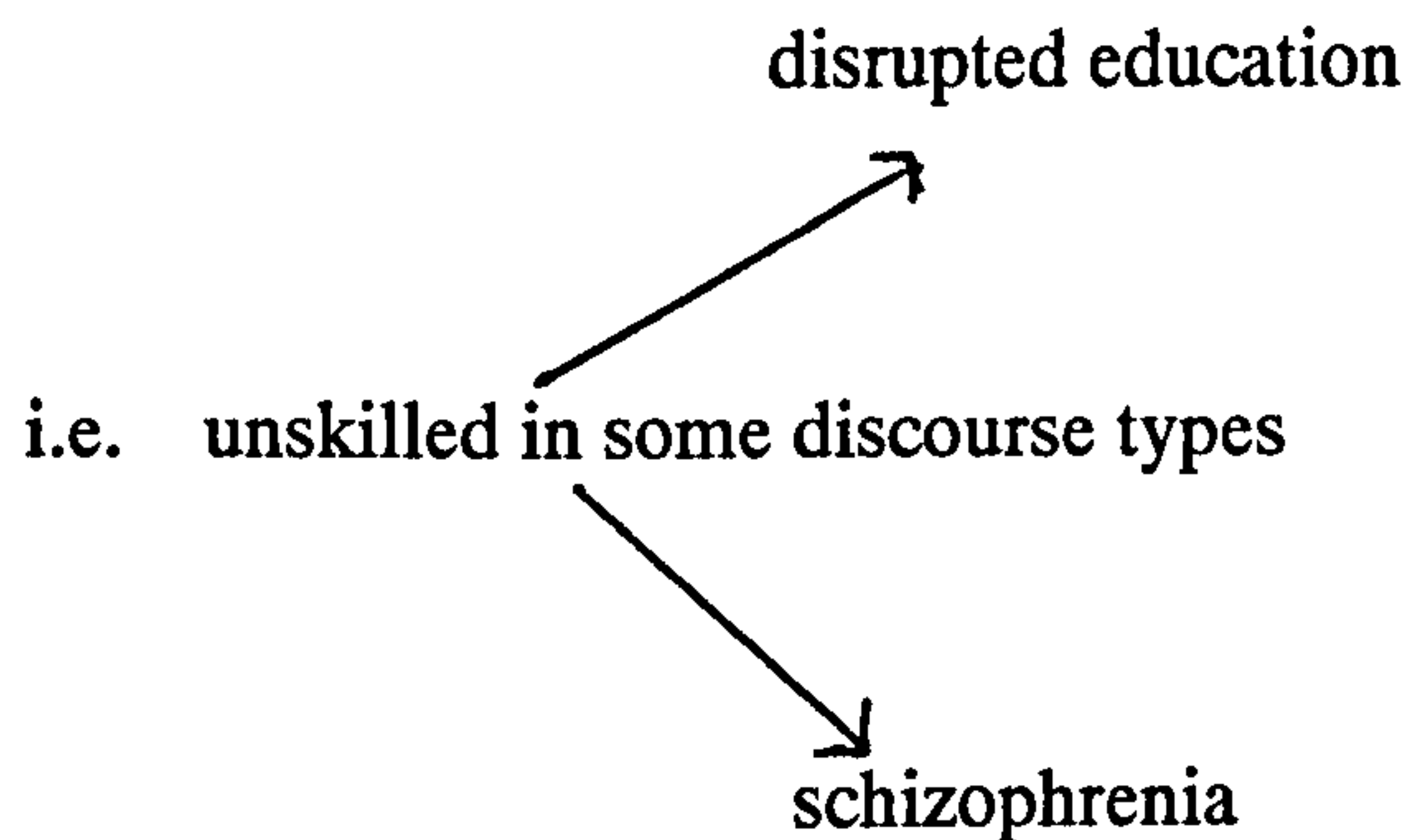
'Example A' demonstrates a possible scenario where study participants who have a disrupted educational background have not had as much experience with certain forms of discourse. A disrupted educational background is also stressful, and could therefore, in addition, act as a precipitant for schizophrenia.

Diagram 1: Example A of one factor influencing multiple variables



An alternative possibility is that being skilled in discourse reduces the likelihood of a disrupted education (e.g. playing truant), and it is one of the factors involved in the identification of schizophrenia. (Diagram below)

Diagram 2: Example B of one factor influencing multiple variables



It was evidently impossible to take into consideration all possibilities within the study. Rather, background information was obtained about the individual participants and used within the interpretation of findings from the language analyses.

SECTION G

INFORMATION ABOUT INDIVIDUAL PARTICIPANTS

SECTION G.1

BACKGROUND ASSESSMENTS RELATING TO INDIVIDUAL PARTICIPANTS

(1.) Cognitive Assessments

Lowered performance on individual measures is only significant when considered in relation to other measures where performance is relatively unimpaired. Similarly, a particular pattern of performance is remarkable in its differentiation between experimental

and control groups of participants in a study. Unfortunately, cognitive assessments were unavailable for participants without mental illness who were included in the study. A semi-structured interview was used to obtain information relevant to participants' scholastic performance.

(2.) The Right Hemisphere Language Battery (Bryan, 1995)

Cutting (1985, 1990) suggests that a right hemisphere dysfunction underlies many of the hitherto mysterious phenomena of schizophrenia. The Right Hemisphere Language Battery (Bryan, 1995) is designed to assess the language measures postulated as being affected by right hemisphere damage including relevant high-level language functions. Within the literature, many of the features of language descriptions of study participants with right hemisphere damage appear similar to those described for individuals with schizophrenia, even where it is not hypothesised that underlying right hemisphere damage is implicated, suggesting the specific value of this language assessment battery. As an example, Brownell *et al.* (1992) state regarding study participants with right hemisphere damage "integration per se is not demonstrably at risk in this population: rather, what is affected is the ability to provide one's own situation-specific structure to constrain the combinatorial process...they show impairments when they must use disparate pieces of information (e.g. speaker mood, real-world plausibility) from the discourse context to construct their own conceptual scaffolding to support inferencing" (p. 138). It was therefore decided to use the Right Hemisphere Language Battery to provide an independent language measure for all participants in the study.

SECTION G.2

LANGUAGE SAMPLES OBTAINED FOR SUBSEQUENT ANALYSIS

(1.) Discourse samples

The study was designed to elicit connected discourse in reasonably natural situations, whilst providing a context against which to check verbal output for comparative data. This makes it more probable that the assessment is measuring a general process rather than a special skill that is not habitually used by language users.

Also, it is likely that discourse is the level at which individuals with schizophrenia experience communication difficulties, as suggested by McGhie's (1970) studies of patients diagnosed as schizophrenic. McGhie writes (p. 12) that their (individuals with schizophrenia) comprehension difficulties arose "not from an inability to perceive the individual words comprising a connected discourse, but from an inability to perceive the words in meaningful relationship to each other as part of an organized pattern". This is consistent with the conclusions of Andreasen and Hurtig (1980). They write that the formalist approach, commonly used prior to the development of discourse analyses, is largely inadequate for dealing with connected discourse or metaphoric extensions of meaning. Dawson, Bartolucci, and Blum (1980) similarly note that discourse analytic approaches are "far more appropriate to the problem (of 'schizophrenic speech') than are earlier models, based on sentence level grammars" (p. 82).

As van Dijk and Kintsch (1983) remark, no single work can do justice either to the breadth of the field or to the variety of methodologies used in studying it. The difficulty is that, as

noted by McGrath (1991, 1996), none of the available studies seems to capture the defining feature of thought disorder. McGrath suggests that the one method of analysis that has come closest to achieving this aim is that involving analysis at the level of discourse.

(2.) Discourse tasks

It has been established that a patient's language is strongly influenced by the particular situation, in addition to the general situation, so that it is difficult to extrapolate from a situation used within a study to other situations. Marcos and Alpert (1980) provide evidence of this difficulty in generalising from findings in individual studies. In their study of bilingualism in psychotic patients, they found that interviews in the two languages suggested different degrees of pathology. Wondering as to the 'true' condition of the patients, they suggested that the linguistic demand contributed to the manifest level of pathology, and this differed between the dominant and nondominant language.

Marcos and Albert also describe the involvement of culturally bound attitudes and beliefs in assessing the thought content and language of psychotic patients. Thus, even small differences in the study's protocol can introduce marked changes in language. This is emphasised by Fine (1995), who discusses how social interaction is a function of the context of available cognitive abilities, which are a reflection of social needs. Thus, with varied social needs, there is an expectation that social interaction will differ.

Manochioping, Sheard and Reed (1992), in a review of pragmatic assessments in adult aphasia, also describe the variation as a result of individual situations. They note that any assessments based on observation of a conversation are subject to sampling error, and

therefore not finite measures in isolation, or a precise measurement of performance over time. However, they are valid as spontaneous discourse samples, despite lower reliability and the lack of precise comparisons over time.

Manochioping *et al.* note that due to variations in social expectations and contexts in which people function, normative data and standardization may not be relevant goals for those observational measures. Rather, their main strength lies in their ability to provide a valid format for a wide range of potential behaviours, so that the changes over time are not a disadvantage of this type of study. Rather, it may be more appropriate to describe the range of behaviours observed in different contexts and their 'relative efficiency'. This could be followed by analysis of the data to detect patterns. Within this study, such a methodology would involve comparing interrater and intra-study participant measures devised in line with the linguistic model chosen, and relating this data to judgements regarding study participants' communicative efficiency.

(3.) Interview format for elicitation of discourse samples

Specifically, the interview situation has been shown to result in more disordered language for thought disordered study participants with schizophrenia, with Rochester and Martin (1979) noting more unclear references by thought disordered study participants with schizophrenia. Similarly, Halpern and McCartin-Clark (1984) reported that 'schizophrenic language' was more deviant in nonstructured situations as compared with structured verbal tasks.

However, the interview setting remains ecologically valid in that it is typically used for diagnostic purposes (Spitzer, Endicott, and Robins, 1975, 1978). Evidently, the language of an interview is not a common language use, but it was assumed to be representative for a number of reasons. Topics raised in interviews, such as everyday events and study participants' lives prior to their incarceration are everyday topics for these study participants. It is also common outside of psychiatric settings to have a relationship of professional or service provider and patient. It is true that the specific function may be undetermined or underdetermined, with the study participant uncertain what the interviewer is really attempting to accomplish. However, most speakers have some experience in adjusting to such situations as when meeting people for the first time. In addition, the study was carried out by a speech and language clinician, whose role is to facilitate speech and language, thus reducing the difficulty of the situation. Furthermore, it was made explicit that this interview would have no bearing on the study participants' length of stay within the institution where they were resident, nor would it influence their treatment within the institution in any way. From the participants' comments, and those of people involved in their care, the participants in the study actually enjoyed the attention provided by an interview with an individual from outside the institution.

Within the interview setting, the study was designed to elicit connected discourse in reasonably natural situations, whilst providing a context against which to check verbal output for comparative data. As mentioned, when discussing the value of naturalistic studies, this makes it more probable that the assessment is measuring a general process rather than a special skill that is not habitually used by language users.

(4.) Validity of the language samples obtained

A number of investigators have suggested that some individuals with schizophrenia are able to utilise role-playing skills to control their own fate. i.e. their behaviour is influenced consciously by the perceived results of acting in a particular way. This has, for example, been shown by Braginsky *et al.* (1966, 1967, 1969), although other investigators including Price (1972) demonstrate that this ability is limited to certain individuals. The possibility of some participants possessing role-playing abilities suggests the possibility that different results can be induced by generating contrasting response sets in study participants. An attempt to reduce the effect of this variable involved testing all study participants within a similar setting and under the same instructions. Of course, it is still possible that the language samples obtained reflect the study participants' perceptions of the task, but it is unlikely given the familiarity with this situation for most people, particularly within a special hospital and penal setting. To a certain degree participants' response may reflect their chosen way of responding, but it is unlikely that study participants would be aware of what would constitute the most desirable response for this study. Furthermore, should this be the case, the resultant behaviour is interesting in its own right, and worthy of analysis. In fact, it is possible that adjusting ones language, according to the particular context, dictates the use of particular language styles. However, it would be expected that more effective speakers satisfactorily achieve this adjustment, and this would be reflected in a linguistic analysis.

(5.) Discourse types included in discourse samples

Discourse can be subdivided into the following three discourse types:

- a.) Narrative discourse can consist of the production of a story oriented around characters or events or the relating of an event;
- b.) Procedural discourse involves offering instructions or providing information;
- c.) Conversational discourse is any communicative interaction between two or more participants.

It is important to include examples of these different forms of discourse, as discussed by Sherratt and Penn (1990), who state that there are different patterns of discourse dysfunction, so that the same study participants demonstrate different difficulties across a range of tasks. Alverson and Rosenberg (1990) actually illustrate the problems which can arise when using one type of discourse and then generalising from these results, thereby making assumptions about other forms of discourse.

There are a number of reasons why differences would be expected within the different discourse types. From a pragmatic perspective, the different discourse types involve very different communicative functions. In a narrative, the primary function is usually to entertain whereas with procedural discourse, the primary function is to inform or to instruct, so that one might, perhaps, expect that procedural discourse would require more clarity and explicitness.

Looking at the information content, with a narrative this is typically oriented around characters or events whereas a procedure is typically action-oriented. Different discourse types also have different cohesion requirements. Frequently, a narrative will require that a large segment of text is cohesive. The narrative might, for example, involve the description of a character with continuous reference to the character for cohesion. A procedure might entail more local cohesion between adjacent sentences but very little over the length of the procedure. The differences in requirements for cohesion between varied discourse types are particularly significant when considering the emphasis on cohesion in studies of the abnormalities in 'schizophrenic communication'.

When choosing the particular tasks for the study, it is essential for the analyst to know a number of pieces of information. This includes the speaker's intentions, so that the analyst can determine the appropriacy of an individual speaker's language production with reference to the speaker's intention (Searle, 1983), and the context in which the interaction occurs (e.g. Rommetveit, 1971; Fillmore, 1981; Linde, 1981; Levinson, 1983; Seuren, 1985; Hassan, 1985). Keeping these factors constant is essential for inter-study participant and intra-study participant comparisons.

(6.) Specific tasks used to obtain discourse samples

a.) Within the narrative task in this study, having study participants look at a series of pictures, and then recount the story provided a context. This is very probably a familiar activity for most individuals, similar to the task involved in describing a cartoon in a magazine. By comparing 'schizophrenic narrations' with those of other participants, it is

possible to relate the differences found among the participants with schizophrenia to specific dysfunctions in their ability to narrate. Chaika and Lambe (1984, 1986) use a similar task in which a short video is presented to provide a narrative, which is subsequently recounted by participants. However, the latter task does introduce a memory component.

b.) A second narrative task in this study involved participants in the study providing a narrative account, involving information from their episodic memory. This enabled a comparison between a narrative task involving a memory component and a narrative task without a memory component where the stimulus materials remained visible throughout the task (as described above in a).

c.) In order to obtain a procedural discourse sample relating to a familiar task for people who had possibly been living in an institution for a number of years, study participants were asked to describe how to make a sandwich.

d.) When considering conversational discourse, samples included conversations with varied conversational partners - including a member of staff, a fellow resident and the researcher. Conversational participants were given suggestions as to which topics to discuss in their conversations to assist the participants in initiating a conversation. Although this is not entirely consistent with 'natural situations', it was considered that frequently within a conversation the topic of conversation is influenced by factors external to the conversation, and this satisfied participants' requests for a topic about which to converse.

(7.) Some of the considerations involved in choosing the specific discourse tasks

A number of issues needed to be considered when devising the particular tasks. As an example, on the basis of a study by Docherty *et al.* (1994), stressful events or circumstances were avoided. Within Docherty *et al.*'s (1994) study, the language of individuals with schizophrenia was evaluated within affectively negative and affectively positive situations. This was carried out on the basis that stressful events or circumstances may engender an exacerbation of psychotic symptoms in patients (Birley and Brown, 1970; Brown *et al.*, 1962, Jacobs and Myers, 1976; Ventura *et al.*, 1989). Unclear linguistic references were used to provide a meaningful language measure (Rochester and Martin, 1979). Docherty *et al.* concluded that the speech of the participants with schizophrenia deteriorated significantly in the negative condition, in contrast to that of parents and controls, although it is not noted to what extent speech varied between individual participants with schizophrenia in the study. However, participants with schizophrenia as a group included more unclear linguistic references in the 'negative affect' condition than their parents or a group of control study participants. Of course this may be the result of a number of factors. As an example, the information recounted by the individuals with schizophrenia in the 'negative affect condition' was possibly mostly information known by the interviewer, as compared with the information discussed by the study participants, so that references did not have to be as clearly specified. However, other evidence supports these findings that stressful circumstances can exacerbate psychotic symptoms (e.g. Ventura *et al.*, 1989). Discourse topics were therefore chosen to be emotionally neutral in this study.

The tasks considered and the justification for the final choices for this study are included in Appendix A. The discourse samples elicited in this way were then subjected to linguistic analysis.

SECTION G.3

LINGUISTIC ANALYSIS USING A MODEL

(1.) Value of a linguistic model

Caplan (1980, p. 235) suggests the value of linguistic analysis of speech production is that “...it utilises psycholinguistic and linguistic constructs derived from scientific studies of language structure and processing rather than intuitive taxonomies and analyses. As a result, it achieves... specificity in the description of the linguistic and psychological deficits...” Without the use of a model, there are no intermediate steps between the speaker’s behaviour and information processing models as proposed in explanations regarding ‘schizophrenic deficits’. Utilising a model also enables the generation of hypotheses to specify which information process (es) is/are being measured.

Furthermore, as explained by Feigl (1952), the majority of investigators develop their categories by examining potential discriminators of individuals with schizophrenia and individuals without schizophrenia selected to provide comparative data, rather than from general principles independent of their choice procedures. The focus on deviance from normal is unproductive in that it precludes the prediction of successes and prevents the systematic description of failures. Categories are often not theoretically justified.

Frequently, the constructs employed are only weakly connected to the behaviours observed. In fact, many categorisations e.g. those offered by the grammar of the language do not have

any established correlations with linguistic units (Rosch, 1977). This is emphasised by McNeil (1979, p.294), who states that grammars describe a language but they do not describe “...(however ideally or abstractly) the cognitive functioning of individual users”. Parallel to this, Macnamara (1977) remarks that it is unlikely that there is a physical resemblance between the formal structure of language and thought. By contrast, a linguistic model of language production looks at the processes involved in transforming thought into the spoken word.

(2.) Model of language production for analysis of language samples

Many models previously employed in the study of language production in schizophrenia have focused on a single deficit type. For example, Cohen and Serban-Schreiber (1992) explain language abnormalities in schizophrenia as the result of ‘the internal representation of context’, and Hoffman (1986) attributed thought disorder to ‘diminished discourse planning abilities’ examining solely these processes. Halliday and Hasan’s (1980) categories of cohesive markers are easily extracted from a text, and subjected to statistical analysis providing objective data on an area frequently described as disordered in schizophrenia. However, the categories included in Halliday and Hasan’s model are not applicable to coherence, are not dependent on cohesive ties, and do not even purport to describe other areas. Other studies use an ad hoc system of categories, with difficulties as described in the section on ‘value of linguistic analysis’.

Using a comprehensive language production model offers a number of advantages. It provides a delineation of various cognitive processes that operate during language

production. Theories, each focusing on a subset of language production and thought disorder, can be combined, providing a more holistic explanation of the ways in which various deficits contribute to thought disorder. Using a normal language production model also enables extrapolation in an empirically and theoretically motivated manner, from knowledge of normal language production to an explanation of specific language deficits. Models are very varied, and are related to their theoretical underpinnings. These can be divided into two broad groups: those reliant on top-down processing; and those involving bottom-up processing.

(3.) Top-down and bottom-up processing

There is extensive evidence in normal language processing for simultaneous bi-directional exchange of information. Anatomically, projections from the posterior association cortex to frontal areas are accompanied by projections in the opposite direction (e.g. Goldman-Rakic, 1988). Intracranial recordings in humans show simultaneous activation of different areas during language production tasks, suggesting reciprocal coupling of cortical areas (Mesulam, 1990a, 1990b). Thus, cognition represents the joint output of neurones in spatially distinct cortical areas.

Many models focus solely on bottom-up or top-down processing. An example is the discourse comprehension model proposed by Kintsch (1988) in which the initial processing is strictly bottom up. Word meanings are activated and propositions formed, with inferences and elaborations produced irrespective of discourse context.

For the purposes of this study a top-down discourse analysis model was chosen, in part due to the finding that 'schizophrenic disruptions' appear to 'proceed from the top down' (Chaika, 1990). As the patient deteriorates further, increasingly lower, and more automatic, levels of language are disrupted. Therefore, whereas, commonly, individuals with schizophrenia suffer from higher level language disruptions, few individuals with schizophrenia demonstrate evidence of lower level errors.

(4.) Discourse analysis

Originally, discourse analysis was an attempt to describe spoken interaction in line with the insights of the philosopher J.L. Austin (1962). This also provided a mechanism with which to describe meaning of language within an established analytical framework, where the meaning differed from the conventional meaning or interpretation. This suggested different levels of language description, requiring a new form of organisation. The Hallidayan model of a taxonomic hierarchy was adopted (Halliday, 1961), in which lower levels involved linguistic units which formed the building blocks of higher levels of language. Whereas the lower levels were easily described in linguistic terms, the larger linguistic units required that some of the description incorporate non-linguistic terms, as suggested by Ventola (1987). This was particularly true of those forms of discourse that are less predictably patterned. The lack of predictability can be regarded as a difficulty, or, as suggested by Coulthard (1992), this can be regarded as an "element of flexibility, adaptable to the genre analysis of the future" (p.81).

Related to the lack of linguistic specificity at higher levels, is the finding that speakers seem to have weaker intuitions about permissible sequences of interaction as compared with sequences of grammatical units. In fact Coulthard and Brazil (1992) suggest that there is no direct equivalent to the concept of grammaticality, and that the distinction between 'competence' and 'performance', as outlined by Chomsky, may be unhelpful in the study of discourse. This is due to the fact that although utterances do place constraints upon what is considered a relevant or unrelated utterance, linguistic constraints appear somewhat limited. Within a dialogue, where the next speaker produces an unrelated utterance, the speaker is most likely to be perceived as socially deviant, rather than as linguistically deviant.

Discourse can nevertheless be described in terms of Halliday's (1961) taxonomic hierarchy. This suggests units in each rank, which form the building blocks for the next rank. At the highest rank within a particular level the units can be described in terms of smaller units, but they cannot be described in terms of any larger unit. Descriptions of structures that are possible suggest that other structures are not possible or unacceptable. In this vein, sentences are grammatical or ungrammatical. Due to the current impossibility of describing discourse or groups of sentences in terms of permissible and non-permissible combinations, discourse must constitute a different level, with its own descriptive terminology. There is minimal information in discourse level linguistic analysis in the literature, necessitating the development of measures, at higher levels within discourse, for a model proposed in the literature, should there be any indication that persons with schizophrenia differ from participants without mental illness at the level of discourse. Such measures were developed within this study.

(5.) Measures corresponding to levels of analysis: Quantitative or qualitative?

The 'scientific community' commonly applauds quantitative versus qualitative data.

However, as with any behaviour, one may obtain quantitative measures, but, at some point in time, the clinician will have to interpret the number in some way. As Gould (1981) has commented, currently it is an era where numbers reign. Gould suggests, though, that the quantification of behaviour and science, in general, is a social act like any human activity and at its core is subjectivity. In other words, there is nothing less objective in a molar analysis compared to a molecular analysis. In the end, someone must also interpret a number and decide what it represents.

Furthermore, Clark (1973) notes the limitations in using analyses of variance in psycholinguistic research. This is because the usual approaches to sampling and statistical analysis do not allow the investigator to generalise beyond the data of the immediate experiment.

However, quantification does facilitate the establishment of inter and intrarater reliability, reducing participant activity variables, as well as facilitating statistical analyses. It was therefore used within this study.

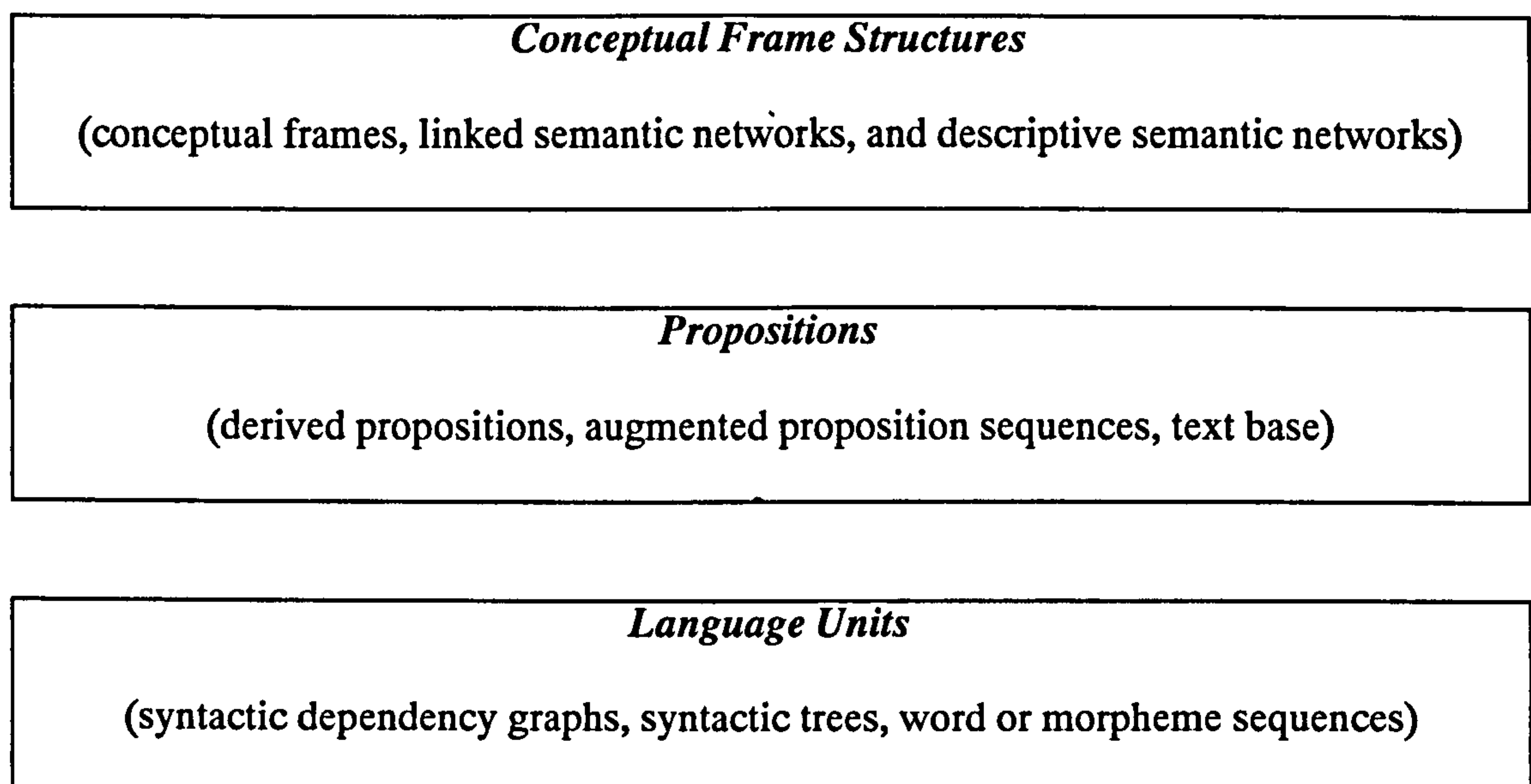
(6.) Particular discourse analysis model chosen

The model chosen for this study is that of Frederiksen, Bracewell and Breuleux (1990), as described in Diagram 3 (overleaf).

The model in the Diagram is a top-down processing model, and would therefore seem most suitable for examining the language of people with schizophrenia, where difficulties seem to be predominantly at higher levels of language processing according to recent accounts in the literature. It was therefore also important to choose a model of processing in which higher levels of language are relatively well represented. The model was also appropriate in that it included both semantic and syntactic measures, where it has been postulated that semantic variables are affected in the language of people with schizophrenia, and it is also important to preclude equally significant syntactic difficulties, an area frequently investigated, particularly historically.

Diagram 3:

Language Production Model of Frederiksen, Bracewell and Breuleux (1990)



i.e. Three levels of representation are involved in text production. These include:

a.) Conceptual frame structures (conceptual frames, linked semantic networks, and descriptive semantic networks);

b.) Propositions (derived propositions, augmented proposition sequences, text base); and

c.) Language units (syntactic dependency graphs, syntactic trees, word or morpheme sequences).

The model proposed here is multilevel in that multiple representations are assumed for all natural language text. Representations at each level are not necessarily generated from representations generated at the immediately preceding level.

The model is modular in that distinct processes are involved with the representations at each level, and it is assumed that these processes do not interact with one another. Rather, component processes affect one another via the data that they output for the application of other processes. Thus, the model assumes the existence of both semantic representations and conceptual frames. Semantic representations are constructs that can usefully represent the conceptual meanings associated with language, perception and thought. By contrast, conceptual frames are used to represent particular types of connected knowledge structures. These types of knowledge are represented in natural-language discourse and long-term memory. A conceptual frame theory provides a bridge between the structure of meaning in memory expressed as linked conceptual frame structures (section G.3 6a) and the semantic representations of natural language in the form of propositions (section G.3 6b).

a.) Conceptual Frame Structures

Conceptual frame structures are connected network structures that represent knowledge in long-term memory. They are vast networks of interconnected conceptual units, which are later cut into propositions, which represent chunks of information. A variety of integrative processes, including retrieval, inferential, and reasoning processes, operate so that prior knowledge can be linked to newer conceptual information.

Conceptual frame structures are a type of data structure that is composed of two types of entity: nodes and links (or arcs). The basic unit, a relational triple, is composed of two nodes that are connected via a link. Networks are composed of sets of relational triples. The nodes are simple or complex, with simple nodes consisting of: a. Lexical concepts; b. Primitive concepts defined by a particular semantic model; or c. Proposition identifiers. Complex nodes, by contrast, are nodes that are explicitly decomposed into other nodes. Links include the various types of relation required to link the nodes.

b.) Propositions

Propositions and propositional representations are an intermediate semantic representation. They are specialised so that they provide a representation of chunks of conceptual information for natural language, and they form a basis for logical reasoning. To provide a semantic base for natural language, propositions include all semantic distinctions that are later reflected in natural language. To serve as a basis for reasoning, propositions include truth-valued and quantified predicates for logical reasoning. Propositional representations include propositions later encoded directly and individually in natural language, and those

that are later involved in providing local coherence within a sequence of related propositions in discourse, as well as those which summarise or extend the literal discourse meaning. They do not include any information specific to language excepting lexical identifiers that identify the concepts included in the propositions.

Propositions can be divided into the following types:

1. **Events:** These are causal systems that involve a cause or agent, an action, and a change in a situation from a source (e.g. a state) to a result (e.g. a different state). The components of an event include a 'resultative' frame that details case relations representing the internal structure of events, and action identifying relations that detail properties of actions such as attributes, location, time, and duration;
2. **Systems:** These are structures representing a process, including a frame that specifies the object characterised by the process (the patient), and any related objects, actions, states, processes or other information involved in the system. They may also include relations that specify properties of a process;
3. **States:** These are relations identifying properties of objects as well as their determination and quantification;
4. **Propositional relations:** These are properties of abstract concepts that represent propositions;
5. **Identities:** These are relations that link concepts or propositions into identity sets;
6. **Algebraic relations:** These are transitive and intransitive order and equivalence relations, which are applied to variables that may represent values identified in other propositions;
7. **Functions:** These are operations defined on operands that return values;

8. **Binary dependency relations:** These are relations where one proposition is dependent on another such as causative relations, conditional relations and logical implication;

9. **Conjoint dependency relations:** These are 'and', alternating 'or', and exclusive 'or' relations.

A proposition is a particular type of conceptual frame structure. It is composed of nodes and relations, has a truth-value and is an independent unit of semantic information that can be expressed in natural language.

Defining a semantic network model requires:

a.) Specification of the content of all nodes;

b.) Definition of all relational links and primitive concepts; and

c.) Specification of all patterns of relational structures and node decompositions that are permitted.

There are two methods of defining a semantic representation: definition in terms of canonical frames, and definition in terms of semantic grammars.

Canonical Frames and Semantic Representations

A canonical frame is a particular network structure or pattern containing variables. The variables can be replaced by specific values. In contrast, a semantic grammar specifies the rules that generate all acceptable patterns within the grammar. This allows a relatively small set of recursive rules to specify a large set of canonical frames.

The two approaches to defining a semantic representation are related to two methods of generating propositions from natural language: i. Frame instantiation; and ii. Parsing.

i.) Within frame instantiation, the generation of propositions involves finding a canonical frame that can match a sentence in natural language. This usually involves matching semantic structures to syntactic patterns that instantiate them and assigning them variable values derived from the natural language information. Commonly, canonical frames are specific to particular lexical entries.

ii.) By contrast, within semantic parsing, the rules of a semantic grammar have associated tests. These are applied to lexical, morphological, and syntactic representations of sentences being analysed and to lexical information. A combination of both methods is involved in natural language parsing, according to all linguistic models.

c. Language Units

The representation of language units or linguistic structures can be described as involving three levels:

- a.) Syntactic dependency relations (linking information in syntactic trees, e.g. relations linking anaphoric elements such as pronouns to their referents);
- b.) Syntactic parse trees (which summarise syntactic information available to the semantic analysis component); and
- c.) Word and morpheme sequences (that form the input to the syntactic parsing component)

Language processing involves processes at three levels, including processes relating to

i. Syntactic dependency relations; ii. Syntactic parse trees; and iii. Word and morpheme analysis.

(7.) Supplementary analysis to that provided by discourse analysis

Conversational analysis involves analysis of segments of text in a bottom up approach.

Within the prison setting, the researcher was not permitted to obtain conversational discourse samples, precluding the use of conversational analysis within the study.

However, language difficulties identified within the discourse samples of participants with schizophrenia were focused at the level of discourse, specifically involving the form and content at a conceptual level (please refer to results in chapter 3). This suggested the potential value of utilising principles of conversational analysis to look at the frameworks and functions of utterances in participants' discourse samples. Principles of conversational analysis were therefore used to look at the 'life' discourse sample. This resembled most closely conversation in the speaker's relative independence in terms of content, compared with the other discourse samples, where the content was largely supplied by the researcher.

(8.) Interrater and intrarater reliability

Interrater and intrarater reliability was examined for the quantitative variables. Interrater reliability was examined by asking an independent individual to use the protocol provided by the initial examiner and rater to analyse a sample of the texts.

With regard to interrater reliability it is important to note that the expectations of hearers develop from the language that those hearers have used and interacted with. This provides

speakers with the necessary information to appropriately parse the verbal and nonverbal context into emic and etic components. Emic components are those differences perceived by the 'community of those familiar with the discourse participants' as relevant and contrastive. The differences allow identification of behavioural units. In contrast, those familiar with the discourse participants do not regard etic differences as significant in terms of functional contrasts. Thus, what is emic in one society will hardly be noticed, if it is noticed, in the latter society, where it will not convey a particular message. When examining interrater reliability, the first rater was someone experienced in working in a forensic psychiatric setting, whilst the second rater had no exposure to this group. It is possible that what constitutes an emic difference within one community is perceived as an etic difference within another community. It is also possible that an outsider will not appreciate the significance of all similarities within a foreign community. However, both raters were speech and language clinicians, resulting in a common background knowledge of linguistics.

Intrarater reliability was established via repeated assessment by the researcher involved in the study following a three-month interval from the initial assessment date.

The issues discussed in sections E-G resulted in the following experimental methodology (Section H).

SECTION H

METHODOLOGICAL DETAILS

SECTION H.1

DESIGN

Due to the difficulties entailed in studying a heterogeneous group of participants, the study was designed as a series of single case studies. However, given that the measures used in this study were developed as part of a single case study (Goodchild, 1991), and further developed within this study, there were as yet no reliability or validity data. Thus, an independent groups design was employed to compare those participants with schizophrenia and those without any known history of mental illness. This was followed by examination of the degree of correlation between the factors which differed significantly between the two groups of participants to look for any indications regarding the pattern of performance of individual participants. This is followed by more detailed discussion relating to two of the participants who were involved in a therapy study. Interrater and intrarater reliability was calculated for the scoring criteria for the measures used.

The independent variable was the presence/absence of a history of mental illness. This was associated with the participants being resident in a Special Hospital or local prison respectively. All patients must have a legal classification of mental illness and/or psychopathic disorder in order to be admitted to a Special Hospital, and individuals with a diagnosis of schizophrenia are unlikely to be resident within a local prison. For this reason, it was not possible to see all the participants within the same setting.

The dependent variables were the Right Hemisphere Language Battery (Bryan, 1993), the measures included in the linguistic protocol (Goodchild, 1991, and this study) as applied to six discourse samples, and those measures included in the Krawiecka scale (Krawiecka *et al.*, 1977).

SECTION H.2

PARTICIPANT SELECTION AND RECRUITMENT

(1.) Participant Selection Criteria

The selection criteria for participants with schizophrenia were:

- i.) to be presently resident at a Special Hospital;
- ii.) to be male;
- iii.) to have a DSM IV diagnosis of schizophrenia;
- iv.) to have English as a first language

The selection criteria for participants without mental illness were:

- i.) to be presently resident in a local prison;
- ii.) to be male;
- iii.) to have no history of mental illness within the nuclear family, and no suggestion of mental illness, according to prison records;
- iv.) to have English as a first language

(2.) Participant Recruitment

1. Ethical Approval

Both the Hospital and the Prison Ethics Committees gave ethical approval. This involved several re-applications, and the intervention of personal contacts in the case of the Special Hospital. Questioning by the ethical committee involved a variety of concerns. These concerns included the suggestion that if it was relevant for a speech and language clinician to see a patient, it was evident that the patient would not have the relevant abilities in order to provide informed consent!

When ethics permission was sought for carrying out the part of the project intended within the prison service, applications were made to numerous bodies who each recommended that the application be made to yet a different body. Permission was finally granted for the study to be carried out over a year after initial applications to a body that merely required a statement that a Special Hospital had approved the study! However, due to security implications the researcher was not given permission to elicit conversational discourse from participants resident within the prison concerned. Staff resource pressures determined that a maximum of an hour be spent with each of the participants resident within the prison concerned, and the researcher was not given access to the records of the latter group of participants.

2. Participant Identification.

Participants With Schizophrenia

Participants with schizophrenia were identified on the basis of their presence on either of two wards included within the study. These wards were chosen due to the support of the responsible medical officers (R.M.O.s) on these wards for speech and language therapy input. This was seen as important following extensive preliminary difficulties in obtaining permission to carry out the study within the hospital.

The Responsible Medical Officer of both wards initially involved in the study were contacted, and provided with a written and verbal explanation of the project. The researcher also attended two ward meetings on each of the wards concerned to explain the project. Due to changes in staffing and moves by patients within the hospital three additional R.M.O.s and two different wards became involved in the project. Verbal and written explanations were provided to the R.M.O.s concerned, and the researcher also attended two ward meetings on each of the wards concerned to explain the project. Due to the difficulties in addressing nursing staff formally, three additional visits were made to each of the wards concerned prior to commencing data gathering to familiarise staff on the wards with the project.

Nursing staff on the wards concerned were then asked for names of patients who satisfied the criteria for the study as outlined earlier in section H.2. The patients were approached by a member of nursing staff, who asked the patient whether he was willing to be seen briefly by the researcher in order for the researcher to explain the study. If the patient was

agreeable, he was provided with a brief verbal explanation and an information sheet approved by the ethics committee (copy in Appendix B) by the researcher, who also offered an opportunity for any of the participant's questions to be answered. Formal consent to participate was collected, using the research consent form approved by the ethics committee (copy in Appendix C). A research interview was then carried out, with the objective of gathering the data as described in sections G.1 and G.2. Where necessary, further research interviews were arranged to complete data gathering, and each participant was provided with a further meeting with the researcher to discuss his performance on the assessments used. A report was provided for the clinical team, and the researcher also attended a ward team meeting to discuss her findings regarding the patient. This procedure was completed when 12 patients with schizophrenia had been interviewed.

Participants Without Mental Illness

A large number of prisons were approached following the granting of ethical permission from the Home Office, to make arrangements for the actual study. A number of prisons did not respond to repeated approaches, a number of other prisons refused immediately, and yet others delayed the final arrangements on several occasions. An approach was made to the prison involved in the study following a personal contact made by a senior official within the prison service. Following agreement by the local prison concerned, two meetings were arranged with the prison governor and medical director respectively to confirm details. A further meeting in which prison records were drawn at random to check whether the inmates thus selected fulfilled the criteria for their inclusion within the study followed this. The first 20 inmates to fulfil these criteria received a letter, approved by the prison

governor and medical director, inviting them to participate in the study at a further date (Appendix D). Research meetings were scheduled for medical centre opening hours on two days. The medical centre organised the availability of the inmates individually in a small room for the purpose of the research meeting. Following discussion with the governor and the medical director regarding suitable rewards and incentives, the researcher provided soft drinks and biscuits for inmates attending the research meeting. Twelve of the twenty inmates initially contacted were seen during the two days. They were selected on the basis of easier availability due to reasons such as other inmates attending the medical centre from their block. Formal consent was obtained using a form approved by the governor and medical director, and the assessments described in sections G.1 and G.2 were completed. Inmates were given immediate feedback due to the difficulties in any follow up imposed by frequent unpredictable movement of inmates. A brief verbal and written presentation of the project was made to interested members of the medical centre.

SECTION H.3

RESEARCH INTERVIEW

Each interview began with a brief description of what would be involved. The order of presentation of the assessments was dependent on participant preference. Where participants required a break from a particular type of assessment, it was suggested that the participant might be agreeable to performing another form of assessment, and returning to the other assessment later or at a future meeting. Similarly, where the meeting was interrupted by ward events, the meeting was resumed later that day, or were this not possible, on another day.

Brief demographic details were obtained during a semi-structured interview at the beginning of the session. This was followed by the language assessments. Instructions for assessments from the Right Hemisphere Language Battery were those included within the battery. Instructions for these assessments were included on a form typed out for the purpose, which also included details of the assessments for recording of the participants' responses where these included pointing or single words. Longer responses were filled in on the basis of the recording following the sessions. (Form included in Appendix E). Instructions for eliciting the discourse samples were those included on an instruction sheet (Copy included in Appendix F).

A Krawiecka rating was completed for participants with schizophrenia on the basis of a video of the research meeting, whereas the Krawiecka rating was carried out immediately following meetings with participants without mental illness on the basis of notes written during the sessions. Sessions with participants with schizophrenia were all videotaped, and sessions with participants without mental illness were audiotaped.

At the end of the interview participants were thanked for participating. They were asked how they found the procedure, and an opportunity was given to ask any questions about the project. Time was also given for brief verbal feedback on the participant's performance on the assessments. Participants with schizophrenia were also offered a further opportunity to receive feedback on their performance on another date, when the video was also available if the participant wanted to view the video and discuss his performance. Following each

interview, staff available were given brief verbal feedback on the participant's performance within the meeting.

SECTION H.4

TASKS

(1.) The Right Hemisphere Language Battery

This battery of tests includes six tests of lexical-semantic processing, high level language processing and prosody. It was administered using the standard procedure, to assess lexical processing and high-level language skills.

Presenting twenty-one line drawings of high frequency target nouns tests lexical processing, each presented together with five associated items. The subject is required to make a forced choice. The number of correctly recognised target nouns is converted into a standard score or z score.

High-level language tests include a metaphor picture test, a written metaphor test, a test of the subject's appreciation of humour, and a test of the subject's comprehension of inferred meaning.

In the metaphor picture test, ten sentences are presented, each including a common metaphor in which either an adjective is drawn from the physical world to express a psychological state, or an adjective is drawn from one sensory modality to modify an

element from a different sensory domain. The subject is required to select the picture representing the metaphorical meaning from a selection of four pictures, including the literal meaning and two pictures depicting one aspect of the sentence. The number of correct choices is converted into a standard score or z score.

The written metaphor test involves ten short contextual sentences incorporating common metaphors. Each sentence is printed on a card and followed by three sentences representing three possible meanings: the genuine metaphorical meaning; a primitive metaphorical meaning, focusing on an incidental aspect of the metaphor; and a metonymical meaning. The metonymical meaning replaces the sentence so that the two terms of the metaphor are interpreted literally without defying realism. The number of correct sentences is then converted into a standard score or z score.

In the test of humour appreciation, ten jokes with clear punchlines are presented with a choice of four punchlines. The choice of punchlines includes: the actual punchline; a straight ending of neutral content; a straight ending of emotional content; and a surprise ending that does not relate to the body of the joke. The number of times the correct punchline is chosen is converted into a standard score or z score.

In the test of comprehension of inferred meaning, comprehension of aspects of inferential meaning is assessed via questions regarding a conversational passage, a narrative passage and an emotional passage. The number of questions correctly answered is converted to a standard score or z score.

Prosody is evaluated using ten sentences, each with two clauses joined by the conjunctions 'and' or 'but', depicted by two line drawings. The two pictures are placed in front of the patient and the examiner points to the first one and describes it using the predetermined phrase. The examiner includes the link word and then points to the second picture for the patient to describe it. The number of sentences with correct stress placement is then converted into a standard score or z score.

(2.) Discourse Samples

a. Narrative 1

Materials

To elicit narrative discourse in a structured setting without involving a memory component, an experimental task involving story telling was constructed. A story was presented in the form of six cartoon pictures (Please refer to Appendices G and H for a copy of the pictures used). The pictures were visible by both participant and researcher.

Narrative as seen in the pictures

The first story involves an adult and a child, who are initially seated at a table, each with a plate of food. The adult is seen discouraging the child from swatting an insect perched on his food. The adult takes the food, with the insect on it to the window, as the child watches him usher the insect out of the window. The insect returns and stings the adult on his head. The two characters return to the table, where the insect flies onto the adult's food, and now he tries to swat the insect.

In the second story, a boy and a man are at the beach with their dog. The boy throws the man's walking stick in the water, and the dog runs after it to retrieve it. The dog returns the stick to the boy, with the man and now an additional man watching. The second man shows the dog his stick, and throws it in the water with a grand gesture, but the dog does not retrieve it. Rather, the dog walks away, with the boy holding the original walking stick, and the first man in tow. The second man is left at the side of the water, stripping off all his clothes, including a hat and tie... ready to go and retrieve his stick.

Task Instructions

Each participant was told that the set of pictures represented a story about two people and they were asked to tell the story that happened in these pictures.

b. Narrative 2

Materials

To observe the influence of a change in context on narrative discourse without involving a memory component in the task, a story was presented in the form of six cartoon pictures (Please refer to appendices G and H for a copy of the pictures used). The pictures were visible only to the participant. A second story was assessed for comparison with narrative 1 so that practice effects would not be involved as a result of the repeated use of the same stimulus materials. This, however, involved the possibility of differences as a result of different stimulus materials.

Narrative as seen in the pictures

Please see information as provided in Narrative 1.

Task Instructions

The subject was told that a second set of pictures similarly represented a story. The subject was asked to tell the story bearing in mind that the researcher could not see the pictures and a future listener would listen to the recording but would also be unable to see the pictures.

c. Narrative 3 (referred to as 'life' discourse sample in results and discussion)

To elicit a narrative involving episodic memory, the participant was asked to tell the researcher about his life before he came to the institution where he was interviewed.

d. Procedural Discourse

To elicit a procedural discourse sample familiar to the participants, they were asked how to make a sandwich.

e. Conversational Discourse 1

To elicit a conversation between the participant and a member of staff, each participant with schizophrenia and a staff member known to the participant were asked to have a chat together about what they liked and what they disliked.

NB: For security reasons, the researcher was not granted permission to elicit a similar discourse sample from participants resident within the prison sector.

f. Conversational Discourse 2

To elicit a conversation between the participant and a fellow patient, participants with schizophrenia were asked to have a chat about what they liked doing and what they disliked doing.

NB: For security reasons, the researcher was not granted permission to elicit a similar discourse sample from participants resident within the prison sector.

SECTION H.5

LINGUISTIC PROTOCOL

This was based on measures developed by Goodchild to reflect the model of linguistic analysis proposed by Frederiksen, Bracewell and Breuleaux (1990), as outlined below.

(Please refer to section G.3 for a more detailed discussion of the model.) Frederiksen *et al.*

(1990) suggest that their model provides a basis for the measurement of the processing operations underlying discourse comprehension and production. They do not specify measurements for the various operations. It is therefore necessary to develop unambiguous quantifiable measures of these operations. For the purposes of the pilot study, Goodchild's (1991) measures were selected (Section H.8) for use on transcripts of audiological recordings (Section H.6) to provide measures of the levels in Frederiksen *et al.*'s (1990) model, as outlined in Sections H.5 and H.7. These include a series of measures developed for practical purposes, and therefore exclude some more qualitative aspects of the text, which evidently could not include all aspects of processes identified by Frederiksen *et al.* (1990). The measures were subsequently modified, following the pilot study to include a

new set of measures (Section H.9), used for the main part of the study. In addition, a consideration of the results (please refer to Chapter 3) suggested the use of principles from conversational analysis, as described in Sections H.9 and H.11. Suggestions are made for further adaptation of the measures in future work within the discussion in Chapter 4.

SECTION H.6

TRANSCRIPT PREPARATION

Transcripts represented as accurately as possible the words and parts of words present on high quality audiological recordings. Where it was not possible to decipher with certainty the words or syllables heard, any discernible features of the unintelligible section were included within brackets e.g. (3 syllables).

The beginning of a transcription was marked with the timing on the counter, and the name used to identify the subject. All utterances on the recordings were transcribed, with the words included in one tone group boundary written on one line. Lines were numbered in the case of participants in the study for subsequent ease of reference. Speech produced by the other speaker in the recording were included but not numbered (thereby distinguishing the speakers on the recording). Where speech overlapped, the speech was transcribed so that the overlapping parts were aligned on the page, with overlapping speech enclosed within brackets. Where pauses were noticeably longer than those habitually used by the speaker, the length of the pause was included within brackets e.g. (5 secs). The adoption of this rule, rather than a time limit, above which pauses were timed, arose from the consideration that some speakers were habitually using longer pauses. This method

enabled the distinction of pauses that perceptually were significantly longer for the individual speaker concerned, as distinct from habitually long pauses.

All transcripts were checked against the original recordings for their accuracy by the transcriber, and a sample of transcripts was checked by an independent individual prior to the analysis of the transcripts.

SECTION H.7

STAGES OF THE ANALYSIS

The analysis takes place in a number of sections designed to correspond with the levels of processing described by Frederiksen *et al.* (1990). The first section addressed frame generation, where frames are retrieved or generated to reflect conceptual structures that act as organising principles for the discourse. Within the second section, three measures aim to assess the integrative operations used to complete the frames with semantic information. Section three looks at the semantic networks incorporated in the existing frames. In section four coherence, which represents relations across the discourse text, is measured, whilst the cohesion between adjacent utterances is addressed in section five. The grouping of propositions into larger clausal structures relating to semantic units is measured in section six. The resulting syntactic dependency graphs are addressed in section seven. The particular choice of syntactic structures is then recorded in section eight, whilst the specification of lexical information is addressed in section nine.

SECTION H.8

VARIABLES FOR ANALYSIS OF PILOT STUDY TEXTS

Measures were as described by Goodchild (1990):

Frame generation

a. % evidence of ability to generate frame given by the task or partner's directive

Within procedural and narrative tasks, this includes the percentage of the necessary frame components to satisfy the task, which are actually produced by the speaker.

b. % frame types used in free-field conversation

The types of framework employed by the speaker are noted as evidence that the speaker is able to generate these.

Integrative operations

c. % non-self-corrected potential loss of integration of prospected topics or domains per total propositions

'Domain' refers to the area of experience or knowledge included within a particular set or network of semantic fields e.g. food, entertainment.

'Topic' (versus comment) refers to the entity or theme about which information is provided, such as the ingredients of a sandwich.

Any topic or domain shift without linguistic or paralinguistic signals constitutes a potential failure to integrate prospected topics or domains.

d. % listener requests for repair of topic integration per total propositions

This includes any listener's actual requests for repair.

e. % 'non-verbal' anomalies in relation to overall semantic content or discourse situation per total propositions

This includes any incidents of loss of integration of the verbal content with all the other auditory and visual signals provided.

Semantic network generation

f. Average, range and median propositions per topics

g. % repeated information per total propositions

h. % semantic anomalies in relation to lexico-semantic markers per total propositions

This is a measure of the semantic network surrounding a particular 'node' or lexical item, e.g. animate attributes where these are precluded by the lexical item.

i. % substantive (versus management) word count per gross word count

This is the number of words used for topics or semantic networks as opposed to semi-automatic management utterances as a percentage of all words produced.

Logical or macrostructure inferences

j. % incidents of non-self-corrected potential loss of coherence per total propositions

(including suprasegmental anomalies e.g. emphatic stress, intonation for questions etc.)

This includes any linguistic or paralinguistic (intonation) disruption to discourse coherence.

k. % incidents of listener request for macro-repair per total propositions

Local propositional inference

l. % non-self-corrected potential loss of cohesion per total propositions

m. % incidents of listener request for local repair per total propositions

Semantic interpretation or proposition sequence

n. Average, range and median propositions per T-unit

These measures relate to the number of propositions per T-unit where a 'proposition' represents a semantic unit of language including a head phrase and one or more arguments, and a T-unit consists of an independent clause and any dependent clauses.

o. % T-units containing argument structure anomalies

This includes both too few arguments and too many arguments.

p. % propositions, categorised by type

This includes the allocation of all propositions to categories as proposed by Frederiksen *et al.*:

A Events: an action that causes a change of state or process

B Systems: an object or action and any process that characterises it and defines the internal structure of the system

C States: object and the properties of the object

D Propositional Relations: abstract concepts

E Identities: relations linking concepts into identity sets

F Algebraic Relations: order and equivalence relations

G Functions: variables identified in other propositions that return values e.g. distance, difference

H Binary dependence relations: causative, conditional, logic implications

I Conjoint dependency relations: 'and', 'alternating or' and 'exclusive of' relations

J Tense/aspect/iterative components: temporal properties of propositions

K Modality/truth value components: specification of the asserted truth of the proposition

Syntactic dependency graphs

q. % T-units containing anaphoric referents or elliptical structures

r. Average, range and median complete clauses per T-unit

A 'clause' refers to a syntactic unit smaller than a sentence but larger than a word or simple phrase. These measures relate to the number of complete clauses per T-unit.

Syntactic parse trees

s. % net words of gross words per T-unit, i.e. not including false starts or repetition.

t. % T-units containing non-self-corrected syntactic 'errors'

This measurement excludes hesitancy, repetition, false starts or mimicry. Examples include:

omission of a phrase within a non-elliptical clause;

word order anomalies;

and prosodic anomalies.

u. Average, range and median gross word count per T-unit

Lexical or morphological processing

v. % non-self-corrected errors at lexical level (i.e. Lexical substitution) per gross word count.

This measure includes any word which is seemingly substituted in error, including:

literal paraphasias;

semantic paraphasias;

metathetical errors;

and prosodic anomalies.

SECTION H.9

VARIABLES GENERATED FOR ANALYSIS OF TEXTS

Following the pilot study, some measures were excluded from the analysis whilst others were defined in more detail. Measures included for the analysis of all the texts, subsequent to the pilot study, are enumerated below, whilst a protocol describing how to perform the analysis follows (Section H.10).

Frame generation

a. % narrative frames produced of narrative frames given in the task or partner's directive

These were also described in terms of Labov's (1972a; 1972b) narrative grammar to provide additional information on the sections of the narrative included and omitted by participants.

b. % procedural frames produced of key procedural frames

Due to a lack of comparative data, conversational discourse samples were not analysed, making a free field conversational measure (from pilot study) redundant.

Semantic network generation

- c. % repeated information per total propositions
- d. % words concerned with semantic networks as a percentage of the total word count
- e. % substantive (versus management) word count per gross word count
- f. % semantic anomalies in relation to lexico-semantic markers per total propositions

Measures relating to the number of propositions per topic were excluded due to the irrelevance of topic within narrative and procedural discourse. Non-verbal anomalies in relation to overall semantic content or discourse situations per total propositions were also omitted due to the difficulty in considering these anomalies as a function of individual propositions.

Logical or macrostructure inferences

- g. % incidents of non-self-corrected potential loss of coherence per total propositions (including suprasegmental anomalies e.g. emphatic stress, intonation for questions etc.)
- h. % incidents of listener request for macro-repair per total propositions

Local propositional inferences

- i. % non-self-corrected potential loss of cohesion per total propositions
- j. % incidents of listener request for local repair per total propositions

Semantic interpretation or proposition sequence

- k. % T-units containing argument structure anomalies

l. % propositions, categorised by type

Average, range and median propositions per T unit were included within the section entitled 'Syntactic dependency graphs' as these reflect the syntactic complexity of propositional sequences.

Syntactic dependency graphs

m. % T-units containing anaphoric referents or elliptical structures

n. Average, range and median propositions per T-unit

The average, range, and median complete clauses per T-unit were omitted due to these measures not providing any information over and above that provided by the average, range and median propositions per T-unit, where there were no argument anomalies. Argument anomalies were notably rare, so that these additional measures were for all intents and purposes redundant.

Syntactic parse trees

o. % net words of gross words per T-unit, i.e. not including false starts or repetition.

p. % T-units containing non-self-corrected syntactic 'errors'

q. Average, range and median gross word count per T-unit

Lexical or morphological processing

r. % non-self-corrected errors at lexical level (i.e. Lexical substitution) per gross word count.

A consideration of the findings suggested the use of conversational analysis that is described as an analytic approach here, with a description of the analytic procedure described in Section H.10. Conversational analysis is a procedure for studying interaction, especially talk-in-interaction. It uses a naturalistic, observation-based approach to study verbal and non-verbal behaviour used in interaction. As such, the approach focuses on how participants in a conversation use language and non-verbal behaviour collaboratively in the production of successful discourse. The approach is derived from the school of ethnomethodology, and, as such, its focus is on revealing the social rules used by people in natural discourse. This approach would seem particularly appropriate here in view of the data-driven nature of conversational analysis. This feature of conversational analysis would mean that the researcher would not be involved in looking at restricted areas of the discourse (the rationale underlying the choice of a linguistic protocol in this study), but, rather, this would involve observations and descriptions of participants' discourse behaviour. In addition, using this approach would avoid potentially subjective judgements by the researcher as to the adequacy of aspects of the discourse (as referred to in hypothesis one where reference is made to the need for an objective measure). Frequently, discourse involving participants with mental illness is described in the literature using terms such as 'incoherence' where the linguistic elements resulting in an impression of incoherence for the listener are not apparent. The focus of conversational analysis on language phenomena commonly ignored in other approaches could potentially demonstrate those elements of discourse which differentiate between persons with schizophrenia and those without a mental illness, where these differences have been seen as elusive (as discussed in the literature review Section A). Furthermore, the focus on sequentiality within a

conversational analysis approach would appear particularly suitable here. This is due to the findings regarding the discourse of participants within the two groups. This differed in terms of frames, a measure relating to sequentiality of units of discourse, whilst the discourse of the two groups of participants did not differ substantially in terms of the linguistic measures at the level of individual utterances.

SECTION H.10

PROTOCOL FOR LINGUISTIC ANALYSIS

Frame generation

This part of the analysis is designed to describe the frames included within the text. For this purpose, the narrative framework is described as potentially including the following frames as listed by Labov (1972a; 1972b) (Diagram 4, overleaf):

Diagram 4: Narrative Framework based on Labov's (1972) narrative grammar

Setting	Introduction of characters, times, activities, and locations
Development	Change in internal or external environment leading to the 'complication'
Complication ¹	Immediate cause for a response by the character(s)
Resolution	Character's response to 'complication'
(coda)	Optional comment

Procedural frames include the components of tasks as described in the text. Key procedural frames include those described in the literature or other comparative data (as discussed in Chapter 4).

¹Where the frames >development= and >complication= cannot be distinguished, the utterances are considered as describing the complication since this is seen to be the cause for a response by the character.

Frames included in the text are then compared with those suggested by the narrative framework and the key procedural frames. Narrative frames included in the text are described as percentages of the frames outlined in the narrative framework (as described in diagram 4) in *measure a*. Procedural frames are described as percentages of the key procedural framework (as described individually for each procedure, and derived from the literature or texts from participants without schizophrenia) in *measure b*.

Integrative operations

This part of the analysis is carried out to determine the pattern of the subject's semantic network generation.

Utterances are divided into those that include at least one independent clause and utterances that lack any clausal structure. The former include at least one subject and finite verb component, except for imperatives and utterances where the subject and at times verb are elided (omitted) but implicit. An example of an utterance with clausal structure is (You) Get two slices of bread, whereas an example of an utterance without clausal structure is whatever filling you want. The latter utterance functions independently within discourse, and as such is not deviant, but it lacks clausal structure.

Utterances with at least one independent clause (i.e. with clausal structure) are parsed into their propositional constituent structures, each including a head phrase plus one or more arguments or modifying predicates (Clark and Clark, 1977). Where the product of ellipsis is evident then this is included in the parsing. Individual propositions are numbered and

written on consecutive lines, and accompanied by their parsed structure in the case of propositions with a clausal structure.

e.g. 23. It hits him on the head +hit c(fly, father, on head)

Utterances without clausal structure are numbered, but are not parsed. Where utterances without clausal structure are not contradicted by the subsequent proposition, but rather the subsequent proposition can be seen as an elaboration of the proposition without clausal structure, these are included on the same line, and only the proposition with clausal structure is parsed. Words which do not add significantly to the meaning of a proposition e.g. 'Some other man' are not included in the parsing, but are counted within the number of words included within semantic networks.

In *measure c.* the number of propositions involving repeated information are calculated as a percentage of the total number of propositions, where a proposition is considered to be a repeat of a previous proposition if it refers to the same referent and does not provide any additional information. However, utterances without clausal structure, e.g. 'Yes' and 'no' are not included as repeated utterances, due to their role in providing emphasis.

eg. 36. And says damn you are going fly +say c (father, 37)

37. +go c (fly, away)

Measure d. involves calculating the number of words that are concerned with semantic networks as a percentage of the total word count. The number of words concerned with semantic networks is said to include all words within the transcripts excluding any dysfluencies and excluding any utterances without clausal structure. Dysfluencies include pause fillers (e.g. Uhm, ah) and words which are then corrected by the speaker (where only

the revised utterance is included in the number of words within semantic networks). The total number of words is calculated to include all words transcribed including those words included in utterances with and without clausal structure and those that constitute dysfluencies. Where compound expressions are encountered, as described by Thomas (1994), if the constituent words can function independently within that syntactic context with the same resulting meaning, they are regarded as individual lexical items. Where the meaning of the compound expression is more than the sum of the individual lexical items, then they are regarded as a single lexical item. Similarly, items such as proper nouns (peoples' names, place names, times, dates ...) are regarded as compound expressions.

Measure e. provides another measure of the information contributed by the subject.

Lexical items which function as 'pause fillers' or 'management utterances' are considered as 'non substantive', except where these are analysable as mental state verbs relating to the following material. The number of substantive words (versus pause fillers and management utterances) is calculated as a percentage of the gross word count.

Measures c., d., and e. provide an indication of the amount of information the subject is contributing.

Measure f. involves the calculation of the percentage of propositions in which there are semantic anomalies in relation to lexico-semantic markers as a proportion of the total number of propositions. Where the semantic network surrounding a particular 'node', i.e.

lexical item, includes a 'bizarre link' as in the example, 'the table was breathing', where the lexical item 'table' precludes its usage with animate attributes (excepting unusual circumstances, where this is made explicit). Although this is a measure relating the 'bizarre descriptions' to a difficulty in the semantic network, possibly this can be seen as an example of the interaction between levels of discourse processing. It is possible that the unusual semantic network is an expression of cognitive difficulties or the speaker's insensitivity to a necessity to a requirement to make explicit the unusual choice of semantic networks. This would differ from a difficulty generated at the level of semantic networks.

Logical or macrostructure inferences

The purpose of this section is to assess the 'coherence' of a text, where this represents the underlying functional connectedness of the macrostructure of a text. Joanne *et al.* (1990) refer to Charolles' four 'metarules' by which coherence may be judged:

- i.* repetition;
- ii.* progression entailing the enrichment of a text with new information;
- iii.* non-contradiction where new information should not contradict previous information except for the purposes of humour or sarcasm; and
- iv.* relation in which new information must relate to previous explicit or implicit information.

It is evidently difficult to measure instances of the above.

Following Goodchild (1990), *Measure g.* is an attempt to document instances of a failure to establish coherence successfully. This measure involves the calculation of the number of

incidents of non-self-corrected potential loss of coherence per total propositions. The measure provides an indication of a disruption to the coherence of the text by counting incidents of the following categories of contradiction:

- i.* contradictory references to tense and sequences of events;
- ii.* adoption of surface meaning of text versus underlying inferred or metaphorical meaning
- iii.* disruption in the use of prosody as a contributory factor to the production of a coherent text

This involves identifying incidents involving suprasegmental anomalies e.g. emphatic stress, intonation for questions etc.

However, it is arguable what *Measure g* truly represents. *Measure g i.* could be seen as documentation of a syntactic difficulty unrelated to coherence. *Measure g iii.* would seem to describe one of many paralinguistic features of a text, with a disruption in intonation not being necessarily directly related to coherence. The measure could equally be seen to reflect a difficulty in establishing cohesion.

As communication is the product of an interaction between two participants, a listener's actual request for repair can provide another indication of communicative breakdown. This could reflect equally a difficulty caused by the speaker or by the listener's deficient attention or inferential skills. *Measure h.* involves the calculation of incidents of listener request for macro-repair as a percentage of total propositions.

Local propositional inference

Halliday and Hasan (1976) describe cohesion as the method in which elements structurally unrelated to each other are linked through the dependence of one element on another element for its interpretation. Halliday and Hasan list reference, substitution, ellipsis, conjunction and lexical cohesion as possible cohesive devices within a text.

- E.g. 23. It hits him on the head +hit c(fly, father, on head)
 24. * Next it stings him on the head After (23, 25)
 25. +sting c(fly, father, on head)

* conjunction

In *Measure i.* propositions where there is evidence of a potential loss of cohesion are calculated as a percentage of total propositions, i.e. where reference, substitution, ellipsis or conjunction are used 'incorrectly'. As noted by Chapman and Ulatowska (1989), on many occasions extralinguistic features of the text e.g. Eye contact and facial gestures will confirm the maintenance of cohesion, so that this measure can only be seen as an indication of increased listener burden.

Measure j., in which incidents of listener request for local repair are calculated as a percentage of total propositions, provide possible confirmation of a speaker's difficulty in establishing textual cohesion.

Again, this is arguably not an expression of a difficulty primarily at this level of discourse processing. Although incidents of cohesion loss are measured against the total number of

propositions, this is not consistently acknowledged as an intersentential feature. It is possible that this is as much a product of impaired lexical retrieval (Glosser and Desser, 1990) or a product of both syntactic and lexical difficulties (Halliday and Hasan, 1976).

Semantic interpretation/proposition sequence

The T-unit, as described by Ulatowska *et al.* (1992), is a semantic unit consisting of a proposition and any subordinate propositions. Thus, a proposition and its subordinate propositions corresponds to one T-unit, whereas propositions which are co-ordinates but not dependent on each other each function as an individual T-unit. In subordination one proposition is superordinate to another in that the meaning of the subordinate proposition is dependent on the main proposition. Whilst the main proposition requires no further elements for its interpretation, the subordinate propositions are not intelligible without information derived from the main proposition. In contrast, propositions which are co-ordinates can both be interpreted on their own without requiring information from each other for their interpretation.

In *Measure k*. the number of T-units that contain argument structure anomalies are calculated as a percentage of all T-units.

In *Measure l*. each proposition is allocated to a working definition of one of the categories of proposition described by Frederiksen *et al.*, after which the percentage of each category of proposition can be calculated as a percentage of all propositions. Propositions were only considered as being included within a specific category such as 'binary dependence

relations' where this was clearly included within the semantic meaning of the propositions. A simplified propositional analysis involves parsing the text into units of meaning but not separating out elements such as tense, aspect, mode, definiteness or deixis. This means that instances of some categories cannot be calculated, for example category J.

Syntactic dependency graphs

Measure m. includes the number of incidents in which the subject includes evidence of 'underlying graphs' to enable information to be conveyed in an abbreviated or different form. This measure included incidents of ellipsis, and referential terms including determiners such as 'that' and pronouns such as 'it' which were used as part of underlying textual graphs. Similar lexical items were not considered instances of underlying graphs when they were made with reference to the external environment versus the text.

Measure n. includes the average, range and median number of propositions per T-unit, providing a measure of syntactic complexity.

Syntactic parse trees

Measure o. reflects the number of lexical items that the subject successfully includes within a linear structure, by calculating the net words of gross words per T-unit, i.e. excluding false starts or repetitions.

Measure p. relates to the number of T-units containing non-self-corrected syntactic errors as a percentage of all T-units. This excludes hesitancy, false starts, repetitions and mimicry. Examples include:

- i. omission of a phrase within a non-elliptical clause e.g. 'Jim was admitted into hospital' > 'was admitted into hospital' 'Jim was admitted into' 'Jim in hospital'
- ii. word order anomalies e.g. > 'Jim hospital into admitted'
- iii. prosodic anomalies related to syntactic categorisation of lexical items e.g. 'Debate' (noun) > 'deBATE' (verb).

Measure q. includes the actual number of lexical items that the subject includes within a grammatical linear structure.

Lexical or morphological processing

Measure r. includes any word seemingly substituted in error including:

- i. Literal paraphasias e.g. Intimidation > 'intimation'
- ii. Semantic paraphasias e.g. Intimidation > 'threat'²
- iii. Metathetical errors e.g. Intimidation > 'indimitation'
- iv. Prosodic anomalies in relation to subjects' usual dialect eg. IntimiDAtion > 'inTIimidation' unless this is deliberate.

Analysis Using Principles of Conversational Analysis

This was based on Labov's analysis of the oral narrative of personal experience (Labov and Waletzky, 1967; Labov, 1970). According to Labov, the narrative involves a bounded unit

²It is arguable whether semantic paraphasias occur at this level of discourse processing, as suggested by Garman (1990).

that includes an optional abstract, narrative clauses and an optional coda. These elements were investigated within the 'life' discourse samples of study participants.

SECTION H.11

KRAWIECKA SCALE

This scale rates positive and negative symptoms and incoherence of speech (thought disorder) during an interview of the participant, to assess current symptomatology.

Separate scores are obtained for each category. The range of ratings for all measures is 0-4, where '0' is absence of a symptom and '4' indicates a severe symptom.

SECTION H.12

SCORING INTERVIEWS

All discourse samples were transcribed. Discourse samples were scored using the scoring criteria as described by Goodchild in Section H.8, using further specifications from the researcher. Following the complete scoring of the first two participants, the measures were rewritten, and an additional form of scoring was developed for the frames used in the narrative and life samples (section H.9 and H.10).

A second rater scored a sub sample of 10 discourse samples and interrater reliability was examined. The same rater following an interval of 3 months rescored 10 discourse samples and intrarater reliability was examined.

CHAPTER THREE – RESULTS

OUTLINE OF CHAPTER ON RESULTS

Measures relevant to the study can be divided into two main subdivisions. The first group of measures relate to the participants' demographic information and information about their general performance, e.g. mental health status and performance on standardised assessments of language and psychological functioning. This background information is included in Section I. The second group of measures relate to participants' performance on the language measures adopted for the purposes of examining the study's first hypothesis. These are described in Section J.

Sections I and J are subdivided further into individual subsections detailing the various areas of information relating to participants. Thus, Section I.1 includes the demographic information available for the participants, which is then subjected to statistical analysis in Section I.2. Background assessments for the participants with schizophrenia are outlined in Section I.3. The mental status of participants is included within Section I.4, with participants' accounts of their experience of hallucinations summarised in Section I.5. Participants' performance on standardised language tests are then outlined in Section I.6.

Section J focuses on the results of discourse analysis for the various discourse samples gathered from all participants. These include Narrative 1, participants' accounts of a story as seen in a series of six cartoon pictures, where the pictures were visible to both

participant and researcher (Section J.1) and Narrative 2, participant's accounts of a story as seen in a series of six cartoon pictures, where the pictures were not visible to the researcher (Section J.2). Participants' adaptation in response to the changed listener environment in Narrative 2 as compared with Narrative 1 is described for participants with schizophrenia in Section J.3a, and for participants without a mental illness in Section J.3b. Participants' procedural discourse samples are described in Section J.4, whilst their story about their life prior to their becoming resident in the institution concerned, referred to as the 'life' discourse samples, are described in Section J.5. Individual participants' discourse behaviour across the range of discourse tasks is outlined in Section J.6, whilst a summary of the differences between the two groups of participants in terms of their discourse, as described using measures of discourse analysis, is provided in Section J.7.

Section K addresses the interrater and intrarater reliability of the discourse analysis measures within Section J. This involves a comparison of discourse analysis measures by two different raters for the narrative discourse samples of five participants (Section K.1) and for the procedural discourse samples of five participants (Section K.2). Intrarater reliability is assessed by comparing discourse analysis measures by one rater on different occasions 3 months' apart for the narrative discourse samples of five participants (Section K.3) and for the procedural discourse samples of five participants (Section K.4). (Please refer to Appendix L for discourse samples used for interrater and intrarater reliability part of the study)

The validity of the discourse analysis measures is then assessed by looking at any relationships between the discourse analysis measures and participants' performance on standardised language tests in Section L.

The relationship between participants' accounts of their hallucinations and their language performance is explored in Section M to address the question posed by the second hypothesis of the study.

The third hypothesis relates to the therapy study that is described separately in Chapter 5.

SECTION I

DATA EXPLORATION AND ANALYSIS

Differences between the group of participants with schizophrenia and the group of participants without mental illness were explored using frequency distributions and measures of mean, median and mode values. Additional exploration of the data involved the plotting of boxplots for each variable. These included a visual display of the median value, the data range for the middle 50% of cases of the variable (presented visually as a box), and outlying and extreme values (where outlying values are defined as values more than 1.5 box lengths away from the box and extreme values are those more than 3 box lengths away from the box). Skewness was displayed by an eccentric location of the median line within the box. Where the distributions were found to be approximately

normal, with equal variance, parametric statistics were employed (Hopkins and Glass, 1978).

Homogeneity of variance was tested for using the Levene Test. Where the F value on the Levene test was not significant, variances were assumed to be homogeneous and the parametric t-test based on equal variances was used. Where the F value on the t-test was significant, variances were assumed to be heterogeneous and a t-test based on separate variance estimates was used. Where there were significant counter indications for the use of parametric statistics, e.g. with marked heterogeneity of variance or highly skewed data or the presence of outlying values in the data, comparable nonparametric tests were used.

A significance level of $p=0.05$ was chosen for all analyses. At this level of significance there is a relatively low probability of falsely rejecting the null hypothesis (a type one error), and a similarly low probability of falsely accepting the null hypothesis (a type two error).

An additional safeguard against falsely rejecting the null hypothesis involved constructing a scatterplot wherever statistical tests suggested a relationship between two variables. This demonstrates whether there is a linear relationship between variables, and the approximate relationship between the variables. As demonstrated by Anscombe (1973), wherever the scatterplot is neither elliptical nor circular (i.e. the variables are neither in a linear relationship nor independent), the statistical test can be misleading. An example of this is a situation where two variables may be unrelated, and the majority of the data is incorporated

in a circular scatterplot. The presence of one or two outliers can suggest a strong linear relationship despite this being incorrect. In contrast, where the shape of a scatterplot is unaltered by the removal of a few data points at random, it is probable that there is a real relationship between the variables. Following the plotting of scatterplots, trends within the group data were investigated using Pearsons' Correlations. This provides an indication of associations between variables.

SECTION I.1

DEMOGRAPHIC DATA

(1.) Participants

Participants included:

a.) Group one - Participants with schizophrenia (sx)

12 participants were identified from two wards within a special Hospital, who satisfied the following criteria:

- male ;
- primary diagnosis of schizophrenia according to DSM IV criteria (DSM IV, American Psychiatric Association, 1994);
- English as the subject's first language; and
- willingness to participate in the project

b.) Group two – Participants without a known history of mental illness or current diagnosis of mental illness (Participants providing comparative data (cl))

12 participants were identified within a local prison, who satisfied the following criteria:

- male;
- no known history of mental illness or current diagnosis of mental illness;
- English as the subject's first language; and
- willingness to participate in the project

(2.) Demographic Data

Demographic data on participants, included information on: age; offence; length of stay in the institution concerned; educational background; work history; and psychiatric history onset where relevant (first contact with psychiatric services). This is tabulated in Tables 1 and 2 (commencing overleaf). The data is then summarised in Tables 3-8, and subjected to statistical analysis in Section I.2.

Demographic data for the groups

Table 1: Demographic Data for Participants with Schizophrenia

<i>Subject No.</i>	<i>Age (years)</i>	<i>Offence</i>	<i>Years In Institution</i>	<i>education al Back-ground</i>	<i>Work History</i>	<i>Psychiatric History (no. of years since first contact)</i>
1	46	Manslaughter	14	Secondary modern	Labourer	25
2	28	Sex + kidnap	5	Comprehensive	Fishmonger	8
3	29	a.b.h.	3	Secondary	Unemployed	7
4	36	a.b.h.	10	Grammar	Student	13
5	40	Kidnap	5	Comprehensive	Unemployed	9
6	30	a.b.h.	2	University	Unemployed	6
7	30	a.b.h.	4	Grammar	Market gardener	14
8	30	Kidnap	2	Comprehensive	Factory	21
9	34	a.b.h.	10	Secondary modern	Unemployed	16
10	28	a.b.h.	2	Special	Unemployed	13
11	24	Robbery + firearms	2	Comprehensive	Asphalter	17
12	40	None	1	University	Unemployed	14

Table 2: Demographic Data for Participants without a Mental Illness

<i>Subject No.</i>	<i>Age (years)</i>	<i>Educational Background</i>	<i>Work History</i>
1	30	College	Bricklayer
2	26	Secondary	Catering
3	36	16 years secondary	Various
4	21	Secondary school	Car mechanic
5	40	17 years secondary school	Property
6	32	16 years secondary school	Unemployed
7	30	16 years secondary school	Unemployed
8	24	Special school	Student
9	31	Secondary school	Scaffold
10	17	15 years secondary school	Warehouse
11	24	14 years secondary school	Unemployed
12	30	Not known	Unemployed

Table 3 – Age of Participants

<i>Participants</i>	<i>Mean Age</i>	<i>Standard Deviation</i>
Participants with schizophrenia (sx)	32.9 years	6.4
Participants without mental illness (cl)	28.4 years	6.4

Table 4 – Educational Background of Participants

<i>Educational Background</i>	<i>No. of Participants with Schizophrenia (sx)</i>	<i>No. of Participants without mental illness (cl)</i>
Completed mainstream school	9	9
Attended special school	1	1
Attended further education	2	1
Not known	0	1

Table 5 – Work History of Participants

<i>Work History</i>	<i>No. of Participants with schizophrenia (Sx)</i>	<i>No. of Participants without mental illness (cl)</i>
<i>Student</i>	1	1
<i>Unemployed</i>	6	4
<i>Partly skilled or semi-routine</i>	5	7
<i>Total not in employment</i>	7	5
<i>Total partly skilled semi-routine jobs</i>	5	7

Table 6 – Age of Onset of Psychiatric History

<i>Participants</i>	<i>Average age for onset of psychiatric history</i>	<i>Standard deviation</i>
Participants with schizophrenia (sx)	13.6 years	5.7
Participants without mental illness (cl)	No contact with psychiatric services	No contact with psychiatric services

Table 7 – Length of Stay in Institution where currently resident

<i>Participants</i>	<i>Average length of stay in institution where currently resident</i>	<i>Standard deviation</i>
Participants with schizophrenia (sx)	5 years	4.1
Participants without mental illness (cl)	< 1 year	(all less than one year in this instance, and this data was gathered in terms of years, but all had a history of contact with forensic services)

Table 8 – Index Offence of Participants

<i>Index Offence</i>	<i>No. of Participants with Schizophrenia (sx)</i>
Manslaughter	1
Kidnap	3
Assault occasioning actual bodily harm	6
Robbery	1
None	1

For the participants without mental illness (cl) the researcher did not have access to details of index offences, but these included the following: robbery, assault occasioning actual bodily harm and driving offences, with one instance of fraud.

SECTION I.2

STATISTICAL ANALYSIS OF DEMOGRAPHIC DATA

In order to check that the groups did not differ significantly on demographic features statistical analyses were performed on this data, where initial exploration of the data suggested the possibility of significant differences between the groups of participants.

Thus, the parametric independent T-test was conducted on the age of participants, with the following results (Table 9):

Table 9 – Independent T Test for Age

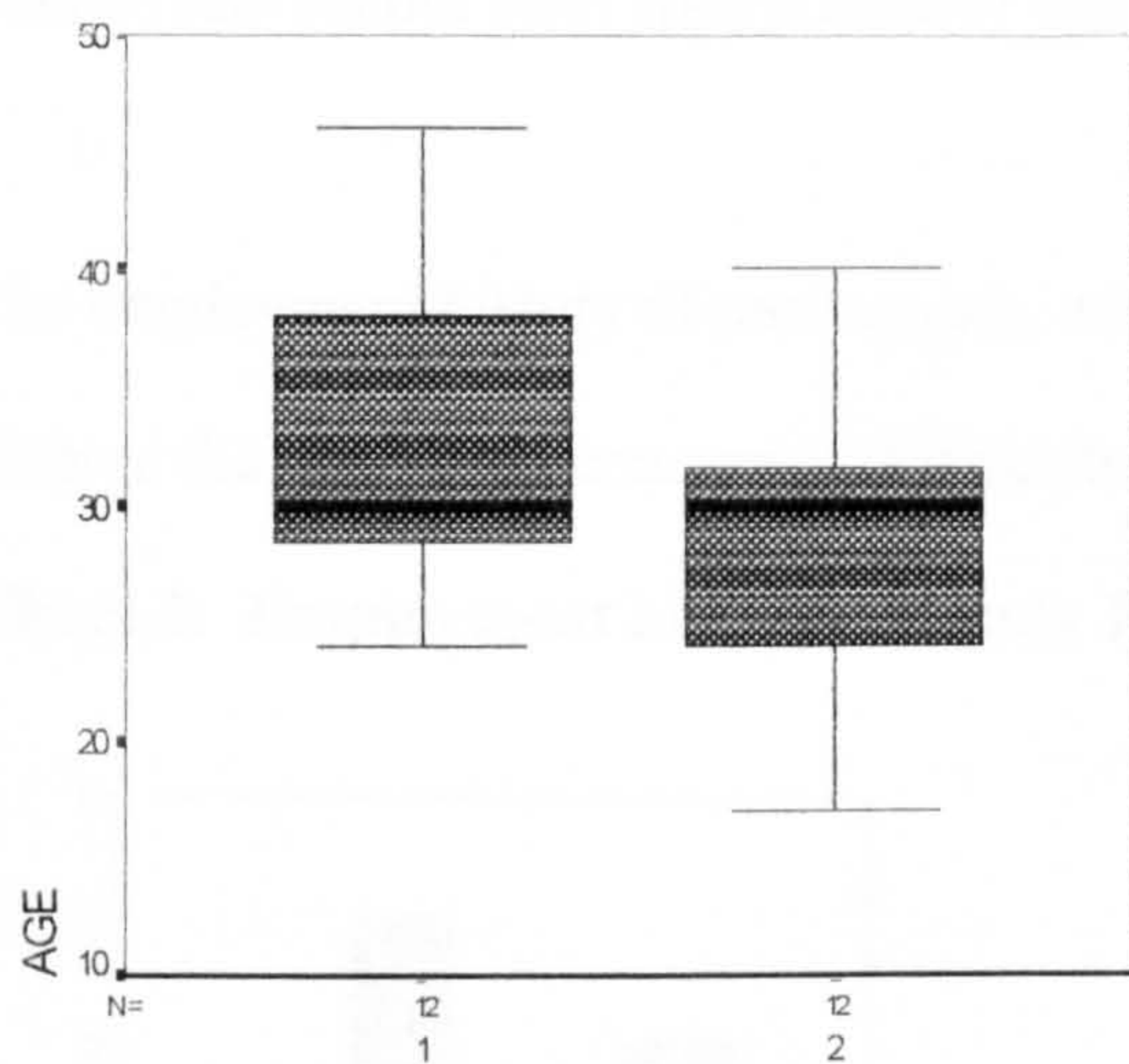
<i>Variable</i>	<i>Case Source</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>T</i>	<i>Sig.(2-tail)</i>	<i>Sig.</i>
Age (years)	Sx	32.9	6.4	1.7	.10	Not sig.
	Cl	28.4	6.4			

Thus, there was no significant difference between the groups of participants in terms of age.

The mean age of participants with schizophrenia (sx) (32.9) was not significantly older than the mean age of participants without a history of mental illness (cl) (28.4).

The boxplot overleaf (boxplot 1) depicts graphically the relative ages of the two groups of participants.

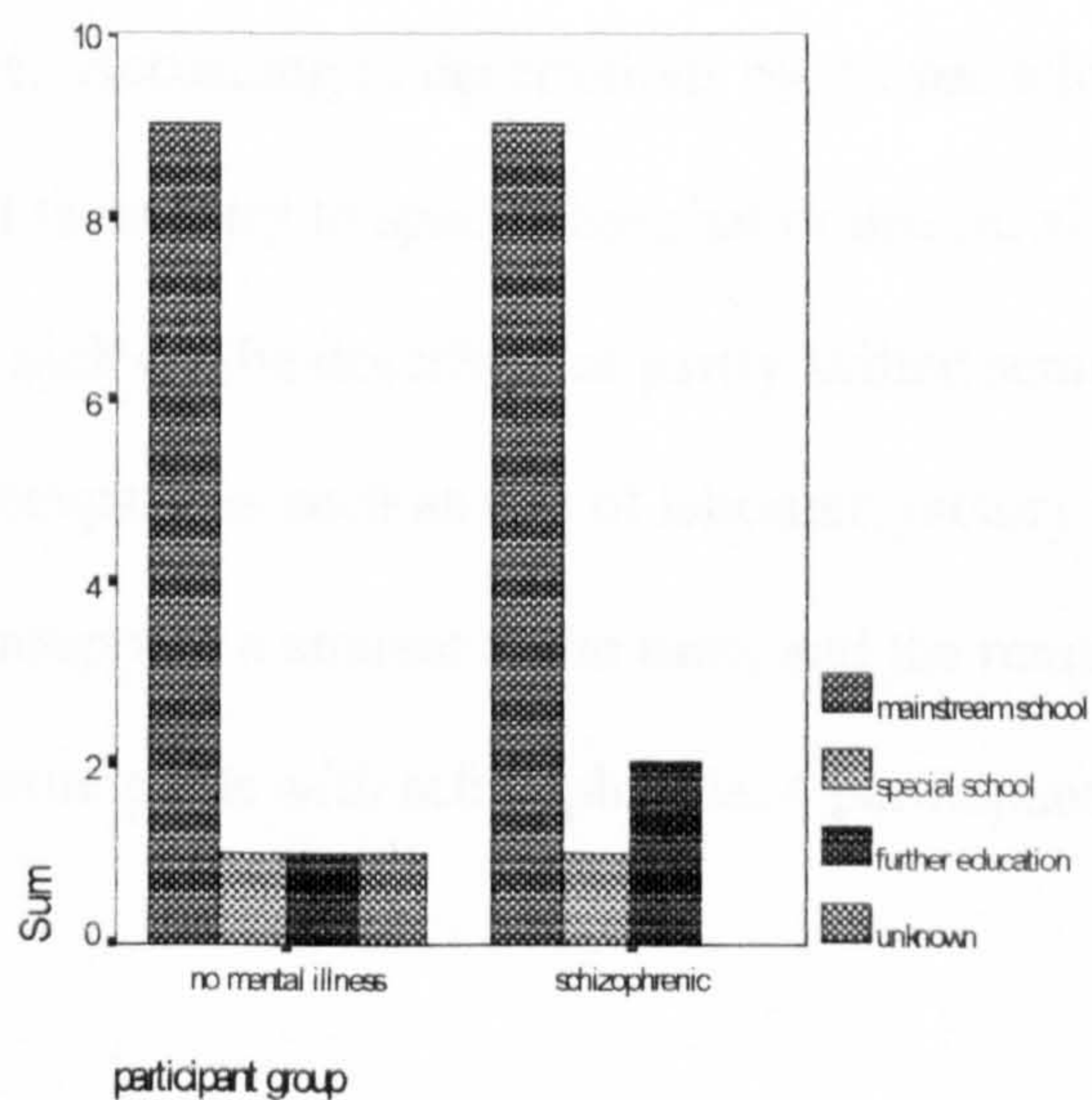
Boxplot 1: Age of Participants



GROUP
 Key Group 1 = Group of Participants with schizophrenia (sx)
 Group 2 = Group of Participants without mental illness (cl)
 Age is described in terms of years.

The bar chart below (Chart 1) describes graphically the educational background of participants.

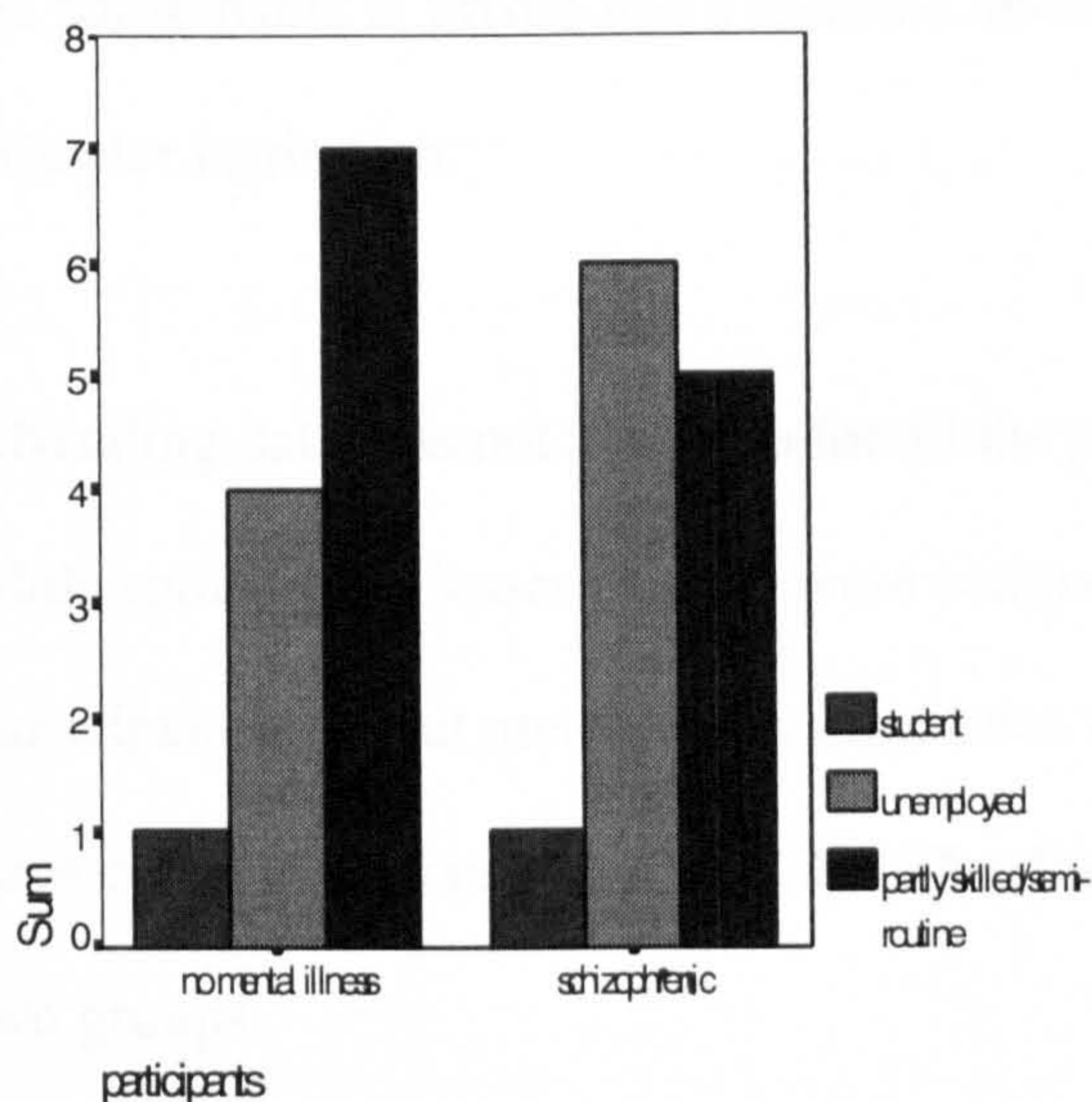
Chart 1 - Educational background of Participants



i.e. The two groups of participants were matched in terms of education. In each group of participants, excepting one participant who started a course in further education, and one with a special school educational background, all participants remained within a mainstream school until approximately age fifteen or sixteen years.

The employment history of participants, according to their accounts of the time before they entered the institution concerned is described in the bar chart below (Chart 2):

Chart 2: Employment history of Study Participants



i.e. According to descriptions by the participants themselves of their occupation at the time of their entry to special hospital or prison, all those employed were within occupations which can be described as partly skilled semi-routine occupations, and included occupations such as that of labourer, factory worker and asphalter. One participant in each group was a student at the time, and the remaining participants were unemployed (6 participants with schizophrenia, 4 participants without mental illness). Occupation prior to

detainment thus appears similar for the two groups of participants, although the balance is such that more of the participants without mental illness were employed and more of the participants with schizophrenia were students.

In contrast, it was evident that those participants who were resident in the Special Hospital had a history of contact with psychiatric services (mean 13.6 years) (standard deviation 5.7). The former participants had also spent significantly longer in the institution in question (mean 5 years, standard deviation 4.1), although it must be remembered that all the participants in prison had a forensic history involving them being resident in an offender institution.

Offending data was not available for all the participants resident within the prison, but while some of the lesser charges were comparable across the groups, none of the sample of participants without mental illness had been alleged to have kidnapped an individual or to have committed manslaughter. The offending data was therefore not entirely similar for the two groups.

SECTION I.3

'BACKGROUND ASSESSMENTS' FOR PARTICIPANTS WITH SCHIZOPHRENIA

Results for a number of background assessments were available for some of the participants with schizophrenia. The number of test results available varied between participants

NB: No background assessments were available for participants without any known history of mental illness, as the researcher was not permitted access to such data.

The following (Tables 10 and 11) is a summary of the performance of the participants with schizophrenia on a number of 'background assessments' where these were available (commencing overleaf):

Table 10: Performance of participants with schizophrenia on 'psychological assessments'

<i>Sub-ject No.</i>	<i>Wechsler Adult Intelligence Scale-Revised</i>	<i>Premorbid IQ (Based On Nart)</i>	<i>Difference Between Estimated Premorbid And Current IQ Scores</i>	<i>Measure Of Prose Recall</i>	<i>Measure Of Prose Recall-delayed</i>	<i>Measure of Design Recall</i>	<i>Measure of Design Recall-Delayed</i>
1	78	101	23	24	31	7	2
2	84	117	33	9	7	11	12
3	77	79	2	2	1	2	1
4	72	-	-	0	0	-	-
5	99	112	13	24	50	83	80
6	88	-	-	3	1	42	1
7	99	101	2	77	75	97	95
8	-	-	-	50	-	50	-
9	83	71	-	1	1	1	2
10	77	79	2	8	0	15	10
11	-	75	-	1	-	-	-
12	-	-	-	9	-	10	-

Table 11: Performance of participants with schizophrenia on ‘psychological assessments’

<i>Subject No.</i>	<i>Adult Memory and Information Processing Battery Motor speed</i>	<i>Adult Memory and Information Processing Battery Cognitive Speed A</i>	<i>Adult Memory and Information Processing Battery Cognitive Speed B</i>	<i>Adult Memory and Information Processing Battery Accuracy A</i>	<i>Adult Memory and Information Processing Battery Accuracy B</i>	<i>Weigl</i>	<i>Stroop (Words)</i>	<i>Stroop (Conflict)</i>
1	<10	<10	<10	<10	<10	1	111	34
2	<10	<10	<10	90	>50	1	112	80
3	<10	<10	<10	<10	>90	1	112	73
4	-	-	-	-	-	-	-	-
5	50	25-50	10-25	10-25	>50	1	112	93
6	<10	25-50	25-50	>50	>50	1	112	88
7	50-75	50	50	50+	<10	1	112	106
8	-	-	-	-	-	-	-	-
9	25-50	25	<10	<10	<10	1		77
10	-	-	-	-	-	-	-	-
11	-	-	-	-	-	-	28	21
12	<10	<10	<10	<10	>90	-	-	-

1. Wechsler Adult Intelligence Scale - Revised: Memory Subtest (WMS-R)

The mean estimated IQ score for participants with schizophrenia, based on the full Wechsler Adult Intelligence Scale - Revised, was 85, with a standard deviation of 9.9. This is towards the lower end of the average range, or about the 18th percentile of the general population. This is consistent with Hartman *et al.*'s (1984) conclusion that a considerable number of people with schizophrenia have an IQ score within the 'defective' range. Unfortunately, the corresponding data was not available for the participants without any known history of mental illness.

2. Premorbid IQ:

The mean estimated premorbid IQ score for the participants with schizophrenia, based on the NART (revised) was 94, with a standard deviation of 18.6. Unfortunately, this information was not available for the participants without a known history of mental illness.

3. Difference between estimated premorbid and current IQ scores:

Participants with schizophrenia scored an average 10-point difference between their estimated current IQ and premorbid IQ, with a standard deviation of 16.2. This pattern of estimated decline from premorbid to current IQ is consistent with the long standing finding that many, although not all, people with schizophrenia demonstrate a significant deterioration in their ability (Frith *et al.*, 1991). Specifically, O'Carroll *et al.* (1992) note

that the NART provides an accurate estimate of pre-morbid abilities, and that estimated premorbid IQs on the basis of the NART are suggestive of a decline in cognitive abilities premorbidly, with a further decline following illness onset.

4. Measures of prose recall

The mean immediate prose recall for the participants with schizophrenia was 20, this being approximately 25th percentile, with a standard deviation of 27.0. Where delayed prose recall was tested, mean recall for participants with schizophrenia was higher, at 24, corresponding approximately to 50th percentile, with a standard deviation of 29.4. The large standard deviation for both measures of prose recall reinforces the heterogeneity of the participants with mental illness involved within the study. These results also suggest that as a group the participants with schizophrenia demonstrate a different pattern of response to that demonstrated by the participants without any history of mental illness.

5. Measures of design recall

The mean immediate design recall for the participants with schizophrenia was 35, with a standard deviation of 40.4, with the mean delayed recall for participants with schizophrenia of 28, and a standard deviation of 41.4. Both these means are above average for a normal population, although evidently there was considerable variation within the group, which was even more extensive than that for the measures of prose recall, again reinforcing the heterogeneity of this 'group' of participants. This data also suggests that the participants with schizophrenia did not have a global memory impairment.

6. Adult Memory and Information Processing Battery

Results were very varied, with in each of the subtests approximately half of the participants scoring below the tenth percentile, and the other half of the participants scoring a varied range of scores including scores corresponding to 95th percentile within a normal population. Interestingly, there was no subtest where participants scored consistently higher or consistently lower than on other subtests. Equally, individual participants showed marked variations in their response to the individual subtests, with no discernible pattern, reinforcing again the individuality of any pattern of responding.

SECTION I.4

MENTAL STATE OF PARTICIPANTS WITH SCHIZOPHRENIA AND PARTICIPANTS WITHOUT ANY KNOWN HISTORY OF MENTAL ILLNESS (AS RECORDED ON 'THE KRAWIECKA')

It is possible to summarise the Krawiecka scores of the participants with schizophrenia and those participants without a history of mental illness. This is done in Tables 13 and 14.

For this purpose, qualitative descriptions of the mean score are based on the correspondence between quantitative ratings and qualitative descriptions of the various symptoms as described by Krawiecka *et al.*, and enumerated in Table 12 (overleaf).

Table 12 – Correspondence between qualitative descriptions and ratings of symptoms

<i>Rating</i>	<i>Presence of symptom</i>
0	Absent
1	Mild
2	Moderate
3	Marked
4	Severe

Table 13 – Mental state of participants with schizophrenia (sx)

<i>Measure</i>	<i>Mean score</i>	<i>Standard deviation</i>	<i>Qualitative description of mean score</i>
Incongruency of affect	2.73	1.19	Mild
Anxiety	.55	1.04	Mild
Delusions	3.55	1.21	Mild
Depression	.82	1.40	Mild-moderate
Hallucinations	2.18	2.09	Moderate
Incoherence	1.00	1.55	Mild-moderate
Negative symptoms	4.00	2.41	Moderate-marked
Positive symptoms	6.18	3.66	Marked-severe
Poverty	.45	1.04	Mild
Psychomotor retardation	.82	1.25	Mild

Table 14 – Mental state of participants without mental illness (cl)

<i>Measure</i>	<i>Mean score</i>	<i>Standard deviation</i>	<i>Qualitative description of mean score</i>
Incongruency of affect	0	0	Absent
Anxiety	0	0	Absent
Delusions	0	0	Absent
Depression	.33	1.15	Mild
Hallucinations	0	0	Absent
Incoherence	0	0	Absent
Negative symptoms	0	0	Absent
Positive symptoms	.33	1.15	Mild
Poverty	0	0	Absent
Psychomotor retardation	0	0	Absent

The following table (Table 15) summarises the data in a form which demonstrates those symptoms present in a mild, moderate, marked or severe form in participants with schizophrenia (according to the mean score for this group of participants) (Table 15, overleaf):

Table 15 – Symptoms present in participants with schizophrenia in terms of severity of symptoms

<i>Qualitative description</i>	<i>Symptom</i>
Absent-mild	Anxiety Poverty
Mild	Depression Incoherence Psychomotor retardation
Moderate	Hallucinations
Marked	Incongruency of affect
Marked-severe	Delusions

Scanning the database for any potentially significant differences between those participants with schizophrenia and those participants providing comparative data suggested the possibility of differences between the two groups of participants in the following variables which form part of the Krawiecka:

- Krawiecka measure of depression
- Krawiecka measure of anxiety
- Krawiecka measure of psychomotor retardation
- Krawiecka measure of affect
- Krawiecka measure of negative symptoms
- Krawiecka measure of positive symptoms

- Krawiecka measure of delusions
- Krawiecka measure of hallucinations
- Krawiecka measure of incoherence

Exploring the data, using frequency distributions and measures of mean, median and mode values, as well as boxplots, the data was not in line with a normal distribution, and was therefore analysed statistically with the Mann-Whitney U Test, providing the following results (Table 16):

(table continued overleaf)

Table 16 – Mann-Whitney U Test for Krawiecka Variables

Krawiecka Variable	Case Source	Mean rank	Sum of ranks	Mann-Whitney U	Asymp. Sig (2 tailed)
Measure of Depression	Sx	13.8	166.0	56.0	.38
	Cl	11.1	134.0		
Measure of anxiety	Sx	14.0	168.0	54.0	.32
	Cl	11.0	132.0		
Measure of psychomotor retardation	Sx	15.0	180.0	42.0	.09
	Cl	10.0	120.0		
Measure of incongruity of affect	Sx	18.0	216.0	6.0	.00*
	Cl	7.0	84.0		
Measure of negative symptoms	Sx	18.0	216.0	6.0	.00*
	Cl	7.0	84.0		
Measure of positive symptoms	Sx	17.8	213.0	9.0	.00*
	Cl	7.3	87.0		

<i>Krawiecka Variable</i>	<i>Case Source</i>	<i>Mean rank</i>	<i>Sum of ranks</i>	<i>Mann-Whitney U</i>	<i>Asymp. Sig (2 tailed)</i>
Measure of delusions	Sx	18.0	216.0	6.0	.00*
	Cl	7.0	84.0		
Measure of hallucinations	Sx	15.5	186.0	36.0	.04*
	Cl	9.5	114.0		
Measure of incoherence	Sx	14.5	174.0	48.0	.18
	Cl	10.5	126.0		

Thus, the two groups of participants (with and without a history of mental illness respectively) differed significantly along the following Krawiecka variables: incoherence of affect, negative symptoms, positive symptoms, delusions, and hallucinations.

Participants with schizophrenia were not significantly more depressed or anxious than participants without mental illness ($P > 0.05$), when considering both the actual behaviour observed at interview together with reports by the participants themselves. Neither did they show more evidence of psychomotor retardation or poverty of speech ($P > 0.05$). This may be related to the fact that the participants without a history of mental illness were in a relatively stressful situation. They were mostly relatively recently admitted to the prison (although generally with previous admissions), and on remand, awaiting trial. In contrast, the participants with schizophrenia were not expecting an imminent decision regarding their freedom, and had spent relatively longer in their current environment. Also, at this stage inmates who are hospitalised upon trial or within prison are generally not recognised as mentally ill and would therefore be included within any sample of inmates in a remand prison (Dell and Robertson, 1988; Taylor and Dell, 1998). Brooke *et al.* (1996) note that

higher levels of morbidity would be expected within a remand population because of a variety of prevalent risk factors for mental illness, such as substance misuse, personality difficulties, and the stress of reception into custody. The incidence of mental illness among remand prisoners is therefore high (Davidson *et al.*, 1995). Birmingham *et al.* (1996) noted that 26% of men within a remand prison without a known history of mental illness upon assessment had a current diagnosis of mental illness, and if diagnoses of substance abuse or dependency were included, the number of mentally ill men with current mental disorders rose to 62%. This is similar to the point prevalence of mental disorder in unconvicted male prisoners in England and Wales (Brooke *et al.*, 1996). The incidence of mental illness within this sample group would be expected to be even higher as 91.7 % of these inmates had been within the care system, where McCann *et al.*, 1996 found a prevalence rate of psychiatric disorder amounting to 96% among adolescents in residential care units.

However, the participants with schizophrenia demonstrated a significantly reduced range of available emotional responses, as evidenced in the participants' lack of emotional tone when discussing emotionally charged topics as compared with the participants without known mental illness ($P < 0.01$).

Considering positive signs and symptoms, participants with schizophrenia expressed significantly more delusional ideas than those without mental illness ($P < 0.01$), and more participants with schizophrenia demonstrated evidence of experiencing hallucinations than did other participants ($P < 0.04$).

The Krawiecka Scale also includes a rating of language incoherence based on a semi-structured interview. There was no difference ($P>0.05$) in the amount of incoherence or irrelevance of speech between participants with and without mental illness. This finding contrasts with descriptions of the language of participants with mental illness which suggest it is incoherent. Possibly the disparity relates to the fact that within spontaneous language there is a certain degree of incoherence which is not pathological (Sherratt, 1998) so that the participants with and without mental illness did not differ along this parameter. Andreasen (1979) notes that only 16% of participants with a diagnosis of schizophrenia exhibit incoherence that is pathological. It is possible that where a model or comparative data are not used as a basis for comparison a judgement of incoherence is made where the degree of 'incoherence' does not differ from that involved in spontaneous speech by individuals without a diagnosis of mental illness.

It is also necessary to look at the reliability of the ratings to determine the significance of the varied findings summarised above. Krawiecka *et al.* note the following concordance rates (Kendall's coefficient of concordance W) for three psychiatrists trained in the method (Table 17, overleaf):

Table 17 – Concordance Rates for 3 psychiatrists trained in the method of Krawiecka *et al.*

<i>Symptom</i>	<i>Coefficient of Concordance</i>
Incongruency of affect	0.50
Anxiety	0.65
Delusions	0.75
Depression	0.82
Hallucinations	0.86
Incoherence	0.64
Poverty	0.67
Psychomotor retardation	0.62
Negative symptoms	N/a (aggregate score)
Positive symptoms	N/a (aggregate score)

This indicates that the coefficient of concordance for the varied symptoms, excepting incongruency of affect, were all significant, demonstrating a substantial degree of agreement, and providing acceptable interrater agreement. This supports the reliability of these measures and the findings enumerated above.

SECTION I.5

DETAILS OF HALLUCINATIONS OF PARTICIPANTS IN THE STUDY

On questioning, participants with schizophrenia all spoke of experiencing auditory hallucinations (voices) in the past if not currently experiencing them. This differed from the participants without a history of mental illness, who all spoke of never hearing auditory hallucinations. (Please refer to Table 18)

Table 18 – Summary of information from participants hearing voices

	<i>Category A</i> <i>(3 participants)</i> <i>Participant 2</i> <i>Participant 8</i> <i>Participant 10</i>	<i>Category B</i> <i>(3 participants)</i> <i>Participant 5</i> <i>Participant 6</i> <i>Participant 7</i>	<i>Category C</i> <i>(6 participants)</i> <i>Participant 1</i> <i>Participant 3</i> <i>Participant 4</i> <i>Participant 9</i> <i>Participant 11</i> <i>Participant 12</i>
<i>Currently hallucinates</i>	No	Yes	Yes
<i>Described illocutionary force of hallucinations</i>	Yes	No	Yes
<i>Affect resulting from hallucinations</i>	Upsetting	Not disturbing	Upsetting
<i>Impact of hallucinations on life</i>	Individuals 'try to get on with them'	Hallucinations form 'part of them and their life'	'Powerful' figure e.g. mother/G-d/medical staff are helping the individuals to do what is right

Please look overleaf for related information.

Exception: Subject 3; denied hearing voices, and mentioned having bad thoughts, which he then stated he no longer had. He said that they forced him to do things which he did not want to do, and found distressing, and that if this occurred again he would remain in an institution for life. He did not provide further details about his hallucinations, and asked a number of times whether the interviewer believed him that he heard hallucinations.

In contrast, none of the participants without mental illness spoke of hearing voices when asked the same questions.

The three participants who spoke of no longer hearing voices were able to describe the illocutionary force of the hallucinations they had experienced and described the negative emotions caused by the hallucinations. They described their response to the experience of hallucinations as an attempt to 'try to get on with them' to minimise the possible negative impact of the hallucinations on their daily life.

Of those participants who said they still experienced auditory hallucinations, three participants were unable to describe the illocutionary force of the hallucinations. These participants suggested that the hallucinations were not disturbing, and were 'part of' them and their life, forming a part of their identity.

The remaining six participants who said they still heard voices were able to describe the illocutionary force of the voices. They spoke of finding the voices distressing, and explained how the voices were the result of someone or something that was perceived as powerful to them guiding them to do what was ultimately correct. Thus, their voices were a message from their mother, god or medical staff, for example, and, according to their descriptions, served a useful role in directing them in their daily life.

SECTION I.6

STANDARDISED LANGUAGE TESTS

This section includes a summary of participants' performance on The Right Hemisphere Language Battery (RHLB) (Table 19), and statistical analyses of RHLB tests where initial exploration suggested differences between the two groups of participants (Tables 20 -22, commencing overleaf).

Table 19: Participants' Performance on The Right Hemisphere Language Battery

Subject No.	Picture metaphor	Written metaphor	Comprehension of inferences	Appreciation of humour	Neutral response On test of humour	Emotional response on test of humour	Unrelated response on test of humour	Primitive responses on written metaphor tests	Metonymical responses On written metaphor tests	Rhlab (total score)
1	41	59	45	53	41	29	29	30	36	198
2	41	36	57	45	32	32	26	30	26	179
3	45	45	57	53	26	29	29	28	33	200
4	41	36	30	29	41	32	32	33	33	136
5	40	59	62	57	26	29	26	28	28	218
6	45	59	57	37	32	29	32	28	28	198
7	45	48	48	57	29	26	26	28	31	198
8										
9	49	48		32	26	29	26	28	31	
10	61	59	62	63	26	26	26	28	28	245
11	39	30	37	37	37	29	29	39	36	143
12	39	30	30	29	34	32	37	36	39	128
13	59	59	57	32	32	34	34	28	28	207
14	59	52	62	57	29	26	26	28	30	230
15	61	59	37	63	26	26	26	28	28	245
16	59	59	30	57	26	26	29	28	28	237
17	61	52	57	63	26	26	26	28	28	233
18	49	48	62	53	26	29	26	30	30	212
19					29	26	26	28	28	

Subject No.	Picture metaphor	Written metaphor	Comprehension of inferences	Appreciation of humour	Neutral response On test of humour	Emotional response on test of humour	Unrelated response on test of humour	Primitive responses on written metaphor tests	Metonymical responses On written metaphor tests	Rhlb (total score)
20	59	52	52	57	29	26	26	28	28	227
21	59	52	52	57	26	29	26	28	30	220
22	53	48	48	63	26	26	26	28	30	216
23	36	43	43	45	29	32	29	36	30	163
24	29	52	52	53	29	29	26	28	28	193

NB: Subject Nos. 1-12: Participants with schizophrenia
Subject Nos. 13-24: Participants without mental illness

Scanning the database for any possible differences between participants with and without schizophrenia suggested the possibility of differences between the two groups of participants within the following tests:

- score on picture metaphor test
- score on written metaphor test
- score on comprehension of inferences test
- score on appreciation of humour test
- no. of primitive responses on written metaphor test
- no. of metonymical responses on written metaphor test
- and the participants' overall score on the RHLB

Exploring the data, using frequency distributions and measures of mean, median and mode values, as well as boxplots, the scores on the appreciation of humour test were in line with a normal distribution, and were therefore suitable for analysis using the independent T-Test. Levene's test of homogeneity of variance was carried out, with an F value which was not significant ($p=.1$), so variances were assumed to be homogeneous, and the equal variances value for the T test was used. The results were as described in Table 20 (below).

Table 20 – Independent T Test for RHLB variables

<i>Variable</i>	<i>Case Source</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>T</i>	<i>Sig. (2-tail)</i>	<i>Sig.</i>
Score on test of humour appreciation	Sx	44.7	12.4	-2.106	.05*	Sig.
	Cl	54.5	9.2			

Thus, the group of participants with schizophrenia and the group of participants without mental illness only differed significantly in their scores on the appreciation of humour test of the RHLB.

This led to the question of whether participants with schizophrenia chose significantly more emotional, neutral or unrelated endings to the jokes, as compared with participants providing comparative data. Following an initial exploration of the data, the data was analysed using the Mann-Whitney test to investigate this possibility, with the following results (Table 21, overleaf):

Table 21 – Mann-Whitney U Test for Responses to Test of Humour

<i>Variable</i>	<i>Case Source</i>	<i>Mean Rank</i>	<i>Sum of Ranks</i>	<i>Mann-Whitney U</i>	<i>Asymp. Sig. (2-tailed)</i>	<i>Sig.</i>
Number of choices of emotional ending on test of humour appreciation	Sx	14.1	155.5	42.5	.15	Not sig.
	Cl	10.0	120.5			
Number of choices of emotional ending on test of humour appreciation	Sx	14.1	155.0	43.0	.17	Not sig.
	Cl	10.1	121.0			
Number of choices of unrelated ending on test of humour appreciation	Sx	13.9	152.5	45.5	.21	Not sig.
	Cl	10.3	123.5			

There was no significant difference between the two groups of participants in the proportion of their responses that were emotional responses, neutral responses and unrelated responses respectively.

For the other RHLB tests, in which the participants' scores within the two groups was not characterised by a normal distribution, the data was analysed using the Mann-Whitney U Test, with results as described in Table 22.

Table 22 – Mann-Whitney U Test for RHLB variables

(table continued overleaf)

<i>Variable</i>	<i>Case Source</i>	<i>Mean Rank</i>	<i>Sum of Ranks</i>	<i>Mann-Whitney U</i>	<i>Asymp. (2-tailed)</i>	<i>Sig.</i>
Score on picture metaphor test	Sx	8.8	96.5	30.5	.05*	Sig.
	Cl	14.2	156.5			
Score on written metaphor test	Sx	9.5	104.0	38.0	.15	Not sig.
	Cl	13.6	149.0			
Score on comprehension of inference test	Sx	9.4	93.5	38.5	.25	Not sig.
	Cl	12.5	137.5			
Number of primitive responses on written metaphor test	Sx	13.8	151.5	46.5	.24	Not sig.
	Cl	10.0	124.5			

<i>Variable</i>	<i>Case Source</i>	<i>Mean Rank</i>	<i>Sum of Ranks</i>	<i>Mann-Whitney U</i>	<i>Asymp. (2-tailed)</i>	<i>Sig.</i>
Number of metonymical responses on written metaphor test	Sx	15.7	172.5			
	Cl	8.6	103.5			
Total score on RHLB	Sx	8.0	79.5	24.5	.03*	Sig.
	Cl	13.8	151.5			

Thus, there were significant differences between the two groups of participants in their scores on the picture metaphor test, their number of metonymical responses on the written metaphor test, and their total score on the RHLB.

i.e. The performance of participants with schizophrenia and those without mental illness on the RHLB can be described as follows:

I. Test of Lexical Processing

All participants, including those with schizophrenia and those without a history of mental illness completed this without difficulty.

II. Metaphor Picture Test

Participants with schizophrenia selected significantly more errors as compared with participants without a known history of mental illness ($P < 0.05$). This deficit was not

evident in the written metaphor test, and could therefore suggest that this is perhaps a reflection of visuospatial impairment, rather than a disruption in the comprehension of metaphor. Examining the data for evidence of visual errors suggested that this was not the case. The low level of significance ($P = .05$) suggests the possibility that the significant difference between the groups of participants on this test reflects 'noise'. However, this is unlikely because the result is close to significant within this small sample. A larger effect would be expected with a larger subject sample.

III. Written Metaphor Test

Participants with schizophrenia did not select more incorrect responses overall than the participants without a history of mental illness ($P > 0.05$). However, the figure was close to significant, so that it is possible that this difference would be significant given a larger subject sample.

IV. Appreciation of Humour Test

Participants with schizophrenia showed a lack of appreciation of the humour included in this test as compared with participants without any known history of mental illness ($P < 0.04$). Brownell *et al.* (1983) have suggested that humour appreciation is dependent on two elements; sensitivity to the surprise element in the punch line and comprehension of the coherence resulting from the punch line's integration with the body of the joke. Analysing the errors on this test revealed that neither of these factors alone was deficient in the participants with schizophrenia when they were compared with the other group of participants ($P > 0.05$). However, a decreased sensitivity on a number of elements of

humour appreciation resulted in an overall slightly significant lack of appreciation of the humour involved in these test items in the participants with schizophrenia as compared with the other participants. Elements where these participants demonstrated a decreased sensitivity included the surprise element in humour and the use of contextual cues to judge an appropriate response. It is possible that a reduced sensitivity to implausible responses by the participants with schizophrenia could mean a decreased appreciation of the joke's surprise element and departure from expectations based on contextual cues. This would be consistent with the findings on the narrative tasks, where participants with schizophrenia tended to include information inconsistent with the pictures or preceding parts of the story or social expectations. However, it must be emphasised that the difference between the participants with schizophrenia and the other participants was minimal, and could reflect 'noise' in the data.

V. Test of Comprehension of Inferential Meaning

Participants with schizophrenia did not make significantly more errors of inference as compared with the other group of participants ($P > 0.05$). This suggests that they were able to appreciate the implications of a message by using semantic information that extends beyond individual word meanings linked to form sentences in this relatively simple task.

VI. Prosody

Stress placement was appropriate for all participants included in the study.

Summary of findings for RHLB

Participants with schizophrenia differed only marginally from participants without mental illness within the picture metaphor test ($p=.047$) and the test of humour appreciation (.048), whilst not differing significantly on other subtests of the RHLB. Moreover, their decreased appreciation of the items in the humour appreciation test was not due to a preponderance of one type of error. This would suggest that participants with schizophrenia do not have global language impairment, affecting all areas of language. Rather, they may be mildly impaired on those language tasks that are associated with right hemisphere functioning. This was suggested by a marginally significant difference between the overall RHLB score of the two groups of participants. The overall difference on the RHLB was consistent with an accumulative difference on the various subtests. Participants did not, however, demonstrate significant differences on the majority of subtests.

SECTION I

FINDINGS RELATING TO HYPOTHESIS ONE

Hypothesis one

Linguistic terminology can be used to describe differences between the language of participants with schizophrenia and that of participants without any known history of mental illness.

As a response to the question posed by hypothesis one, whether any difference(s) exist(s) between the participants with a diagnosis of schizophrenia and the participants without any

known history of mental illness, in their use of language, each type of language sample was examined in turn. These include:

narrative 1 (section J.1)

account of series of six cartoon pictures containing the following story

narrative 2 (section J.2)

account of series of six cartoon pictures containing the following story

comparison of narratives 1 and 2 for participants with schizophrenia (section J.3a)

comparison of narratives 1 and 2 for participants without a known history of mental illness

(section J.3b)

procedure (section J.4)

Participants are asked to explain how to make a sandwich.

life (section J.5)

Participants are asked to speak about their life before they came to the institution in question.

The differences between the language of participants with schizophrenia and those without a history of mental illness are described in terms of measures developed to reflect the stages of Frederiksen *et al.*'s (1990) model (Diagram 5).

Diagram 5: Measures to assess language at stages of Frederiksen *et al.*'s (1990) model (continued overleaf)

<i>Frame generation</i>
a. % narrative frames produced of narrative frames given in the task or partner's directive
b. % procedural frames produced of key procedural frames
<i>Semantic network generation</i>
c. % repeated information per total propositions
d. % words concerned with semantic networks as a percentage of the total word count
e. % substantive (versus management) word count per gross word count
f. % semantic anomalies in relation to lexico-semantic markers per total propositions
<i>Logical or macrostructure inferences</i>
g. % incidents of non-self-corrected potential loss of coherence per total propositions (including suprasegmental anomalies e.g. emphatic stress, intonation for questions etc.)
h. % incidents of listener request for macro-repair per total propositions

Local propositional inferences

i. % non-self-corrected potential loss of cohesion per total propositions

j. % incidents of listener request for local repair per total propositions

Semantic interpretation or proposition sequence

k. % T-units containing argument structure anomalies

l. % propositions, categorised by type

Syntactic dependency graphs

m. % T-units containing anaphoric referents or elliptical structures

n. Average, range and median propositions per T-unit

Syntactic parse trees

o. % net words of gross words per T-unit, i.e. not including false starts and repetition.

p. % T-units containing non-self-corrected syntactic 'errors'

q. Average, range and median gross word count per T-unit

Lexical or morphological processing

r. % non-self-corrected errors at lexical level (i.e. Lexical substitution) per gross word count.

SECTION J.1

NARRATIVE 1 (NARRATIVE WITH PICTURE STIMULI VISIBLE TO BOTH SPEAKER AND LISTENER)

[account of series of six cartoon pictures containing the following story

(with cartoon pictures visible to both participant and researcher):

A man (or father) and boy (or son) are seated at a table. There is food (melon/banana/sausage) on the table, and a wasp on the food. The boy wants to kill wasp, but the man stops him. The man takes the food with the wasp on it to the window. The wasp flies through the window, but then returns. The wasp stings the man, who then tries to swat the wasp.]

Scanning the database for any possible differences between the two groups of participants suggested differences between participants with schizophrenia and participants without mental illness along the following variables within the sample referred to as narrative 1:

- % non-repeated propositions per total propositions
- % substantive (versus management) word count per gross word count

This is the number of words used for topics or semantic networks as opposed to semi-automatic management utterances as a percentage of all words produced.

- Average propositions per T-unit

This is the average number of propositions per T-unit where a 'proposition' represents a semantic unit of language including a head phrase and one or more arguments, and a T-unit consists of an independent clause and any dependent clauses.

- Median propositions per T-unit

This is the median number of propositions per T-unit where a 'proposition' represents a semantic unit of language including a head phrase and one or more arguments, and a T-unit consists of an independent clause and any dependent clauses.

- % T-units containing argument structure anomalies

This includes both too few arguments and too many arguments.

- % T-units containing anaphoric referents or elliptical structures
- Average number of words (gross) per T-unit
- Median number of words (gross) per T-unit

Exploring the data, using frequency distributions and measures of mean, median and mode values, as well as boxplots, data for the following variables were characterised by a distribution which approximated normal:

- Average propositions per T-unit

This is the average number of propositions per T-unit where a 'proposition' represents a semantic unit of language including a head phrase and one or more arguments, and a T-unit consists of an independent clause and any dependent clauses.

- Median propositions per T-unit

This is the median number of propositions per T-unit where a 'proposition' represents a semantic unit of language including a head phrase and one or more arguments, and a T-unit consists of an independent clause and any dependent clauses.

- % T-units containing anaphoric referents or elliptical structures
- Average number of words (gross) per T-unit
- Median number of words (gross) per T-unit

indicating the appropriacy of the Independent T-Test for these variables. Levene's test of homogeneity of variance was carried out for all of the variables. Where the resultant F values were not significant (i.e. $P > 0.05$), variances were assumed to be homogeneous, and the equal variances values for the T test were used. In contrast, where the F values were significant, equal variances were not assumed when calculating T values. Results were as described in Table 23, overleaf:

Table 23: Independent T test for narrative 1 variables

<i>Variable</i>	<i>Case Source</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>T</i>	<i>Sig. (2-tail)</i>	<i>Sig.</i>
Average propositions per T-unit	Sx	1.9	0.4	-4.2	.00*	Sig.
	Cl	3.0	0.8			
Median propositions per T-unit	Sx	3.0	0.6	-0.9	.36	Not sig.
	Cl	3.3	1.1			
% T-units containing anaphoric referents or elliptical structures	Sx	71.4	23.5	0.2	.85	Not sig.
	Cl	69.6	21.4			
Average number of words (gross) per T-unit	Sx	8.0	2.6	-2.9	.01*	Sig.
	Cl	12.0	4.1			
Median number of words (gross) per T-unit	Sx	9.6	3.1	-2.7	.01*	Sig.
	Cl	14.7	5.7			

The difference between participants with schizophrenia and participants without mental illness was shown to be significant for the following variables: average propositions per T-unit; average number of words (gross) per T-unit; and median number of words (gross) per T-unit (with p values of .00, .01, and .01 respectively). In contrast, the differences between participants with schizophrenia and participants without mental illness were not significant for the following variables: median propositions per T-unit; and % T-units containing

anaphoric referents or elliptical structures. The data could not be characterised by a normal distribution for the following variables: % non-repeated propositions per total propositions; % substantive (versus management) word count per gross word count and % T-units containing argument structure anomalies. The Mann-Whitney U Test was therefore applied to this data, with results as described in Table 24.

Table 24: Mann-Whitney U Test for Narrative 1 Variables

<i>Variable</i>	<i>Case Source</i>	<i>Mean Rank</i>	<i>Sum of Ranks</i>	<i>Mann-Whitney U</i>	<i>Asymp. Sig. (2-tail)</i>	<i>Sig.</i>
% non-repeated propositions of all propositions	Sx	10.25	123.00	45.00	.05	Not sig.
	Cl	14.75	177.00			
% substantive vs. management word count per gross word count	Sx	10.38	124.5	46.5	.10	Not sig.
	Cl	14.63	175.50			
% T-units containing argument structure anomalies	Sx	12.09	133.00	54.00	.47	Not sig.
	Cl	10.91	120.00			

There were no significant differences between participants with schizophrenia and participants without mental illness along these variables, although the difference in the amount of new information versus repeated information introduced by the two groups of participants approached significance.

i.e. Participants from the two groups (those with schizophrenia and those without a known history of mental illness) were able to transform the vast amount of information included within the cartoon pictures into spoken discourse, to tell the story about two characters as shown in the series of cartoon pictures. This involved generating a suitable framework for the recounting of the narrative, which was then filled out with appropriate semantic information.

The intermediate semantic representations of chunks of conceptual information are propositions, where, specifically, a proposition represents a semantic unit of language consisting of a head phrase plus one or more arguments or modifying predicates (Clark and Clark, 1977). Propositions are incorporated into T units, where a T unit consists of an independent clause plus any dependent clauses attached to it (Ulatowska *et al.*, 1992). The narratives of the participants with schizophrenia differed from those of the participants without a history of mental illness in that on average they produced fewer propositions per T-unit ($P < 0.05$). This demonstrates reduced complexity or less elaboration in these participants' use of language as compared to the group of participants without a history of mental illness.

Propositions are linguistically encoded. The group of participants with schizophrenia also produced significantly fewer words than the group of participants without a history of mental illness ($P < 0.05$), similarly reflecting a less elaborate narrative.

The narratives of the participants with schizophrenia appeared not only less elaborate and less complex in their linguistic structure, but also different in content as compared with the participants without mental illness. Participants with schizophrenia included less new information as compared with the other participants, although this difference was only approaching significance. However, results which approach significance with small samples are frequently significant when using larger numbers of participants (Taylor, 1999). It therefore seemed important to score the narratives for information content along further measures as described in methodology sections G.3 – 8, H.9 and H.11. Independent T tests for the data produced the following results (Table 25, below):

Table 25: Independent T Test for additional narrative 1 variables

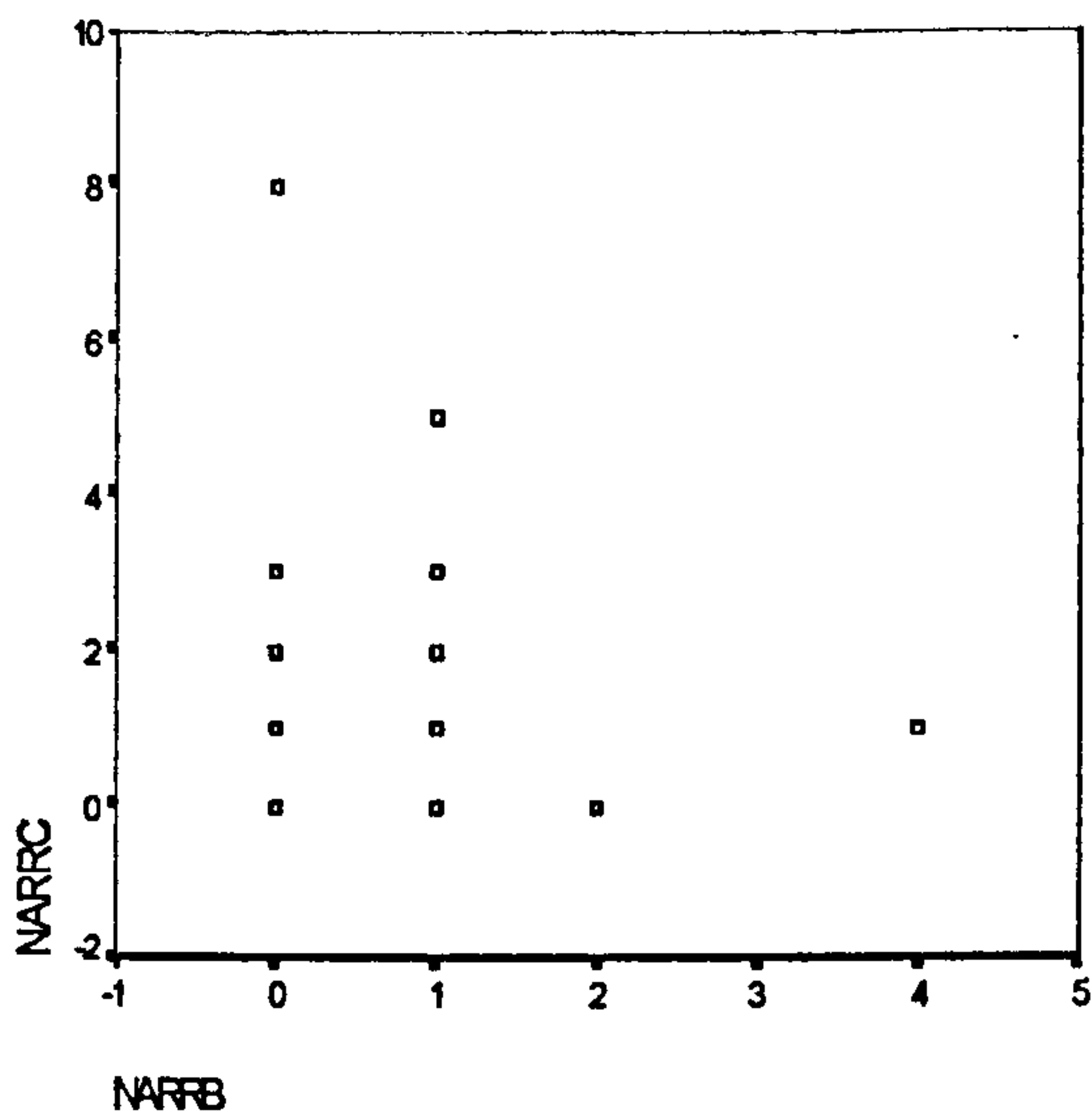
<i>Variable</i>	<i>Case Source</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>T</i>	<i>Sig. (2-tail)</i>	<i>Sig.</i>
a. ideas not included in the pictures, but consistent with the rest of the story	Sx	.00	.00	N/a	N/a	N/a
	Cl	.00	.00			
b. ideas inconsistent with the pictures or preceding parts of the story or social expectations	Sx	1.08	1.51	1.84	.09	Not sig.
	Cl	.25	.45			

<i>Variable</i>	<i>Case Source</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>T</i>	<i>Sig. (2-tail)</i>	<i>Sig.</i>
c. key idea in the story, omitted by the participant	Sx	2.33	2.42	1.80	.09	Not sig.
	Cl	.92	1.24			
Sum of scores a, b, and c.	Sx	3.42	2.50	2.72	.01*	Sig.
	Cl	1.17	1.40			

This analysis demonstrated that no participant recounted a narrative that, whilst consistent with the pictures and the preceding parts of the story as told, included material not represented in the pictures. There were, however, some differences in the narratives recounted by the two groups of participants. Participants with schizophrenia more frequently recounted ideas that were inconsistent with the pictures and the preceding parts of the story and social expectations as compared with participants without mental illness, although this did not reach significance ($P = .09$). Similarly, participants with schizophrenia omitted more ideas that were crucial to the story line as compared with participants without mental illness, although this difference also only approached significance ($P = .09$). When combining these scores to form an aggregate score (totalnarr), there was a significant difference between the two groups of participants ($P = .01$), with participants with schizophrenia scoring significantly higher. These scores were reflected in the more varied stories produced by the participants with schizophrenia.

A scatterplot was plotted to look at any possible correlations between measure b (ideas inconsistent with the pictures and the preceding parts of the story and social expectations, described as NARRB in the scatterplot) and measure c (ideas crucial to the story which were omitted, described as NARRC in the scatterplot). This showed that there was no consistent trend (Please see Scatterplot 1, below). Thus, the scatterplot demonstrates that participants who tended towards including ideas inconsistent with the pictures and the preceding parts of the story and social expectations were not necessarily the same participants who tended towards omitting ideas that were crucial to the story.

Scatterplot 1: Relationship between Measure b (NARRB) and Measure c (NARRC) on narrative 1



SECTION J.2

NARRATIVE 2 (NARRATIVE WITH PICTURE STIMULI ONLY VISIBLE TO THE SPEAKER)

[account of series of six cartoon pictures containing the following story

(with cartoon pictures only visible to participant, and this factor made explicit):

A well-built man, a child and a dog are at the seaside. The boy throws the man's walking stick into the sea and the dog retrieves it. A second man arrives and watches as the dog retrieves the stick. The second man throws his walking stick into the water as the other man, the boy and the dog look on. They walk away as the second man is left there on his own, with his walking stick in the sea. The second man starts to undress to retrieve the stick himself.]

Scanning the database for differences between the two groups of participants suggested the possibility of differences along the following variables:

- number of propositions describing 'setting'
- number of propositions describing 'development'
- number of propositions describing 'complication'
- number of propositions describing 'resolution'
- % non-repeated propositions per total propositions
- % substantive (versus management) word count per total word count
- % incidents of non-self-corrected potential loss of cohesion per total propositions

- average number of propositions per T-unit
- median number of propositions per T-unit
- % T-units containing anaphoric referents or elliptical structures
- average number of words (gross) per T-unit
- median number of words (gross) per T-unit

Exploring the data via frequency distributions and measures of mean, median and mode values, as well as boxplots, the following variables were characterised by an approximately normal distribution:

- number of propositions describing 'setting'
- number of propositions describing 'development'
- number of propositions describing 'complication'
- number of propositions describing 'resolution'
- average number of propositions per T-unit
- median number of propositions per T-unit
- % T-units containing anaphoric referents or elliptical structures
- median number of words (gross) per T-unit

Levene's test of homogeneity of variance was carried out for all of the above variables.

Where the resultant F values were not significant (i.e. $P > 0.05$), variances were assumed to be homogeneous, and the equal variances values for the Independent Samples T test were used. In contrast, where the F values were significant, equal variances were not assumed when calculating T values. Results were as described in Table 26 (overleaf) :

Table 26: Independent T Test for Narrative 2 variables

(Table continued overleaf)

<i>Variable</i>	<i>Case Source</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>T</i>	<i>Sig. (2-tail)</i>	<i>Sig.</i>
Number of propositions describing 'setting'	Sx	11.36	10.46	2.38	.03*	Sig.
	Cl	3.29	4.28			
Number of propositions describing 'development'	Sx	41.00	28.90	-2.52	.03*	Sig.
	Cl	64.83	12.68			
Number of propositions describing 'complication'	Sx	21.21	10.87	1.75	.09	Not sig.
	Cl	14.33	7.81			
Number of propositions describing 'resolution'	Sx	18.18	17.76	.03	.98	Not sig.
	Cl	18.00	12.46			
Average number of propositions per T-unit	Sx	2.40	.74	-1.35	.19	Not sig.
	Cl	2.82	.73			

<i>Variable</i>	<i>Case Source</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>T</i>	<i>Sig. (2-tail)</i>	<i>Sig.</i>
Median number of propositions per T-unit	Sx	3.63	1.21	1.09	.29	Not sig.
	Cl	3.17	.83			
% T-units containing anaphoric referents or elliptical structures	Sx	67.40	21.44	2.67	.01*	Sig.
	Cl	39.10	28.53			
Median number of words (gross) per T-unit	Sx	11.70	3.37	-.47	.64	Not sig.
	Cl	12.42	3.65			

The difference between participants with schizophrenia and participants without a mental illness was significant for the following variables: number of propositions describing 'setting', number of propositions describing 'development', and % T-units containing anaphoric referents or elliptical structures (with p values of .03, .03, and .01 respectively).

A Mann-Whitney U test was carried out for median number of words (gross) per T-unit, due to its distribution, with the following not significant result overleaf (Table 27).

Table 27: Mann-Whitney U Test for Narrative 2 Variables

<i>Variable</i>	<i>Case Source</i>	<i>Mean Rank</i>	<i>Sum of Ranks</i>	<i>Mann-Whitney U</i>	<i>Asymp. Sig. (2-tail)</i>	<i>Sig.</i>
Median number of words (gross) per T-unit	Sx	10.90	109.00	54.00	.69	Not sig.

Within narrative 2 (participants were asked to recount the story as described in the six cartoon pictures but without the pictures visible to the listener) participants with schizophrenia elaborated on the first two frames significantly more than did the other group of participants (those participants without any known history of mental illness) ($P < 0.05$).

This elaboration on the first part of the narrative could be seen as a response to instructions that emphasised the inability of the listener to see the picture stimuli. The increased elaboration relative to the group of participants without a history of mental illness was not maintained in the subsequent parts of the narrative.

It could also be expected that in response to the instructions for narrative 2, speakers would reduce their use of anaphora due to the stimuli not being present in the environment for the listener. This expectation, together with the increased number of differences between the groups of participants for narrative 2 as compared with narrative 1, suggested the value of looking at any differences between narrative 1 and narrative 2 as recounted by the participants with schizophrenia (section J.3 (1.)). Similarly, it appeared important to

consider any differences between narrative 1 and narrative 2 as recounted by the group of participants without any mental illness to establish a basis for comparison (section J.3 (2.)). The expectation was that participants with schizophrenia would possibly demonstrate less significant differences in their narrative in response to a change in the 'listener's environment'.

SECTION J.3

(1.) Differences Between Narrative 1 And Narrative 2 As Recounted By The Participants With Schizophrenia

(Narratives With And Without The Picture Stimuli Visible To The Listener)

[where narrative 1 = account of series of six cartoon pictures containing the following story (with cartoon pictures visible to both participant and researcher): A man (or father) and boy (or son) are seated at a table. There is food (melon/banana/sausage) on the table, and a wasp on the food. The boy wants to kill wasp, but the man stops him. The man takes the food with the wasp on it to the window. The wasp flies through the window, but then returns. The wasp stings the man, who then tries to swat the wasp.]

and

[narrative 2 = account of series of six cartoon pictures (with cartoon pictures only visible to participant, and this factor made explicit) telling the following story: A well-built man, a child and a dog are at the seaside. The boy throws the man's walking stick into the sea and the dog retrieves it. A second man arrives and watches as the dog retrieves the stick. The second man throws his walking stick into the water as the other man, the boy and the dog

look on. They walk away as the second man is left there on his own, with his walking stick in the sea. The second man starts to undress to retrieve the stick himself.]

Narratives 1 and 2 of participants with schizophrenia were explored to investigate any within subject differences between narratives 1 and 2. Those variables, which differed between the two narratives, with a distribution approximating normal were analysed using paired T Tests, with the following results (Table 28, overleaf):

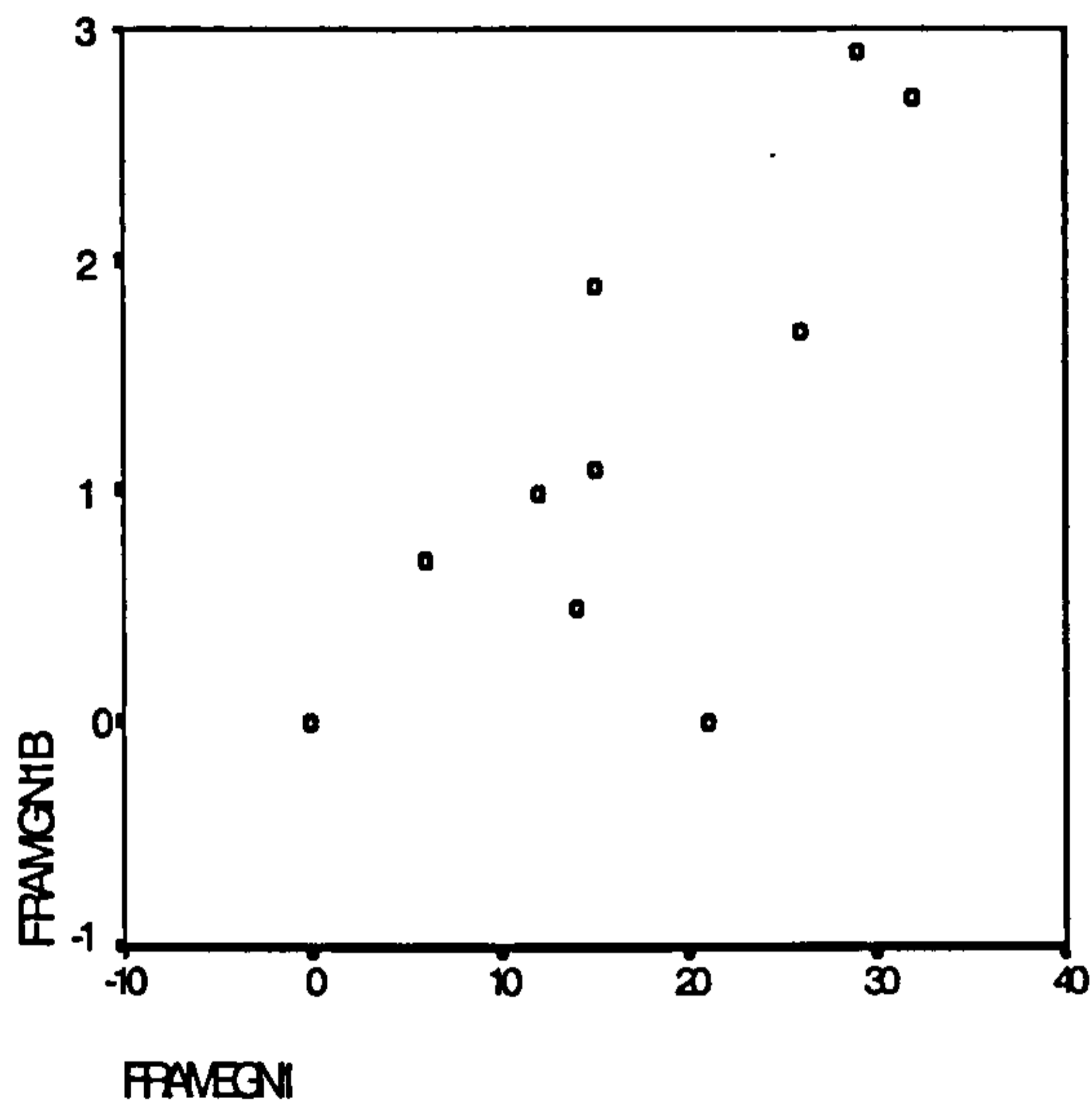
Table 28: Paired T Test for differences between narratives 1 and 2 for participants with schizophrenia

<i>Pair</i>	<i>Case Source</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>Correlation</i>	<i>Sig.</i>	<i>Sig.</i>
Number of propositions describing 'setting'	Narrative 1	15.45	10.87	.79	.00*	Sig.
	Narrative 2	11.36	10.46			
Number of propositions describing 'development'	Narrative 1	53.91	19.43	.32	.33	Not sig.
	Narrative 2	21.21	10.87			
Number of propositions describing 'complication'	Narrative 1	14.36	7.46	-.17	.62	Not sig.
	Narrative 2	21.21	10.87			
Number of propositions describing 'resolution'	Narrative 1	15.82	14.93	.34	.30	Not sig.
	Narrative 2	18.18	17.76			
Average number of propositions per T-unit	Narrative 1	1.97	.36	-.36	.27	Not sig.
	Narrative 2	2.40	.74			
Median number of propositions per T-unit	Narrative 1	3.00	.63	-.13	.70	Not sig.
	Narrative 2	3.6	1.21			

Thus, the T Test demonstrated that of these variables, the participants with schizophrenia showed a significant difference between narrative 1 and narrative 2 on the measure of the number of propositions describing the 'setting'.

To check for anomalies in the data, scatterplots were subsequently created. These were examined for the presence of outliers. Even one outlying pair of scores, including where this shows a difference in the same direction as the others, can have the effect of increasing the denominator of the t statistic more than the numerator and so reduce the value of T to insignificance. The vulnerability of the standard deviation to the leverage exerted by outliers derives from the fact that the elements of the variance are the squares of the deviations from the means. This means that large deviations continue to have a disproportionate influence, even after the square root operation by which the standard deviation is derived from the variance has been carried out.) There were no outliers on the scatterplot created for the variable of the number of propositions describing 'setting', as seen in scatterplot 2, overleaf.

Scatterplot 2: Relationship between the number of propositions describing 'setting' in narrative 1 (framegn1) and the number of propositions describing 'setting' in narrative 2 (framegn1b) in narratives 1 and 2 of participants with schizophrenia



where distribution of the variables did not approximate normal, the nonparametric Wilcoxon Test was used, with the following results (Table 29, overleaf):

**Table 29: Non-parametric Wilcoxon Test for narratives 1 and 2
for participants with schizophrenia**

<i>Variable</i>	<i>Case Source</i>	<i>Mean Rank</i>	<i>Z Asymp. Sig. (2-tail)</i>	<i>Sig.</i>
% non-repeated propositions per total propositions	Narrative 1	4.00	.75	Not sig.
	Narrative 2	3.00		
% substantive (versus management) words per total word count	Narrative 1	4.25	.89	Not sig.
	Narrative 2	4.75		
% T-units containing anaphoric referents or elliptical structures	Narrative 1	6.00	.79	Not sig.
	Narrative 2	6.00		
Average number of words (gross) per T-unit	Narrative 1	4.25	.16	Not sig.
	Narrative 2	7.00		

Thus, there were no significant differences between narratives 1 and 2 on the variables analysed with the Wilcoxon Test.

i.e. Narrative 1 (narrative with pictures visible to both speaker and listener) and narrative 2 (narrative with pictures visible on the speaker only) of participants with schizophrenia differed significantly with respect to the initial frame in the narrative ($P < 0.005$).

Participants with schizophrenia elaborated on the initial frame for narrative 2 in response to the experimenter emphasising that the listener would not have access to the picture stimuli. Interestingly, these participants' use of anaphora was identical in quantity within the two narrative samples, suggesting that they did not take into consideration the decrease in the physical context common to both participants when determining their use of anaphora.

In summary, in narrative 2, participants were asked to recount the story as described in the six cartoon pictures but without the pictures visible to the listener. The participants with schizophrenia elaborated on the first two frames significantly more than did the other group of participants (those participants without any known history of mental illness) ($P < 0.05$). Participants with schizophrenia elaborated on the first part of the narrative in response to instructions that emphasised the inability of the listener to see the picture stimuli. This increased elaboration relative to the group of participants without a history of mental illness was not maintained in the subsequent parts of the narrative.

SECTION J.3

(2.) Comparison Of Narrative 1 And Narrative 2 For Participants Without A History Of Mental Illness (Participants Providing Comparative Data)

[where narrative 1 = account of series of six cartoon pictures containing the following story

(with cartoon pictures visible by both participant and researcher): A man (or father) and boy (or son) are seated at a table. There is food (melon/banana/sausage) on the table, and a wasp on the food. The boy wants to kill wasp, but the man stops him. The man takes the

food with the wasp on it to the window. The wasp flies through the window, but then returns. The wasp stings the man, who then tries to swat the wasp.]

and

[narrative 2 = account of series of six cartoon pictures (with cartoon pictures only visible by the participant, and this factor made explicit) telling the following story: A well-built man, a child and a dog are at the seaside. The boy throws the man's walking stick into the sea and the dog retrieves it. A second man arrives and watches as the dog retrieves the stick. The second man throws his walking stick into the water as the other man, the boy and the dog look on. They walk away as the second man is left there on his own, with his walking stick in the sea. The second man starts to undress to retrieve the stick himself.]

Narratives 1 and 2 of those participants providing comparative data were explored to investigate any within subject differences between narratives 1 and 2. Despite the large number of variables explored, there were only a few variables with considerable variance between narratives 1 and 2. These included:

- average number of propositions per T-unit
- % T-units containing anaphoric referents or elliptical structures
- average number of words (gross) per T-unit
- median number of words (gross) per T-unit

None of these variables demonstrated a distribution approximating a normal distribution, without outliers. The above variables were therefore all analysed using the non parametric sign test, with the following results (Table 30, overleaf)

Table 30: Non Parametric Sign Test For Comparison Of Narratives 1 And 2 For Participants without A Known History Of Mental Illness

<i>Variable</i>	<i>Neg. differences</i>	<i>Positive differences</i>	<i>Ties</i>	<i>Sig. (2-tail)</i>	<i>Sig.</i>
Average number of propositions per T-unit	7	4	1	.55	Not sig.
% T-units containing anaphoric referents/ elliptical structures	1	10	1	.01*	Sig.
Average number of words (gross) per T-unit	7	4	1	.55	Not sig.
Median number of words (gross) per T-unit	9	2	1	.07	Not sig.

The variable describing % T-units containing anaphoric referents or elliptical structures per T-unit varied significantly between narratives 1 and 2 of the participants providing comparative data, with the participants without a history of mental illness utilising less anaphora within a context where demands on the listener were increased.

SECTION J.4

PROCEDURAL DISCOURSE SAMPLE

(INSTRUCTIONS ON HOW TO MAKE A SANDWICH)

Scanning the database for any possible differences between the two groups of participants suggested the possibility of differences between participants with schizophrenia and participants without a mental illness along the following quantitative variables within the sample referred to as procedure:

- % non repeated propositions per total propositions
- % substantive (vs management) word count per total word count
- average number of propositions per T-unit
- median number of propositions per T-unit
- % T-units containing anaphoric referents or elliptical structures per T-unit
- median number of words (net) per T-unit
- average number of words (gross) per T-unit
- median number of words (gross) per T-unit

Exploring the data, using frequency distributions and measures of mean, median and mode values, as well as boxplots, data for the following variables were characterised by a distribution which approximated normal:

- average number of propositions per T-unit
- median number of words (gross) per T-unit

The Independent T-Test was therefore used to test for significant differences for these variables. To determine whether equal variances could be assumed for the T test, Levene's test of homogeneity of variance was carried out. Where the resultant F values were not significant (i.e. $P > 0.05$), variances were assumed to be homogeneous, and the equal variances values for the T test were used. In contrast, where the F values were significant, equal variances were not assumed when calculating T values. Results were as described in Table 31.

Table 31: Independent T Test For Procedure Variables

<i>Variable</i>	<i>Case Source</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>T</i>	<i>Sig. (2-tail)</i>	<i>Sig.</i>
Average number of propositions per T-unit	Sx	1.62	.38	-3.67	.001*	Sig.
	Cl	2.41	.64			
Median number of words (gross) per T-unit	Sx	7.10	2.42	-.61	.552	Not sig.
	Cl	7.9	3.53			

The difference between participants with schizophrenia and participants without a mental illness was shown to be significant for the variable average number of propositions per T-unit (p value of .001). In contrast, the difference between participants with schizophrenia and participants without a mental illness for the variable median number of words (gross) per T-unit was shown to be not significant.

Data subsumed under the following variables was not characterised by a normal distribution: % non-repeated propositions per total propositions, % substantive (vs management) word count per total word count, median number of propositions per T-unit, % T-units containing anaphoric referents or elliptical structures per T-unit, median number of words (net) per T-unit and average number of words (gross) per T-unit. The Mann-Whitney U Test was therefore applied to this data, with results as described in Table 32.

Table 32: Mann-Whitney U Test For Procedure Variables (continued overleaf)

<i>Variable</i>	<i>Case Source</i>	<i>Mean Rank</i>	<i>Sum of Ranks</i>	<i>Mann-Whitney U</i>	<i>Asymp. Sig. (2-tail)</i>	<i>Sig.</i>
% non-repeated propositions per total propositions	Sx	9.71	116.50	38.50	.061	Not sig.
	Cl	14.50	159.50			
% substantive (versus management) word count per total word count	Sx	10.13	121.50	43.50	.126	Not sig.
	Cl	14.05	154.50			

<i>Variable</i>	<i>Case Source</i>	<i>Mean Rank</i>	<i>Sum of Ranks</i>	<i>Mann-Whitney U</i>	<i>Asymp. Sig. (2-tail)</i>	<i>Sig.</i>
Median number of propositions per T-unit	Sx	10.33	124.00	46.00	.157	Not sig.
	Cl	13.82	152.00			
% T-units containing anaphoric referents or elliptical structures	Sx	12.21	146.50	63.50	.877	Not sig.
	Cl	11.77	129.50			
Median number of words (net) per T-unit	Sx	6.80	34.00	19.00	.329	Not sig.
	Cl	9.27	102.00			
Average number of words (gross) per T-unit	Sx	9.82	108.00	42.00	.223	Not sig.
	Cl	13.18	145.00			

There were no significant differences between the two groups of participants along these variables, so that of the quantitative variables, only average number of propositions per T-unit varied significantly between the groups of participants.

Within any discourse sample speakers must not only provide the information but also transform the information stored in their memory into spoken discourse within an appropriate framework. Within a procedural sample it is possible to compare the frames included by the participant with those required by the task. Ulatowska *et al.* (1983) define the frames necessary for describing how to make a sandwich. These include:

Get bread;

Butter slices of bread;

Prepare spread;

Put spread on bread;

Place other slice of bread on top;

Cut in half;

Serve.

This qualitative data for the procedure was explored using crosstabulation. As more than 20% of the cells had an expected value of less than 5, the data was not analysed using chi-square, but rather through Cramer's analysis, with the following results (Table 33, overleaf):

Table 33: Cramer's Analysis of Procedural Data

<i>Variable</i>	<i>Value</i>	<i>Approx. sig.</i>	<i>Sig.</i>
Get bread	.569	.006*	Sig.
Butter	.013	.949	Not sig.
Prepare filling	.411	.049*	Sig.
Spread filling	N/a	(Sprfill is a constant)	N/a
Other slice of bread	.569	.006*	Sig.
Cut the sandwich	.032	.879	Not sig.
Eat	.054	.795	Not sig.

Thus, of the categorical data, there were highly significant differences along the measures get bread and other slice of bread (p approx. .006), and a significant difference for the measure prepare filling ($P < .05$).

Participants with schizophrenia more frequently omitted the frames get bread and place other slice of bread on top as compared with participants without mental illness ($P < 0.05$). They also more frequently omitted to mention preparing the filling ($P < 0.05$), although this difference was far less significant than that relating to the mention of bread, which was highly significant ($P = 0.006$).

The pattern of participants' inclusion of the last two frames as suggested by Ulatowska (1983) is also interesting. These frames ('cut in half' and 'serve') are commonly associated with 'making a sandwich' although arguably they are not as integral to the procedure of

making a sandwich (as compared with the other frames). These were the two most commonly omitted frames by the participants without any known history of mental illness, with half of this group omitting the frames 'cut in half' and 'serve'. When omitting these last two frames, which were less integral to the procedure, from the list of required frame components it is interesting to note that there is an even more significant difference between the participants with schizophrenia and the participants without any history of mental illness. The participants with schizophrenia produce significantly fewer of the required frames as compared with the participants without a history of mental illness ($P < .001$). i.e. When considering the core frames as compared with other non-essential frames, there is a more marked difference between participants with schizophrenia and participants without a mental illness with participants with schizophrenia omitting more of the core frames and participants without mental illness omitting more of the non-essential frames. This reinforces the findings of a reduced appreciation of the framework required for various discourse samples by participants with schizophrenia. It also emphasises the importance of looking at the performance of participants providing comparative data. Within this study the participants without a mental illness also omitted some of the frames listed by Ulatowka (1983), although the pattern of omissions was different.

SECTION J.5

LIFE (NARRATIVE OR STORY ABOUT THE PERSON'S LIFE PRIOR TO HIS ADMISSION TO THE INSTITUTION CONCERNED)

Scanning the database for any possible differences between the two groups of participants suggested the possibility of differences between participants with schizophrenia and participants without a mental illness along the following variables within the sample referred to as life:

- average number of propositions per T-unit
- median number of propositions per T-unit
- % non-repeated propositions per total propositions
- % substantive (versus management) word count per total word count
- average number of propositions per topic
- median number of propositions per topic
- % T-units containing anaphoric referents or elliptical structures
- average number of words (gross) per T-unit
- median number of words (gross) per T-unit

Exploring the data, using frequency distributions and measures of mean, median and mode values, as well as boxplots, data for the following variables were characterised by a distribution which approximated normal:

- median number of propositions per T-unit
- % non-repeated propositions per total propositions

- % substantive (versus management) word count

This indicates their suitability for analysis using the Independent T-Test. Levene's test of homogeneity of variance was carried out for these variables. Where the resultant F values were not significant (i.e. $P > 0.05$), variances were assumed to be homogeneous, and the equal variances values for the T test were used. In contrast, where the F values were significant, equal variances were not assumed when calculating T values. Results were as described in Table 34.

Table 34: Independent T Test for 'life' variables

Variable	Case Source	Mean	Standard Deviation	T	Sig. (2-tail)	Sig.
Median number of propositions per T-unit	Sx	17.33	5.69	.38	.712	Not sig.
	Cl	14.80	10.92			
% non-repeated propositions per total propositions	Sx	97.87	2.43	1.23	.244	Not sig.
	Cl	87.97	27.74			
% substantive (versus management) word count	Sx	95.54	4.33	.93	.366	Not sig.
	Cl	92.89	7.67			

Thus, none of these three variables differed significantly between participants with schizophrenia and participants providing comparative data.

The data subsumed under the following variables was not characterised by a normal distribution: the average number of propositions per T-unit, average number of propositions per topic, median number of propositions per topic, % T-units containing anaphoric referents or elliptical structures, average number of words (gross) per T-unit and median number of words (gross) per T-unit. The Mann-Whitney U Test was therefore applied to this data, with results as described in table 35.

Table 35: Mann-Whitney U Test for 'Life' Variables (Table continued overleaf)

<i>Variable</i>	<i>Case Source</i>	<i>Mean Rank</i>	<i>Sum of Mann-Whitney Ranks</i>	<i>U</i>	<i>Asymp. Sig. (2-tailed)</i>	<i>Sig.</i>
Average number of propositions per T-unit	Sx	8.33	25.00	11.00	.499	Not sig.
	Cl	6.60	66.00			
Average number of propositions per topic	Sx	6.61	59.50	14.50	.005*	Sig.
	Cl	14.29	171.50			
Median number of propositions per topic	Sx	8.44	76.00	31.00	.092	Not sig.
	Cl	12.92	155.00			

<i>Variable</i>	<i>Case Source</i>	<i>Mean Rank</i>	<i>Sum of Mann-Whitney Ranks</i>	<i>U</i>	<i>Asymp. Sig. (2-tailed)</i>	<i>Sig.</i>
% T-units containing anaphoric referents or elliptical structures	Sx	8.33	75.00	30.00	.220	Not sig.
	Cl	11.50	115.00			
Average number of words (gross) per T-unit	Sx	6.33	57.00	12.00	.007*	Sig.
	Cl	13.30	133.00			
Median number of words (gross) per T-unit	Sx	7.89	71.00	26.00	.120	Not sig.
	Cl	11.90	119.00			

Thus, there were significant differences between participants with schizophrenia and participants without mental illness along the variables average number of propositions per topic and average number of words (gross) per T unit.

As with the narrative 1 (narrative with pictures available to both speaker and listener) and procedural discourse samples (instructions how to make a sandwich), participants with schizophrenia produced significantly less complex language, as measured by the number of propositions per T unit ($P=0.005$).

Also, in common with the narrative 1 sample (narrative with pictures available to both speaker and listener), participants with schizophrenia produced significantly fewer words than participants without mental illness ($P<0.05$). This suggests that participants with schizophrenia used language that was significantly less complex and less elaborate than that of the participants without mental illness.

It was also very noticeable anecdotally that the participants with schizophrenia produced a coherent account involving a narrative including a number of events which culminated in their arrival at the institution where this study was carried out. This compares with the discourse samples provided by the participants without mental illness, and resident in a prison. The discourse samples of members of the latter group (including 8/12 participants) could be described in terms of a sequence of events, where they disclosed information about what led to them being within the institution concerned. Where this information was not included (4/12 participants) their accounts could be described in terms of a diverse range of facts rather than by a narrative structure. This would suggest that where an appropriate framework is offered to the participants with schizophrenia (e.g. via psychotherapeutic intervention), they are able to apply this framework effectively to their discourse production at least within restricted contexts. The findings also suggest the

possibility that where participants wish to avoid referring to a 'key frame' within a narrative they do not use a narrative framework, but adopt a structure in which they relate a number of related facts. These issues are described more extensively within the discussion (Chapter Four).

SECTION J.6

DISCOURSE BEHAVIOUR OF INDIVIDUAL PARTICIPANTS ACROSS TASKS

Scatterplots were plotted to explore the possibility of correlations between measures distinguishing significantly between participants with schizophrenia and participants without mental illness on varied discourse types. Pearsons Correlations were then carried out on measures where correlations were apparent. These measures included measures of language complexity and use of frames in varied discourse samples. This enabled a consideration of a number of questions: whether those participants who produced more complex language in one discourse sample produced more complex language in other discourse samples; whether those participants who elaborated more on initial frames in a narrative in response to context also produced less anaphora as a response to the context; and whether those participants omitting certain key frames were more likely to omit other key frames or to respond in a particular way with respect to elaboration on the first two frames or reduction in use of anaphora on narrative 2. The findings are summarised in Tables 36 and 37 (commencing overleaf):

Table 36: Relationship between the measure of propositions per T unit in ‘life’, narrative 1 (narrative with pictures) and procedural discourse samples (where propositions per T unit represents a measure of language complexity)

Propositions per T-unit

	<i>Discourse Sample</i>	<i>Narrative 1</i>	<i>Procedure</i>	<i>Life</i>
Pearson Correlation	Narrative 1	1.000	.597**	.432
	Procedure	.597**	1.000	.304
	Life	.432	.304	1.000
Sig. (2-tailed)	Narrative 1	.	.003	.057
	Procedure	.003	.	.206
	Life	.057	.206	.

** Correlation is significant at the 0.01 level (2-tailed).

This demonstrates a correlation between language complexity on the narrative discourse sample and the procedural discourse sample ($P < 0.01$), meaning that there was a trend for participants who produced more complex language on the narrative discourse sample to produce more complex language on the procedural discourse sample. The complexity of participants' language on the 'life' sample was not, however, related to the language complexity of those participants on the other discourse samples. This is understandable in terms of Sheratt and Penn's (1990) and Alverson and Rosenberg's (1990) comments about the differing demands involved in different forms of discourse. This result is also

interesting in light of the other findings relating to differences between the 'life' sample and the other discourse samples.

Table 37 (below) considers the relationship between the individual participants' behaviour in adapting their language in response to the listener's environment in narrative 2 and the participants' inclusion of procedural frames.

Table 37: Relationship between adaptations of narrative 2 (narrative with pictures not visible to researcher) with respect to increased elaboration of the first two frames and their use of anaphora and those key frames distinguishing between procedural discourse of participants with schizophrenia and participants without mental illness.

<i>Pearson</i> <i>Cor-</i> <i>relation</i>	<i>Narrative</i> <i>2</i> <i>Frame 1</i>	<i>Narrative</i> <i>2</i> <i>Frame 2</i>	<i>Narrative</i> <i>2</i> <i>Anaphora</i>	<i>Procedure</i> <i>'Get</i> <i>bread'</i>	<i>Procedure</i> <i>'Prepare</i> <i>filling'</i>	<i>Procedure</i> <i>'other</i> <i>bread'</i>
Narrative 2 Frame 1	1.000	-.608**	.221	.028	-.352	.015
Narrative 2 Frame 2	-.608**	1.000	.061	.108	.222	.023
Narrative 2 Anaphora	.221	.061	1.000	-.232	-.273	-.145
Procedure 'Get bread'	.028	.108	-.232	1.000	.132	.549**
Procedure 'Prepare filling'	-.352	.222	-.273	.132	1.000	-.071
Procedure 'other bread'	.015	.023	-.145	.549**	-.071	1.000

NB: For Table 37 (page 289) ** means the correlation is significant at the 0.01 level (2-tailed).

This demonstrates a correlation between elaboration of the first frame on the narrative where the pictures are not visible to the researcher and elaboration of the second frame on the same narrative ($P < 0.01$). This means that where participants elaborated on the first frame in this narrative, they tended to adopt this strategy for the second frame. However, participants' elaboration of these frames was not related to their production of less anaphora in these samples, meaning that participants who elaborated more on the initial frames were not generally those who produced less anaphora in this discourse sample. There was also a trend ($P < 0.01$) for participants who omitted the frame relating to getting bread to also omit getting the other slice of bread in the procedural discourse sample. There was, however, no significant trend for those participants who omitted frames relating to bread to also omit the frame preparing a filling. There were also no significant correlations between participants' elaboration of the first frames or their more limited use of anaphora on the narrative sample and their inclusion of key frames in the procedural discourse sample. This reinforces the finding that individual participants respond to varied discourse samples in different ways, with, for example, some participants producing less complex language on the 'life' sample, and other participants producing less complex language on the narrative and procedural discourse samples. Participants' varied response to the different discourse tasks indicates the importance of any language assessment including more than one discourse sample.

SECTION J.7

SUMMARY OF DIFFERENCES BETWEEN THE TWO GROUPS OF PARTICIPANTS IN THEIR USE OF LANGUAGE

The discourse samples produced by the participants with schizophrenia were of lower complexity than those of the participants without mental illness, excepting narrative 2, where narrative 2 involved an account of a series of cartoon pictures where these were not visible to the listener.

The lack of a difference in language complexity between the two groups of participants in this discourse sample was accounted for by participants without mental illness reducing the complexity of their language and their use of anaphora in situations where the listener's task was more difficult. Participants with schizophrenia did not modify their language in this way.

Analysing the content of the discourse samples, participants with schizophrenia more frequently recounted ideas that were inconsistent with the pictures and the preceding parts of the story and social expectations as compared with participants without mental illness. Participants with schizophrenia also omitted more ideas that were crucial to the story line as compared with participants without mental illness.

Participants with schizophrenia similarly omitted more of the core frames than participants without mental illness when describing a procedure.

Within the discourse sample where the participants were required to tell the story of their life before they arrived at the institution participants with schizophrenia produced a coherent account. This consisted of a narrative that included a number of events culminating in the participant's arrival at the institution where this study was carried out. This was similar to 75% of the participants without mental illness. 25% of the participants without mental illness did not follow a narrative framework in their accounts. Principles of conversational analysis were later applied to this data, providing many more details as described in methodology section H and Section O.5.

The differences in participants' performance on the varied discourse types, as seen in the above findings, underlines the importance for any language assessments to include a variety of discourse samples.

The question as to whether the differences described in sections J.1-J.6 can be termed objective can be determined by checking whether interrater reliability and intrarater is satisfactory.

SECTION K

INTERRATER RELIABILITY AND INTRARATER RELIABILITY

SECTION K.1

INTERRATER RELIABILITY FOR NARRATIVE DISCOURSE SAMPLES

Discourse analysis measures for the narrative discourse samples from both rater 1 (independent rater) and rater 2 (researcher) are listed for the narrative discourse samples of five participants. Rater 1 is a speech and language therapist currently working in mental health. She had no further training following her qualification as a speech and language therapist and no knowledge of this study or the technique being employed within the study. Rater 2 is the speech and language therapist conducting the study. The comparison of their measures forms the basis for an evaluation of interrater reliability for the narrative discourse analysis measures. The data is included in the series of tables 38-44.

Scores were judged as concordant if identical, where the scores were recorded as absolute measures and covered a narrow range of scores. Where scores covered a wider range or where scores were expressed in terms of percentages, these were judged as concordant if the resultant rank ordering would be the same for both raters.

Table 38: Frames Analysis For Interrater Reliability

<i>SETTING</i>		<i>DEVELOPMENT</i>		<i>COMPLICATION</i>		<i>RESOLUTION</i>	
Rater 1	Rater 2	Rater 1	Rater 2	Rater 1	Rater 2	Rater 1	Rater 2
2.0	2.0	5.0	5.0	1.0	1.0	1.0	1.0
1.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0
1.0!	2.0!	5.0	5.0	1.0	1.0	1.0	1.0
0.5	0.5	1.0	1.0	0.0	0.0	0.0	0.0
2.0	2.0	5.0	5.0	1.0	1.0	0.0!	1.0!

This demonstrates a 90% concordance rate between the two raters. Both incidents of non-concordance, marked by ‘!’ were marked by raters’ reticence in deciding on their scoring for this particular frame, as discussed in Chapter Four.

Table 39: Measures Of Integrative Operations For Interrater Reliability

<i>MEASURE C</i> (%)		<i>MEASURE E</i> (%)	
Rater 1	Rater 2	Rater 1	Rater 2
5.4	5.4	98.6	95.2
7.1	8.3	100.0	100.0
0.0	0.0	98.9	96.8
0.0	0.0	100.0	100.0
5.3 +	0.0 +	99.3	98.6

Excepting the score marked by ‘+’ it can be seen that the raters concord in their scores for all five participants in that the participants’ scores for both raters follow the same rank order.

Table 40: Measures Of Semantic Network Generation For Interrater Reliability

<i>MEASURE F</i> (%)		<i>MEASURE Gi</i> (%)		<i>MEASURE Gii</i> (%)		<i>MEASURE H</i> (%)		<i>MEASURE I</i> (%)	
R1	R2	R1	R2	R1	R2	R1	R2	R1	R2
5.4 +	0.0 +	18.9 +	0.0 +	0.0	0.0	0.0	0.0	5.4 +	2.7 +
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.6 +	0.0 +	0.0	0.0	0.0	0.0	0.0	0.0	2.6	3.0

It can be seen that there are four incidents of non-concordance between the two raters (indicated with '+'), three of which concern the same participant. This is discussed in more detail in the discussion within Chapter Four.

Table 41: Measures Of Logical or Macrostructure Inferences For Interrater Reliability

<i>MEASURE J</i> (%)		<i>MEASURE K</i> (%)	
Rater 1	Rater 2	Rater 1	Rater 2
0.0	0.0	7.7	5.9
0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0

It can be seen that there is 100% concordance between the two raters in that the scores follow the same rank ordering for the two raters.

Table 42: Measures of Local Propositional Inferences for Interrater Reliability

MEASURE M

Rater 1	Rater 2
24.0	24.0
7.0	6.0
4.0	4.0
4.0	3.0
11.0	13.0

It can be seen that there are some differences in terms of absolute scores for the two raters, but the scores follow the same rank ordering for both raters.

Table 43: Measures Of Semantic Interpretation or Proposition Sequences For Interrater Reliability

<i>MEASURE N</i>		<i>MEASURE Pi</i> (%)		<i>MEASURE Pii</i> (%)	
Rater 1	Rater 2	Rater 1	Rater 2	Rater 1	Rater 2
2.5 +	3.5 +	7.7	5.9	0.0 +	5.9 +
2.0	2.0	11.1	40.0	0.0	0.0
3.0	3.0	0.0	0.0	0.0	0.0
2.0 +	3.0 +	0.0	0.0	0.0	0.0
2.5 +	3.0 +	0.0 +	6.7 +	0.0	0.0

It can be seen that in 33.3% instances there is a lack of concordance between the two raters in their implied rank ordering of participants in terms of measures of semantic interpretation or propositions sequences. This is discussed in Chapter Four.

Table 44: Measures Of Syntactic Dependency Graphs For Interrater Reliability

<i>MEASURE Q</i> (%)		<i>MEASURE R</i> (%)	
Rater 1	Rater 2	Rater 1	Rater 2
100	100	0.0	0.0
100	100	0.0	0.0
100	100	0.0	0.0
100	100	0.0	0.0
100	100	0.0	0.0

It can be seen that there is 100% concordance for the two raters on measures of syntactic dependency.

SECTION K.2

INTERRATER RELIABILITY FOR PROCEDURAL DISCOURSE SAMPLES

Discourse analysis measures for the procedural discourse samples from both rater 1 (independent rater) and rater 2 (researcher) are listed for the procedural discourse samples of five participants. This forms the basis for an evaluation of interrater reliability for the procedural discourse analysis measures. This data is summarised in the series of tables 45-51.

Scores were judged as concordant if identical, where the scores were recorded as absolute measures and covered a narrow range of scores. Where scores covered a wider range or where scores were expressed in terms of percentages, these were judged as concordant if the resultant rank ordering would be the same for both raters.

Table 45: Frames Analysis For Interrater Reliability

<i>GET BREAD</i>		<i>BUTTER</i>		<i>PREPARE FILLING</i>		<i>SPREAD FILLING</i>		<i>OTHER BREAD</i>		<i>CUT</i>		<i>SERVE</i>	
R1	R2	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2
1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	0	0
1	1	0	0	0	0	1	1	0	0	0	0	1	1
1	1	1	1	1	1	1	1	1	1	0	0	0	0

It can be seen that there was 100% concordance between the two raters for measures of frame analysis.

Table 46: Measures Of Integrative Operations For Interrater Reliability

<i>MEASURE C (%)</i>		<i>MEASURE E (%)</i>	
Rater 1	Rater 2	Rater 1	Rater 2
0.0	0.0	97.5	98.7
0.0	0.0	100	100
0.0	0.0	92.9	92.9
0.0	0.0	100	100
0.0	0.0	96.9	96.9

As can be seen, there was 100% concordance between the raters for measures of integrative operations.

Table 47: Measures Of Semantic Network Generation For Interrater Reliability

<i>MEASURE F</i> (%)		<i>MEASURE Gi</i> (%)		<i>MEASURE Gii</i> (%)		<i>MEASURE H</i> (%)		<i>MEASURE I</i> (%)	
R1	R2	R1	R2	R1	R2	R1	R2	R1	R2
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1	3.6
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.1	12.5
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

It can be seen that there was 100% concordance between the two raters for measures of semantic network generation.

Table 48: Measures Of Logical Or Macrostructure Inferences For Interrater Reliability

<i>MEASURE J</i> (%)		<i>MEASURE K</i> (%)	
Rater 1	Rater 2	Rater 1	Rater 2
0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0
0.0	0.0	5.9	12.5
0.0	0.0	25.0	25.0
0.0	0.0	0.0	0.0

It can be seen that there was 100% concordance between the raters in terms of the implied rank ordering of measures of logical or macrostructure inferences.

Table 49: Local Propositional Inferences For Interrater Reliability

MEASURE M

<i>Rater 1</i>	<i>Rater 2</i>
5	5
5	6
6	6
2	2
2	2

As can be seen, there was 100% concordance between the two raters for measures of local propositional inference.

Table 50: Measures Of Semantic Interpretation Or Proposition Sequences For Interrater Reliability

MEASURE N **MEASURE Pi** **MEASURE Pii**
 (%) (%)

<i>Rater 1</i>	<i>Rater 2</i>	<i>Rater 1</i>	<i>Rater 2</i>	<i>Rater 1</i>	<i>Rater 2</i>
2.5	2.5	0	0	0.0	0.0
2.5	2.0	0	0	0.0	0.0
2.0 +	3.0 +	1 (5.9%)	1 (12.5%)	0.0	0.0
2.0	2.0	1 (25%)	1 (25%)	0.0	0.0
1.5	1.5	0	0	0.0	0.0

As can be seen, there was 93.3% concordance between the two raters for measures of semantic interpretation or proposition sequences.

Table 51: Measures Of Syntactic Dependency Graphs For Interrater Reliability

<i>MEASURE Q</i> (%)		<i>MEASURE R</i> (%)	
Rater 1	Rater 2	Rater 1	Rater 2
100	100	0.0	0.0
100	100	0.0	0.0
100	100	0.0	0.0
100	100	0.0	0.0
100	100	0.0	0.0

It can be seen that there was 100% concordance between the two raters for measures of syntactic dependency.

SECTION K.3

INTRARATER RELIABILITY DATA FOR ANALYSIS OF NARRATIVE

DISCOURSE SAMPLES

Discourse analysis measures for the narrative discourse samples at both T1 (initial rating) and T2 (re-rating for intrarater reliability) are listed for the narrative discourse samples of five participants. This forms the basis for an evaluation of intrarater reliability for the narrative discourse analysis measures. This data is included in the series of tables 52-58.

Scores were judged as concordant if identical, where the scores were recorded as absolute measures and covered a narrow range of scores. Where scores covered a wider range or where scores were expressed in terms of percentages, these were judged as concordant if the resultant rank ordering would be the same for both occasions.

Table 52: Frames Analysis For Intrarater Reliability

<i>SETTING</i>		<i>DEVELOPMENT</i>		<i>COMPLICATION</i>		<i>RESOLUTION</i>	
Time 1	Time 2	Time 1	Time 2	Time 1	Time 2	Time 1	Time 2
2.0	2.0	5.0	5.0	1.0	1.0	1.0	1.0
1.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0
2.0	2.0	5.0	5.0	1.0	1.0	1.0	1.0
0.5	0.5	1.0	1.0	0.0	0.0	0.0	0.0
2.0	2.0	5.0	5.0	1.0	1.0	1.0	1.0

It can be seen that there was 100% concordance between the same rater's measures of frame analysis on two separate occasions.

Table 53: Measures Of Integrative Operations For Intrarater Reliability

<i>MEASURE C</i> (%)		<i>MEASURE E</i> (%)	
Time 1	Time 2	Time 1	Time 2
5.4	5.3	95.2	95.2
8.3	8.3	100.0	100
0.0	0.0	96.8	96.8
0.0	0.0	100.0	100.0
0.0	0.0	98.6	98.6

It can be seen that there was 100% concordance between the same rater's measures of integrative operations on two separate occasions.

Table 54: Measures Of Semantic Network Generation For Intrarater Reliability

<i>MEASURE F</i> (%)		<i>MEASURE Gi</i> (%)		<i>MEASURE Gi</i> (%)		<i>MEASURE H</i> (%)		<i>MEASURE I</i> (%)	
T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	2.6
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	3.1

It can be seen that there was 100% concordance for the same rater's measures of semantic network generation on two separate occasions.

Table 55: Measures Of Logical Or Macrostructure Inferences For Intrarater Reliability

<i>MEASURE J</i> (%)		<i>MEASURE K</i> (%)	
Time 1	Time 2	Time 1	Time 2
0.0	0.0	5.9	6.7
0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0

As can be seen, there was 100% concordance between the same rater's measures of logical or macrostructure inferences on two separate occasions.

Table 56: Local Propositional Inferences For Intrarater Reliability

MEASURE M

Time 1	Time 2
24.0	24.0
6.0	6.0
4.0	4.0
3.0	3.0
13.0	13.0

It can be seen that there was 100% concordance between the rater's measures of local propositional inferences on two separate occasions.

Table 57: Measures Of Semantic Interpretation Or Proposition Sequences For Intrarater Reliability

MEASURE N

MEASURE Pi
(%)

MEASURE Pii
(%)

Time 1	Time 2	Time 1	Time 2	Time 1	Time 2
3.5	3.5	5.9	6.7	5.9	6.7
2.0	2.5	40.0	33.3	0.0	0.0
3.0	3.0	0.0	0.0	0.0	0.0
3.0	3.0	0.0	0.0	0.0	0.0
3.0	2.5	6.7	6.7	0.0	0.0

It can be seen that there was incomplete concordance for measures of semantic interpretation or proposition sequences by the same rater on two separate occasions, with 'different ties' on measure N between time 1 and time 2.

Table 58: Measures Of Syntactic Dependency Graphs For Intrarater Reliability

<i>MEASURE Q</i> (%)		<i>MEASURE R</i> (%)	
Time 1	Time 2	Time 1	Time 2
100	100	0.0	0.0
100	100	0.0	0.0
100	100	0.0	0.0
100	100	0.0	0.0
100	100	0.0	0.0

As can be seen, there was 100% concordance for measures of syntactic dependency graphs on two occasions by the same rater.

SECTION K.4

INTRARATER RELIABILITY DATA FOR ANALYSIS OF PROCEDURAL DATA

Discourse analysis measures for the procedural discourse samples at both T1 (initial rating) and T2 (re-rating for intrarater reliability) are listed for the procedural discourse samples of five participants. This forms a basis for the evaluation of intrarater reliability for the procedural discourse analysis measures. This data is summarised in the series of tables 59-65.

Scores were judged as concordant if identical, where the scores were recorded as absolute measures and covered a narrow range of scores. Where scores covered a wider range or

where scores were expressed in terms of percentages, these were judged as concordant if the resultant rank ordering would be the same for both occasions.

Table 59: Frames Analysis For Intrarater Reliability

<i>GET BREAD</i>		<i>BUTTER</i>		<i>PREPARE FILLING</i>		<i>SPREAD FILLING</i>		<i>OTHER BREAD</i>		<i>CUT IT</i>		<i>SERVE/EAT</i>	
T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	0	0
1	1	0	0	0	0	1	1	0	0	0	0	1	1
1	1	1	1	1	1	1	1	1	1	0	0	0	0

As can be seen, there was 100% concordance between measures of frame analysis on two occasions by the same rater.

Table 60: Measures Of Integrative Operations For Intrarater Reliability

<i>MEASURE C (%)</i>		<i>MEASURE E (%)</i>	
T1	T2	T1	T2
0.0	0.0	98.8	98.7
0.0	0.0	100	100
0.0	0.0	92.9	92.9
0.0	0.0	100	100
0.0	0.0	96.9	96.9

As can be seen, there was 100% concordance on measures of integrative operations on two occasions by the same rater.

Table 61: Measures Of Semantic Network Generation For Intrarater Reliability

<i>MEASURE F</i> (%)		<i>MEASURE Gi</i> (%)		<i>MEASURE Gii</i> (%)		<i>MEASURE H</i> (%)		<i>MEASURE I</i> (%)	
T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	3.6
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.3	12.5
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

As can be seen, there was 100% concordance on measures of semantic network generation between two ratings by the same individual.

Table 62: Measures Of Logical Or Macrostructure Inferences For Intrarater Reliability

<i>MEASURE J</i> (%)		<i>MEASURE K</i> (%)	
T1	T2	T1	T2
0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0
0.0	0.0	12.5	12.5
0.0	0.0	25.0	25.0
0.0	0.0	0.0	0.0

As can be seen, there was 100% concordance between two measures of logical or macrostructure inferences by the same individual.

Table 63: Local Propositional Inferences For Intrarater Reliability

MEASURE M

T1	T2
5	5
6	6
6	6
2	2
2	2

It can be seen that there was 100% concordance on measures of local propositional inferences on two different ratings by the same individual.

Table 64: Measures Of Semantic Interpretation Or Proposition Sequences For Intrarater Reliability

MEASURE N

**MEASURE Pi
(%)**

**MEASURE Pii
(%)**

T1	T2	T1	T2	T1	T2
2.5	2.5	0.0	0	0.0	0.0
2.5	2.0	0.0	0	0.0	0.0
3.0	3.0	1 (12.5%)	1 (12.5%)	0.0	0.0
1.5	2.0	1 (25%)	1 (25 %)	0.0	0.0
1.5	1.5	0	0	0.0	0.0

It can be seen that there was 100% concordance on measures of semantic integration or proposition sequences between ratings on two separate occasions by the same individual.

Table 65: Measures Of Syntactic Dependency Graphs For Intrarater Reliability

MEASURE Q (%)		MEASURE R (%)	
T1	T2	T1	T2
100	100	0.0	0.0
100	100	0.0	0.0
100	100	0.0	0.0
100	100	0.0	0.0
100	100	0.0	0.0

It can be seen that there was 100% concordance between measures of syntactic dependency graphs by the same rater on two different occasions.

SECTION L

RELATIONSHIP BETWEEN DISCOURSE ANALYSIS MEASURES AND MEASURES FROM STANDARDISED LANGUAGE ASSESSMENTS

It is also of interest whether the language measures obtained relate in a direct way to language measures that have been standardised. For this reason, Pearsons correlations were carried out on participants' overall score on the RHLB and language measures where there were significant differences between participants with schizophrenia and those without mental illness (Table 66, overleaf).

Table 66: Correlations between overall RHLB score and language measures with significant differences between participants with schizophrenia and those without mental illness (table continued overleaf)

<i>Pearson Correlation</i>	<i>RHLB</i>
Average propositions per T-unit	.250
Average propositions per T-unit (narrative 1, where pictures were visible to both participant and researcher)	.571**
Anaphora (narrative 2, where pictures were not visible to the researcher)	-.327
Ideas in the narrative which were inconsistent with the pictures or preceding parts of the story or social expectations	-.441*
Key ideas in the story, omitted by the participant	-.483*
First frame (narrative 2, where pictures were not visible to the researcher)	-.344
Second frame (narrative 2, where pictures were not visible to the researcher)	.073
Average propositions per T-unit (procedural discourse sample)	.622**
Inclusion of 'get bread' frame (procedural sample)	.690**
Inclusion of 'other bread' frame (procedural discourse sample)	.381
<i>Pearson Correlation</i>	<i>RHLB</i>
Inclusion of 'prepare filling' frame (procedural discourse sample)	.381

** correlation is significant at the 0.01 level (2-tailed)

* correlation is significant at the 0.05 level (2-tailed)

This demonstrated that participants' overall scores on the RHLB correlated with their language complexity as measured by propositions per T-unit on the narrative sample with pictures and on the procedural discourse sample ($P < 0.01$), but not with language

complexity on the 'life' sample ($P > 0.05$). Participants' inclusion of ideas in the narrative which were inconsistent with the pictures or preceding parts of the story or social expectations, and their omission of key ideas in the story also correlated with their overall score on the RHLB ($P < 0.05$). Participants' overall score on RHLB did not correlate, however, with the measures of their adaptation of the second narrative in response to a different context (where pictures were not visible to the researcher). There was no significant correlation between participants' overall score on the RHLB and their use of anaphora or their elaboration of the first two frames in the narrative. In contrast, participants' inclusion of the frames 'get bread' and 'get the other slice of bread' in the procedural discourse sample correlated with participants' overall RHLB score ($P < 0.01$ and $P < 0.05$ respectively).

To summarise, this means that the overall RHLB score correlated with language complexity and measures of frame production on the narrative and procedural discourse samples. In contrast, the overall RHLB score was not correlated with measures of frame production in the 'life' sample. Neither, was the overall RHLB score correlated with participants' adaptations of their narrative in response to the researcher not having available the pictures for the narrative.

SECTION M

HYPOTHESIS TWO

Hypothesis 2 suggested that participants' language performance and experience of hallucinations might be related. The hallucinatory data for the participants with schizophrenia was summarised in the following table (Table 67, overleaf). Category A includes those participants who said that they hallucinated in the past but no longer did so. Those participants who spoke of currently hallucinating were divided into those who could describe the illocutionary force of their hallucinations and claimed that they did not find their hallucinations disturbing (Category B), and those who did not describe the illocutionary force of their hallucinations and described their hallucinations as upsetting (Category C):

Table 67: Summary Of Information From Participants Hearing Voices

	CATEGORY A (3 PARTICIPANTS) <i>Participant 2</i> <i>Participant 8</i> <i>Participant 10</i>	CATEGORY B (3 PARTICIPANTS) <i>Participant 5</i> <i>Participant 6</i> <i>Participant 7</i>	CATEGORY C (6 PARTICIPANTS) <i>Participant 1</i> <i>Participant 3</i> <i>Participant 4</i> <i>Participant 9</i> <i>Participant 11</i> <i>Participant 12</i>
Currently Hallucinates	No	Yes	Yes
Described illocutionary force of hallucinations	Yes	No	Yes
Affect resulting from hallucinations	Upsetting	not disturbing	Upsetting
Impact of hallucinations on life	Individuals 'try to get on with them'	hallucinations form 'part of them and their life'	'Powerful' figure e.g. Mother/G-d/medical staff are helping the individuals to do what is right

Exception: Subject 3; denied hearing voices, and mentioned having bad thoughts, which he then stated he no longer had. He said that they forced him to do things which he did not want to do, and found distressing, and that if this occurred again he would remain in an institution for life. He did not provide further details about his hallucinations, and asked a number of times whether the interviewer believed him that he heard hallucinations.

In contrast, none of the participants without schizophrenia spoke of hearing voices when asked the same questions.

then investigated whether any of the language variables which differentiated significantly between participants with schizophrenia and those without mental illness differentiated significantly between the group of participants who currently hallucinated and those not currently hallucinating. This was carried out using the independent parametric t-test where the variables had a normal distribution, and the non-parametric Mann-Whitney U test where the distribution of the variables was not normal, with results as follows (Tables 68 and 69, commencing overleaf).

Comparison of language variables which differentiate participants with schizophrenia and those without mental illness in 'current hallucinators' (Group A) and 'non-current hallucinators' (Groups B and C)

Table 68: Independent T Test For Language Variables With Normal Distribution (Table continued overleaf)

<i>Variable</i>	<i>Case Source</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>T</i>	<i>Sig. (2-tailed)</i>
Average propositions per T-unit	Group A	2.3	.4	2.7	.02*
	Groups B & C	1.8	.3		
Ideas in narrative which were inconsistent with the pictures/ Preceding parts of the story or social expectations	Group A	1.3	2.3	.3	.76
	Groups B & C	1.0	1.3		
Key ideas in the story, omitted by the participant	Group A	.7	.6	-1.4	.18
	Groups B & C	2.9	2.6		
Anaphora (narrative 2)	Group A	70.1	29.0	.3	.81
	Groups B & C	66.4	20.3		

<i>Variable</i>	<i>Case Source</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>T</i>	<i>Sig. (2-tailed)</i>
First frame (narrative 2)	Group A	13.7	7.6	.4	.68
	Groups B & C	10.5	11.7		
Second frame (narrative 2)	Group A	24.7	16.2	.3	.27
	Groups B & C	47.1	31.0		
Average propositions per t-unit (procedure)	Group A	1.9	.5	1.8	.10
	Groups B & C	1.5	.3		
Frame 'get bread' (procedure)	Group A	1.0	.0	4.0	.004*
	Groups B & C	.3	.5		
Frame 'other slice of bread' (procedure)	Group A	.7	.6	.6	.55
	Groups B & C	.4	.5		
Frame 'prepare filling' (procedure)	Group A	.7	.6	1.0	.36
	Groups B & C	.3	.5		

Table 69: Mann-Whitney U Test for Language Variables without normal distribution

<i>Variable</i>	<i>Case Source</i>	<i>Mean Rank</i>	<i>Sum of Ranks</i>	<i>Mann-Whitney U</i>	<i>Asymp. Sig. (2-tailed)</i>
Average propositions per T-unit ('life' sample)	Group A	5.5	11.0	6.0	.77
	Groups B & C	4.9	34.0		
RHLB (overall score)	Group A	7.0	14.0	5.0	.43
	Groups B & C	5.1	41.0		

Only the average number of propositions per T-unit and the inclusion of the frame 'get bread' within the procedural discourse sample distinguished between those not currently hallucinating and those currently hallucinating ($P < 0.05$ and $P < 0.01$ respectively).

Similar tests were then carried out to see whether any of the language variables that differentiated significantly between participants with schizophrenia and those without mental illness differentiated significantly between the group of participants who could describe the illocutionary force of their hallucinations and claimed that they did not find their hallucinations disturbing (Category B), and those who did not describe the illocutionary force of their hallucinations and described their hallucinations as upsetting (Category C), as seen in Tables 70 and 71.

Comparison of members of Category B ('non-current hallucinators' who could describe the illocutionary force of their hallucinations and claimed that they did not find their hallucinations disturbing), and members of Category C (those who were 'non-current hallucinators' who did not describe the illocutionary force of their hallucinations and who described their hallucinations as upsetting) on language variables that differentiate participants with schizophrenia and those without mental illness

Table 70: Independent T Test For Language Variables With Normal Distribution (Table continued overleaf)

<i>Variable</i>	<i>Case Source</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>T</i>	<i>Sig. (2-tailed)</i>
Average propositions per T-unit (narrative 1)	Group B	1.8	.1	-.2	.88
	Group C	1.8	.4		
Ideas in narrative which were inconsistent with the pictures or preceding parts of the story or social expectations	Group B	.3	.6	-1.1	.32
	Group C	1.3	1.5		
Key ideas in the story, omitted by the participant	Group B	1.7	.6	-1.0	.35
	Group C	3.5	3.1		

<i>Variable</i>	<i>Case Source</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>T</i>	<i>Sig. (2-tailed)</i>
Anaphora (narrative 2)	Group B	59.0	18.5	-.8	.47
	Group C	70.8	22.0		
First frame (narrative 2)	Group B	5.7	5.1	-.9	.41
	Group C	13.4	14.1		
Second frame (narrative 2)	Group B	61.7	8.5	1.0	.34
	Group C	38.4	37.3		
Average propositions per T-unit (procedure)	Group B	1.6	.3	.4	.73
	Group C	1.5	.3		
Frame 'get bread' (procedure)	Group B	.3	.6	.0	1.00
	Group C	.3	.5		
Frame 'other slice of bread' (procedure)	Group B	.7	.6	.88	.41
	Group C	.3	.5		
Frame 'prepare filling' (procedure)	Group B	.3	.6	.00	1.00
	Group C	.3	.5		

Table 71: Mann-Whitney U Test For Language Variables Without Normal Distribution

<i>Variable</i>	<i>Case Source</i>	<i>Mean Rank</i>	<i>Sum of Ranks</i>	<i>Mann-Whitney U</i>	<i>Asymp. Sig. (2-tailed)</i>
Average propositions per T-unit ('life' sample)	Group B	4.8	14.5	3.5	.37
	Group C	3.4	13.5		
RHLB (overall score)	Group B	6.0	18.0	3.0	.17
	Group C	3.6	18.0		

None of the language measures significantly differentiating between participants with schizophrenia and those without mental illness differentiated between the two groups of participants currently hallucinating (Groups B and C).

HYPOTHESIS THREE

This relates to the therapy study, described in chapter five.

CHAPTER FOUR – DISCUSSION

OUTLINE OF CHAPTER ON DISCUSSION

This chapter first describes the backgrounds of participants within this study, including their demographic details (Section N.1) and their functioning on a battery of psychological tests (Section N.2). The performance of participants on a variety of ‘background’ measures obtained within this study are then discussed, with Section N.3 detailing the mental status of participants, Section N.4 summarising their experience of hallucinations and Section N.5 looking at participants’ performance on standardised language assessments.

Discussion within this chapter then addresses Hypothesis One (that the differences between the discourse of participants with schizophrenia and participants without mental illness can be described objectively using linguistic terminology). This involves a consideration of the differences between the discourse samples of the two groups of participants in this study (those with schizophrenia and those without a known history of mental illness). These differences are, for the purposes of the discussion, divided into four broad groups of findings: those relating to reduced complexity in the language of participants with schizophrenia (Section O.1); those relating to the pattern of generation or retrieving of frames by the two groups of participants (Section O.2); and those relating to participants’ adaptation of their discourse in terms of language complexity and anaphora to a situation involving reduced context (picture stimuli not visible to the listener) (Section O.3). Differences described in

Sections O.2 and O.3 are then considered in terms of the cognitive processes that are possibly implicated, in section O.4. The discourse sample entitled 'life' involved some markedly different results from those in the procedural and narrative samples, and is therefore described separately (Section O.5). The findings described in Sections O.1-O.5 are then discussed in terms of their implications for the establishment of a baseline and outcome measure for therapy in Section O.6.

The linguistic measures underlying the findings in Section O, are then examined for their interrater and intrarater reliability in Section P.

The validity of these same measures is then examined by a consideration of the relationship between the performance of participants on measures developed in the study (described in sections O.1-O.5) and the Right Hemisphere Language Battery, a standardised language measure in Section Q.

Within Section R, Hypothesis 2 is addressed, by a consideration of the relationship between participants' accounts of their hallucinatory experience as described in Section N.4 and their performance on language measures where there were significant differences between the two groups of participants, including those measures discussed in Sections O.1-O.5.

SECTION N

DISCUSSION OF BACKGROUND DETAILS OF PARTICIPANTS WITHIN THE STUDY

SECTION N.1

DEMOGRAPHIC DETAILS OF PARTICIPANTS WITHIN THE STUDY

(Refers to Results Section I.2)

Participants with schizophrenia had a mean age of 32.9 years, whilst participants without a mental illness had a mean age of 28.4 years, a difference that was not significant.

Participants in the two groups also had a similar educational background. Participants in the two groups remained within a mainstream school until approximately age fifteen or sixteen years, excepting, within each group of participants, one participant who started a course in further education, and one participant with a special educational background.

Participants' occupation prior to their entry to special hospital or prison were also similar for the two groups of participants.

Participants within the two groups differed, however, in a number of ways:

Participants with schizophrenia had a mean history of contact with psychiatric services of 13.6 years, as compared with the group of participants without a history of mental illness, who had no history of contact with psychiatric services.

The participants with schizophrenia had also spent significantly longer within the institution concerned. Their mean length of stay was five years. In contrast, participants

without a mental illness had all been resident within the institution concerned for a time period which was less than a year, although participants within this group had been resident within other institutions prior to their entry to the prison where they were currently resident. This makes it probable that both groups of participants had suffered considerable disruption to their education and home life.

Offending data for the participants within the two groups also differed, although it was not possible to determine the extent of the variation due to restrictions in the data available.

SECTION N.2

PERFORMANCE OF PARTICIPANTS ON PSYCHOLOGICAL TESTS

(Refers to Results Section I.3)

This data was only available for participants with schizophrenia.

1. Wechsler Adult Intelligence Scale – Revised: Memory Subtest (WMS-R)

The mean estimated IQ score for participants with schizophrenia, determined on the basis of the full Wechsler Adult Intelligence Scale – Revised, was 85, with a standard deviation of 9.9. This is towards the lower end of the average range, or about the 18th percentile of the general population. This is consistent with Hartman *et al.*'s (1984) conclusion that a considerable number of people with schizophrenia have an IQ score within the 'defective' range.

2. Premorbid IQ

The mean estimated premorbid IQ score for the participants with schizophrenia, based on the NART (revised) was 94, with a standard deviation of 18.6.

3. Difference between estimated premorbid and current IQ scores:

Participants with schizophrenia scored an average 10 points difference between their estimated current IQ and premorbid IQ, with a standard deviation of 16.2. This pattern of estimated decline from premorbid to current IQ is consistent with the long standing finding that many, although not all, people with schizophrenia demonstrate a significant deterioration in their ability (Frith *et al.*, 1991). Specifically, O'Carroll *et al.* (1992) note that the NART provides an accurate estimate of pre-morbid abilities, and that estimated premorbid IQs on the basis of the NART are suggestive of a decline in cognitive abilities premorbidly, with a further decline following illness onset. These findings are reiterated in other studies, such as those of Crawford (1992) and Van Den Broek *et al.* (1994).

4. Measures of prose recall

The mean immediate prose recall for the participants with schizophrenia was 20, this being approximately 25th percentile, with a standard deviation of 27.0. Where delayed prose recall was tested, mean recall for participants with schizophrenia was higher, at 24, corresponding approximately to 50th percentile, with a standard deviation of 29.4. The large standard deviation for both measures of prose recall reinforces the heterogeneity of the participants with mental illness involved within the study. These results also suggest

that as a group the participants with schizophrenia demonstrate a different pattern of response to that demonstrated by the participants without any history of mental illness.

5. Measures of design recall

The mean immediate design recall for the participants with schizophrenia was 35, with a standard deviation of 40.4, with the mean delayed recall for participants with schizophrenia of 28, and a standard deviation of 41.4. Both these means are above average for a normal population, although evidently there was considerable variation within the group, which was even more extensive than that for the measures of prose recall, again reinforcing the heterogeneity of this 'group' of participants. This data also suggests that the participants with schizophrenia did not have a global memory impairment.

6. Adult Memory and Information Processing Battery

Results were very varied, with in each of the subtests approximately half of the participants scoring below the tenth percentile, and the other half of the participants scoring a varied range of scores including scores corresponding to 95th percentile within a normal population. Interestingly, there was no subtest where participants scored consistently higher or consistently lower than on other subtests. Equally, individual participants showed marked variations in their response to the individual subtests, with no discernible pattern, reinforcing again the individuality of any pattern of responding.

SECTION N.3

MENTAL STATUS OF PARTICIPANTS

(This refers to Results Section I.4.)

The participants with schizophrenia differed significantly from the participants without a mental illness along the following Krawiecka variables: incoherence of affect, negative symptoms, positive symptoms, delusions, and hallucinations.

Participants with schizophrenia were not significantly more depressed or anxious than participants without mental illness ($P>0.05$), when considering both the actual behaviour observed at interview and reports by the participants themselves. Neither did they show more evidence of psychomotor retardation or poverty of speech ($P>0.05$). This may be related to the fact that the participants without a history of mental illness were in a relatively stressful situation. They were mostly relatively recently admitted to the prison (although generally with previous admissions), on remand, awaiting trial. In contrast, the participants with schizophrenia were not expecting an imminent decision regarding their freedom, and had spent relatively longer in their current environment. Also, at this stage inmates who are hospitalised upon trial or within prison are generally not recognised as mentally ill and would therefore be included within any sample of inmates in a remand prison (Taylor and Dell, personal communication). Brooke *et al.* (1996) note that higher levels of morbidity would be expected within a remand population because of a variety of prevalent risk factors for mental illness, such as substance misuse, personality difficulties, and the stress of reception into custody. The incidence of mental illness among remand

prisoners is therefore high (Davidson *et al.*, 1995). Birmingham *et al.* (1996) noted that 26% of men within a remand prison without a known history of mental illness upon assessment had a current diagnosis of mental illness, and if diagnoses of substance abuse or dependency were included. The number of mentally ill men with current mental disorders rose to 62%. This is similar to the point prevalence of mental disorder in unconvicted male prisoners in England and Wales (Brooke *et al.*, 1996). The incidence of mental illness within this sample group would be expected to be even higher as 91.7 % of these inmates had been within the care system, where McCann *et al.*, 1996 found a prevalence rate of psychiatric disorder amounting to 96% among adolescents in residential care units.

However, the participants with schizophrenia demonstrated a significantly reduced range of available emotional responses, as evidenced in the participants' lack of emotional tone when discussing emotionally charged topics as compared with the participants without known mental illness ($P < 0.01$).

Considering positive signs and symptoms, participants with schizophrenia expressed significantly more delusional ideas than those without mental illness ($P < 0.01$), and more participants with schizophrenia demonstrated evidence of experiencing hallucinations that did other participants ($P < 0.04$).

The Krawiecka also includes a rating of language incoherence based on a semi-structured interview. There was no difference ($P > 0.05$) in the amount of incoherence or irrelevance of speech between participants with and without mental illness. This finding contrasts with

descriptions of the language of participants with mental illness which suggest it is incoherent. Possibly the disparity relates to the fact that within spontaneous language there is a certain degree of incoherence which is not pathological (Sherratt, 1998) so that the participants with and without mental illness did not differ along this parameter. Andreasen (1979) notes that only 16% of participants with a diagnosis of schizophrenia exhibit incoherence that is pathological. It is possible that where a model or comparative data are not used as a basis for comparison a judgement of incoherence is made where the degree of 'incoherence' does not differ from that involved in spontaneous speech by individuals without a diagnosis of mental illness.

SECTION N.4

DETAILS OF HALLUCINATIONS OF PARTICIPANTS IN THE STUDY

(This refers to Results Section I.5.)

On questioning, participants with schizophrenia all spoke of experiencing auditory hallucinations (voices) in the past if not currently experiencing them. This differed from the participants without a history of mental illness, who all spoke of never hearing auditory hallucinations.

Three of the participants with schizophrenia spoke of no longer hearing voices. They were able to describe the illocutionary force of the hallucinations they had experienced and also described negative emotions caused by the hallucinations. They spoke of their response to the experience of hallucinations as an attempt to 'try to get on with them' to minimise the possible negative impact of the hallucinations on their daily life.

Of those participants who said they still experienced auditory hallucinations, three participants were unable to describe the illocutionary force of the hallucinations. These participants suggested that the hallucinations were not disturbing, and were 'part of' them and their life, forming a part of their identity.

The remaining six participants who said they still heard voices were able to describe the illocutionary force of the voices. They spoke of finding the voices distressing, and explained how the voices were the result of someone or something that was perceived as powerful to them guiding them to do what was ultimately correct. Thus, their voices were a message from their mother, god or medical staff, for example, and, according to their descriptions, served a useful role in directing them in their daily life.

SECTION N.5

PARTICIPANTS' PERFORMANCE ON STANDARDISED LANGUAGE

MEASURES

(This refers to Results Section I.6.)

On the right hemisphere language battery (RHLB) participants with schizophrenia differed from participants without mental illness in two of the subsets: their appreciation of humour and their score on the picture metaphor test, although the differences for both these tests were only marginally significant.

The two groups of participants also differed marginally on their overall RHLB score. This was consistent with an accumulative difference over the subtests of the RHLB. These findings relating to the RHLB indicate that the language disorder in the participants with schizophrenia could not be described entirely in terms of a right hemisphere disorder or a global language disorder. Participants with mental illness did not perform significantly worse than the participants without mental illness on individual language tests associated with right hemisphere functioning, which would be the case in both a right hemisphere disorder and a global language disorder. Rather, participants with schizophrenia demonstrated a mild impairment on the tests of right hemisphere language functioning used as part of the right hemisphere language battery. A significant difference in the overall RHLB score between the two groups of participants could be explained as an accumulative difference over the various subtests. This is consistent with participants presenting with either subtle difficulties on right hemisphere language functioning or a subtle language deficit not specifically related to right hemisphere functioning.

SECTION O

PERFORMANCE OF PARTICIPANTS ON LANGUAGE MEASURES

DEVELOPED TO REFLECT THE LEVELS IN FREDERIKSEN *ET AL.*'S (1990)

FRAMEWORK

Using measures designed to reflect the levels in Frederiksen *et al.*'s (1990) framework, the narrative and procedural discourse samples of participants with schizophrenia were less syntactically complex and included fewer words than the discourse samples of participants without mental illness. The content of their narratives and procedures also differed from those of participants without mental illness in that they omitted more key ideas or frames in the narrative and procedural samples. Also, they tended to include more ideas that were inconsistent with the picture stimuli, preceding parts of the story and social expectations. Other measures reflecting Frederiksen *et al.*'s model did not differentiate between the two groups of participants.

Measures of discourse content could be computed 'on-line' and did not require sophisticated linguistic knowledge. Clinically, measures of discourse content would therefore be particularly valuable, due to the ease of the analysis. Additional measures from Frederiksen *et al.*'s model suggested by the differences between the groups of participants in this study would include a measure of syntactic complexity. Due to the limited impact of syntactic complexity on functional language and the time involved in computing this measure, it would be more suitable as an additional measure for specific purposes e.g. research.

More significantly, in this study, where context was different in that picture stimuli were not visible by the researcher, it was noted that participants with schizophrenia failed to reduce their language complexity or their use of anaphora, unlike participants without mental illness. This would suggest looking at participants' ability to adapt their language in response to varied contexts.

Using the measures to reflect Frederiksen *et al.*'s (1990) model, unlike the narrative and procedural discourse samples, the 'life' sample appeared not to differentiate between participants with schizophrenia and those participants without mental illness. Applying principles of conversational analysis to this discourse sample provided a clear differentiation between the two groups of participants, especially in relation to the more interactive elements of the discourse sample. It is suggested that the different findings using these two modes of analysis (Frederiksen *et al.*'s (1990) discourse analysis model and a conversational analysis approach) reflect the decreased importance of a consideration of the listener relative in certain discourse samples. This means that the difference between the two groups of participants in the latter forms of discourse is only evident when using a method of analysis that considers the collaborative nature of discourse. These findings are discussed in more detail in Sections O.1 - O.5 overleaf.

SECTION 0.1

COMPLEXITY OF LANGUAGE USED BY PARTICIPANTS WITH SCHIZOPHRENIA AND THOSE PARTICIPANTS WITHOUT A KNOWN HISTORY OF MENTAL ILLNESS

The discourse samples described, excepting that of 'narrative 2' (story with pictures only visible to the speaker) involved less complex speech, reflected in fewer propositions per T-unit. This is consistent with the findings of Morice and Ingram (1982), Morice and McNicol (1986), Fraser, King, Thomas and Kendell (1986), Hoffman and Sledge (1988) and Thomas *et al.* (1995). Speech of lower syntactic complexity can be interpreted as an example of poverty at the level of syntax in parallel with poverty in other modes of action, frequently encountered in people with schizophrenia. In fact the reduced range of emotional responses of the participants with schizophrenia, as apparent on the Krawiecka scale could possibly reflect more a lack of expressive use of the face and tone of the voice in communication than it reflects the underlying affect (Frith, 1992). This could then be seen as another example of poverty of action in participants with schizophrenia. The latter possibility is supported by Leff and Abberton's (1981) findings that showed patients with flattened affect as patients whose monotonous voices were measurable as a reduction of variation in the pitch of the voice. Similarly, Murphy and Cutting (1990) showed that patients with acute schizophrenia were specifically impaired in the use of prosody (variations in the pitch, intensity and rhythm of speech) for the expression of emotion. In a parallel manner, Braun *et al.* (1991) showed that patients with chronic schizophrenia were specifically impaired in using their faces to express emotion. This finding has been

replicated in more recent studies such as those by Davison *et al.* (1996) and Troisi *et al.* (1998).

There was no significant difference between the language complexity of the participants with schizophrenia and the participants without mental illness in the 'narrative 2' samples, in which participants were told that the pictures were not visible to the listener. However, these results could be explained by a significant decrease in language complexity by the participants without mental illness when the listener did not have access to the pictures as a resource, and the memory requirement for the listener was subsequently increased. In this situation the participants without mental illness, but not those with schizophrenia, adjusted their language complexity as a result of the changed context (as described in further detail in Section 0.3).

SECTION 0.2

LANGUAGE DIFFICULTIES IN SCHIZOPHRENIA AS A DIFFICULTY AT THE LEVEL OF FRAMES

(1.) Language Difficulties In Schizophrenia Described As A Difficulty In Generating Or Retrieving Frames

The differences between the procedural (instructions how to make a sandwich) and narrative (telling the story as seen in the series of pictures) discourse samples of the participants with schizophrenia and those of the participants without any known mental illness can also be described in terms of a difficulty in retrieving or generating some of the

required frames in this task. Thus, the participants with schizophrenia as a group displayed broadly similar difficulties on the procedural and narrative tasks.

In both these tasks, participants with schizophrenia omitted more of the key frames. In the narrative task used for narrative 1 (telling the story with pictures visible to both speaker and listener) and narrative 2 (telling the story with pictures only visible to the speaker) the participants with schizophrenias' omission of frames was accompanied by the inclusion of frames that were not required by the task and frames that did not reflect generally accepted expectations.

It is probable that the inclusion of 'inappropriate' frames can be explained by the differing task demands. The greater complexity of the narrative task stimulus may offer increased opportunities for the inclusion of inappropriate frames. In a complementary manner, the increased clarity necessitated by instructions as compared with narrative discourse would possibly decrease the likelihood of the inclusion of additional inappropriate frames.

It is particularly interesting that the difficulties with regard to frames were observed in the narrative task as this task did not involve a memory component, and yet this behaviour is that which is described by the term confabulation. Participants with schizophrenia both omitted frames included by participants without schizophrenia and included idiosyncratic frames. Nathaniel-James and Friths' (1996) found confabulation by participants with schizophrenia in story telling tasks that involved a memory component. However, the presence of 'confabulation' in a task not involving a memory component is very

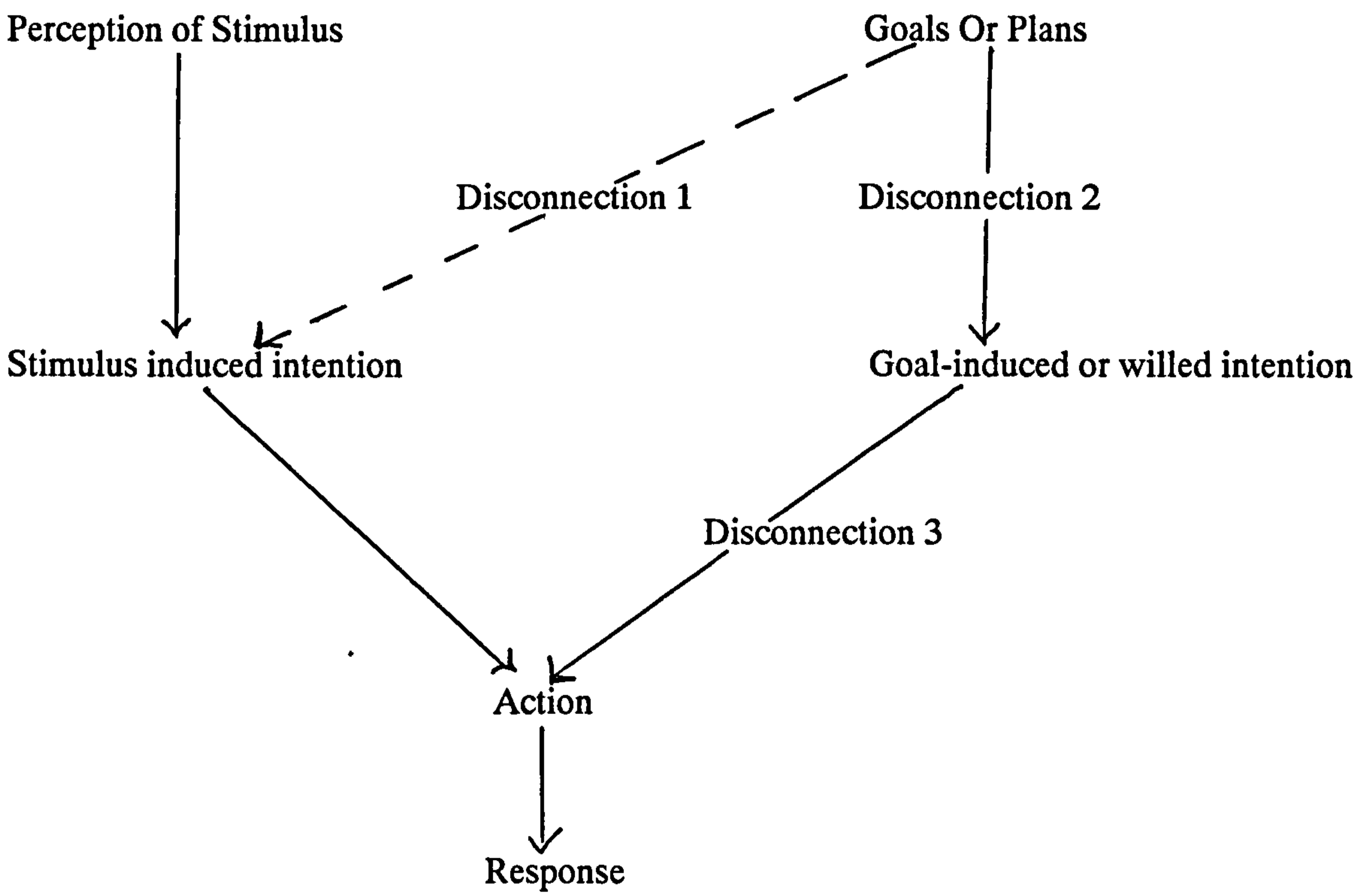
interesting. This is particularly significant as one of the most commonly held theories on the process of confabulation postulates that memory difficulties are the most significant factor in confabulation. This is discussed in Section R.

Analysing the findings in more detail, it would appear that the different story produced by participants with schizophrenia is in part the result of participants with schizophrenia producing more 'incorrect ideas', and fewer of the ideas necessary to recount the story (interpreted in terms of a difficulty in the performance of action, in section O.2 ii), but, in addition, the participants with schizophrenia are interpreting the material differently, resulting in different stories (interpreted in terms of a deficiency in world knowledge or less consideration of wider context relative to other participants, as described in sections O.4 and O.3.

(2.) Discourse Of Participants With Schizophrenia As A Consequence Of A Difficulty In The Performance Of Action

Diagram 6: 2 Routes to action, including consequences of possible causes of disconnections

(figure adapted from page 46 in Frith (1992) The Cognitive Neuropsychology of Schizophrenia)



Key:

_____ Stimulating effect

- - - - - Inhibiting effect

The Diagram demonstrates two routes to action, including stimulus-driven action and willed action, where stimulus-driven action involves the following sequence: perception of stimulus - stimulus-induced intention – action – response, and willed action involves the following sequence: goals or plans – goal-induced or willed intention – action – response.

The Diagram also demonstrates three possible disconnections, labelled disconnection 1, disconnection 2 and disconnection 3 respectively. Disconnection 1 can be described as the situation where goals or plans do not inhibit stimulus-driven action, resulting in incoherent action (positive symptoms). Disconnection 2 can be described as the situation where goals or plans fail to generate goal-induced or willed intentions, resulting in poverty of action (negative features). Disconnection 3 can be described as the situation where goal-induced or willed intentions do not result in action, as in Parkinsonism.

Participants' difficulties in their generation or retrieving of frames can be described in terms of an impairment in their willed route to action. In this route to action, goals and plans guide the person's willed intention in the production of actions resulting in a particular response. Impairments can therefore result in three different consequences. Firstly, a difficulty in generating a spontaneous new response can mean that nothing is done, reflected in poverty of speech or other actions. Alternatively, a previous response may be repeated despite it now being inappropriate, in perseverative, stereotyped responding. Yet a third possibility is that the response might be stimulus-driven inappropriately by some perceived or actual signal in the environment.

Thus, it is possible to explain the discourse samples of the participants with schizophrenia as a reflection of a difficulty in generating actions spontaneously. This is reflected in poverty of speech in the procedural discourse sample (instructions how to make a sandwich), with participants with schizophrenia omitting some of the required frames when generating a procedure, and similarly in the narrative discourse samples (telling the story in the pictures) where they omit some of the key information.

However, where a stimulus is available in the form of pictures, in the narrative discourse task, there is, in addition, inappropriate stimulus-driven behaviour, at the expense of the dictates of the narrative i.e. the person's response is dictated by the individual stimulus with insufficient regard for the context. This was seen where participants with schizophrenia produced frames that were consistent with the picture stimulus, but were inconsistent with knowledge of narratives which occur or 'normal expectations'.

There were no instances of perseveration, i.e. the repetition of a response or action when this was no longer appropriate. However, as Frith (1992) comments, perseveration is the most elementary response developmentally, and is not commonly seen when there is sufficient guidance in the task to suggest the inappropriacy of this manner of responding.

SECTION 0.3

DISCOURSE SAMPLES AS A REFLECTION OF PARTICIPANTS' USE OF CONTEXT

It is possible to describe difficulties in the performance of goal-directed action rather than stimulus-driven action in terms of difficulties in responding to the overall context rather than the stimuli. Examples of this within the study included the following: Some participants with schizophrenia described individual frames within the narrative as seen within the cartoon strips without incorporating the frames within a narrative framework. Similarly, some participants with schizophrenia described several of the frames involved in making a sandwich (procedural discourse sample) without producing a complete account of how to make a sandwich.

These examples are consistent with behaviour described in Ribeiro's (1994) account of a patient providing information to the interviewing psychiatrist without following an appropriate framework. The patient produced some of the relevant frames, and when Ribeiro supplied the framework the material could be seen as a relevant response to the psychiatrist.

The difficulty in considering listener context adequately is also commonly encountered in examples of discourse with persons diagnosed with other illnesses along 'the continuum of schizophrenia-aspergers-autism'. Within both Aspergers' syndrome and autism linguistic descriptions frequently include a failure to respond to the listener or particular context (e.g.

review of literature on Aspergers' syndrome by Attwood, 1992, and literature on autism by Bishop and Rosenbloom, 1987). An example of this is seen in the characteristic inappropriate use of deictic expressions by persons diagnosed as autistic. This suggests the possibility of these findings being applicable to individuals with a wider range of diagnoses.

Within the narrative 2 discourse sample, where participants were told that the researcher was unable to see the pictures, participants without mental illness modified their language as compared with their discourse in narrative 1, by reducing their use of anaphora and their language complexity. The participants with schizophrenia did not adopt these modifications. As possibly (one of) the most easily observable ways of looking at a person's consideration of the listener within discourse, it is then perhaps not surprising that the literature on the language in schizophrenia is replete with accounts of difficulties with the use of anaphora as described in Chapter One, section B.2 4. Within clinical practice, the difficulty in adapting discourse in response to a consideration of the context may be of interest in the assessment and monitoring of patients with schizophrenia. It may be possible to formulate a checklist of different linguistic evidence of responding to changing context. This could include stylistic features such as the degree of formality and use of time or location anchoring (please see section O.2 ii for examples of linguistic features and their significance), and aspects of context considered by the speaker which would be of interest to the mental health professional (please see examples of studies considering the appreciation of context by persons with schizophrenia in section O.3). These might be particularly useful when assessing patient risk. It is possible that a person's ability to

modify his linguistic performance in response to a listener is related to a participant's consideration of others with regard to different forms of behaviour.

It is of course more difficult to study the effects of contextual influences on language production as compared to language comprehension. Perhaps in part as a result of this, more commonly, studies have looked at the limited influence of textual context on language comprehension of people with schizophrenia. These studies reinforce the relevance of assessing various aspects of consideration of context by individuals with schizophrenia, as can be seen from the varied findings in studies looking at both tasks of language comprehension, and initial studies of language production.

(1.) Studies Looking At The Consideration Of Context By Participants With Schizophrenia In Language Comprehension Tasks

Chapman, Chapman and Miller (1964) report that people with schizophrenia tend to interpret the more common meaning of a homonym when listening to a sentence even when the context provided by the sentence suggests the less common meaning. One of their examples is the sentence 'The farmer needed a new pen for his cattle'. Participants with schizophrenia interpreted the word pen as a 'writing implement' more frequently than did the participants who were not mentally ill. However, the two groups did not differ in the number of unrelated responses they chose, nor did they differ in the number of errors they made when the more common meaning was correct. These findings have been replicated in a number of studies (Benjamin and Watt, 1969; Blanley, 1974; Strauss, 1975).

It is possible that the difficulty recorded in the studies mentioned above would be paralleled in language production tasks involved in this study with a failure to consider language variations in response to individual contexts. This was confirmed in the language of the participants with schizophrenia when they failed to reduce their use of anaphora and did not reduce their language complexity in response to the instructions in narrative 2, where the pictures for the narrative were not visible to the listener.

The difficulties noted in the 'language comprehension' studies mentioned above may relate to a failure to respond adequately to the requirements of the communicative partner. A similar focus on the material to be conveyed rather than the partner's requirements based on the partner's knowledge, understanding and assumptions might be expected in participants with schizophrenia. This was seen in the discourse samples of the participants with schizophrenia in this study. Within the 'life sample' of the participants with schizophrenia, there was an absence of the more interactive elements of narrative discourse relative to the discourse samples of the participants without schizophrenia, as described in section 0.5 ii.

(2.) Studies Examining The Consideration Of Context By Participants With Schizophrenia In Language Comprehension and Language Production Tasks

Cohen and Serban Schreiber (1992) consider the response of people with schizophrenia to context in both language comprehension and language production tasks. They outline a model in which there is a singular underlying functional deficit in the internal representation of context. It is this deficit which is reflected in various behaviours observed in people with schizophrenia. Cohen and Serban Schreiber suggest that individuals with

schizophrenia may experience difficulties in their appreciation of the influence of contextual factors in both language comprehension and language production. These authors used a lexical ambiguity task, similar to that employed by Chapman *et al.* (1964), except that sentences were designed so that they could be presented with context first or context last within the sentence. Their results corroborated those of Chapman *et al.* (1964). Participants with schizophrenia chose significantly more of the more common or dominant meanings than did the other participants, when the less common meaning was correct and the context was provided first. Thus, providing the context first facilitated the correct choice for the participants without mental illness, but not for those participants with schizophrenia. This is consistent with the other findings reported, in which participants with schizophrenia attributed relatively less significance to the context, particularly the wider context, whilst attributing more importance to the target word(s) in isolation. These findings would seem to correspond with the focus of the participants with schizophrenia in this study. It was noted that they produced individual frames within the narrative and procedural discourse sample, without sufficient attention to the narrative or procedural framework, e.g. omitting essential frames within their procedural discourse samples.

(3.) Studies Examining The Consideration Of Particular Aspects of Context By Participants With Schizophrenia In Language Comprehension Tasks

Further studies similarly demonstrate a difficulty in responding to particular aspects of the context. Frith *et al.* (1991b) report on the performance of participants with schizophrenia on the Continuous Performance Task, where they experienced difficulties inhibiting their response when the target letter was preceded by another letter, and they were required not

to respond. Liddle and Morris (1991) similarly reported poor performance by some people with schizophrenia on the STROOP test, in which one is required to attend to certain features of stimuli, whilst not responding to other features of the same stimuli. i.e. in these tasks participants with schizophrenia also experienced difficulties in responding to a particular pattern of contextual features. It is possible that this difficulty is related to the difficulty demonstrated by participants with schizophrenia in this study. Participants in this study were noted to include less relevant details within their narratives whilst omitting details which could be termed the key or core elements due to the inclusion of these elements by 'control subjects' in studies in the literature and in the comparative data in the study described here. It is possible that participants having difficulties responding to particular contextual patterns also experienced difficulty in describing the key frames of the narratives, and excluding aspects of the narrative that did not form part of the key framework for the narrative. It is interesting that in both the studies described in the literature individuals experiencing difficulties in responding to particular contextual patterns were those who demonstrated incoherence in their speech. This finding suggests that a number of disparate forms of behaviour may be associated, and individuals with schizophrenia are likely to have a difficulty in producing language with due attention to contextual factors. This reinforces the possibility that the difficulties noted in the language of participants with schizophrenia in this study may be related to those difficulties described in the above two studies.

A possible difficulty with using the wider context within language tasks is suggested by another set of studies involving the 'cloze procedure'. Here, the participant has to fill in the

missing words in a passage of text. De Silva and Hemsley (1977) found that participants in the acute phase of schizophrenia experienced difficulty selecting the appropriate words. A similar difficulty in the use of context was documented in Salzinger *et al.*'s (1978) study using the cloze procedure. People with schizophrenia were able to guess words deleted from a sample of normal speech when contextual clues were local, i.e. when the missing word was surrounded by only two or three words. However, when cues were provided by the larger context, participants without schizophrenia improved in their ability to predict the word, whilst this was not true of participants with schizophrenia. Thus, the participants with schizophrenia were less able to use the wider context when interpreting text. This would seem similar to a difficulty demonstrated by participants with schizophrenia in this study, who produced individual frames, but without fulfilling the requirements of the narrative framework or procedural framework.

(4.) Studies Examining The Consideration Of Context By Participants With Schizophrenia In Language Production Tasks

The possibility of a difficulty such as that described above with respect to language comprehension, but within spoken language is suggested by Salzinger *et al.*'s study. They note a parallel finding to that in studies of language comprehension displayed in the speech of people with schizophrenia, noting that it was easier for people without mental illness to 'cloze' small segments of the speech of people with schizophrenia as compared to larger segments. This suggests that larger segments of the discourse of people with schizophrenia do not aid comprehension because of contextual references that are limited to smaller segments of speech. It is also possible that failure to use an appropriate discourse

framework could account for these findings. Salzinger *et al.* conclude within their study that the behaviour of people with schizophrenia is governed more by immediate stimuli within their spatial and temporal environment than for people without mental illness. Within this study, participants responded more to the individual pictures in the narrative without sufficient regard for a probable storyline.

(5.) Studies Examining The Consideration Of Particular Aspects of Context By Participants With Schizophrenia In Discourse Tasks Rather Than Individual Utterances

A number of studies look directly at the relationship between difficulties in the recognition of context and language production including discourse production. Rutter (1979) conducted a test of speech reconstruction in which sentences were rearranged and participants were required to order the sentences derived from the discourse of people with schizophrenia. Rutter concluded that people with schizophrenia demonstrated a difficulty in sequencing their utterances. This was consistent with the reduced appreciation of discourse frameworks demonstrated by participants with schizophrenia in this study. However, participants with schizophrenia in this study did not demonstrate a specific difficulty in sequencing their utterances.

(6.) Studies Examining The Consideration Of Particular Aspects of Context By Participants With Schizophrenia In Language Production Tasks

The findings in the above studies of language comprehension are paralleled in initial studies of language production, in tasks involving single words. Frith and Allen (1988) provide an example of an incoherent patient responding to the word pair 'tree-bark' with the word 'dog', producing an association to the less likely meaning. In this example the patient's response appears less influenced by the context than is habitually the case. Done and Frith (1984) describe context as affecting the auditory threshold of people with schizophrenia in a similar manner to control subjects. However, incoherent persons with schizophrenia produce less appropriate guesses as to the words when these are below threshold. These findings of a reduced appreciation of context are consistent with the findings in this study. Participants with schizophrenia in this study did not adapt their language in response to a change in instructions in a similar way to other participants. They similarly failed to pay adequate attention to the requirements of a discourse framework or specific discourse needs as dictated by the communicative partner's requirements. Evidently, it would be interesting to consider whether the individual with schizophrenia adapts his language more in response to listener responses in a 'dialogue'.

SECTION 0.4

POSSIBLE COGNITIVE PROCESSES FOR DIFFERENCES DESCRIBED IN SECTION 0.2 AND 0.3

(1.) Difficulties In The Performance Of Action As A Function Of Shallice's Supervisory Attentional System (SAS)

The problems described in the past two sections, involving participants' responses to stimuli (section 0.2 ii) resulting in inadequate use of contextual information (section 0.3), have been explained by Shallice (1988) in terms of defects in a Supervisory Attentional System (SAS). This is outlined overleaf.

Where an action is a goal-directed response, many actions can be stimulated by an environmental stimulus. In a process of contention scheduling, all actions, excepting that which is the most activated, are mutually inhibited. The SAS can modify the actions independently of the influence of environmental stimuli, allowing in addition the stimulation of an action where there is no suitable environmental stimulus, and suppressing responses to stimuli where these are not appropriate, for example as a consequence of real world knowledge. An example of a possible difficulty in this area is seen in the narrative discourse sample of Subject 11 with schizophrenia, who describes the man in the pictures as chasing the bees. This is consistent with the pictures but unlikely given real world knowledge. Thus, on a cognitive level, a deficit in the function of the SAS could account for a difficulty in initiating spontaneous actions, and inappropriate responses to stimuli demonstrating a lack of due consideration for both knowledge of the real world and awareness of the listener. Yet another example of a difficulty which could reflect defective action by the SAS is provided by a number of participants referring to the same object or

character within the story by a variety of different mutually exclusive terms, e.g. 'banana' and 'sausage', 'boy' and 'girl' destroying the storyline. Although these were all possible interpretations of the individual pictures, an intact SAS would ensure both that these were plausible interpretations given the story and that the pictures were interpreted consistently.

Another possible outcome of an impairment in the functioning of the SAS is perseverative behaviour, as noted earlier. This is a more primitive response that takes place when the SAS does not temporarily inhibit an action following its stimulation. However, perseveration was not observed within the discourse samples in this study.

(2.) Possible Cognitive Mechanism For Discourse Production In Schizophrenia

The monitoring of actions via the SAS can be described on a cognitive level with reference to terms such as 'theory of mind' and 'metarepresentation'. Specifically, this study's findings with respect to the SAS can be described cognitively in terms of a number of interrelated abilities: a deficient social knowledge (section O.4 iii); a difficulty in mentalising (section O.4 v and vi) and a difficulty with metarepresentation, one of several cognitive modules involved in a theory of mind or mentalising (section O.4 vii).

Impairments in these abilities have a variety of effects on language.

An impairment in a person's theory of mind or one of its components, metarepresentation would be associated with a reduced sensitivity to the listener's needs in discourse.

Presupposition entails the formation of assumptions regarding a listener's beliefs and knowledge, and thus necessitates an awareness of one's communication partners.

Someone's 'theory of mind' reflects his presuppositions, whilst someone's ability to use metarepresentations allows him the ability to appreciate someone's beliefs, intentions and desires.

These related concepts are important at a variety of levels in a diverse range of situations, affecting a number of linguistic choices including those relating to referential and lexical markers as well as conversational management devices, as speakers try to make their contributions appropriate for the listener. The findings in this study as described in Results Section I are supported by numerous suggestions in the literature that participants with schizophrenia demonstrate a deficit in their theory of mind. Hypotheses include the following: Rutter (1985) postulates a failure in the usage of a theory of mind by individuals with schizophrenia, and Frith (Frith, 1992; 1994; 1997) describes how a difficulty with theory of mind explains the person with schizophrenia's failure to take into account the information required by the listener. A difficulty with theory of mind entails a decreased sensitivity to contextual constraints on language production. This difficulty of a decreased sensitivity to contextual constraints is also implied in theories suggesting that people with schizophrenia have difficulties with metarepresentation (e.g.s. Frith, 1992; Walsh, 1997).

(3.) Discourse Samples As A Reflection Of A Deficiency In Social Knowledge

It is possible to describe the discourse samples of participants with schizophrenia in this study in terms of a deficient social knowledge (culturally bound). Thus, for example, within Western cultures story telling is generally guided by a specific understanding of

narrative grammar and social knowledge of listener expectations. A narrative grammar provides a requirement for describing the setting, development, complication, resolution and coda in a story. However, participants with schizophrenia in this study frequently display a decreased sensitivity to these guidelines in their language production. Examples of this included not mentioning the 'complication' in a story following an elaborate description of the setting and development of the narrative, or suggesting, in the story involved in the narrative discourse sample, ideas that were not consistent with a social knowledge of listener expectations. Participants with schizophrenia included a combination of these behaviours in their discourse samples, distinguishing them from participants without mental illness.

The result of a decreased sensitivity to the requirements of a narrative and listeners' expectations based on their social knowledge would be apparent in the production of more irrelevant ideas and fewer core ideas in story telling. Where not adhering to the structure of story grammar, participants would not include all sections of the story, omitting key ideas whilst including other ideas not contributing to the structure of the narrative. Elaboration on what is irrelevant potentially decreases the intelligibility of the narrative.

Thus, speakers and listeners utilise narrative grammar and knowledge of the world as resources to design their utterances and to make adequate sense of what is said. Where these resources are not used the narrative is perceived as deviating from expectations as in the following examples. Where the rules of a story grammar are violated the discourse sample would be seen as failing to tell a story. Discourse involving information inconsistent with a listener's knowledge and social knowledge with regard to listener

expectations would be perceived as an example of confabulation. A diminished sensitivity to both the rules of a story grammar and social knowledge is found in the example cited below, and continued overleaf (Subject 11's narrative).

Subject 11 - Narrative Discourse Sample 1

*"At the moment the little boy is around the table
and eating his banana
his father must be telling him to put his bib on
after he finishes eating the father took his plate away
a little bee must have e flying at him
and he was trying to kill a bee or something
anyway
he let the bee out the window I think
he let the bee out the window
the bee's gone after his banana skin
anyway
and the bee h jumped up on the mountain
they're they're trying to catch these bees
and the bees 're after their banana
anyway they caught the bee so so far
and they didn't want the trouble"*

Support for a diminished sensitivity to social knowledge being perceived as confabulations is found in Jefferson's (1984) description of a normalising device for extraordinary events, and Wooffitt's (1992) account regarding the requirements for telling tales of the unexpected. They suggest that a story must be consistent with a listener's expectations based on his knowledge of the world. An example of where this is not the situation is in tales of the paranormal. Jefferson and Wooffitt explain that it is necessary for the person telling the story to explain the ordinariness of the account. Palmer (1997) reports that the difference between tales of the paranormal as told by a psychic and those told by someone with delusions lies in the latter's failure to explain the ordinariness of their account. An example of this is that the psychic reports his initial incorrect reaction to a paranormal entity's manifestation in line with a listener's expectations of the world. Then, the speaker describes some unambiguously paranormal activity after which the speaker proposes a paranormal account of the event. The stories told by the participants with schizophrenia in this study did not include explanations of the ordinariness of their accounts. This was true of their story even where the story was inconsistent with a listener's knowledge of the world. This was seen as an example of 'confabulation'.

The stories in this study are thus not similar to the examples of confabulation reported by Kopelman (1987) with Korsakoff and Alzheimer participants. In Kopelman's study of story recall, participants tended to produce irrelevant or unrelated material to varying degrees. It was predominantly these ideas that the participants combined when producing their stories. They also differ from the examples reported by Nathaniel-James and Frith, where, in their examples of confabulation, the participants appeared to be reorganising the

ideas they recalled. In this study participants appeared to be interpreting differently the ideas which they included in their stories. It is possible that participants in the latter study also remembered a number of the ideas from the stories, which they recounted together with new interpretations as compared with the original interpretations. Thus, the suggestion is that participants with schizophrenia may be interpreting the stimuli differently by using a 'different logic' and thus arriving at conclusions that are inconsistent with a listener's expectations.

Referring to the example cited earlier (page 354), subject 11's story involves an interpretation of the pictures that differs from that offered by other participants, creating a different sequence of events, as described below. Initially, the patient does not introduce the insect when introducing the other key characters and objects involved in the story. Then, despite suggesting that the discussion in the pictures is related to a bib rather than the insect, as suggested by other participants, the story is similar. However, missing out the return of this insect when talking about a bib also means that the irony involved in the story (in which the father initially tells the child not to swat the insect, and finally resorts to the same action) is missed.

However, this same participant's later interpretations of the pictures differ even more markedly from that told by the majority of the participants without schizophrenia. Whereas participants without schizophrenia note that the father is stung by the insect and he then tries to swat the insect, this patient says the following; "they're trying to catch these bees and the bees 're after their banana. Anyway they caught the bee so far and they didn't want

the trouble.” Evidence of this ‘confabulation’ where no memory component is involved in the task suggests the importance of the researcher being aware when analysing a discourse task as to whether it involves memory or not. This also suggests the importance of including in future studies both discourse samples involving a memory component in their elicitation and discourse samples where a memory component is not entailed in their elicitation.

(4.) Support For A Deficiency In Consideration Of Social Expectations Or World Knowledge From The Literature

Cutting and Murphy (1988) postulate deficient real world knowledge as one of four abnormalities which together account for formal thought disorder, whilst Brown (1973) describes a content dependent impairment of world knowledge. Such a deficit is also noted by other researchers (Cameron, 1944; Bannister, 1960), who note a dissociation between a deficient social knowledge and an intact intellectual ability. This leads to the question as to the precise locus of the breakdown (Chernigovskaya and Deglin, 1986). Thus, it is possible that knowledge of the real world had a lesser influence on the discourse of the participants with schizophrenia as compared with other participants. The decreased influence could be related to a defect in the functioning of the SAS, or perhaps there is a deficient knowledge of the real world, which is reflected in less modulation of the narrative as presented in the stimuli.

It is suggested that in this study knowledge of the real world did not govern the discourse samples of participants with schizophrenia to the extent that this is true of ‘normal’

discourse. This is suggested by the disparity between the participants' knowledge of the world and their knowledge as reflected in their discourse samples. As an example, participants with schizophrenia frequently omitted key frames such as 'getting bread' when making a sandwich in their procedural discourse. Yet, it was confirmed that they were aware that this was a necessary component of any sandwich.

Support for the reduced use of knowledge in the world in persons with schizophrenia in the literature is found in Jefferson's (1993) account of her experience as someone with schizophrenia. She notes that she was aware of the reality for conversational participants without schizophrenia, but that her world was more real to her, and she therefore conformed to the reality of her world, ignoring reality for the listener. In another attempt to define the precise locus of the impairment (practical knowledge of the world or social evidence of practical knowledge or listener's social expectations and knowledge of the world), Cutting and Murphy (1988) presented participants with nine tests. These included four tests of thinking, two tests of perception, one test of conversational discourse, and two tests of real world knowledge (practical and social). The Conversational Discourse Test was designed "to measure a participant's understanding of the intended meaning of an utterance as opposed to the formal meaning of the language symbols" (p.314). Participants with schizophrenia differed from the participants with other forms of mental illness on this test and that of social knowledge, whilst performing in a similar manner on the other tests. Interestingly, there was no correlation between these results and length of hospitalisation, suggesting that the impoverished practical and social knowledge could not be accounted for by prolonged institutionalisation. Thus, Cutting and Murphy conclude that commonly

people with schizophrenia demonstrate a deficient social and practical knowledge of the world. This was not fully investigated here, and would require questioning participants with schizophrenia as to their beliefs about listener expectations. However, within the limited areas where participants were questioned in this way, it is suggested that participants with schizophrenia were deficient in their social conformity to listener expectations of the world.

(5.) Possible Role Of Mentalising Or 'Theory Of Mind' In The Discourse Samples Of Participants With Schizophrenia

The monitoring of actions described has also been explained in terms of a mentalising ability. Mentalising refers to the ability to possess a belief that other people have minds that differ from our own and an ability to infer the beliefs, wishes and intentions of other people in order to predict their behaviour (Premack and Woodruff, 1978). This enables the person with a 'theory of mind' or 'ability to mentalise' the possibility of taking into account the intentions and beliefs of other people, and therefore the demands of varied situations (Frith, 1992) when determining the appropriate 'willed action' or speech, and monitoring others' actions or their speech. It is thus possible to speculate on a possible explanation for the pattern of speech and language abilities and difficulties observed in terms of an impaired 'theory of mind'.

Where people have particular beliefs about the listener's beliefs and intentions, this will be reflected in their interaction. The requirement to take into account the listener's knowledge, beliefs and intentions is one of the key requirements for all successful

communication (e.g. Grice, 1975; Sperber and Wilson, 1986). Thus, it is possible that participants with schizophrenia are inferring incorrectly the beliefs of the listener about the task, or failing to consider the beliefs of the listener in this task. This would result in the participants producing the less essential information, whilst omitting core frames in the procedural and narrative discourse tasks as described in the previous section (section O.2).

A similar underlying cognitive deficit could also account for the more extensive use of anaphora in the second narrative (the story in which the pictures were only visible to the speaker) by participants with schizophrenia as compared to that by other participants. This was due to the reduction in the use of anaphoric references by the participants without mental illness where there was a reduced common physical context in the second narrative due to the absence of pictures as a resource for the listener. Successful use of anaphora is dependent on the listener being aware of the referents because of antecedents or 'common context' e.g. in the form of pictures visible to both speaker and listener. Appropriate use of anaphoric devices provides a structure for the listener and an indication of when the speaker is introducing knowledge new to the listener and when the speaker is referring to something the listener already knows. Participants with schizophrenias' lack of variability in their use of anaphora provides further evidence of their failing to consider adequately the listener's knowledge and the listener's requirements when constructing their utterances. Yet, their consideration of the listeners' needs for more detailed information in this context are reflected in their elaboration of the first two frames in the narrative discourse sample where the pictures were not available to the listener. This suggests a deficiency in the ability of the participants with schizophrenia to adapt their narrative discourse sample in line with

listener requirements in the presence of some recognition of a listener's increased requirements in this situation. Their ability to adapt in some way their language in response to these instructions suggested their amenability to therapy. However, as noted earlier, this adaptation was not appropriate for contextual requirements.

These findings of insufficient adaptation in response to the listener context are consistent with findings in the literature regarding conversations involving participants with schizophrenia. In Rutter's (1985) analysis of a series of conversations between participants with acute schizophrenia and nurses, he reported abnormalities in the predictability of the discourse samples. Rutter concluded that the central problem involved a difficulty in adopting 'the social process of taking the role of the other'. In a similar vein, Harrow and Miller (1985) concluded that 'schizophrenic speech' appears disjointed to others because the participants do not share 'conventional social norms'. It would appear that their discourse is guided, at least partially, by knowledge that is not shared with the listener. Seemingly, the participants with schizophrenia demonstrate some awareness of the changed listener requirements where the pictures are not visible, but they do not adapt their discourse in line with the expectations of participants without schizophrenia.

(6.) Possible Role Of Mentalising Or Theory Of Mind In Effective Communication At Different Levels Of Communication

It is plausible that mentalising or a theory of mind has a role at a number of different levels in communication. At a conversational management level, partners interact to negotiate topics, turns, and breakdowns in exchanging intentions and information. Verbal interaction

hinges in part on an evaluation of mutual knowledge and beliefs involving an intact 'theory of mind'. As an example, a listener's inferences about communicative intent and speaker meaning, and subsequent responses to a speaker, require knowledge of the world, of the speaker, and of pragmatic conventions. Similarly, a speaker plans verbal contributions to conversations and other forms of discourse based on assumptions about the listener's perspective and knowledge. Participants in a verbal interaction also develop theories about each others' presuppositions, and about what knowledge they have in common.

Communicators draw inferences about the nature of shared knowledge based on several factors. These include group membership, which may be based on various kinds of relationships (e.g. professional, familial, cultural, geographic); shared access to physical objects; and shared knowledge of linguistic and pragmatic markers that occurred earlier in a discourse.

Discourse appears to be guided further by a number of knowledge structures or conventions, facilitating communication. At a general level, some of these create an unspoken contract between participants, each of whom is presumed to cooperate by contributing appropriately. Thus, all contributions are assumed to be guided by four maxims (Grice, 1975); try to be relevant, informative (e.g. convey new information), truthful and appropriate in manner (e.g. brief and orderly). Of course these all require to a greater or lesser extent a consideration of listener needs. Harrow and Miller (1985) suggest that it is the violation of these 'conventional social norms' which distinguishes the speech of people with schizophrenia from that considered normal. This is what makes their language

disjointed. They do not adequately consider the discourse context, including the listener's needs and the influence of the remainder of the discourse.

It is suggested that within this study participants with schizophrenia as a group did not demonstrate evidence of a difficulty at a conversational management level, determining appropriately turn taking opportunities. However, participants with schizophrenia produced discourse samples that suggested a more subtle difficulty in conforming with Grice's (1975) maxims. This included participants with schizophrenia contributing different information to that included by other participants, suggesting that they saw different frames as relevant, e.g. in their omission of 'get bread' in the procedural discourse sample. They tended to include less new information than other participants (with the difference between the groups of participants almost significant). This could result in the discourse samples of the participants with schizophrenia being perceived as less informative. The narrative scores of these same participants (participants with schizophrenia) could be similarly interpreted as disordered, consistent with 'confabulation' rather than truth. The inclusion of material by these participants was not orderly if comparing their inclusion of narrative frames to that of other participants.

The above implies that the participants with schizophrenia did not make adequate use of some of the resources of 'normal discourse'. Within 'normal discourse', each individual proposition is context shaped in that it is understood with reference to the context in which it occurs. Equally, each individual proposition in discourse is also context renewing in that the local preceding context after which each proposition occurs, together with the larger

environmental activity is also relevant to the production of further propositions. Thus, participants use the context as a resource, with speakers employing it in formulating their utterances, and hearers in order to make adequate sense of what is said, with each proposition in the discourse also functioning to renew the context in that it creates context for what follows. This provides a contextual framework for understanding any subsequent propositions within a particular discourse sample, with a shared knowledge of linguistic and pragmatic markers which have occurred earlier in the discourse guiding the listener's understanding of subsequent parts of the discourse. Where there are omissions of key frames within procedural and narrative discourse samples, together with some inclusion of frames not considered integral to the discourse sample as in the narrative discourse sample), seen in the discourse samples of the participants with schizophrenia, this same contextual framework is not present.

Considering language production as a series of interdependent levels of language processing (where higher levels are concerned with processes such as that involving the 'semantic system or overall system of meaning' and lower levels are concerned with processes such as those involved in the 'phonological output lexicon or actual words uttered'), it can be seen that the effects of a deficient or different contextual framework can be found at all levels of language processing. Within this study, at the semantic level, 'confabulation' was demonstrated in the different narrative produced by some participants with schizophrenia, and in lower level processes, with e.g. no reduction in anaphora in the narrative without pictures visible to the listener in comparison with the participants without mental illness.

Similarly, findings of differences at all levels of language are documented in the literature. Bernstein (1964) reports on a 'restricted code', where speakers present with incoherence, ellipses, fragments structure, and lack of referentiality in settings where substantial mutual knowledge is assumed. This involves less explicit elaboration at all levels of language, and was initially thought to demonstrate the restricted language competence of certain speakers. Some examples of this less explicit elaboration of all levels of language within the discourse of people with schizophrenia are provided by Ribeiro (1994). Ribeiro describes an interview in which a patient provides the doctor with limited material, which appears on the surface to be incoherent, but which Ribeiro then amplifies, explaining the coherence of these transcripts when they are understood in the context of additional information. It is now recognised that a restricted code is an appropriate reflection of speakers and listeners sharing of mutual background knowledge of topic, theme, situation and speaker intention, appropriate to particular settings. Where speakers and listeners do not share a mutual background or mutual considerations, as is suggested with respect to the participants with schizophrenia, that the code used by the speakers may be considered inappropriate. This is exemplified by the frequent failure of participants with schizophrenia to include 'get bread' in the procedural discourse sample, where this is seen as an essential consideration by all the participants in the study without mental illness.

As Wrobel (1990) notes, communicative competence requires "the means to be able to select from the system inventory of communication behaviours, such forms of behaviours which could be most correct from the point of view of the interlocutor (social competence),

the communication situation (situational competence) and the purpose which we wish to achieve (pragmatic competence)"(p.24), including what Bernstein referred to as a 'restricted code' if and when appropriate. This evidently necessitates adequate sensitivity to the listener's needs. This sensitivity is dependent on a competence in the processes involved in presupposition, theory of mind, and metarepresentation, where the terms can be defined in the following way. Presupposition involves the process of forming assumptions about what a listener believes and knows, and, as such, requires taking perspective of one's communication partner. A person's 'theory of mind' reflects his presuppositions, whilst his metarepresentations enable the appreciation of the beliefs, intents and desires of others. Within this study, participants with schizophrenia did not select the communication behaviours that were most appropriate. Rather, they displayed a limited sensitivity to the listener's needs. An example of this is that these participants demonstrated some adaptation of their narrative where the pictures were not visible to the listener. However, they did not produce those communicative behaviours that were demonstrated by participants without schizophrenia in the form of a reduction of anaphora and a reduction in language complexity. Similarly, the patient described by Ribeiro (1994) violates constraints, so that her use of a restricted code is inappropriate for the interlocutor and communication situation, reducing the cohesive structure of the discourse. Thompson and Copolov (1998) describe a similar deficit with respect to participants with a variety of disorders.

In line with these findings, Alverson and Rosenberg (1990) postulate that incorrect assumptions about mutual knowledge by participants with schizophrenia could account for

'reduced cohesive structure' in the discourse of participants with schizophrenia. Similarly, Wrobel (1990) suggests that speakers ordinarily assume the primary determinants of the speech act to be represented by 'I-here-now', in discourse, making explicit where communication assumes a different 'initial situation'. In contrast, participants with schizophrenia assume the primary determinants are defined as 'not necessarily I-not necessarily here-not necessarily now'. Thus, the discourse of a participant with schizophrenia may refer to 'secondary determinants' without making this explicit, with discourse referring to a listener (versus 'I' or the speaker) and other locations (rather than 'here' or this location) and other times (rather than 'now' or the current time). Wrobel suggests that this accounts for a deficit in the language of participants with schizophrenia at the 'deictical level'. This is consistent with Rochester and Martin's (1979) finding of a lack of referents and cohesive ties in the utterances of people with schizophrenia. Within this study, it is similarly seen that the discourse samples of participants with schizophrenia differ from those of participants without mental illness in that they are making different assumptions about listener knowledge and expectations, including different frames within the procedural and narrative discourse sample, for example.

(7.) Involvement Of Metarepresentation In Tasks Demanding An Intact Theory Of Mind

Control at a higher level of low level actions can involve a determination on the basis of metarepresentation, a cognitive mechanism underlying an intact theory of mind, where metarepresentation involves knowledge about representations involving a representation of a representation. Metarepresentation is involved when mental states are considered, and

wherever there is a second order representation of the physical world such as a belief or desire for a particular representation of the physical situation e.g. 'I think the noise has stopped' (metarepresentation) versus 'The noise has stopped' (primary representation). This is a pre-requisite for self-awareness. Thus, metarepresentation is involved in goal-directed behaviours versus stimulus-elicited behaviour, with the person modifying his behaviour until his goal is reached.

The abilities described by the term metarepresentation allow the person to recognise information about the goal and to be aware of an intention to reach the goal. It can be seen that this goal may differ between participants with schizophrenia and other participants, as described earlier (e.g. in Section O.4 vi). The 'attaining of goals' can be related to Shallice's model of the Supervisory Attentional System. This contains knowledge about the various routines relating to various goals as involved in 'contention scheduling'. A disorder of conscious processes in which there is a lack of control from higher level conscious processes (i.e. the supervisory attentional system) would create an imbalance between high and low level processes. In this situation, low level processes would have a greater preponderance than normal in their effects on the experience and behaviour of people with schizophrenia. Thus, in verbal communication, individual aspects of the stimuli will have a greater preponderance than normal, at the expense of the demands imposed by the overall context. This would mean that speakers may, for example, include frames which are not integral to a narrative whilst other more key frames are omitted, as seen in the narratives of participants with schizophrenia.

A difficulty with metarepresentation could also lead to other difficulties with discourse in that an inability to monitor one's speech effectively could lead to difficulties with self monitoring and repair strategies, as discussed by Leudar *et al.* (1982). In addition, this could lead to difficulties in detecting the source of representations leading to symptoms including hallucinations, as described by Hoffman (1986), as discussed in section R.

(8.) Complementary Theories To Those Proposing An Impaired Theory Of Mind Or Impaired Ability To Mentalise

Theories proposing an impaired theory of mind or an impaired ability to mentalise bear similarities to a number of theories such as that suggested by Wrobel (1990). It is possible that the discourse analysis in this study does not provide evidence to support or disprove these largely complementary philosophical theories, for which different discourse samples and different forms of analysis would be more appropriate. Meanwhile, the data in this study are consistent with the general principles proposed in the theories discussed below.

Wrobel (1990) proposes that with people with schizophrenia, the language system can be described as a 'langue' (language) with individual speech acts (*parole*). He considers that this is not a new language. However, he suggests, that people with schizophrenia utilise a separate semantic system that does not contain objective incoherencies. Rather, Wrobel describes, using the linguistic theory of de Saussure (1966), a discontinuity between the external features of language (*Signifiant*) and reality (*Referent*). He notes that this discontinuity can even change into an identity between *Signifiant* and schizophrenic reality. He offers a semantic analysis of their utterances in which he reconstructs their conceptual

world (Wrobel, 1990), and suggests that the person with schizophrenia may not adopt the semantic system which is conventionally accepted.

This complements the findings of De Decker and Van de Craen (1987), who describe the communication of people with schizophrenia in terms of the theoretical framework developed by Grice (1975). They describe a number of conversations between clinicians and their participants with diagnoses of schizophrenia. According to De Decker and Van de Craen the participants violate the cooperative principle and refuse to accept the direction given by the clinician and conversational conventions. These authors provide conversations that demonstrate how the participants violate Grice's maxims of quantity, quality, relation and manner at the level of discourse. However, their analysis does not fully reflect Grice's (1975) theory, with for example, Grice's maxim of quality described in terms of truth and falsity.

Kaesermann (1987) also describes communication as compared with language as deficient in people with schizophrenia, with people with schizophrenia demonstrating a failure to employ the conventionally accepted structure of questions and responses. Thus, people with schizophrenia are seen to demonstrate an impairment at the level of discourse.

Kaesermann presents a single case study of dialogues between a male patient with a diagnosis of schizophrenia and a psychiatrist. In her analysis, Kaesermann identifies four different types of question. She describes an assumed structure of the task to be solved when answering questions or when reacting to requests, noting that this is most difficult for the person with schizophrenia. According to Kaesermann, the different types of instruction

can be classified according to specific formal markers and the postulated continuation of the dialogue. She concludes that many of the responses by the person with schizophrenia are not deviant as individual utterances. Rather, the deviance is dependent on the particular subject matter involved in the dialogue and is thus at the level of discourse or language performance. However, she does not describe the conditions under which language deviance becomes evident. The general findings, though, would appear similar to those in this study, where the language of participants with schizophrenia differed from those of other participants at the level of frames or discourse rather than at the level of individual utterances, excepting in measures of language complexity.

Returning to the study cited earlier involving the comparison of narratives of paranormal events by professional psychics and individuals with schizophrenia, Palmer (1997) notes that the psychotic individuals do not use certain conversational rules. He describes three components in the paranormal stories of professional psychics, which are not included in similar accounts told by people with schizophrenia. The first of these includes a component that helps make the encounter understandable by explaining the particular circumstances. In the second component, speakers who were professional psychics did not present the strongest evidence that they had for paranormal events first, but rather preceded this by stating their feelings that something was slightly strange, and not in line with ordinary expectations. In the final component, these same speakers explained how it was reasonable for them to assume that they had in fact met a paranormal entity. In contrast, the participants within the study with a diagnosis of schizophrenia accomplished none of these three components in their accounts. This would be consistent with these participants

not considering the expectations of the listener on the basis of social expectations. This resulted in differences between the psychic and psychotic participants at the level of conversation or discourse.

(9.) Alternative Theories

There are, however, alternative theories to those involving metarepresentation that have been proposed to account for the discourse of people with schizophrenia. Largely, these do not specify the implications in terms of speech and language, providing very little information on the translation of the theories' descriptions at a cognitive level for parallel descriptions at the level of speech and language. This means that it is very difficult to look at speech and language data as supporting or disproving the various alternative theories. Therefore, the most frequently elaborated of these theories will be discussed below in terms of their limited implications for speech and language symptomatology in general, and the specific data within this study.

(10.) Communication In Schizophrenia As An Inhibitory Or Attentional Dysfunction

Attentional deficits have been postulated as the cause of a speech and language disorder in a number of other theories (McGhie, 1970; McGhie and Chapman, 1961; McGhie, Chapman and Lawson, 1965a, 1965b; Maher, 1983). These theories are rather varied and include suggestions that people with schizophrenia accord too little attention to their speech, or, alternatively, devote excessive attention to irrelevant concerns. Commonly, within these theories there is no satisfactory explanation of the relationship between the

postulated attentional deficits and the speech and language presentation of people with schizophrenia.

Chaika, however, does incorporate a number of strands of evidence in a theory describing a relationship between insufficient attention and the speech and language presentation of people with schizophrenia. According to Chaika (1982), the speech and language presentation of people with schizophrenia reflects an inhibitory dysfunction. Chaika (1997) proposes that this inhibitory dysfunction could reflect an attentional dysfunction. Evidence for this theory includes the diversity of speech and language deviations, their similarities with errors in 'normal speech' and the episodic nature of these speech and language difficulties in people with schizophrenia.

In support of the diversity of speech and language differences produced by people with schizophrenia, Chaika provides examples of various categories of structural speech and language deviations. These include gibberish, neologising, perseveration, erroneous lexical choice, glossomania and disruptions in syntax. She notes that the variations are sufficiently diverse to include both dysfunction at the level of the lexicon and syntax as well as at the level of discourse. Within the discourse samples within this study, although there were examples of disruptions in language at many levels, as described by Chaika, there were no significant differences in their frequency of incidents of language disruption between the two groups of participants, except at the level of frames. Thus, the discourse samples in this study differed from what Chaika suggests in that the discourse of the persons with

schizophrenia only differed from the discourse of other study participants in terms of their frames, and not a large range of language measures.

Chaika suggests that the errors found are not qualitatively dissimilar to those errors produced in normal speech, and cites the work of researchers like Baars, on normal slips of the tongue. Rather, the distinction is that these errors are more frequent in persons with schizophrenia. This is the basis for Chaika's explanation of the relationship between attention and speech and language performance in people with schizophrenia. She notes that Baars (1992), among others, attributes slips of the tongue to a lapse between volition and performance, ultimately caused by a temporary malfunction of the executive function of the brain. Chaika explains this phenomenon as a chasm between intentions and performance, due to executive difficulties. This of course bears similarities to other explanations of the speech and language in people with schizophrenia, which suggest that people with schizophrenia have an executive difficulty. Chaika does not, however, elaborate on the executive nature of the speech and language difficulty in people with schizophrenia.

Rather, Chaika refers to the work of Reason (1984) to explain the relationship between attention and intention. She notes that attention is a more limited resource than intention and she comments that all activities, mental and physical, make some demands on this resource.

She describes 'intention', as the resource that determines what we say and how it is said. Chaika notes that our interpretation of others' speech is determined by us assuming their

intentions in them saying what they did. Thus, 'intention' would appear to encompass two concepts, which are commonly described.

With regard to language production, all 'top-down' linguistic models rely on the premise that people convert their thoughts, concepts and memories into language, not dissimilar to Chaika's description of intention governing our speech. The concept of 'presupposition' describes behaviour in which people interpret speech by assuming among other facts the speaker's communicative intention.

Chaika explains the role of attention, as compared with the role of intention, as one in which attention is used to initiate routines, but in which it is then diverted to other matters for the duration of the routine. This includes monitoring behaviours and an inhibitory function for behaviours only related to the target behaviour. Chaika does not describe in any depth how the executive function is accomplished within her model, rather attributing a monitoring and inhibitory function to the attentional resource, upon which she does not elaborate.

In support of her claim that a lapse of attention affects self monitoring of speech, Chaika refers to the work on 'normal' speech and language, where she notes that with lapses of attention the self monitoring function is impaired. She notes that this can occur as a result of excitement, despair, old age and general distracted states. She also reports that Baars (1992) and others investigating slips of the tongue have found that as cognitive interference increases, so do slips of the tongue. Evidently, this bears similarities to other theories in which difficulties of self monitoring or inhibition are postulated. Chaika focuses on the

speech and language presentation in people with schizophrenia as a reflection of an attentional deficit resulting from the cognitive strain and stresses caused by the illness. She notes that the speech of people with schizophrenia is usually adequate initially, but progressively more inappropriate associations are included as the person continues to speak, and there is insufficient attention to filter out these associations. This, Chaika suggests can account for the inclusion of the diverse errors in the speech and language of people with schizophrenia. She notes that this is not dissimilar from the process in normals, except that errors within schizophrenia are more persistent and disorganised than what is considered normal error. However, the speech and language presentation which Chaika hypothesises will result from this is not consistent with the discourse samples analysed here. In this study, the pattern of frame inclusion by the two groups of participants varied qualitatively. Examples of this include the procedural frames referring to bread, which were not omitted by any of the participants without mental illness and the inclusion of frames inconsistent with world knowledge, only found in the narrative samples of participants with schizophrenia. In fact, even Chaika contradicts herself when she describes differences between the discourse of people with schizophrenia and other people, mentioning that over the course of a discourse sample their language gradually includes more inappropriate associations. This pattern contrasts with Chaika's description of communication difficulties that are not dissimilar to those slips of the tongue evident in the speech of normals.

Chaika suggests that the inclusion of tangentially related or irrelevant frames by individuals with schizophrenia is due to the attentional resource being insufficient to filter out these

associations. It is unclear, though, why initially the attentional resource is adequate for these peoples' requirements, and becomes gradually unsatisfactory. Data from the participants with schizophrenia in this study did not support the notion of discourse being initially adequate and becoming progressively disordered, with, for example, the first key frame in the procedural discourse sample omitted by a significant number of the participants with schizophrenia. Chaika's theory does not provide an explanation for discourse samples where irrelevant associations are included in the initial parts of the samples. Chaika also does not explain how attention determines the level of the difficulties and a diverse range of presentations, although she presents this fact as one of the arguments in support of the theory. Within the study described here, there was no support for a diverse range of language difficulties. Rather, difficulties were centred on the area of frames. It is also unclear how Chaika excludes a theory in which there is excessive attention to extraneous materials rather than insufficient attention to inhibit and monitor irrelevant associations. In fact, Chaika does not make reference to any independent measures of attention in support of a specific attentional deficit in the people concerned. Chaika cites as a final form of support for her theory the episodic nature of the speech and language disorder. However, the episodic nature of the speech and language disorder could be used to support many theories which differ from that of Chaika, and for which she does not provide any counter-evidence, particularly all those theories hypothesising a difficulty with respect to language usage versus language knowledge. Evidently, the cross-sectional nature of this study means this study cannot be used to support or refute Chaika's claim regarding the episodic nature of the language presentation in schizophrenia, although this is commonly reported. In conclusion, it would appear that Chaika's theory does not provide a

satisfactory or conclusive explanation for the findings with regard to the speech and language of people with schizophrenia.

(11.) Communication In Participants With Schizophrenia As A Reflection Of Hemispheric Differences Between Participants With Schizophrenia And Participants Without Mental Illness

Yet another possibility is that the communication of people with schizophrenia reflects hemispheric differences between these individuals and other people without a diagnosis of mental illness. Among those suggesting hemispheric differences, Crichton-Browne (1879) appears to have been one of the first proponents of such a theory. There have been numerous findings consistent with a loss of asymmetry e.g. Computerised tomographic (CT) scans (Crow *et al.*, 1989; Daniel *et al.*, 1989), and magnetic resonance imaging (MRI) studies (Johnstone *et al.*, 1986; Bogerts *et al.*, 1990; Barta *et al.*, 1990; Rossi *et al.*, 1992; Hoff *et al.*, 1992; Shenton *et al.*, 1993; and Bilder *et al.*, 1994). The loss of asymmetry is present early in the course of the disease. This suggests that the asymmetry reflects an abnormality of development, either that there is an arrest of a normal process of asymmetrical growth or that, amongst a number of hemispheric growth patterns, individuals at risk of schizophrenia are amongst those with greater symmetry of development.

There is extensive evidence that individuals who develop schizophrenia are less lateralised, with a finding that deviates away from strong left cerebral dominance for language (Shan-Ming *et al.*, 1985, and Clementsz, Iaconon and Beiser, 1994). Thus, it is possible that

individuals who, by their genetic or other endowment, are close to the point of 'hemispheric indecision' are at particular risk of schizophrenia.

Yet other theories include suggestions that schizophrenia is a reflection of right hemisphere dysfunction. Thus, e.g. Cutting (1985, 1990, 1994) describes four forms of evidence to suggest that right hemisphere damage is accountable for the symptomatology of schizophrenia. The evidence he describes includes: neuropsychological analogies; neuropsychological test results; neurobiological findings; and neuropsychiatric analogies.

Equally, there are theories which suggest the possibility that abnormalities of the left hemisphere are responsible for the symptomatology observed in schizophrenia e.g. Early *et al.* (1994). Of course, it is possible that with a heterogeneous disorder like schizophrenia, evidence can be found to support all of these theories, none of which can be confirmed on the basis of current evidence.

In terms of language findings, studies conducted thus far do not demonstrate difficulties with language abilities traditionally associated with either the right or left hemispheres.

Within this study, participants with schizophrenia did not differ significantly from participants without schizophrenia on the majority of subtests of language associated with right hemisphere functioning within the RHLB. Their significant difference in their overall RHLB score suggested the possibility of a mild impairment on language tests associated with right hemisphere language functioning. This would militate against a description of the language in schizophrenia as a right hemisphere impairment. It is suggested that the language of participants with schizophrenia would be unlikely to be explained as a left

hemisphere disorder. The RHLB was chosen due to the similarities between the language skills assessed within this assessment battery and descriptions of the language in schizophrenia as found in the literature.

(12.) Communication By Participants With Schizophrenia As A Neurodevelopmental Difficulty

Yet another proposal is that referred to as the neurodevelopmental model. This, however, describes the possible aetiology for difficulties encountered in schizophrenia, whilst not proposing the process behind the observable difficulties in schizophrenia. Within the model, it is suggested that the pathology observed in schizophrenia may reflect an aetiology involving a neuropathological process which could also account for other difficulties frequently observed in individuals prior to their diagnosis as schizophrenic. Alternatively, it may be that the individuals concerned have a generalised CNS vulnerability increasing the likelihood of the individual later developing the specific pathology denoted by the diagnosis of schizophrenia. i.e. There is a neurodevelopmental difficulty that manifests itself as the symptoms of schizophrenia in the adult. One such theory is described by Done, Crow, Johnstone and Sacker (1994a). They supply evidence that people with schizophrenia as a group are significantly impaired across a range of intellectual abilities from an early age. This suggestion forms part of Crow *et al.*'s neurobiological model, described in more detail in more recent works such as that by Crow (1997, 1998). Thus, for the discourse samples in this study to be consistent with their theory, the discourse samples must reflect a disruption in maturational development. Further support for schizophrenia as a disruption

in maturational development is derived from studies of the brain and child development studies.

Brain scans of people who have later developed schizophrenia have shown evidence of enlarged ventricles, prior to symptom onset (O'Callaghan *et al.*, 1988; Weinberger, 1988). Frequently, there are no signs of an additional degenerative process in the brain tissue of people with schizophrenia (Bruton *et al.*, 1990; Roberts and Bruton, 1990). These results suggest that the brain abnormality associated with schizophrenia occurs early, reflecting a neurodevelopmental disorder (Murray and Lewis, 1987). This may include any form of pathology early in the person's development, which becomes apparent with brain maturation. Of course, the neurodevelopmental theories do not explain why schizophrenia is evident clinically only relatively late in the person's life. However, the increasing evidence of abnormalities in people with schizophrenia prior to the onset of schizophrenia lends support to the possibility of pathology occurring early in development.

An example of a child development study providing such evidence is that entitled the National Child Development Study or National Survey of Health and Development, as reported by Jones *et al.* (1994). From a cohort of 5362 individuals, thirty cases of schizophrenia were identified, and they were found to have reached their developmental milestones more slowly. Crow (1997) notes that it is becoming increasingly evident that the impairments implied by the delayed developmental milestones include a difficulty with oral and written communication, and that these difficulties are evident at an early age.

Consistent with the finding of impaired communication in children who later develop schizophrenia, Giddan *et al.* (1996) observed that of 55 psychiatrically hospitalised preadolescents with DSM-III-R diagnoses not commonly associated with language deficits, 60% were determined to have language or speech deficits. Similarly, children referred primarily for psychiatric disorders are frequently language impaired, with estimates of prevalence ranging from 25% to 97% (Camarata *et al.*, 1988; Chess and Rosenberg, 1974; Cohen *et al.*, 1989; Cohen and Lipsett, 1991; Gualtieri *et al.*, 1983; Kotsopoulos and Boodoosingh, 1987; Love and Thompson, 1988). Looking at those children with a primary diagnosis of a speech and language disorder, there is a relatively high incidence of emotional difficulties. (Affolter, Brubaker and Bischofoerger, 1974; Butler, Peckham, and Sheridan, 1973; Griffiths, 1969; Ingram, 1959). These two strands of evidence could suggest that language-impaired children are at risk for developing a psychiatric disorder (Beitchman *et al.*, 1986; Cantwell and Baker, 1985; Fundudis *et al.*, 1979; Richman *et al.*, 1982), or that children with psychiatric disorders are at risk for developing speech and language problems, or both. However, currently available studies do not indicate whether the communication difficulties constitute just one of multiple impairments, or whether there is a communication difficulty which is more severe than would be expected on the basis of a profile of the individuals' other skills and deficits. In fact, Done *et al.* mention explicitly that they do not propose to offer an explanation for the impairment in communication, and Walker (1994), who describes a similar theory, emphasises that as yet the theory must be largely speculative due to the current lack of evidence. With respect to the theory as it is currently stated, delayed development is unlikely to explain the pattern of communicative functioning observed in people with schizophrenia. Certain aspects of schizophrenic

symptomatology are not observed at any stage in normal language development. Also, some features of schizophrenic language are not consistent with the level of development of other features of the communication of people with schizophrenia. An example of this is that people with schizophrenia are frequently impaired in the area of pragmatics almost to the exclusion of other areas of language. This compares with the relatively early acquisition of many pragmatic skills as part of normal child language development.

Within this study, participants with schizophrenia demonstrated specific differences as compared with participants without mental illness whilst not differing significantly on most language measures including the standardised Right Hemisphere Language Battery. It is possible that the impairment is developmental, but is restricted to certain brain functions or neurobiological processes. However, as yet this is unclear within the theory, as is the rationale for any similarities or differences between the pattern of impairment between different diagnoses of mental illness and impairments in persons with serious emotional difficulties. Thus, it is possible that there is a neurodevelopmental reason for the communication difficulties observed in the discourse of people with schizophrenia, but this does not provide a satisfactory explanation for the speech and language presentation observed. The possibility that there is a developmental impairment restricted to certain areas of language development would suggest the possible importance of investigating discourse abilities in children. This is currently not widespread, and could potentially distinguish those children who experience communicative difficulties later as compared to other children who show more significant improvements in their language. It is possible that, in parallel to this study, some children may experience specific difficulties at the level

for discourse as compared to the language abilities more commonly tested in developmental clinics.

Within this study, the 'life sample' of participants differed markedly from the other discourse samples in that this did not differ significantly between the two groups of participants using Frederiksen *et al*'s measures. This is discussed in more detail in the following section.

SECTION 0.5

DIFFERENCES BETWEEN 'LIFE SAMPLE' BY PARTICIPANTS WITH SCHIZOPHRENIA AND PARTICIPANTS WITHOUT MENTAL ILLNESS

(1.) 'Life sample' as representative of participants' discourse samples

As described in section Chapter Two (Section H.4 ii) in this task participants were asked to tell the researcher about their life before they came to the institution where they were being interviewed. (Please refer to Appendix H for 'life' discourse samples of participants.) This meant that participants needed to generate the material to fill in a superstructure provided by a story grammar framework. Participants with schizophrenia were all resident within a special hospital, as compared with those participants without any known mental illness, who were resident in a prison. Participants with schizophrenia all produced a 'life sample' which followed the framework provided by a story grammar, as compared with eight of the twelve participants without mental illness, the other four including information on 'setting', whilst omitting the other components of a story grammar. This result differed from that involving the other narrative samples (narratives 1 and 2 involving picture stimuli for their

elicitation). It was thought possible that the latter difference could be explained in terms of participants' varied approach to different forms of discourse. As part of this suggestion, it was thought possible that the 'life sample' might be rehearsed or learned due to its significance for patients. Patients within a special hospital environment receive help in constructing a coherent account of their life history and positive reinforcement for this discourse sample being appropriate. Benefits could even include moves to a lower level of security in some cases. There would therefore be an added incentive for participants producing an acceptable account of their past history. This might mean participants producing an account of their past history which differed in terms of language use from their use of language for other discourse samples. If true, then the 'life' discourse sample of participants with schizophrenia could constitute an example of 'formulaic' or 'reusable' discourse, where, ordinarily, discourse includes three main components, described as 'formulaic' discourse, 'reusable' discourse, and 'unique' discourse (Newell, 1991). Formulaic discourse includes generic speech acts such as openings, small talk, feedback and closings (Alm, 1988), whereas word-based unique discourse is very specific to the current situation. Reusable discourse is situated between the above two discourse genres. This includes discourse that is frequently produced in varied situations, and can include narrative discourse. Thus, it is possible that in an environment with an emphasis on describing the participant's index offence, the requirements of this task might encourage the participants within this environment to produce what is to a large extent reusable and formulaic discourse. This could involve participants with schizophrenia producing narratives that followed a structure provided in assessments and therapy. This is particularly probable given the positive reinforcement for producing such a narrative,

including intermittent rewards of increased privileges, and the increased likelihood of hospital discharge. Support for this possibility is provided by Jefferson's accounts of when she was ill, when she notes how she furnishes the psychiatrist with particular information in order to affect her management in a particular way, even within the acute stages of her schizophrenic illness (Jefferson, 1993). This has implications for any interviewing, as part of the patient's management, where the possibility of the patient adopting a particular approach in order to affect his management would have to be considered. It would seem particularly pertinent at this point in time, as interviewing will potentially play an even greater role in patient management with the introduction of renewable sentencing for mentally disordered offenders.

In contrast, within the prison environment, this narrative does not play an important role in decisions relating to the individual inmate's management. Furthermore, this narrative is not commonly discussed within this environment, as suggested by staff and inmates at the prison involved in this study, and, indeed, where discussed, there is no positive reinforcement for inmates producing a coherent narrative for the events leading up to arrest. Interestingly, for prison inmates, the narrative demanded in this study in the 'life' task resulted in them producing a sample of unique discourse, which was not necessarily structured in terms of a story grammar.

It was also noted that those discourse samples involving a narrative framework all included reference to the offence culminating in the participant's arrival at the institution concerned whereas those narratives not following a narrative framework did not make reference to the

person's offence. It would be interesting to look at the relationship between these factors and other issues. These issues might include the following: the individual person's concept of himself as a character independent of the person's forensic history and the person's view of himself as a perpetrator of the offence or as a person within an institution who has also coincidentally committed offences. It is possible that an indicator of lowered risk for reoffending might involve the person demonstrating an ability to recount a similar story to that involving his offending behaviour, but with a different less maladaptive ending. An alternative possibility would involve looking at whether the individual was able to recount a story in which a different person is the focus of the story e.g. the victim. It would also be interesting to observe whether the person was able to produce a parallel story where this story had not been the focus of therapy. In the narratives outlined above the person would be required to utilise at least in part 'unique discourse', perhaps reflecting more closely thought patterns and thus providing a better indicator of risk of offending and other maladaptive behaviour. The findings in this study would suggest that using these alternative discourse tasks might be a more effective way of assessing the individual's mental health and risk to himself and the public. Analysis using principles of conversational analysis could provide an additional level of understanding of the participants. This is done in the next section.

(2.) Observations Regarding 'Life Sample' Based On Principles Of Conversational Analysis

In accordance with the criterial properties of oral narratives of personal experience (Labov, 1972a; Labov, 1972b; Linde, 1986; Polanyi, 1989), all the narrative samples demonstrated well-defined boundaries and a describable internal structure. The individual participant verbally negotiated the narrative to be told, or accepted the task of telling his narrative of his life before he came to the institution, in a determination of the initial boundary of his narrative. He then recounted a structured narrative that constituted one turn, uninterrupted by the listener. The strength of this unit's boundary was demonstrated by the lack of interruptions to this unit, which was only interrupted in the case of two participants, subject 5 with schizophrenia and subject 2 without schizophrenia.

Examining the content of the two narratives where the listener contributed during the narration, it is noteworthy that they both included a limited number of ideas, with no additional information being offered to extend the progression of the narrative, when the researcher interrupted. Thus,

e.g. subject 5 (with schizophrenia) 's narrative (**bold font = interviewer's contributions**):

"married

common law wife

wife older than me

a daughter who last saw now two three years ago

spent three years as a father

before being commonly law married (unclear, only deciphered later on recording)"

"mm"

"charged with GBH leading to B. (Institution where interview took place)"

"you said for three years a father

surely you're still a father"

"unintelligible response (possibly explaining his comment "before being commonly law married")

also I sung in a church choir"

"do you do any singing now"

"sometimes

my father is the organist and the minister in the local church

all through my years I've always sung in the choir

it doesn't quite go with being a drug addict"

"I think drugs are entering into all walks of life"

"it was always from the chemist

or buying glue myself

so it wasn't a stark drug addict"

"but as you say that was at one time

and then you changed"

"no I still take them

(unintelligible) medication

(unintelligible) the same effect"

"I don't see")

"I was addicted to") overlap

"this was by the doctor

and that's about it"

Thus, it can be seen that subject 5 provides a minimal narrative in which he provides a chronologue of significant life events, the latter involving "*charged with GBH leading to B.*" (the institution where the interview takes place). This is followed by the researcher questioning the negative sounding comment "*spent three years as a father*", where this is the last life event mentioned before "*charged with GBH leading to B.*" which is evidently a negative life event, and possibly a sensitive area for discussion. This is perceived by the speaker as an invitation to elaborate on the chronologue to provide a narrative or a series of narratives: "*also I sung in the choir*". This is again stated in the past tense, to which the researcher asks, "*do you do any singing now*". The participant then provides a comment relating to the present, and described in the present tense: "*my father is the organist and the minister in the local church*". He adds, "*all through my years I've always sung in the choir*". When he continues by stating "*it doesn't quite go with being a drug addict*", implying that he was a drug addict, the researcher comments, "*I think drugs are entering into all walks of life*", suggesting that having been a drug addict does not damn him. The participant accepts this evaluation, noting "*it was always from the chemist or buying glue myself so it wasn't a stark drug addict*", accepting the evaluation that he might have used drugs whilst carrying on a more positive existence. The researcher, responding to the participant's acceptance of a more positive interpretation of his behaviour, provides yet another positive interpretation "*but as you say that was at one time and then you changed*". The participant does not accept this evaluation, insisting, "*no I still take them*",

and he insists that prescribed medication falls into the same category as the drug taking discussed earlier, despite the researcher suggesting that these two behaviours cannot be categorised in the same way. He then states "*and that's about it*", - a coda, which is discouraging further discussion.

Subject 2 (without schizophrenia), in contrast, does not produce a minimal narrative, but rather produces more extensive language, without furthering the content of the macrostructure of the narrative (i.e. the plot being described). Thus, Subject 2 says:

"ehm rather hectic

I seem to have had a lot of problems with the police

ehm gor in my younger days I used to be balmy

really got me for something I done four years ago

so ehm sort of grown out of criminal activities just for the hell of it

it makes a lot of money

doing it for that

(2 secs)

don't know

probably always breaking the law in some way or another

I see the stuff that I do

like driving whilst disqualified

and stuff like that

I don't see it as a serious offence

I don't see why I should come in prison for stuff like that

*but I I just don't get on with police
and they don't get on with me
they come down and trouble me with something I done four years ago
I mean I've been out of trouble since
I've spent spent a lot of time in jails since eh
but I don't know
about
the charges that I have had were dropped
and it's like"
"so you did it four years ago
and then suddenly four years afterwards then") overlap*

"Yeah)

*then everyone come and trouble me
and could have come and seen me and sorted it out a long time before then
suddenly now come troubling me
when they should have sorted it out a long time ago"
"that's why you're angry"
"certainly is
eh "
"I can imagine it does"
"mm"
"are you hoping to get out soon"*

Thus, interruption by the researcher with subject 2 can be seen as a clarification of the factual content of the participant's narrative: "*so you did it four years ago and then suddenly four years afterwards then*". This is followed by the participant accepting the researcher's understanding of this factual content, and adding emotional force to his reporting, employing the word "troubling" in "*suddenly now come troubling me*", and suggesting "*they should have sorted it out a long time ago*". The researcher suggested the emotional response of the participant, "*that's why you're angry*", which is accepted by the speaker *certainly is*". Suggestions by the researcher allow for the possibility that the speaker accepts an interpretation which is not his own. However, it would also be expected that the researcher would make use of non verbal cues available in her interpretation of the participant's verbal contributions, reducing the possibility of this happening. Non verbal information provided by the speaker in this sample suggested that the researcher's contribution "*that's why you're angry*" could be interpreted as clarification of the speaker's message. The speaker follows this comment by the researcher with an acceptance "eh", prompting an acknowledgement by the researcher; "*I can imagine it does*". A further filled pause by the participant suggests to the researcher that the participant is not willing or able to provide further information on this topic. The researcher then asks an additional question relating to the narrative, but widening the scope of the content, and bringing it closer to the present with "*are you hoping to get out soon?*"

The comments contributed by the person acting as listener and researcher for both the narratives thus do not alter the topic discussed, or the type of discourse unit prior to its

completion. This is in line with Linde's (1993) description of the narrative unit as being such that a second speaker is only able to contribute questions, appreciations and side sequences, so that the discourse unit and topic are not interrupted prior to the unit's completion. Although the speaker's narrative is temporarily interrupted, the speaker does not lose the floor or his turn to the listener, as described by Jefferson (1972). Rather, the speaker resumes the narrative as though this was not halted. Thus, it can be seen that for all participants, the narrative discourse unit has defined boundaries.

The other criterial property of a narrative is that it has a describable internal structure.

Examining the internal structure of the narratives demonstrated some similarities and some differences between the groups of participants with and without schizophrenia respectively.

Commonly, a narrative is seen to consist of four ordered sections structurally (1972a; 1972b). These include:

- i. An optional abstract;
- ii. An orientation;
- iii. Narrative clauses;
- iv. An optional coda.

The abstract, also termed the announcement (Wald, 1978), and the preface (Sacks, 1971; Goodwin, 1984) has a number of functions. It can summarise the narrative or provide an evaluation of the following narrative, where the evaluation involves introducing the listener to the nature of the narrative and the listener's expected response to this narrative.

Goodwin (1984) notes that the position of the abstract at the boundary of the narrative

means that it contains a particularly interactive function. Thus, it can include a bid for an extended turn to include the narrative, or it can include negotiation as to whether the narrative will be told, and what constitutes relevant material.

Within the narrative samples described here, the participant was provided with the instruction "Please could you tell me about your life before you came here", offering a preface to the narrative. Interestingly, two of the nine participants with schizophrenia also provided their own abstract or preface to their narrative, a feature of the narratives of nine of the eleven participants without schizophrenia.

Both participants with schizophrenia (subjects 2 and 6) who incorporated an abstract in their narrative, used the abstract to summarise their evaluation of their life prior to them coming to the hospital. They then oriented the listener to why their life had been like this. This use of the abstract was similar to that by subject 2 of the participants without schizophrenia.

Thus, subject 2 with schizophrenia (Michael) says:

"Well

it was pretty miserable actually

because you know I was in a mental hospital before that"

and Subject 6 with schizophrenia (Jimmie) says:

"my life before I came here

eh eh ordinary

very ordinary

I mean eh ehm

one of the greatest things that have ever happened to me is is discovering that there's more to life than being normal"

The two participants' abstracts can also be seen to be negotiating the content of the narrative. Subject 2's (Michael) abstract ends with a questioning intonation "*because you know I was in a mental hospital before that?*" This abstract is followed by the listener saying:

*"I don't know anything about you
you tell me",*

inviting the speaker to provide an account of the time prior to his admission to the institution in question, including his time in a mental hospital. Michael accepts the invitation, proceeding with the chronological skeleton of his narrative. His account commences with his time in a mental hospital.

In contrast, the abstract of subject 6 (Jimmie) is a statement, which is followed by the listener's acknowledgement or acceptance, demonstrated through non-verbal listening behaviour. This can be viewed as an acceptance of Jimmie's bid for the floor for the duration of his narrative and Jimmie immediately proceeds with his general account of the

past six years. This then proceeds uninterrupted, with Jimmie providing some information about the past six years, which would possibly be perceived as being unusual or abnormal. However, this is not questioned, after Jimmie's preface that "*one of the greatest things that have ever happened to me is discovering that there's more to life than being normal*". The latter comment by Jimmie can be seen as an example of the speaker making the story understandable, where making activities understandable can be seen as necessary with respect to activities as diverse as telling an unusual story, complaining about someone or justifying one's own behaviour. An intersubjective requirement of any story is that the story is always 'understandable', so that at the end of the story a recipient can understand it in terms of belief systems that the listener can accept. This end result requires some 'background detailing' by the speaker, so that stories do not begin with an event or information which cannot be understood in terms of a 'common sense' theory. Rather the scene is set for the story then recounted. As such, the material Jimmie initially provides; "*one of the greatest things that have ever happened to me is discovering that there's more to life than being normal*" 'pre-monitors' (Wooffitt, 1992) the subsequent narrative. This is not just a 'frame' in which the subsequent narrative occurs, but, rather, this comment is used to make the subsequent narrative understandable.

Of the nine participants without schizophrenia who incorporated an abstract in their narrative, six participants questioned or confirmed the requirements of the task, examples of the negotiations including the following two examples (overleaf):

Subject 3 without schizophrenia:

"before I came here"

"mm

yeah"

"what eh

immediately before I came here"

"whatever you want to say

(a about"

("or should I keep giving a general recount of the last sort of ten years"

("yeah fine"

("about "

Subject 5 without schizophrenia:

"em

what would you like to know"

"whatever you wish"

Of the other participants, one participant (subject 1) responded to the literal or direct meaning of the request, stating *"alright"*, and then followed this by his narrative, whilst two other participants (subjects 2 and 4) prepared the listener for their subsequent narrative.

Thus, subject 2 without schizophrenia stated,

"ehm

rather hectic

I seem to have had a lot of problems with the police”

(2 secs.)

summarising the content of his subsequent chronological account of his troubles with the police,

whilst subject 4 without schizophrenia stated,

“I don’t know

(2 secs.)

It’s just like anything else

you know.

I just got on with what I gotta do to get myself sorted out”

It is interesting that subject 4 is the only participant in the sample who incorporated a pause in the section which could be described as the abstract. This is accompanied by an abstract which involves a negative statement about this participant’s ability to fulfil the request; *“I don’t know”*, together with a suggestion that there is nothing remarkable to tell; *“it’s just like anything else”*. The justification for telling a narrative is that it has particular moral relevance and is relevant to be told due to it constituting an unusual experience in some way, so that it has moral implications (Polanyi, 1989). The participant follows this statement about his lack of material to contribute with the suggestion for a shift of responsibility to the listener; *“I don’t know... you know”*. The speaker then provides a general statement, phrased in terms of non-specific verbs including *“got on, gotta do, get sorted out”*. This is followed by a brief narrative, involving few details and further pauses.

The narrative is concluded with a coda or evaluation of the narrative; *“that’s about it really”*, reinforcing the speaker’s suggestion to the listener that there is little to recount.

After the abstract, if it is present, most narratives include orientation clauses, to establish the characters, the time, the place and the circumstances of the narrative. Orientation clauses may be included at the beginning of the narrative or interspersed with narrative clauses. Within these narrative samples the key character and circumstances of the narrative were specified in the instruction *“Please could you tell me about your life before you came here”*, requiring that the speaker orient the listener to the time and place of the narrative.

Schegloff (1972) discusses the methods by which co-conversationalists describe the locations of people and places. He notes that locations are not entirely specified in terms of their geography, but that rather the speakers relate their descriptions of locations to the location of co-conversationalists, and other factors such as the topic or activity of the interaction. This can be described as location anchoring. It is also possible for speakers to parallel location anchoring with time anchoring in which identification of times is anchored in terms of the times of relevant factors to the conversation or conversationalists.

Examining the narratives produced by both participants with and without schizophrenia, it was possible to describe the general failure to use location and time anchoring by speakers with schizophrenia relative to the other speakers. Four of the participants with schizophrenia produced an appropriate account in response to the question and referred to

their current location if this was relevant. However, they referred to the location by name rather than by making use of terminology such as 'here' or 'there', therefore not making reference to the location of the conversation. Three of the participants told a narrative such that location was not a significant factor in their account, and as such these participants' narratives did not make use of time anchoring. Only subject 6 with schizophrenia (Jimmie) and subject 8 with schizophrenia (Bob) made use of the mechanism of anchoring, examples including "*used here*" and "*the last 6 years*" (subject 6), and "*and then I came to B.*" and "*and here I am at B.*" (Subject 8).

This reference to time and location contrasted markedly with the participants without schizophrenia. They, with the exception of two participants, included anchoring to time or location, with particularly extensive reference to time. Examples include (subject 3 without schizophrenia):

(orientation to time)

*"and then about two yeah about two years ago and
in the last couple of years"*

(orientation to location)

*"doing the same course that I am doing in here
except on the outside the course got cancelled from lack of interest"*

In fact, the only participant including anchoring to time but not location was interestingly a participant who provided an account in present tense of his life outside of the institution where he was now resident. He did not make any reference to his having been arrested or

imprisoned, possibly suggesting at least at some level a denial of his current location. Notably, those participants not describing time and location (subjects 4 and 10 without schizophrenia) were those participants who produced minimal reports, suggesting they did not have a moral implication relevant to the interview. Minimal narratives occur infrequently. Linde (1993) notes that they generally occur when the speaker is obligated to recount a narrative which is unpleasant or painful, so that it is produced in limited format. This makes it most likely to occur in an interview situation as here the speaker may be asked a direct question where the power relationship between the interviewer and interviewee constrains the possibilities for refusing to respond with the narrative that is requested.

The main body of the narrative involves a sequence of narrative clauses. The chain of events relating to the characters and the setting, constituting the content of the narrative, can be distinguished from the method via which this is communicated. It is possible for the sequence of events that occurred not to match entirely the order employed to describe the narrative. Variations include that in which the order of the actual occurrence of the events in the narrative and the order in which events are recounted match, that in which the narrative involves a 'flash-back' in order to describe an earlier event or occurrence, so that an earlier event is referred to later in the narrative, and a narrative where the order is in 'medias res', where only some parts of the narrative are recounted (Chatman, 1978).

Within the narratives described in this study, the narrative sequence for the majority of narratives followed the sequence in which the events occurred. Exceptions involving flash-

backs included the narratives of one participant with schizophrenia (Subject 2 with schizophrenia - Michael), and four of the participants without schizophrenia (Subjects 1, 2, 3, and 9 without schizophrenia).

The narrative clauses may or may not be followed by a coda, which signals the end of the narrative. The coda, where present, can include a purely formal marker like "*that's about it really*" (subject 4 without schizophrenia). It may additionally serve another purpose such as relating the narrative account to the present. The latter use of a coda was only found in this data where the coda described the participant's incarceration within the institution where the conversation took place.

Also interspersed in narratives are evaluations. These do not have a standard position in the structure of the narrative, but they are crucial in conveying to the listener the point of the story or why it is worth telling this story. Describing this in interactional terms, evaluations are the part of the narrative that conveys to the listener the intended meaning of the narrated sequence. This is therefore the most important part of the narrative socially (Wolfson, 1982).

The evaluations within a narrative about the self can be seen to be demonstrating the speaker's understanding of the listener's moral standards, and his negotiation as an acceptable member of the listener's group. Thus, the evaluations in a person's self narrative can be perceived as his self evaluation as an acceptable member of the group. As such, it would be expected that the content of the narratives would differ between these two

groups of participants. It would be expected that the group of participants with schizophrenia would perceive themselves as members of a group of ill patients, given their hospitalisation. In contrast, the group of participants without schizophrenia would perceive themselves as members of a group of men accused of activity warranting a prison sentence, but with prison not necessarily justified, as these individuals were all on remand. Participants with schizophrenia would see their life before they were admitted to a Special Hospital as a period in which they were demonstrating symptoms of mental illness and a deterioration in their lifestyle, with increasing negative thoughts and events, until their index offence. Their index offence would demonstrate them as a danger to themselves or others, and would mean their admission to the Special Hospital. Being perceived as dangerous would be unpleasant to contemplate, and their index offence would be most likely interpreted by staff within the institution as not entirely justified by their mental illness, and abhorrent. It would therefore be likely that the description of the index offence would not be detailed, or would be described in terms which justified the act. In contrast, participants without schizophrenia might perceive of themselves as individuals whose activities had fallen foul of the law, but which did not justify them being in prison, which would be construed as being for bad people. It would be likely that they would suggest that either they had been falsely accused, or that their alleged offence was not of a serious nature.

These expectations were born out in the data. Narratives of the participants with schizophrenia included a chronologue of difficulties. This was followed in the majority of these narratives (seven of a cohort of 9 participants with schizophrenia) by justifications for

the participant's index offence (e.g. Subject 2 with schizophrenia (Michael) below) or an allusion to the participant's index offence without further descriptions of the offence (e.g. Subject 1 with schizophrenia (Martin) overleaf).

Subject 2 with schizophrenia (Michael)

"I couldn't get work

and I was on the dole

and (sigh)

I was

in 1982

it was a very traumatic year for me

because me mum died

she died of pneumonia

and then my uncle a few weeks later

(additional details leading to a suicide attempt)"

Subject 1 with schizophrenia (Martin)

"in 1986 I did some

I did something which really worried me"

Evidently, it is possible that there is a discrepancy between some of the narrative accounts by the participants and the events described as they actually occurred. Nevertheless, the narratives as they were recounted remain of interest in the ways described in this discussion in that these were the narratives that were recounted. Also, interestingly, where it was

possible to confirm the details of the narrative accounts via another source, facts were found to be accurate.

It would also seem to be of potential interest that, within the narrative accounts, the two participants who did not include any mention of their index offence were the two participants within this group (subject 4 with schizophrenia (Dennis) and subject 6 with schizophrenia (Jimmie)) who were thought disordered at the time when this project took place. Within the special hospital environment it is considered normal to discuss issues relating to ones index offence, making an omission of their index offence within these participants' accounts remarkable. Perhaps their omission of any discussion about their index offence could be related to their psychosis. Is one interpretation of psychosis a defence against concepts which are otherwise too difficult to contemplate as might be suggested in a psychoanalytic account of psychosis, as discussed in Jefferson (Jefferson, 1993)?

On a more practical level, the finding of a relationship between this omission and psychosis within this study suggests the possible value of further investigations as to whether measures of thought disorder correlate with omissions of what may be considered key events within similar or more varied narratives.

Within the narratives of participants without schizophrenia, participants provided details relating to their life's normality. Eight of the eleven participants followed this by a reference to their alleged offence, whereas the remaining three participants did not make

reference to this event. Where no mention was made, and the researcher asked a question which might have been perceived as a probe for further information, participants made explicit their unwillingness to divulge certain information. As an example, subject 8 without schizophrenia suggested:

“There’s not much about my background that is really imp really interesting because most of it is in here now most of it is in prison for the last couple of years”

“yes but you have a whole person from before you came here”

“yeah”

“but some of it I’d rather keep quiet”

The other eight participants of the cohort of participants without schizophrenia all referred to their offence or procedures related to their arrest. Those participants only making reference to the latter (subjects 3 and 5 without schizophrenia) did not discuss matters relating to the arrest in any detail. Rather, they referred to it briefly as part of a larger and more detailed narrative. This reduced the significance of the incident to the narrative as a whole, with for example subject 5’s reference consisting of

“I was extradited back to England”

The remainder of the narratives placed an emphasis on the person’s innate goodness via one or more of a number of methods. These included justification for the action by way of difficult circumstances, e.g. Subject 3 without schizophrenia:

“in the last couple of years

I’ve not actually been too involved in a great number of things that I used to

I didn't have access to my own children

eh

I wasn't involved with the with the narrow boat so much

because ehm

another guy that used to work on the boat with me

he used it as partly as a source of income

so he didn't lend it to the trips

over the last couple of years

and I was more of a standby

ehm it sort of financed his trips to Africa and that"

and a bit later:

"I was trying to get sorted at at home

and also I was trying to find a more more regular source of income workwise and that

it was a little difficult for a while

plus all the eh change in government legislation doesn't exactly make it easier for me and

for a whole number of other people"

minimalising the offence e.g. Subject 4 without schizophrenia

"I got disqualified for speeding on a motorway"

suggesting the inappropriacy of prison e.g. Subject 2 without schizophrenia

"the charges that I have had were dropped"

and later:

“then everyone come and trouble me

and could have come and seen me and sorted it out a long time before then

suddenly now come troubling me

when they should have sorted it out a long time ago”

and an account of the alleged behaviour being a behaviour which no longer characterised the individual, but rather was something that the individual did in the past,

e.g. Subject 2 without schizophrenia

“in my younger days I used to be balmy

really got me for something I done four years ago

so ehm sort of grown out of criminal activities just for the hell of it”

and

e.g. Subject 7 without schizophrenia:

“but got over all these problems

got meself settled”

These accounts can also be understood in terms of ‘expert coherence systems’ and ‘semi-expert coherence systems’ (Linde, 1993: 163), where the coherence system is a global cultural device for structuring experience into socially sharable narrative. The coherence system is the discursive practice representing a system of beliefs and relations between beliefs. This provides the context in which one event or statement may be considered as

the cause of another event or statement. The coherence system can include both common sense beliefs which are shared or minimally understood by all persons within a culture and beliefs and relations between beliefs which are the property of a group of experts, termed an expert system. The semi-expert coherence system is a system of beliefs derived from an expert system, but used by someone with no corresponding expertise or credentials.

Jordan (1989) notes that any member of a group of experts needs to learn how to tell appropriate stories, the particular story performing an information packaging function, and also identifying the speaker as having a suitable claim to membership of the particular 'expert' group. Consistent with this, the stories of the participants with schizophrenia would appear to be identifying with a life in which there is a chronologue of negative events culminating in a serious incident leading to the participant's institutionalisation. By contrast, the participants without schizophrenia are seen to be leading what can be classified as a 'normal' existence, and are then arrested, but in circumstances where their alleged offence does not justify their imprisonment.

At a social level, particular sequences of events are acceptable as constituting adequate accounts. These are seen to demonstrate appropriate causality and continuity, with the events recounted being acceptable to the listener as a sequence of events. Extra force is provided in the demonstration of adequate causality by the speaker providing multiple forms of non-contradictory evidence for the sequence of events included in the account. Thus, for example, participants with schizophrenia provide a number of examples of events

which are consistent with the negative impact of illness, whilst participants without schizophrenia provide varied pieces of information suggesting their 'normality'.

The success of these narrative accounts is dependent on the listener accepting that the sequences of events provide appropriate evidence for the evaluations made by the speaker. This requires that the speaker's account is consistent with the social systems of assumptions about the world. These frequently involve semi-expert systems, derived historically from systems that are expert systems, but which have now been adopted more widely within a reduced form. An understanding of schizophrenia is considered to be the property of an expert group of psychiatrists and psychologists. However, aspects of the illness and its impact on individuals are understood more widely, including the negative impact of the illness on peoples' lives, and a possibility for this being a factor in an offence. These beliefs are so pervasive as to almost constitute an invisible coherence system, which is no longer perceived as an expert or semi-expert system, but is rather perceived as a common sense set of beliefs. These beliefs are thus perceived by speakers to be known and shared by people within a Western culture. They would therefore be considered true for all participants within this study (who all had a Western background). Such widely accepted beliefs are generally not perceived as a set of beliefs, but as facts. Thus, the series of events described would be perceived as a natural reflection of schizophrenic illness, and landmark events in the story of an individual with schizophrenia.

Conventionally, the life story includes certain kinds of landmark events. Moreover, the narrative's content (the items it includes and excludes) and the narrative's form (the

structures used to make it coherent) reflect membership of a particular culture. Aspects of the narrative form used to express the speaker's interpretation of landmark events are very varied. Wolfson (1982) describes a wide range of linguistic structures and linguistic choices. These include the choice of specific words, a switch of linguistic form from the surrounding forms, e.g. A contrast of direct and indirect discourse, paralinguistic features such as pitch or tone of voice, and nonlinguistic features such as gesture and facial expression.

Aspects of the participants' 'perceptions of their narratives' were reflected in their choice of linguistic structures, in addition to the actual events included in their narratives, as demonstrated in the three examples from the narratives of participants with schizophrenia described below:

Subject 3's (Chris) description of positive events was entirely in the past tense. By contrast, his description of negative events was in the present tense. This pattern of language use could be seen to reflect Chris' perceptions of his life. His description would appear to depict a period in the past that he now perceives as a relatively pleasant time, prior to the onset of his illness. This is followed by the onset of illness, which he associates with unpleasant symptomatology, thus describing negative symptomatology in the present tense

e.g. *"Got a job as a radio controller"* (past tense)

And later

"and now I am divorced" (present tense)

Subject 5 (Conrad) included explicit use of the subject 'I' when referring to behaviours and events which he considered to be a part of his current life as well as a feature of his life in the past,

e.g.

"All through my years I've always sung in the choir"

and

"I was addicted to drugs"

(where he explained that he perceived himself as still addicted to drugs, where this referred to predominantly prescribed drugs, but he thought of them as similar to the drugs he had previously taken for recreational purposes)

whilst omitting the subject 'I' where he perceived behaviours and events to relate only to his past, e.g.

"Spent three years as a father before being commonly law married charged with GBH leading to B. (location of assessment interview)"

Subject 6 (Jimmie) suggested that his behaviour was the product of his illness and his youth. His account of his life prior to his admission to the institution in question was described in terms of passive utterances suggestive of events happening to him, rather than him being the orchestrator of his life, as seen below:

e.g.

"One of the greatest things that have ever happened to me"

and later

“the last six years they have been up and down up and down up and down”

with later

“and that torment made me very unwell”

This pattern of linguistic structure reflecting participants' perceptions of their life narratives was also evident in the narratives of participants without schizophrenia. An interesting example of this is found in the narrative accounts of the two participants without schizophrenia who did not refer to their offence and the events relating to their arrest. They both spoke of events in their past in present tense, as if these related to their current activities and relationships,

e.g. Subject 6

“and the only time we see Anuska (daughter) is when we pass each other on the stairs”

e.g. Subject 9

“play football at weekends

get down to the pub now and again

go to the odd rave”

Typically, any extended narrative also includes all those issues which play a major role in a person's self definition. Interestingly, whereas family members are mentioned within four of the narratives of participants with schizophrenia, family is mentioned by all of the

participants without schizophrenia, excepting two of these participants, one of whose narratives makes implicit reference to family. The researcher was not party to participants' interpretations of their relationship with their families, and it is possible to postulate a number of reasons for the variation between participants with schizophrenia and those without schizophrenia as groups. It is possible that participants with schizophrenia did not perceive their family in as integral a way as those participants without schizophrenia. This could reflect their extended period of uninterrupted incarceration within an institution, which contrasted to the experience of those participants without schizophrenia. It is also possible that participants with schizophrenia generally experienced poorer relationships with relations than participants without a documented history of mental illness, so that family were not perceived in as integral a way. Of course, it is equally possible to postulate other explanations for this data, which cannot be corroborated without more extensive knowledge of these participants, which it was not possible to obtain in this study due to researcher access restrictions.

Looking at the 'life sample' using principles of conversational analysis thus demonstrated a number of very important findings. Most importantly:

1. There were significant differences between the 'life samples' of participants with schizophrenia and participants without mental illness. It is suggested that these are not a result of the possibility that if sufficient analyses are performed differences will be evident. Rather, it is suggested that the 'life discourse sample' has a relatively minimal requirement for considerations of 'intersubjectivity' and a social consideration of listener expectations. This means that the differences between those samples of participants with schizophrenia

and those without mental illness did not differ significantly on measures designed within a discourse analysis framework. Focusing on the interactive element by utilising an approach that emphasises the importance of a consideration of discourse as a collaborative effort between participants allowed these differences to be discerned;

2. The approach enabled the researcher to examine individual participants' linguistic behaviour in addition to group data derived when using the discourse analysis model.

Where similar findings result from a number of different approaches, this allows the attribution of more credence to the findings;

3. The differences between participants' performance on the 'life' sample and other discourse samples reinforces the importance of considering a variety of discourse samples when analysing the discourse of any individual.

SECTION 0.6

IMPLICATIONS OF THE PRESENT STUDY FOR DEVELOPMENT OF A LANGUAGE MEASURE

(1.) Implications For A Baseline And Outcome Measure For Language Therapy

Findings within this study pointed to within group language differences and language differences between the groups of participants with a diagnosis of schizophrenia and participants without mental illness respectively. As described by Frith (1992), cognitive and linguistic descriptions are descriptions at different levels. A description in terms of language processing becomes particularly valuable in view of the fact that it is discourse that we are able to evaluate from natural situations, whereas we are restricted to evaluating cognitive skills within tests which are atypical of everyday situations or via inferences from

language. Notably, the descriptions in terms of cognitive variables as described in Section O.4 were difficult to translate into specific implications. The possibility of a reliable and valid baseline and outcome measure of language that requires little time for analysis is therefore particularly attractive. This study has provided some normative data from inmates within a prison, and from nurses in a special hospital setting (as part of the therapy study, described in Chapter Five). Importantly, these are not difficult to obtain and are easy to score. It has then been possible to train clinicians to analyse spontaneous language in terms of the frameworks for which baselines were established, following a brief explanation, and for clinicians to carry out this analysis 'on-line'. This has meant that the frame analysis assessment as described here could offer a useful clinically viable tool for the analysis of language with persons having a mental health diagnosis. It would be hoped that more language data with appropriate analyses would in time provide more information to support particular cognitive descriptions. The significance of the language measures developed as part of this study may be important in the development of language measures in future studies. The importance of suitable language measures is discussed further in Chapter Five. Similarities between language presentations in persons with a range of related diagnoses (e.g. Asperger's Syndrome, Personality Disorder) would suggest the potential importance of language measures similar to those described for a wider population. The possibility that these measures may provide valuable information about children's language abilities as suggested when the language difficulties are viewed as a developmental difficulty (e.g. Crow, 1997; 1998) suggests yet another area for their potential use.

(2.) Implications Of Language Samples In This Study For Therapy For Participants With A Deficit In Theory Of Mind

The pattern of differences between the 'life' discourse sample and other language samples of participants with schizophrenia within this study suggest that it is possible to provide a discourse structure for participants with schizophrenia, which they can incorporate at least within a restricted range of discourse tasks. This suggests that the participants with schizophrenia may be able to benefit from speech and language therapy where such therapy would enable them to produce discourse with an appropriate discourse structure within a wider range of circumstances (please see chapter five) . The increased use of an appropriate discourse structure by participants with schizophrenia would have multiple benefits for both the participants as speakers and the listener. Specifically, participants would benefit from generalising their ability to use an appropriate discourse structure in a wider range of discourse situations. Within this study, there were marked differences between the life discourse sample and the other discourse samples gathered (including other narrative discourse samples). This might suggest that participants with schizophrenia were only able to use an appropriate framework within a restricted range of discourse tasks, perhaps only where their discourse included predominantly formulaic discourse. The ability to utilise an appropriate structure within a wider range of discourse tasks, even where still restricted, e.g. to narrative discourse, could mean extensive benefits for the speaker and the listener.

Evidence suggesting the possibility that the ability to use discourse structure may be generalised is provided by work with people with Asperger's Syndrome and people with

autism. Individuals with these diagnoses have been taught a structure, which they have subsequently used in a variety of situations. One example of such a structure is that outlined by Gray (1994). She describes a technique she has developed, called Comic Strip Conversations. This is a pictorial representation of the different levels of communication that occur in a conversation. Stick figures, speech and thought 'bubbles', symbols and colour are used to enable the individual concerned to see aspects of discourse of which they may not have been aware. One method of using comic strip conversations that she suggests is to show that each person may have very different thoughts and feelings in the same situation. Another use is found in the representation of the sequence of events in a conversation to illustrate the potential effects of a range of alternative comments or actions. She reports success with these methods.

Even were the participants to generalise their use of an appropriate discourse structure to other narrative discourse samples but not other forms of discourse, the benefits for the individual concerned would be substantial. For the speaker, it is the narrative in which the person situates his experience, determining the meaning given to that experience. It is possible that a major difficulty in acute psychosis is the unsuccessful search for a narrative. It is part of human nature to try to make sense of situations that seem incomprehensible. For example, in order to get a better control of a situation, our minds construct theories or stories about what has caused the problems and how they can be solved. Stories are also important in that past experience and the ability to relate events are an essential part of a person's make up, with other people's view of us to a large extent dependent on our

relating and sharing of common experiences. Thus, forming a narrative about our experiences is an integral part of our self-understanding.

Narrating of stories is also important in our daily communication with others in that hardly any of our day-to-day use of language stops after one sentence, and as argued by Cheepen (1988), a large proportion of our interaction takes place through the medium of the narrative or story. This type of interaction is collaborative, and allows evaluations to be exchanged and matched during the interaction, suggesting the importance of an organised framework for both speaker and listener, and the importance of being able to consider other peoples' beliefs, intentions and desires. Thus, the implications of being able to produce a suitable narrative account of one's life history has important implications.

The significant differences between the 'life sample' and other discourse samples within the study, together with the implications for research and clinical purposes, as described above, suggested the importance of looking at this particular sample using other available methods. For this reason, principles of conversational analysis were applied to this data. Examining the narratives of those participants with and without schizophrenia for patterns in their story about their lives before they came to the institution where they were interviewed produced evidence for a number of interesting findings.

(3.) Implications For Further Development Of The Measure

Within the study it was evident that despite the large number of measures used, significant differences between the groups of participants were apparent at the level of frames rather

than at disparate levels throughout the analysis suggested by Frederiksen *et al.*'s (1990) model. Further analysis of one discourse sample using principles of conversational analysis demonstrated differences at a similar level, the level of frames, both for the groups of participants and individual participants. This would suggest the value of expanding analysis at the level of frames. Expansion of the linguistic analysis at the level of frames is described for narrative, procedural and conversational discourse samples below.

Narrative Discourse Framework

It is proposed to expand analysis of the narrative framework at the level of frames to include the following: the framework described by Garber and Detweiler (1993) as outlined in an adapted form overleaf in Diagram 7, Bamberg and Damrad Frye's (1991) evaluation categories and Reinhart's (1995) evaluation focus in the analysis (where these last two are outlined in Diagrams 8 and 9 respectively). Those methods of analysis outlined in Diagrams 8 and 9 would also seem to be particularly relevant in view of the postulated cognitive disorders as demonstrated in the language of participants with schizophrenia, as discussed in Section O.4.

**Diagram 7:
Frame Level Analysis Proposed by Garber and Detweiler (1993) for Narrative Discourse Samples**

<i>1. setting</i>	<i>Habitual or static states of characters and locations</i>
a. Major setting	The first introduction of the main characters, activities, and locations. Locations are considered major setting statements only when they are specified in the same proposition as the character.
b. Minor setting	Subsequent changes in characters, times, activities, and locations. Minor settings include descriptions of people and objects.

2. Initiating events	<i>The immediate cause for a response on the part of the protagonist</i>
a. Natural occurrence	A change in the physical environment. It is not caused by an animate being and cannot be directly caused by characters' actions.
b. Action	An action performed by one character that stimulates a response in another character.
c. Internal event	Perception of an internal or external event or changes in internal states such as pain, hunger, sickness... This includes all senses.
d. Verbalisation	An initiating event expressed in dialogue form.

3. Response	<i>The psychological state of the character after the initiating even or a verbal response to a situation.</i>
a. Affective	The character's emotional response
b. Goal	The character's desires or intentions
c. Cognition	Statements that refer to a character's thoughts

4. Plan	<i>Statements that specify a character's strategy for obtaining the goal</i>
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5. Attempt	<i>The character's overt action(s) to obtain the goal</i>
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6. Direct consequences	<i>The character's success or failure at attaining the goal(s): any changes in the sequence of events resulting from the character's actions.</i>
a. Natural occurrence	A change in the physical environment that affects the achievement of the character's goal
b. Action	Actions of the character that impinge upon the attainment of the goal
c. End state	An event that is not immediately changeable or one that connotes finality.

7. Reaction	<i>The way the character feels or reports feeling about the outcome: the character's thoughts</i>
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	<i>regarding success or failure.</i>
a. Affect	The character's emotional state.
b. Cognition	The character's thoughts
c. Action	Actions that result from an emotional response

Diagram 8

Bamberg and Damrad-Frye's (1991) five evaluative types:

a. <i>References to frame of mind</i> – emotional states, mental states and activities (e.g. being sad, happy, scared, thinking, being interested in something).
b. <i>Character speech</i> - either a direct or an indirect statement of any character. Although character speech is not necessarily evaluative, it attributes particular intentional states to a third person and thus the narrator uses this device to distance himself from the plot line.
c. <i>'Hedges'</i> - which function as distancing devices. This refers to any lexical device that suggests non-commitment to the truth value of the proposition (e.g. seems like, basically, kind of, probably).
d. <i>Reference to negative states and actions</i> – direct negations such as no, not.
e. <i>Causal connectors</i> - inter-clausal connectors such as because, since, that's why, so.

Diagram 9

Reinhart's (1995) evaluation foci

Reinhart's (1995) evaluation foci suggest that there is a concentration of evaluation devices at 'centred points' in stories, where evaluation devices help in creating and building up tension in specific places in stories, and in presenting the thoughts and feelings of the heroes and narrator of stories. Further details are provided in Reinhart (1995).
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Procedural Discourse Framework

It would seem appropriate to analyse the procedural discourse within a linguistic framework as used in this study. Where a suitable framework is not available within the literature, it is necessary to find an alternative means for determining the frames necessary

to complete the task. The frames can be derived from procedural descriptions by significant others in the person's environment, or, if these are not available, those frames considered to be important by the clinician or researcher (please see therapy study for a comparison between these two methods of deriving key frames).

Conversational Discourse Framework

Within conversational discourse the framework for analysis could include 'what', 'where', 'when' and 'why' are described for each topic, with the understanding that this information will not be included when presupposed. (Please refer to therapy study for more details, including the rationale for these measures)

The differences in participants' performance over the varied discourse types would emphasise the importance of considering a variety of discourse samples in any discourse assessment, to include narrative, procedural and conversational discourse samples. Some baseline measures have been derived within this study, and the ease with which these norms could be obtained and interrater and intrarater reliability achieved suggest the viability of this method of assessment as a clinically suitable option.

Measures at the level of frames would be supplemented by other measures designed to reflect Frederiksen *et al.*'s (1990) model, where these measures would include the following measures of cohesion and coherence:

- % 'non-verbal' anomalies in relation to overall semantic content or discourse situation per total propositions
- % non-self-corrected potential loss of integration of prospected topics or domains per total propositions
- % listener requests for repair of topic integration per total propositions
- Average, range and median propositions per topics-conversations

SECTION P

INTERRATER AND INTRARATER RELIABILITY OF LANGUAGE MEASURES

(This corresponds to Results Section K)

Interrater reliability is discussed with respect to the narrative and procedural discourse samples in Sections P.1 and P.2 respectively. This is followed by a discussion of intrarater reliability for narrative and procedural discourse samples in Sections P.3 and P.4 respectively.

Raters' measures were considered concordant for categorical measures where measures by the two raters were identical.

With regard to the non-categorical measures, ratings were considered concordant where rescoring of the data in terms of ranks would have resulted in the same rank ordering for both raters. Other methods of examining concordance, including statistical methods, were not appropriate because of the possible wide variance between measures by the two raters as a result of small rating differences. This difficulty was particularly acute due to the

small numbers of propositions and T-units involved in certain discourse samples, where measures were predominantly measures expressed as percentages of the number of propositions or T-units in the discourse sample.

SECTION P.1

INTERRATER RELIABILITY OF NARRATIVE DISCOURSE MEASURES

i. Interrater Reliability Of Frames Analysis

There was 90% concordance for the two raters in their assignment of narrative propositions to the varied frame categories included in the study. Where there were differences between the two raters, in both cases the raters had individually questioned their method of scoring this data. In both cases the raters had made an arbitrary decision with respect to their frame analysis, recognising the arbitrary nature of their decision. The raters' lack of confidence in their frame analysis of these propositions differed from their analysis of the other propositions into frame categories, where both raters did not question their decisions. In both these cases of difficulty, raters' questions revolved around the issue of what constituted a frame: was this dependent on the presence of the particular content of that frame in the part of the sequence reserved for that frame, or on its presence anywhere within the discourse sample? Specifically, the questions were as follows: was a description of characters not included in the initial part of the narrative, but rather mentioned as part of the 'development' of the narrative acceptable as part of the 'setting'? Also, could a 'resolution' be considered present, where the 'complication' to which this would refer was not included in the person's narrative?

ii. Interrater Reliability For Measures Of Integrative Operations

For measures of integrative operations, there was complete concordance between the raters, excepting raters' measurement of measure c for one participant, where measure c refers to the percentage of repeated information per total propositions. This was a result of one rater considering one proposition a repeat of another proposition where the propositions were identical but the referent of the proposition was different. This contrasted with the other rater, who considered that this was not an example of repetition due to the different referent involved, a difference which could have been easily resolved to improve the interrater reliability of this measure.

iii. Interrater Reliability For Measures Of Semantic Network Generation

Measures by the two raters were concordant for the majority of measures. However, raters differed in their rating of 'measure f' for two participants. In the first instance this was due to one rater (rater 1) considering an incomplete word in the transcription as its non-existence, differing from the other rater (rater 2), who considered this as the production of the word in abbreviated form as part of spontaneous discourse. In the other instance, there was a difference of opinion between raters as to whether a verb was omitted inappropriately (rater 1), or whether this was acceptable as part of spontaneous language usage (rater 2). Raters also differed in their scoring of measure Gi for one participant. This was due to rater 1 considering a particular anomaly as an example of disruption at both the level of cohesion and coherence. In contrast, rater 2 considered the same anomaly as an example of disrupted cohesion only.

iv. Interrater Reliability For Measures Of Logical Or Macrostructure Inferences

There was 100% concordance between the two raters for measures of logical or macrostructure inferences.

v. Interrater reliability for measures of local propositional inferences

There was 100% concordance between the two raters for measures of local propositional inferences.

vi. Interrater Reliability For Measures Of Semantic Interpretation Or Proposition Sequences

There was 60% concordance between the two raters for measures of semantic interpretation or proposition sequences. Excepting one difference, lack of concordance was a result of rater 1 and rater 2 calculating T-units differently. The remaining difference was due to differences in raters' understanding of what constituted a difficulty at the level of coherence and what constituted a difficulty at the level of cohesion.

vii. Interrater reliability for measures of syntactic dependency graphs

There was 100% concordance between the two raters for measures of syntactic dependency graphs.

SECTION P.2

INTERRATER RELIABILITY OF PROCEDURAL DISCOURSE MEASURES

i. Interrater Reliability Of Frames Analysis

There was 100% concordance between the two raters for measures of frame analysis.

ii. Interrater Reliability For Measures Of Integrative Operations

There was 100% concordance between the two raters for measures of integrative operations.

iii. Interrater Reliability For Measures Of Semantic Network Generation

There was 100% concordance between the two raters for measures of semantic network generation.

iv. Interrater Reliability For Measures Of Logical Or Macrostructure Inferences

There was 100% concordance between the two raters for measures of logical or macrostructure inferences.

v. Interrater reliability for measures of local propositional inferences

There was one incident of lack of concordance for measures of local propositional inferences. This related to the number of units containing anaphoric referents or elliptical structures, with the two raters recording 5 and 6 incidents respectively.

vi. Interrater Reliability For Measures Of Semantic Interpretation Or Proposition Sequences

There were two incidents of lack of concordance of the average number of propositions per T-unit. These were due to a difference between the raters' calculation of T-units.

vii. Interrater reliability for measures of syntactic dependency graphs

There was 100% concordance between the two raters for measures of syntactic dependency graphs.

SECTION P.3

INTRARATER RELIABILITY OF NARRATIVE DISCOURSE MEASURES

i. Intrarater Reliability Of Frames Analysis

There was 100% concordance between the rater's scores on the two occasions.

ii. Intrarater Reliability For Measures Of Integrative Operations

There was 100% concordance between the rater's scores on the two occasions.

iii. Intrarater Reliability For Measures Of Semantic Network Generation

There was 100% concordance between the rater's scores on the two occasions.

iv. Intrarater Reliability For Measures Of Logical Or Macrostructure Inferences

There was 100% concordance between the rater's scores on the two occasions.

v. Intrarater reliability for measures of local propositional inferences

There was 100% concordance between the rater's scores on the two occasions.

vi. Intrarater Reliability For Measures Of Semantic Interpretation Or Proposition Sequences

There was 100% concordance between the rater's scores on the two occasions.

vii. Intrarater reliability for measures of syntactic dependency graphs

There was 100% concordance between the rater's scores on the two occasions.

SECTION P.4

INTRARATER RELIABILITY OF PROCEDURAL DISCOURSE MEASURES

i. Intrarater Reliability Of Frames Analysis

There was 100% concordance between the rater's scores on the two occasions.

ii. Intrarater Reliability For Measures Of Integrative Operations

There was 100% concordance between the rater's scores on the two occasions.

iii. Intrarater Reliability For Measures Of Semantic Network Generation

There was 100% concordance between the rater's scores on the two occasions.

iv. Intrarater Reliability For Measures Of Logical Or Macrostructure Inferences

There was 100% concordance between the rater's scores on the two occasions.

v. Intrarater reliability for measures of local propositional inferences

There was 100% concordance between the rater's scores on the two occasions.

vi. Intrarater Reliability For Measures Of Semantic Interpretation Or Proposition Sequences

There was 100% concordance between the rater's scores on the two occasions.

vii. Intrarater reliability for measures of syntactic dependency graphs

There was 100% concordance between the rater's scores on the two occasions.

Sections P.1-P.4 are therefore seen to demonstrate that the language measures had a high degree of interrater and intrarater reliability, following minimal training in the case of interrater reliability (45 mins.).

SECTION Q

VALIDITY OF LANGUAGE MEASURES

(This corresponds to Results Section L)

As described in Results Section L, this involved an examination of the relationship between measures of language reflecting levels of Frederiksen *et al.*'s (1990) model where there

were significant differences between the two groups of participants and measures of RHLB where there were significant differences between the two groups of participants.

The overall RHLB score correlated with measures of language complexity and frame production (reflecting Frederiksen *et al.*'s (1990) measures) for the narrative and procedural discourse samples. These two language measures were those that differentiated significantly between the two groups of participants for these two discourse samples. Thus, the measures which demonstrated significant differences between the two groups of participants in their narrative and procedural discourse samples correlated with the performance of the participants on the standardised language measure used in this study. The correlation between these two different sets of measures provides support for the validity of the measures.

Interestingly, the overall RHLB score did not correlate with measures of frame production in participants' 'life' discourse sample, where it was postulated that this discourse sample represented a different form of discourse by the participants, involving 'formulaic' or 'reusable' discourse, rather than 'unique discourse' (Refer to Section O.5 ii)

Participants' overall score on the RHLB also did not correlate with participants' adaptations of their narratives in response to the researcher not having available the pictures for the narrative in narrative 2. This finding is interesting in that the lack of a correlation differed from the measures on the narrative and procedural discourse samples, where there was a correlation between the significant measures and the overall RHLB score. This could be

viewed as support for different deficits being involved. It is possible that the skills resulting in a difference in language complexity and frame production in participants' narrative and procedural discourse samples differ from the skills required for the adaptation of the participants' narrative discourse samples in response to a different listener environment. It is possible that the skills required for the latter task may be more similar to those considered using principles of conversational analysis, with both these sets of measures not correlating with participants' overall RHLB score. Both these sets of measures can be considered on a cognitive level in terms of participants' consideration of listener requirements.

SECTION R

DISCUSSION OF FINDINGS RELATING TO HYPOTHESIS 2

(This corresponds to Results Section M)

According to hypothesis 2, there is a relationship between language and hallucinatory behaviour in people with schizophrenia, so that a consideration of this hypothesis involves the analysis of any relationship between measures of mental state, in particular hallucinatory behaviour, and measures of language, as discussed below.

Examining the language data in this study for correlations between language measures and measures of mental health, it was found that there was a very significant inverse correlation between the number of frames produced by participants with schizophrenia in the procedural discourse sample and both their 'total narrative' score (aggregate of scores relating to the content of the narrative discourse samples, including the number of ideas

included in the narrative, where they were not present in the pictures, but were consistent with the pictures and the preceding parts of the story as told, the number of ideas that were inconsistent with the pictures or the preceding parts of the story or social expectations and the number of key ideas in the story that were omitted by the participant) and their Krawiecka negative and positive ratings ($P < 0.01$). This means that participants producing fewer of the required frames within the procedural discourse samples also differed most from the participants without mental illness in terms of the ideas they included in their narratives based on the cartoon pictures. Also, participants producing fewer of the essential frames in the procedural discourse sample were rated as having the most severe positive and negative symptoms on the Krawiecka ratings of mental health. In other words, participants' production of frames within discourse samples was an index of participants' symptoms as measures on the Krawiecka ratings of mental health.

However, when looking at the data for the participants with schizophrenia alone, the only significant correlation was that between the number of frames produced by the participants as well as the number of idea units they included in the narrative discourse and their ratings on the Krawiecka positive symptoms scale. Thus, participants with schizophrenia who produced more key frames on the procedural discourse task produced more of the key information in their narrative discourse samples and displayed fewer or less severe positive symptoms of schizophrenia. There were no significant correlations in the data for the participants without any known mental illness. These findings suggest that the correlation of language measures with negative symptoms of schizophrenia may not reflect a relationship with these specific symptoms, but may be a reflection of these symptoms 'as

an index of illness severity'. However, as discussed later, this possibility is contradicted by further findings. It is possible that the lack of any significant correlations between language measures and Krawiecka ratings for the participants without mental illness is a reflection of the relative lack of symptomatology in this group of participants.

It was also noted that the number of frame components omitted by the participants with schizophrenia was related to their ratings on the Krawiecka positive symptom scale. In contrast, the number of frames omitted by this group of participants was not found to be related to formal thought disorder, negative symptom ratings, scores on a narrative task and the Right Hemisphere Language Battery. This is consistent with the theory espoused by Frith (1992) of an impaired representation of mental states, where the consequences would include both an inadequate procedural discourse sample and positive symptoms due to an impaired representation of the other person's intentions. It is postulated that the differences in the participants' procedural and narrative samples can also be explained by looking on a cognitive level at the two major sources of action, as described by Frith (1987), and outlined below.

Negative symptoms of schizophrenia could reflect an impairment in generating willed intentions so that actions are primarily dependent on the stimulus driven route. At a cognitive level, these symptoms could reflect a lack of awareness of the person's own mental states and the mental states of other people, including affects and emotions, as well as goals and intentions, accounting for some of their impoverishment of action. Positive symptoms could be the result of a failure in monitoring of actions, so that actions are not

perceived as the product of willed intentions. However, the participant with schizophrenia is aware of the existence of willed intentions, and therefore infers these incorrectly. This could result in symptoms such as those where participants perceive that their actions are being controlled externally. Some commonly held delusions by participants with schizophrenia could be occasioned by their awareness that other people may have different knowledge, beliefs and intentions without an ability to infer these correctly. As an example, these individuals may infer that other people intend them harm in persecutory delusions. Thus, it could be hypothesized that negative symptoms would correlate with a failure to generate actions based on an internal goal, with excessively stimulus bound responses, and positive symptoms would correlate with a failure to monitor actions as against willed intentions. Participants who produced more of the required frames in the procedural discourse produced fewer inappropriate ideas or omitted fewer of the important ideas in the narrative task and displayed less severe or fewer of both the negative and positive symptoms of schizophrenia.

Factor analysis was used to look in more detail at the relationship between participants' Krawiecka ratings and their performance on language measures. The analysis demonstrated that the Krawiecka negative symptom rating was responsible for most of the variance in the narrative information measures and the right hemisphere language battery test measures. However, none of the other Krawiecka measures were related to the narrative information measures or the findings on the right hemisphere language battery. Comparing these findings with some reported in the literature, it was interesting that within this study scores relating to content in the narrative tasks by participants with schizophrenia

were not related to formal thought disorder. Nathaniel-James and Frith (1996) describe a similar phenomenon to that found in this study with the narrative task, although in a task involving a memory component. They describe the phenomenon as confabulations, and note a correlation between 'confabulations' and thought disorder. Interestingly, they observe that even participants with little or no thought disorder confabulated. These findings accord with the possibility that thought disorder may be a contributor to the severity of confabulation in particular tasks. This could mean that an association between confabulation and thought disorder would be evident where confabulation was severe, with the thought disorder contributing to the severity of confabulation. Possibly, smaller amounts of confabulation do not involve an element of thought disorder. This would be consistent with the lack of a relationship between the behaviour resembling confabulations and the thought disorder in participants in this study. Perhaps this was due to the smaller variations in confabulation severity or the lower levels of formal thought disorder among the participants with schizophrenia in this study.

Nathaniel-James and Frith (1996) also examine the relationship between confabulations and memory deficits, observing that confabulation was still found when matching participants with schizophrenia and other participants on story recall performance, regardless of the presence or absence of a memory deficit. This suggests that confabulation is not a consequence of a memory deficit. The study here demonstrates moreover that behaviour similar to that described as confabulation can be present in the absence of a memory component in the task, suggesting that the presence of confabulation may not always be associated with a memory deficit. This is particularly significant given that one of the two

main theories of the mechanism for confabulation is one involving a memory deficit as the mechanism for confabulation.

The association within this study between the degree of 'confabulation' or narrative scores relating to content and negative symptom ratings is consistent with Frith *et al.*'s (1991b) findings that some phenomena are associated with negative symptoms, namely intellectual impairment and incoherence. There was no significant incoherence in the participants in this study. Although at first sight the association with negative symptoms could be a reflection of illness severity, with negative symptoms being particularly prevalent in more chronic schizophrenia, this would seem to be contradicted by the lack of correlation between the narrative content or 'confabulation' scores and Krawiecka overall ratings. There are of course other possible explanations for some of the relationships observed. It is possible that participants with schizophrenia who possess a decreased sensitivity to others' knowledge of the world, as postulated in a cognitive description of their story telling, may demonstrate a reduced emotional response. Yet another possible interpretation is provided by Frith's (1987, 1992) framework. Frith suggests that persons with schizophrenia who exhibit a deficit in generating actions based on willed intentions will have an increased reliance on external stimuli (reflected in negative symptoms). Within this study, participants with schizophrenia could be described as responding to the picture stimuli involved in the narrative task without adequate recourse to internal willed intentions. Thus, participants with schizophrenia recounted a narrative consistent with the picture stimuli, but with insufficient regard for the requirements of a narrative grammar and the listener's social expectations.

It is also interesting to note that the narrative content or 'confabulation' scores and right hemisphere language scores are not related. Language in schizophrenia is not completely

consistent with a right hemisphere language problem despite some studies suggesting that participants with schizophrenia demonstrate a language deficit involving processes such as making inferences, a subtest included in the battery. The finding of a difficulty with narrative content but not the inference subtest on the RHLB is consistent with participants with schizophrenia experiencing difficulty in forming assumptions about other peoples' intent, a process not required in the comprehension questions included in the 'inference subtest' of the RHLB.

Participants' experience of hallucinations was investigated in relation to their performance on the language measures, within this study. Prior to the therapy study, of those language variables that differed significantly between participants with and without a diagnosis of schizophrenia only two measures distinguished between participants currently hallucinating and participants not currently hallucinating (self-report on a semi-structured interview). The measures that distinguished these two groups of participants included a measure of syntactic complexity (average number of propositions per T-unit) and participants' inclusion of the frame 'get bread' in the procedural discourse sample. No language measures distinguished between the two groups of participants currently hallucinating (referred to as Categories B and C in Table 67).

Following therapy, similar information was obtained with respect to participants' experience of hallucinations as had been obtained prior to therapy. Unfortunately, in addition to the difficulty caused by the limited number of participants involved in the therapy study, there were additional difficulties with the investigation of the relationship between

language difficulties and auditory hallucinations. One of the participants (Martin) had a history of hallucinating when exposed to a particular form of stress. He had not been exposed to this form of stress for a period of four years prior to the commencement of the study. Towards the end of the therapy study, he was exposed to this stress again, and reported that he had experienced voices. The other participant described here did not hallucinate at any point in the study, having reported hearing voices only at the time of his diagnosis as mentally ill. It was therefore not possible to look at the effect of language therapy on participants' experience of auditory hallucinations within this study.

CHAPTER FIVE – THERAPY STUDY

OUTLINE OF CHAPTER ON THERAPY STUDY

Results of linguistic analysis suggested that participants in the study with schizophrenia differed from those participants without mental illness in terms of the frames they used at the level of a discourse framework, and in terms of syntactic complexity, but not in terms of measures at other levels of Frederiksen *et al.*'s (1990) model, as summarised in Section S.1. Also, participants with schizophrenia did not adapt their language in response to a change in listener context to the extent that other participants adapted their narrative. The inadequate consideration of elements of discourse structure and the listener's social expectations by participants with schizophrenia in all their discourse samples within the study (as described in Sections O.1, O.2, O.3, and O.5) had the most significant impact on the participants' communication. Inadequate consideration of discourse frameworks and social expectations were perceived as 'confabulation'. The superior use of discourse

frameworks by participants with schizophrenia in the 'life' discourse sample and their limited adaptation of their narrative sample in response to a different listener context suggested the probable value of speech and language therapy.

Speech and language therapy has a limited theoretical knowledge base. This is particularly true of speech and language therapy in mental health, which is in its infancy. Speech and language therapy posts within mental health settings are relatively new and few. There are no postgraduate courses on speech and language therapy in mental health and there is little coverage of the area in undergraduate training. This study describes a programme of therapy designed to utilise the theoretical findings of the earlier part of the study in a practical way. The therapy aimed to focus participants on discourse frameworks in a way that they could utilise in everyday speech, using methods accessible to patients chronically ill with schizophrenia.

A brief literature review provides the background for the intervention, including the methodological rationale for the therapy study (Section S.2). This review involved consideration of the literature available for speech and language therapy with populations other than a population of persons with a diagnosis of schizophrenia due to the lack of studies on speech and language therapy for persons with a diagnosis of mental illness. The review of the literature leads on to the actual methodology employed in the therapy study (Section S.3), and the measures of performance used at baseline and post therapy (Section S.4), which are theoretically motivated. The study

participants are described, including their general communication (Section S.5) and their language in terms of the measures used as a baseline for therapy and following therapy (Section S.6). In conclusion, the implications of this study are discussed (Section S.7).

SECTION S.1

SUMMARY OF FINDINGS FROM FIRST PART OF STUDY SUPPORTING A THERAPY STUDY

Within the narrative samples involving picture stimuli and the procedural discourse samples participants with schizophrenia were seen to omit essential frames whilst at times elaborating on frames which were not essential, or even tangentially related to the key or essential frames. Key or essential frames were derived from normative data (narrative discourse samples) or the literature (procedural discourse samples).

Initial analysis suggested that, in contrast with their pattern of performance on the narrative and procedural discourse samples as summarised above, the participants with schizophrenia produced a narrative relating to their life prior to their arrival at the special hospital using an appropriate framework as described within narrative grammars (possibly due to use of 'reusable' versus 'unique' discourse, Newell, 1991). This suggested that within certain contexts, perhaps relating to more practice opportunities and higher levels of motivation for a similar discourse sample, participants with schizophrenia were able to produce discourse samples that involved similar discourse frameworks to those derived from normative data and the literature. The pattern of performance of these participants suggested the

possibility that therapy could enable participants with schizophrenia to produce discourse samples with appropriate frameworks.

It was noteworthy, however, that further analysis using principles of conversational analysis) on these same samples (where a conversational analysis framework involves a focus on discourse as the product of interaction between discourse participants) suggested that participants with schizophrenia differed from the participants without a mental illness. Participants with schizophrenia did not include the more interactive components of a narrative's structure e.g. abstract and 'anchoring' (Schegloff, 1972). Both the abstract and 'anchoring' perform particularly interactive functions within narratives (Goodwin, 1984).

Although the differences between the 'life discourse samples' of the two groups of participants were only noted upon further analysis, they are significant in that they demonstrate significant differences in the 'interacting' part of the discourse (Kagan, 1995b). It is possible that the surface appearance of normality is due to the prominence in this discourse sample of 'transacting' communication (Kagan, 1995b), where this refers to the exchange of information. This preponderance of the 'transacting' element of communication is not true of many instances of everyday discourse so that a difficulty in the 'interacting' element of communication would constitute a significant handicap, and would warrant therapy.

SECTION S.2

LITERATURE REVIEW PROVIDING THE BACKGROUND FOR INTERVENTION

(1.) Current theories of speech and language therapy intervention

Leahy (1995) describes in her discussion of the science of intervention in speech and language therapy how the bases for current clinical practice of speech and language therapy is largely a function of health care tradition, resulting from an understanding of disease and disorder. She notes that health care tradition reflects in part speculation or intuition and in part an emerging understanding.

Leahy suggests the above means that some of the fundamental theories forming the speech and language clinician's repertoire may not have been fully informed by a clear rationale, and she comments that much of the existing rationale for these theories is implicit rather than explicit. In many instances, a rationale has been sought to explain the perceived effect of therapy and this is termed a theory. This method of development of speech and language therapy practice has resulted in a limited understanding within the profession of many of the tenets of speech and language therapy. However, this pattern of development for speech and language therapy methodology is not entirely negative. The current limited understanding of the theoretical background for many methods does simultaneously justify clinicians creatively adapting available techniques in accordance with individual patient profiles in the pursuit of the establishment of evidence based practice. There are many instances in the literature where clinicians report on techniques that are effective, but where

there is an inadequate theoretical rationale, e.g. the use of auditory integration training (Rimland and Edelson, 1994). This means that there is a largely circular rather than unidirectional relationship between therapy and theory. At times, therapy informs our current theoretical understanding. At other times, our theoretical understanding informs therapy. It is also possible for theoretical knowledge to provide the basis for therapy, with therapy subsequently further informing our theoretical understanding (Leahy, 1995). Leahy suggests that this lack of a comprehensive theoretical underpinning for therapy means that it is important for the clinician to respond to her 'inner self' in addition to the information with which she is presented. She describes the clinician as forming hypotheses about the rationale for a patient's observed behaviours. The patient's pattern of behaviours is frequently consistent with a variety of possible theoretical explanations. The clinician chooses the easiest and most efficient means for the patient to attain the desired target behaviour, without necessarily understanding fully which theoretical explanation is appropriate. Wilson and Patterson (1990) note that clinicians evidently have some knowledge of rehabilitation methods as effective therapy already takes place. However, as Byng (1995) comments, the rationale for therapeutic decisions is largely implicit.

Some clinicians and researchers question the acceptability of intervention unsupported explicitly by theory. Hatfield and Shewell (1983) emphasise that in their view therapy should be based on well-thought-out theory. They contrast this with intervention based on tradition or intuition that is not supported by explicit interpretation of past therapeutic interventions. Similarly, Byng and Black (1995) suggest, "Adequate remediation programmes require the development of an independent theory of therapy that provides a

detailed specification of the different components of the therapeutic process.” (P.303) This is endorsed by Hillis (1993), who notes that a rational treatment programme requires a theory of the normal processes underlying the tasks concerned, and a hypothesis about the patient’s level of breakdown as part of a theory of therapy. Possibly, the two standpoints regarding evidence-based therapy can be reconciled if we see the viewpoint typified by Leahy (1995) as acceptable in the development of suitable theories in the development of evidence-based therapy as recommended by those including Hatfield and Shewell (1983).

The achievement of a theory of therapy is, however, particularly difficult to achieve given that the selection of appropriate intervention is dependent on the clinician’s judgement (Lesser and Milroy, 1993), where factors influencing this judgement are not clear (Caramazza and Hillis (1993). Baddeley (1993) comments that any theory of therapy presupposes that we already possess knowledge about rehabilitation. This suggests, as was mentioned earlier, the existence of a circular argument. The question at this stage becomes what is it that a theory of intervention needs to include? There are a number of uncertainties regarding rehabilitation that need to be clarified. Kent (1985) notes, as an example, that it is insufficient to know that we can modify behaviour. Rather it is essential to know that modifications are in the correct direction and that these are sufficient to warrant the resources of clinician and patient. Perkins (1985) notes the effects of various treatments are clearer than why these effects are achieved. It is even possible that to a large extent effective treatment is a reflection of speech and language clinicians’ expectations that therapy will be effective (in the form of a self-fulfilling prophecy). Thus, speech and

language clinicians' expectations are consistent with the limited objective evidence available - that therapy is effective (Howell and McCartney, 1990).

The influence of health care tradition, as outlined in the above paragraphs, is accompanied by the impact of current market forces. These forces have resulted in, for example, an increasing awareness among clinicians and researchers of the importance of considering the use of communication in everyday life as part of any language intervention (Frattali, 1996; Holland, 1992; Kagan, 1995b). It has been suggested that communication in daily life has become today's reimbursable criterion for health care, making goals relevant to daily living particularly important in any therapy (Leahy, 1995). Providers are determining the value of language intervention in terms of its immediate, verifiable and lasting changes for daily living (Frattali, 1996; Warren, 1996). In accordance with this, the study described here involved targeting aspects of discourse in tasks resembling those involved in the participants' everyday life. It was also evidently necessary to consider explicitly the requirements for a theory of intervention when considering a programme of intervention as part of this study, in addition to those factors dictated by health care tradition and market forces.

(2.) Requirements For A Theory Of Intervention

Caramazza and Hillis (1993, p.226) suggest the development of a theory of neuropsychological rehabilitation requires:

“1. A model of the cognitive processes to be treated;

2. Specific hypotheses about the nature of the damage to such processes in the patients to be treated; and

3. Hypotheses about how specific interventions may modify the functioning of the identified damaged processes.”

Within this study, it was hypothesised that participants with schizophrenia did not demonstrate a consideration of the listener in their determination of suitable discourse frames. It was postulated that making explicit the requirement for suitable discourse frames, together with those frames which are essential in a variety of discourse types, would enable participants with schizophrenia to produce discourse samples with frameworks resembling more closely those of participants without schizophrenia.

Caramazza and Hillis (1993, p.226) suggest that theories of remediation do not include explicit claims relating to the factors and conditions which can potentially modify language and cognitive processing, although this is essential for effective remediation. They subsequently outline the requirements of such a theory (p. 227), to include the following components:

“1. Articulate in some detail the relationship between pre-therapy and post-therapy damaged states;

2. Specify the manner in which the change from one state to the other occurs as a function of specific aspects of the pre-therapy state, that is identification of the crucial parameters of the intervention and how these parameters, in the context of specific conditions of brain damage, affect the outcome of therapeutic intervention; and

3. Identify the characteristics of the patient that are relevant to the results of the intervention.”

They note that the most important of these areas of specification is the identification of the important parameters for intervention, and the nature of the interaction between these parameters and specific conditions of brain damage in intervention outcome. They concede that it is unclear how best to address this issue. However, preliminary studies of intervention could involve principles of intervention which have been established on the basis of the limited knowledge available and 'established wisdom'.

Within the earlier part of this study it was demonstrated that participants with schizophrenia experienced difficulties with producing a discourse framework similar to that of the participants without schizophrenia, yet they were able to produce a framework more closely resembling that of the participants without schizophrenia within specified contexts. This led to the suggestion that an appropriate goal for speech and language intervention would be to enable participants to use an appropriate discourse framework within a wider range of discourse samples, using established principles of intervention.

(3.) Principles Guiding The Process Of Intervention

A number of authors have suggested sets of principles that guide the intervention process. An example of these principles is the list of ten principles to guide intervention for children with language disorders, generated by Johnston (1985, p. 132). These are:

1. Teach language that expresses the child's available meanings;

Normal conversation can be divided into 'interacting' and 'transacting' forms of communication (Kagan, 1995b), where 'transacting' involves the exchange of information, and 'interacting' involves conveying a sense of well-being, and providing the context for

the conveying of information. Participants with schizophrenia could be described as demonstrating a difficulty predominantly with the 'interacting' form of communication. This suggested that the participants with schizophrenia had available to them 'the meanings' involved in the material used in the intervention, as advised by Johnston (1985) in his first recommendation.

2. Teach language that accomplishes the child's desired purposes;

The material was chosen to reflect the participants' interests to enable the participants to achieve their desired purposes e.g. tasks relating to phone calls to family members where this was an area of concern for the participant, fulfilling Johnston's second recommendation. This also meant that the tasks involved knowledge about the world with which the participants were familiar, as described by Johnston in his third recommendation.

3. Teach language that the child can interpret given his current knowledge about the language and the world;

4. Teach language recognising the child's preferred strategies;

Varied tasks were included within the intervention programme to provide a range of strategies for participants, enabling them to make an informed choice as to which strategies they preferred

5. Teach language while seeming to pursue some other goal;

The inclusion of tasks similar to those experienced by participants within their day to day life also meant a focus on a 'functional goal', rather than on linguistic details.

6. Teach language by providing concentrated, salient examples of a single pattern;

The focus on discourse structures within a variety of tasks meant repeated examples of appropriate discourse structures.

7. Teach language in contexts that clarify meaning;

The 'real' nature of the tasks included within therapy meant a similar level of context to that commonly experienced within everyday life, at times clarifying meanings and at times requiring the participant to recognise the requirement to clarify meanings as part of the goal of therapy.

8. Teach language in natural as well as contrived transactions;

9. Teach language while communicating real messages;

10. Teach language in the child's world.

Friedmann *et al.* (1991) describe treatment using natural communication as any approach in which the participant is trained to perform speech acts relevant to everyday conversations.

In other words, the therapy approach makes it possible for the participant to perform speech acts in therapy sessions that are relevant to everyday life (e.g. Aten *et al.*, 1982; Aten, 1986;

Davis and Wilcox, 1985; Green, 1984). Wittgenstein (1953, p.23) describes in some detail principles of this approach. Contrasting with everyday conversation, treatment must

provide opportunities for the participant to work on his deficits, with assistance from the clinician as necessary, whilst retaining some of the features of everyday communicative

interaction. This includes asymmetrical forms of therapeutic interaction, when working on forms of dialogue that are not symmetrical. In common with Johnston (1985), Wittgenstein notes that participants' knowledge relevant to communication in the clinical setting should be congruent with the knowledge of participants in a given form of natural conversation.

Communicative purposes and strategies of therapy participants should be the same as those habitually involved in natural conversation, and the participant should be provided with the opportunity to practice one kind of communicative action repeatedly. As can be seen from

comments on Johnston's earlier recommendations, recommendations 8-10 were also satisfied within the intervention described here.

It is noteworthy that Johnston's (1985) principles also make reference to some of the principles espoused by Howell and McCartney (1990). The similarities between the various sets of principles proposed would suggest their universal importance in a therapeutic programme. Howell and McCartney refer to five general principles of intervention determined by a cognitive, interactionist discovery perspective of language learning. These are outlined below:

1. Intervention should encourage participation by child and clinician, emphasising the learning rather than teaching element; experiential learning, involving children as active participants in the learning process;
2. Active participation in therapy should be encouraged as opposed to passive receipt of therapeutic information;
3. Children should be provided with opportunities to hear the target utterances, and to appreciate the differences between their production and the corresponding targets;
4. Children's self monitoring skills should be developed;
5. 'Real' communication situations are the preferred learning environment, to enable the child to develop an awareness of his communicative effectiveness.

The focus of therapy on developing participants' awareness of appropriate discourse structures in texts which were provided, and in the speech of others, followed by a focus on using appropriate structures within tasks replicating participants' everyday experiences

satisfied the principles enumerated by Howell and McCartney (1990). Leahy (1995, page 83) describes more global principles for speech and language intervention. She suggests that intervention must involve consideration of three components: context, content, and procedures, where context refers to the setting, participants and materials of therapy, content refers to the goals or objectives of therapy, and the procedures are the actual ways or activities employed to teach language. Leahy suggests that determining appropriate language goals forms the final stage of the assessment process. She notes that an important criterion in determining goals is the consideration of whether achievement of the goals will improve communicative effectiveness (Leahy, 1995, page 85). Rees (1983) notes that deciding what children should be able to do is the basis for decisions about language goals. Within the study described, intervention was aimed at enabling the participants with schizophrenia to produce discourse which resembled more closely the discourse of the participants without schizophrenia in terms of discourse frameworks.

Leahy describes the procedures facilitating the achievement of these goals as involving a three part sequence, where:

- a. The clinician provides a model of communicative behaviour;
- b. The child responds to the model; and
- c. The clinician provides feedback for the child about the child's response.

This was evident in the intervention described here in that the participant was first provided with material involving appropriate use of discourse frameworks, and was then asked to produce parts of the discourse framework, progressing to producing the discourse framework without prompting, with the clinician providing feedback to the participant.

Leahy notes that there are many different approaches to intervention. Fey (1986) describes the variation between approaches in terms of a continuum of clinician-oriented and child-oriented approaches. A number of additional considerations, described using a variety of terminology determine what children learn via therapy (Leahy, 1995, page 85), where other features of intervention can similarly be described in terms of continua. Leahy (1995) notes that the frequency with which a model is produced varies between being highly repetitive and systematic for a particular structure (focused stimulation) and low levels of repetition and unsystematic modelling of structures (general stimulation). With respect to the teaching of language to children, focused stimulation is often involved in teaching specific language forms, whereas in general stimulation the clinician models language forms which are approximately 'one level' above the child's level of functioning. Due to the goal of therapy, which involved enabling participants to use appropriate discourse structures, stimulation was focused and systematic, although more varied tasks were included in later sessions to assist participants in generalising the skills to an increased range of discourse samples.

The therapy participant's target responses in interaction with the clinician similarly vary. Responses can include a continuum of responses from an exact repetition of the model to no response, so that operant approaches frequently involve the therapy participant in reproducing imitations of models, whereas frequently 'modeling' involves the therapy participant initially producing no response but later being provided with an opportunity to respond. Earlier tasks within the therapy programme discussed as part of this study

focussed on the participants' recognition of elements of appropriate discourse frameworks with more minimal responses, and progressed to their production of appropriate discourse frameworks including more extensive responses.

Incorporating the above principles in a more holistic framework for intervention, reference was made to Byng and Black (1995). They suggest that the psycholinguistic (as opposed to the psychotherapeutic or psychodynamic) considerations for speech and language intervention for any group of patients include:

1. The focus of therapy (referring to the area of language impairment targeted);
2. The materials;
3. The task requirements.
4. The interaction between the patient and clinician;
5. The hypothesised mechanism for change.

These concepts are outlined below, after which the methodology for the therapy programme is described in terms of these same concepts.

(4.) Psycholinguistic Considerations For Speech And Language Intervention

Focus Of Therapy

Commonly, where the focus of therapy is discussed, this is described as making explicit or focusing the patient's attention on an area of language (Byng and Black, 1995). An example of this is found in a description of therapy for 'mapping deficits'. Schwartz *et al.* (1994) describe the focus of their therapy as making explicit the verb-noun relational structure of sentences. Similarly, Jones (1986) suggests that mapping therapy is aimed at

encouraging the patient to concentrate more fully on the meaning relations attached to the verb and Byng *et al.* (1994) describe therapy as making explicit the relationship between participant roles and the sentence position of noun phrases expressing these roles. The particular area of language that constitutes the focus of therapy is determined on the basis of participants' performance on a baseline assessment.

Materials

Modality Of Therapy Materials

Modality of therapy is sometimes determined by the patient's profile. Where one modality is particularly impaired, it may be inappropriate to use materials reliant on this modality. At other times, a particular modality may be suggested by a difficulty in accessing concepts or linguistic knowledge via one modality. Within yet other studies, the most appropriate modality for intervention may be less specified by the results of the baseline assessments.

Content Of Therapy Materials

This is frequently determined by the patient's profile of impaired and intact processes, and chosen to direct patients' attention to the focus of therapy without placing increased demands on the patients from areas of language not targeted within the therapy. However, Byng and Black (1995) note that materials are selected largely on the basis of assumptions that are not supported by theories of therapy, so that a clear rationale is frequently not made explicit.

Tasks

Work On Comprehension Then Production

There are now numerous accounts of therapy for varied speech, language and communication deficits, where therapy is focused on aspects of receptive processing and then production, in part due to an implicit assumption that these involve similar capabilities, but with receptive abilities preceding production developmentally.

Examples of therapy studies involving a focus on comprehension followed by a focus on language production include accounts of therapy to improve mapping skills, as in the studies of Jones (1986), Byng (1988), Nickels *et al.* (1991), Marshall *et al.* (1993) and Schwartz *et al.* (1994).

Describing intervention for yet another area of speech and language, Lambert and Waters (1995) outline three categories of approaches to intervention for phonological disability, all of which involve a period of ear training for the target sound, followed by work on speech sound production in graded steps. This is exemplified in the metaphon approach to therapy for phonological disorders (Dean and Howell, 1986; Howell and Dean, 1994), where the first phase involves developing children's awareness of the nature of speech sound categories and contrasts, and the second phase involving them improving their own communicative competence.

Sloane (1995) describes parallel processes in the remediation of voice disorders in children; "Voice goals may be organised under the banners of awareness and production. The initial part of the voice therapy programme should concentrate on developing an awareness of the

problem and outlining the possible benefits of therapy... Successful elimination of faulty vocal habits is predicted on their accurate identification.” (P. 147)

This is not dissimilar to the processes described by Lesser (1995), when she describes theory-based intervention for people with aphasia. She notes; “The ‘semantic’ patient may need therapy aimed at clarifying word meaning, and producing sharper distinctions between words and associates.” (P. 198)

Support for working on receptive language prior to work on language production skills is found in the distinction between ‘linguistic competence’ and ‘performance’. Crystal and Varley (1993) note, “linguistic competence refers to knowledge of the phonology, grammar and semantics of a language, whereas communicative competence refers to the appropriate use of linguistic knowledge across a variety of communicative situations (in what has also been described as ‘linguistic performance’). It is possible that ‘an individual may have some linguistic knowledge, but be unable to use this knowledge flexibly in these varied situations...” (P. 248). ‘Linguistic competence’ is prerequisite, but insufficient in isolation for ‘performance’ in any particular area of language, in line with normal development in many areas of language skill.

This is consistent with Adams and Conti-Ramsden (1995), who advocate a developmental hierarchy in their description of a bottom-up approach to language intervention with respect to developmental language disorders. Crystal and Varley (1993) note that in the absence of other ways of defining linguistic difficulty, developmental hierarchies are commonly used

in determining stages in intervention for acquired disorders. Thus therapy programmes generally involve a series of learning goals, commencing with small steps at a low level, and progressing upwards to more advanced structures or meanings in line with the accepted model of normal development.

Interaction Between Patient And Clinician

Largely, speech and language therapy seems to use discussion and explanation, but without the precise form of interaction by the clinician being specified, so that it may be difficult to replicate or evaluate the specific intervention strategy. However, it could be that the modulating of therapy tasks in response to patient responses may be one of the most critical elements of the therapy process. This mode of interaction could perhaps be described as 'facilitated problem solving', where the materials reflect a narrow focus of therapy and the patient is encouraged to make his own deductions from the materials. Simultaneously, the clinician draws out from the materials and the patient responses features of language (Byng and Black, 1995).

Hypothesised Mechanism For Change

The technique of making elements of language explicit would seem to be effective in producing change where the particular linguistic or conceptual knowledge is present but only partially accessible, so that this knowledge is not automatically applied within all contexts. This is consistent with Shallice's (1988) descriptions of access or retrieval deficits as partial deficits, so that conscious, explicit processes enable patients to access this knowledge.

SECTION S.3

METHODOLOGY OF THERAPY

Focus Of Therapy

Within the assessments included as part of the first phase of the language study, the differences between the discourse samples of the two groups of participants could be divided into four broad groups (Section O):

- those demonstrating reduced linguistic adaptation in response to changes in listener context;
- those demonstrating reduced complexity in the language of participants with schizophrenia; those relating to the pattern of generation or retrieving of frames by participants with schizophrenia as compared to that demonstrated by the participants without any known mental illness; and
- those involving participants with schizophrenias' reduced use of some of the more interactive elements of the narrative framework.

It was the two latter groups of results that affected the participants' effective communication, so that it appeared important to focus therapy on these two areas of language.

Modality Of Therapy

In this study, the language symptomatology as identified within the baseline assessments (refer to Sections S.4 and S.5) can be described in terms of an impairment at the conceptual level in Frederiksen *et al.*'s (1990) model (refer to Diagram 3 in Results Section J). Alternatively, this language presentation can be seen to reflect an impairment at the

'message level' in Schwartz's (1987) model, where Schwartz's model constitutes a development of the model originally described by Garrett (1980, 1982). Within the model, as described by Schwartz (1987), the following levels are included:

- 1. A message level, where this is conceptual versus linguistic, to include decisions about ideas and meanings (messages) conveyed. Impairment at the message level would therefore suggest that the language difficulty is not modality specific. This would suggest the suitability of a therapy programme involving varied modalities, including the written and spoken word. In this situation, varied therapy using varied modalities would be advocated due to individual persons' predilections to relate to experiences via different senses (O'Connor and Seymour, 1990). Levels 2 to 5 then follow the 'message level' of speech production, as described below. These levels are modality specific, but demonstrated to be unimpaired within the baseline assessments.**
- 2. A functional level that includes three operations: Retrieval of semantic representation of content words; composition of predicate argument structure; and allocation of lexical items to role positions;**
- 3. A positional level that involves the ordering of components prepared in the previous level, into a syntactic planning frame. It is at this level that all function words are accessed. A further lexical search enables the retrieval of the phonological forms of content words as well as their placing within the planning frame;**
- 4. A phonetic representation level, in which phonological information is recoded into phonetic representations required for articulation;**
- 5. A motor level, where the phonetic information is realised in a neuromuscular code for subsequent articulation.**

As there was no evidence for one particular modality being impaired relative to other modalities, therapy involved both written and oral modalities in the belief that multi-sensory input would provide additional reinforcement over and above that provided by one modality alone. It is then necessary to look at other specifications of the materials.

Content Of Materials

Types of materials were chosen to reflect those encountered by participants within their everyday lives. An additional consideration meant that the pictures employed within the narrative assessment tasks all involved non-emotional content and incidents unrelated to the patients' daily life to avoid influencing the task complexity by increasing the emotional tension (ref. Appendix G for pictures used). Within therapy sessions materials relating to patients' everyday life were used to encourage patients to focus their attention on appropriate frameworks within their everyday discourse, and to avoid a therapy focusing on improving patient scores on outcome assessments without a corresponding benefit where tasks differed from those used during assessment.

Work On Comprehension Then Production

The repeated suggestion within the literature that work on comprehension should precede work on production was reflected in the programme of intervention, with earlier sessions focusing on language reception, and later sessions focusing on language production.

Initially, tasks were selected to include discourse comprehension tasks in which participants were required to recognise the use of appropriate frameworks, using material not produced by these participants. This was followed by work on participants' recognition of what they needed to include. Next, discourse production tasks involved participants producing discourse samples, with decreasing amounts of information regarding discourse structure being provided. Participants then worked on self-monitoring of what they needed to include within their discourse. (Ref. to session plans in Appendix M)

Interaction Between Patient And Clinician

Within the assessments (baseline, following therapy and at reassessment) the clinician provided feedback which did not relate to the participants' performance on the tasks (e.g. 'Thank you' versus 'you did it correct'). This meant that the clinician did not provide feedback on the specific tasks that were repeated at a later stage in the therapy programme as part of another assessment.

Within therapy, the clinician responded to the participant's performance relative to a target performance, therefore modifying her response to the individual participant. i.e. The focus of therapy remained the same, but therapy tasks were modulated in response to the individual participants, with e.g. Michael being encouraged to restrict himself to key frames, rather than including an extensive number of tangentially related frames, whilst Martin was encouraged to produce additional frames relative to the number of frames he produced at the outset of the intervention programme (refer to focus of therapy).

Hypothesised Mechanism For Change

Participants' failed to use discourse frameworks appropriately within some discourse samples whilst producing the narrative discourse sample describing their life prior to their arrival at the hospital by demonstrating superior adherence to a narrative discourse framework. This was suggestive of participants having a partial awareness of the requirements of a discourse framework. Therapy in which elements of discourse frameworks would be made explicit therefore seemed particularly appropriate.

SECTION S.4

MEASURES OF PERFORMANCE

(1.) Measures of Performance At Baseline

Particularly useful as a measure of performance would be a measure which was suitable for clinical purposes in its ease of administration, reliability, applicability to a range of discourse samples and validity as a reflection of the level at which language of participants with schizophrenia differed from that of participants without schizophrenia in the earlier part of the study (refer to Sections O.6, P and Q). An assessment allowing repeated administration enables the later evaluation of any therapy in terms of these measures.

Checking for the presence of key frames within narrative and procedural discourse samples fulfils the above criteria, and enables a description of participants' use of frames to structure their discourse. Discourse elicitation was similar to that included within the earlier part of the study. Narrative discourse samples included accounts of a series of six cartoon pictures (and therefore did not involve a memory component). Administration of

the task included times in which the pictures were visible by the researcher and where they were not visible by the researcher). Additional narratives related to personal experiences of the study participants. Procedural discourse samples were similarly related to procedures familiar to patients within the hospital. Conversational discourse samples were obtained by asking a question relating to life in the hospital, and then reflecting back where intuitively this appeared necessary to maintain the conversation. Although atypical of the turn taking involved in some contexts, this allowed a degree of consistency and reflects to a certain extent the turn taking in many interview situations. Instructions used for the elicitation of the various discourse samples are included in Appendix F.

Analysis at the level of frames, as suggested above, necessitates a list of essential or key frames for the narrative and procedural discourse samples employed within the study. These were determined by obtaining discourse samples using the same materials and instructions from 5 male nursing staff within the hospital. The members of staff shared with the participants within the therapy study a similar environment and knowledge of the significant features of hospital procedures. They are also those individuals with whom participants within the study would most frequently communicate verbally. This meant that what the nurses considered as the most essential frames within the narrative and procedural discourse samples would be valid as a basis for comparison for the discourse samples obtained from the participants within the therapy study.

For the 'time-pressed clinician', using stimuli where key frames have already been established in previous studies would eliminate the need for this stage. Alternatively, it is

possible to compare the frames produced within any discourse sample with those frames seen to be essential by those with whom the patient would habitually communicate. Within this study, an additional set of key frames was drawn up from those frames considered to be essential or key frames by the researcher prior to her exposure to the samples from the nursing staff. The researcher was familiar with hospital procedures from the perspective of a speech and language clinician. This process did not involve obtaining samples from control subjects. Comparisons were made between discourse samples by the participants with schizophrenia and the key or essential frames as postulated by the researcher.

Findings from the comparison between samples of participants in the study and those of the nursing staff and from the comparison between samples of participants in the study and the key frames as postulated by the researcher would be compared. This allowed the investigation as to whether it might be possible to obviate the necessity for obtaining comparative data in other studies.

Within conversational discourse, which is seen to encompass many individual topics, content would have to be analysed in terms of a different framework due to the unsuitability of determining a framework of essential frames for this discourse type. Unfortunately, this was not possible within this study, but it would be anticipated that a measure could be developed to include consideration of the transactional and interactional element of conversational discourse, as described below.

Measures of the transactional element of this discourse type could be based on a framework used to structure reports within the journalistic literature. A precedent for applying methodology from the literature on journalistic prose to the discourse structure of participants with schizophrenia is found in the use of the cloze procedure to look at schizophrenic discourse. This method was first described by Taylor (1953) for the analysis of journalistic literature, and later applied to the discourse of participants with schizophrenia (e.g.s. Rutter, Wishner, & Callaghan, 1975; Rutter, Draffan, & Davies, 1977; Rutter, Wishner, Koptynska, & Button, 1978; Salzinger, Portnoy, & Feldman, 1964). Here, a framework described by Hennessy (1987) to structure reports by journalists could be used as a basis for assessing the material contributed by participants with schizophrenia in their conversational discourse. This suggests that it is important to describe who, what, where, when and why in relation to topics introduced, providing a specification of the material which must be made explicit or presupposed according to Hennessy (1987). For each topic, 'who', 'what', 'where' 'when' and 'why' can be identified. If these are omitted in the discourse text, this would be noted down, together with a judgement whether this information could reasonably be presupposed. The judgement would be carried out by the researcher involved in the conversation, and according to an independent professional, also working in the same environment with a similar relationship to the speaker.

Due to the importance of 'interactional' as well as 'transactional' information within conversational discourse, it would seem important to also include in any measure of conversational discourse a consideration of the interactive component of communication,

within a future study. It would be anticipated that work by Eggins (1993; Eggins and Slade, 1997) would form a sound basis for the development of such a measure.

(2.) Measures of Efficacy

Evidence for the efficacy of therapy can involve one of a number of study designs:

Historically, evidence for therapy efficacy was sought largely from group studies.

Coltheart (1983) notes that many of the methodological problems encountered within these studies can be circumvented via the use of longitudinal single-case studies. Single group designs involve a group of patients, for whom there is a pre-treatment measure, treatment and post therapy measure. This methodology does not demonstrate what might have occurred as part of spontaneous recovery, nor does it demonstrate the efficacy of one therapeutic method as compared with that of another form of therapy. Providing a number of groups of patients with different forms of therapy could facilitate answers to these last questions. The latter methodology answers questions regarding differential benefits in response to varied therapeutic methods, but does not demonstrate which type of treatment is efficacious for which patient. Alternatively, a treatment versus no treatment design provides evidence as to whether treatment is more effective than no treatment, but it does not indicate which patients respond best to which types of treatment. A comparison of two or more types of treatments with each other and with a no treatment group indicates whether one treatment is superior to another treatment, and whether either or both treatments are superior to no treatment. It does not indicate whether various forms of treatment are efficacious for varied patients. Post hoc speculation is difficult due to the number of variables that could influence response to treatment. In addition, retrospective

speculation differs from prospectively gathered empirical evidence. Other possible designs include single-participants alternating treatment with replications.

Combining an alternating treatments design with a multiple baseline design (McReynolds and Kearns, 1983) would suggest which of two treatments may be more effective for that specific patient, and comparison of treated and untreated areas could imply that the treatment was efficacious. Replications with a number of patients would provide evidence of the treatment's efficacy for other patients. However, as explained by Rosenbek, LaPointe, and Wertz (1989), the alternating treatment design requires determining performance over a number of baseline sessions to ensure stability of the measures.

Within this study, multiple baselines were available in that a large number of measures were involved in the initial assessments. Performance over time was demonstrated to be stable in that there was an interval following the first part of the study in which the language of twelve participants with schizophrenia was studied prior to the part of the study involving an intervention programme. Participants with schizophrenia persistently differed from those participants without schizophrenia in terms of their language complexity, and their discourse framework. Language complexity was not specifically targeted during intervention and could therefore potentially provide a measure of language that was not targeted, although it might be expected that this could vary in response to non-specific language stimulation as part of the therapy programme. Commonly, therapy to increase a patient's language complexity might include general language stimulation at a level that is slightly higher than that of the patient. A measure of language complexity would therefore

not act as a suitable baseline and outcome measure to look at whether intervention focused on discourse frameworks was effective, rather than there being a general improvement in the patient's well-being. However, measures of patient well-being as documented in the nursing process and changes in patient medication would be expected to be indicative of any major change in mental health. This information was therefore used to exclude the possibility of language changes being a function of a change in mental health rather than a result of therapy.

Of course, generalisation of the findings in this study to the population from which the patients are drawn would further require the study of groups, but this requires adequate sample sizes to provide acceptable power, not possible as part of this study.

In order to relate the discourse performance of the participants to a relevant target discourse sample, five nursing auxiliaries were provided with the same instructions and materials as the therapy participants. This was considered to be appropriate as a source for comparative data. Nursing auxiliaries are the people with whom therapy participants interact most frequently. Nursing staff provide much of the participants' role models in terms of communication, and make many judgements regarding the acceptability of the participants' communication for the purposes of case conferences, tribunals... Each of the participant's performance was compared with that of five male nursing auxiliaries, where the percentage of the nursing staff including particular frames was taken as a 'measure' of the degree of importance of that frame for the discourse sample. As an example, frames included by 100% or 80% of nursing staff were considered as very important to include within a discourse sample.

(3.) Materials For Discourse Elicitation For Outcome Measures

Baseline assessments were repeated to elicit outcome measures immediately post therapy and again two months after the termination of therapy. To assess participants' generalisation of any skills acquired during therapy, additional tasks, which paralleled the tasks used during the baseline assessments, were employed for an outcome assessment. These were then repeated two months after the termination of therapy together with yet another set of parallel tasks to evaluate the durability of any benefits of therapy. (Refer to Appendices F for the instructions for eliciting discourse and Appendix G for pictures used to elicit narratives respectively.)

SECTION S.5

PARTICIPANTS IN THERAPY STUDY

Four participants were chosen from those participants involved in the initial part of the study to include patients who were on wards where facilities were available for group therapy. This was because it was anticipated that patients would be seen as part of a group, with the location alternating between the two 'blocks of wards'. Two patients were resident in each of the two 'blocks of wards'. Group therapy would allow for therapy participants to provide feedback to each other in a relatively natural communicative situation, and to provide support for each other, as well as removing some of the intensity of one-to-one therapy. Due to logistical difficulties in obtaining escorts for the patients, it was finally necessary to see each patient individually for the therapy study. Two of the four patients were chosen for report here as they were not receiving other direct 'talking

therapies' in contrast with the two other individuals who were also involved in other therapeutic programmes during the time that they were involved in this therapy.

Details about the two participants in the therapy study are provided below, in terms of their history and psychological functioning (at their most recent assessment of psychological functioning) as recorded in their medical records.

MARTIN

d.o.b. 14/06/65

Family history:

Martin's father had a history of alcohol abuse and contact with forensic services, whilst he lived with his mother in numerous bedsits, with his mother working as a domestic Serbant. His mother had several psychiatric admissions, and Martin's three older brothers were put in care prior to Martin's birth.

Personal History:

Martin is alleged to have suffered sexual abuse at the hands of his godfather. He left school at age 16, following extensive truancy, with three CSE's in English, metal work, and technology (Grades 2,3,3)

Psychiatric/Forensic History:

10 years:

*request from mother for him to be taken into care,
with allegation that he beat her up and demanded money
later allegation withdrawn, with truancy as stated problem*

10 - 16 years:

*attendance at intermediate treatment centre (subsequent to social work
report following above accusation)*

11 years:

*2 year supervision order because of burglary on a railway station carried out
together with an 18 year old friend*

14 years:

1 year conditional discharge for burglary, trespassing and receiving stolen goods

15 years:

*social work report concerning above incident contained first mention of
Martin's sexual abuse at the hands of his godfather from age 9 years*

16 years:

*school teacher received obscene anonymous letter, which Martin said he'd sent,
but then retracted his confession. Corrosive was poured on her car and the
school mini-bus. School authorities suspected Martin was responsible.
charged with administering poison with intent to injure a man who had allegedly
been sexually abusing Martin since age 9 years, together with others, after
letters to police about the abuse had been ignored.*

Released on bail, but then asked to be taken into care because of fear of retribution from victim

Contaminated food at care centre, and transferred to another centre

17 years:

Transferred to hostel on contract, where poisoned food and poured corrosive on a staff member's car, also planning to poison others known to him, so transferred back to a previous centre for 10 days before returning to hostel

Possibly linked to open gas taps and loosened electric sockets at the hostel on a number of occasions

On one occasion found in godfather's allotment with air gun

On one occasion found at 1 am in a cemetery, and possibly linked to a rape near there

A number of incidents of poisoning family, but informing them first

Returned to care centre

18 years:

discharged on contract to hostel

19 years:

lived alone in a flat and used day centre plus numerous admissions to accident and emergency on claims of swallowing poison

Admission to a Special Hospital due to local psychiatric services suggesting they were inadequate for Martin's requirements.

Psychological Report (1994)

Martin's estimated full scale IQ (WAIS-R) was 78 (towards the lower end of average), demonstrating a 23 point drop from his premorbid IQ equivalent of 101 (based on NART-R). His speed and accuracy of information processing (on the AMIPB) were below the 10th percentile for his age. Martin acknowledged that when he feels challenged by extensive information, or too many demands he panics and gives up in confusion.

Specifically, Martin demonstrated disorganisation in his response pattern, especially with complex material. He had difficulty inhibiting unwanted responses. His disorganisation was more marked perceptually (1st and 7th percentile for age on a design recall task) than verbally (24th and 31st percentile for age on a prose recall task).

Communication

Martin's speech was intelligible, but was quiet and with predominantly head and nasal resonance, so that although his articulation was adequate and his speech was fluent, his intelligibility was reduced in the presence of loud noise or where his face was not visible. His rate of speech was slowed and his intonation included few intonational contours each spanning a limited pitch range.

Martin's use of eye contact varied, with him at times looking at the researcher with a fixed eye gaze, and at times averting his eye gaze. His facial expression was an almost constant grimace, with an occasional forced grin. His speech was accompanied by minimal facial expression and a minimal amount of non-specific gesture.

When seated and when standing, Martin maintained a hunched position, and stood close to the listener. Within the listening role, Martin nodded to indicate comprehension and agreement but did not modify his facial expression and did not make use of any verbal behaviours to demonstrate his listening.

Martin did not initiate discussion with the researcher, and was said not to initiate discussion with staff or patients on the ward or with people within his work area. When addressed directly, following a frequently lengthy response time, Martin produced minimal responses which were relevant to requests. Within his spontaneous speech he did not provide evidence of using inference or humour.

MICHAEL

d.o.b. 17/10/55

Family history:

Both Michael's parents were treated for psychiatric difficulties (with mother having a history of mental illness including paranoid psychosis, depression and documented overdoses and father treated by GP for mental illness, and later suffering from dementia). Mother died when Michael was age 27 years from pneumonia, and Michael's father died when Michael was aged 33 years following a cardiac arrest. Michael lived in the family home until his admission to hospital.

Personal History:

early life:

no record of abnormality, but family environment reported to have been significantly abnormal (parents had a difficult marital relationship and channeled their love towards him and used him to communicate with each other, also parents did tasks such as bathing him when he was in his twenties and actively prevented him going out of the house and socialising with peers)

school:

unsuccessful socially and academically

Recorded as lacking in confidence and suffering verbal and physical bullying

Missed significant part of schooling as required to stay at home to be with depressed mother

Aged 15 years left school with no qualifications

employment:

first employment aged 15 years as trainee store keeper

Picked on by colleagues and left employment after two years

Worked for two years in a factory

Then joined father as a stores porter in psychiatric hospital for four years

where he got on well with one of the other workers, but left job because of trouble with other members of staff fighting

Then occasional work for a few days at a time

Aged 22 years returned to psychiatric hospital as nursing assistant

One month into this employment attacked by a patient, and left employment due anxiety

Subsequently only voluntary work

Psychiatric History:

32 years:

first admission following father's heart attack, when found semi-conscious due to overdose. Reported that he had been depressed for seven years, worsened following father's ill health. Revealed delusions and auditory hallucinations. Underwent ECT during three months admission, then self discharged

further month long admission due to worsening depression

33 years:

several incidents of self harm prior to this admission, which was precipitated by an overdose, due to stress from father's acute organic brain syndrome and incontinence. Twenty nine month admission with several suicide attempts and one attack on a staff member

35 years:

immediate precipitant to admission was an overdose, but spoke of hallucinations and depression. Following two days left due to argument, as described in index offence under forensic history.

Forensic History:

Aged 35 years, disagreement with staff at hospital where resident because of increased demands of him and Michael went home. At 7.00 am matron from old peoples home where Michael did voluntary work phoned to request he be at work by 8.00 am. He walked down stairs around 7.30 am and fell, waking up on the floor at 8.30 am panic stricken that he was late for work. He cut his wrists and telephoned for police and ambulance. Police suggested he telephone the hospital where he had been resident. Michael said staff answering were rude to him, and he heard voices saying he should kill the charge nurse whom he alleges abused him on the telephone. On arriving to the hospital the charge nurse went past him in his car without noticing him. The voice said to him to get his wife, so Michael went to where his wife was thought to reside, but did not know where exactly she would be, so the voice said get a nurse to come. He therefore went to get a female nurse with a view of taking her hostage and exchanging her for the charge nurse. He approached a nurse in the hospital corridor and told her to come with him whilst attempting to hold a knife to her throat. He was then restrained. Michael described a history of murderous thoughts. In custody he was actively suicidal, 'behaved strangely' and had auditory hallucinations. He was admitted to a Special Hospital three months after his index offence.

Psychological Report (1991):

Michael's estimated full scale IQ (WAIS-R) was 84 (towards the lower end of average), demonstrating a 31 point drop from his premorbid IQ equivalent of 117 (based on NART-R). Whilst Martin was relatively accurate on AMIPB (90th percentile for his age), his speed of information processing on this assessment battery was below the 10th percentile

for his age. Moreover, Michael demonstrated inconsistencies in his performance, suggestive of a moderate degree of underlying cerebral dysfunctioning. Specifically, Michael was particularly impaired in 3 areas of cognitive functioning:

- a. Michael demonstrated disorganisation in tasks involving non-verbal concepts (e.g. Completing jigsaws or copying a design) and he showed a mild degree of dyspraxia in this area;*
- b. Michael demonstrated slowed information processing, with a profound impairment in the processing of complex information processing (AMIPB),*
- c. Consistent with his own perception, Michael's memory skills were also poor, specifically in non-verbal modes e.g. Recalling designs (WMS-R and MFD) or temporal order.*

The psychology reports include a comment that Michael's particular difficulties with non-verbal tasks may reflect in part a mild congenital difficulty. This was suggested by Michael's reports of a slowness 'with his hands' and with numbers as a child, possibly increased by the side effects of essential medication, and perhaps an adverse reaction to ECT.

Communication:

Michael's speech was fluent and of an appropriate volume when speaking to the researcher within a small room. He noted that he generally did not raise his voice when this was necessary, but was able to do this to demand. His rate of speech was slow, and he

produced a repetitive intonation pattern using a small number of intonational contours, although with an appropriate pitch range.

Michael 's facial expression was relatively limited, but appropriate. His use of eye contact was mostly appropriate, but at times developed into a fixed eye gaze. This was accompanied by minimal use of non-specific gesture, and by very close proximity to the other conversational partner, when standing.

Michael used active listening skills when communicating, and at times took the floor from the other speaker when the speaker paused where this was not necessarily appropriate. His response time when addressed directly was fast, and his verbal contributions were lengthy, with Michael moving from one topic to a related topic, interspersed with repetitions of information previously included. He did not demonstrate evidence of use of inference or humour in his spontaneous speech.

SECTION S.6

PARTICIPANTS' RESULTS

(1.) Baseline Measures

Narrative Samples (Six Cartoon Pictures As In Appendix G)

Comparison With Key Frames Determined From Samples Of Nursing Staff For Baseline Narrative With Pictures Visible.

(Ref. To Appendix I for tables comparing use of key frames by Martin and Michael as compared with five members of nursing staff)

Martin

Martin included 4/6 of the frames included by 100% of nurse auxiliaries, and included a smaller percentage of frames included by fewer nurse auxiliaries (4/9 of the frames included by 80% or more of nurse auxiliaries, 4 ½ /13 of frames included by 60% or more of participants). He did not include any frames not included within the narratives of nurse auxiliaries.

This resulted in a narrative that was very brief, and omitted many of the key frames.

Omissions included those frames concerned with the 'complication' of the narrative (the element of the narrative that makes it relevant to recount). Martin, furthermore, included only one element of the 'resolution', which due to the limited 'development' of the narrative, and absence of a 'complication' does not feature as a resolution. The resulting

narrative is therefore very different to that recounted by the nurse auxiliaries (see Appendix I).

Michael

Michael included a larger percentage of frames included by nurse auxiliaries, particularly those forming the complication and resolution (5/6 of those frames included by 100% of nurse auxiliaries, 8/9 of those frames included by 80% or more participants). Interestingly, he did not produce 100 % of those frames included by 100 % of the nurse auxiliaries. He also included a significant percentage of those frames infrequently included by nurse auxiliaries (2/5 of those frames included by no more than one of the five nurse auxiliaries), and extensive detail about each of 3 frames not included by any of the nurse auxiliaries.

Thus, Michael included numerous frames that did not feature in the nurse auxiliaries' narratives in addition to the key frames of the narrative as told by nurse auxiliaries. These frames included frames that were not evident in the pictures. The result was a narrative featuring many narrative events that did not feature within the narrative as recounted by the nurse auxiliaries. Notably, there was no increased emphasis on the key frames as recounted by the nurse auxiliaries, which were considered the 'macrostructure' of the narrative.

Comparison With Key Frames Determined From Samples Of Nursing

Staff For Baseline Narrative With Pictures Not Visible

(Ref. to Appendix J for tables comparing the use of key frames by Martin and Michael as compared with five members of nursing staff)

Martin

Where the pictures were not visible to the researcher, the number of frames produced by 80% or more of the nurse auxiliaries increased slightly. This difference was reflected in a slight increase in frames included by Martin. Martin included 5 1/2 of the 11 frames included by 80% or more participants, whilst including none of the frames mentioned by 40% or fewer of the nurse auxiliaries. The increased number of frames demonstrated that Martin adapted his narrative in response to the decrease in contextual information available.

However, Martin's narrative did differ from that of nurse auxiliaries in terms of its content. Martin suggested that one of the characters in the narrative was pushed away, when this was not evident in the pictures and this was not suggested by any of the other participants. In addition, Martin omitted many of the key frames as included by the majority or all of the nurse auxiliaries. This meant that, as with the narrative where the pictures remained visible for both the participant and the researcher, Martin's narrative was dissimilar to that recounted by the nurse auxiliaries.

Michael

Michael included 7 of the 11 frames included by 80% or more of participants, but he also included information not seen in the pictures and not featured in the narratives of any of the nurse auxiliaries. The additional frames included additional narrative events, featuring details of the argument between the men and of an additional event at the end of the story. As such, the narrative differed to that told by the nurse auxiliaries.

Narrative Samples (Six Cartoon Pictures As In Appendix G)

Comparison With Key Frames As Suggested By Researcher

(refer to Appendices I, J and K for narrative 1, narrative 2 and procedural discourse samples respectively)

The frames suggested by the researcher varied from those developed from the discourse samples of nurse auxiliaries. However, findings, when comparing the participants' narratives with these key frames, were similar to those found when using those frames used by nurse auxiliaries:

Martin's Baseline Narrative Discourse Samples

For the narrative where the pictures remained visible to the researcher, Martin included a setting in his narrative and part of the narrative's development. However, he did not describe the complication, and only included one out of six frames in the resolution, which, together with the omission of the complication, meant that this frame did not function as a resolution.

Where the pictures were not visible by the researcher, in line with the response by the nurse auxiliaries, and the expectations of the researcher, Martin increased the frames he included in his narrative account. However, the pattern of his inclusion of the various elements of the narrative framework was similar to that where the pictures were visible.

Within both narrative accounts it was noted that Martin included frames within a different order to that included within the suggested framework, and with some repetitions.

Particularly where only a few of the key frames were included, this had a significant impact on the resulting narrative, which thus differed from that suggested by the researcher, as it did from that recounted by the nurse auxiliaries (ref. to beginning of section S.6).

Michael's baseline narrative discourse samples

Where the pictures remained visible to the researcher, it can be seen that Michael included a larger percentage of the frames describing the complication and the resolution than did Martin. However, he included fewer than half the frames suggested by the researcher. Yet, he included approximately five times as many frames as those suggested by the researcher, including material not suggested by the pictures, so that the narrative differed substantially from that suggested by the researcher.

Where the pictures were not visible by the researcher, Michael included a larger number of the key frames as suggested by the researcher, whilst decreasing marginally those frames that he included that were not suggested by the researcher and were not evident in the

pictures. However, the general effect was similar to that where the pictures remained visible to the researcher.

Procedural Samples

(Ref. to Appendix F for instructions and appendix K for procedural discourse samples)

Within the procedural discourse sample, both Martin and Michael omitted the abstract and orientation. These were included by all of the nurse auxiliaries. The abstract and orientation perform a particularly interactive role within discourse. The abstract (also called the announcement by Wald (1978) and the preface by Sacks (1971) and Goodwin (1984)) has a number of functions. It can summarise the narrative or provide an evaluation of the following narrative, where the evaluation involves introducing the listener to the nature of the narrative or the listener's expected response to this narrative. Goodwin (1984) notes that the position of the abstract at the boundary of the narrative means that it contains a particularly interactive function. Thus, it can include a bid for an extended turn to include the narrative, or it can include negotiation as to whether the narrative will be told, and what constitutes relevant material.

Within the list of ordered events included within the procedure, it is noticeable that Martin and Michael included discussion of events and visits related to their change in ward. This information related to the time before the decision that Martin and Michael would be changing ward. Martin and Michael also provided details of the ward to which they were transferred. Neither of these areas of information were mentioned by any of the nurse

auxiliaries, and these are also not strictly included within a response to the question asked. In contrast, Martin and Michael did not include any of the details related to packing their belongings. Four out of the five nurse auxiliaries described the packing of belongings using a number of frames. Interestingly, the nurse auxiliary omitting these details uses an abstract and orientation to explain why this is not a question he is able to answer, and he does not describe at all any of the procedure.

Both Martin and Michael also include evaluative comments, where they convey to the listener the intended meaning of the narrated sequence. This is not true of the samples by the nurse auxiliaries, and would seem to reflect a different understanding of the task. Nurse auxiliaries would seem to be focusing on the frames involved within the procedure, whilst both Martin and Michael appear to be focusing on their particular experience. Evidently, it is difficult to interpret this data without additional information. Are the differences in the procedural discourse samples a reflection of patients assuming that staff are aware of the procedure involved in moving ward, so that the request is for an account of their particular experience? Is the information provided by Martin and Michael a reflection of the importance attached to people demonstrating appropriate emotional responses to events within a psychiatric institution? These are just a few of the possibilities.

Interestingly, looking at the comparison of frames produced by Martin and Michael as compared with those frames suggested by the researcher (ref. Appendix K);

Martin did not include any abstract or orientation. He mentioned an initial suggestion of his change of ward, and a series of events leading up to his change of ward, without elaborating on either of these areas. He did not mention explicitly the final decision that he would change ward. Martin then omitted describing the preparations for a change of ward, despite this information being the subject of the question.

Michael did not include any abstract or orientation. He provided a detailed account of events prior to the actual move. Then, after not making the decision for the final move explicit, Michael mentioned briefly "*and I was transferred to here and went into a three bed dormitory*". He did not elaborate on this comment, and did not describe any details of the preparations for the move, when these were the subject of the question. Michael then went on to describe in detail what could only be described in terms of another framework or other frameworks related to time following the move, where these were not included in the question, and were not included by any of the nurse auxiliaries.

It could therefore be seen that the findings using the framework based on the discourse samples of the nurse auxiliaries and the framework suggested by the researcher were similar despite differences in the actual frames included by these two methods. It could also be seen that Martin and Michael demonstrated similar difficulties in using an appropriate discourse framework for both narrative and procedural discourse samples used in the baseline assessment.

Intervention would focus on making appropriate discourse frameworks explicit, and focusing the patients' attention on these frameworks.

(2.) Therapy Outcome Measures

(Please refer to discourse sample transcripts and Frames Analyses in Appendices I, J, and K.)

Martin:

On the same discourse task as that included within the baseline assessment, where the pictures remained visible to the listener, (without being provided with feedback), Martin included more frames following therapy as compared with his baseline. This decreased slightly at reassessment (two months following the completion of therapy), but did not revert to his baseline level. At the end of therapy and reassessment he was near or within the range of nurse auxiliaries for these measures.

On the same discourse, where the pictures were not visible to the listener, Martin included more frames at the end of therapy, and yet again more frames at reassessment. The number of frames he included was just below the bottom of the range for nurse auxiliaries (e.g. 9/11 frames produced by 80% or more nurse auxiliaries, compared with a range of 10-11 in nurse auxiliaries, and 10/13 of those frames produced by 60% or more of nurse auxiliaries, as compared with the range of 11-13 among nurse auxiliaries). This contrasted with a very low baseline (e.g. 5 1/2 of frames produced by 80% or more of nurse auxiliaries, versus range in comparative data of 10-11, and 5 1/2 of frames produced by 60% or more of nurse

auxiliaries, as compared with a range of 11-13 among nurse auxiliaries). Thompson (1991) describes a similar situation in which a patient (HL) continued to improve after the termination of therapy. Thompson suggests that this does not reflect improvement as evidence of natural recovery, but rather that improvement as a result of therapy enabled the patient to gain additional experience independently, which continued to have a rehabilitative effect. It is possible that the continued improvement following the end of the therapy programme was a reflection of an increased appreciation of the frames required within a discourse framework. This improvement might have been subsequently reinforced due to the positive feedback from others and via increased satisfaction when used by the participants in the therapy programme.

For the discourse sample used at the end of therapy (outcome measure) and at reassessment (6 weeks post therapy), where the pictures remained visible to the listener, Martin scored near or within the range of nurse auxiliaries for all measures at both outcome and reassessment.

For the discourse sample used at the end of therapy (outcome measure) and at reassessment (6 weeks post therapy), where the pictures were not visible to the listener, Martin included more frames at outcome (just under the range of nurse auxiliaries), and yet more frames at reassessment to within the range of nurse auxiliaries.

For the discourse sample used only at reassessment, where pictures were visible, Martin included frames within the range produced by nurse auxiliaries, and where the pictures

were not visible, Martin produced frames just outside of the lower limit by nurse auxiliaries.

i.e. post therapy, and at reassessment Martin increased the number of essential frames he produced to be near or within normal range where pictures were visible to the listener, but still outside the normal range for where the pictures were not visible to the listener (possibly improving with therapy, but not showing sufficient attention to context. A possible focus for future therapy could involve looking at the effects of different forms of context on discourse)

Michael

At baseline, for the narrative with pictures visible, Michael produced a similar number of essential frames to those within the range for nurse auxiliaries for essential frames although just outside the upper or lower end of the range for the various measures (e.g. % of frames produced by 80% of the nurse auxiliaries, % of frames produced by 60% of the nurse auxiliaries). However, notably, he produced an extensive number of frames not produced by any of the nurse auxiliaries. This resulted in a very lengthy discourse sample, where it was difficult to determine what Michael was attempting to convey due to the large number of pieces of information or frames without any indication of their degree of importance to the discourse. Post therapy and at reassessment the number of essential frames Michael included altered slightly (increase or decreased slightly depending on the measure e.g. % of frames produced by 80% of the nurse auxiliaries, % of frames produced by 60% of the nurse auxiliaries), whilst the additional frames not produced by nurse auxiliaries were omitted.

For the narrative without pictures visible, at baseline Michael produced fewer essential frames than nurse auxiliaries, but many frames not included by any of the nurse auxiliaries. At the outcome of therapy and at reassessment Michael produced slightly fewer essential frames and omitted the frames not included by the nurse auxiliaries.

For the narrative included only at outcome and reassessment and the narrative included at reassessment only, both with and without pictures visible to the listener, Michael showed some variation between outcome and reassessment, but was within the range of the nurse auxiliaries for essential frames, and did not include many frames not included by nurse auxiliaries (within normal range, because nurse auxiliaries also included idiosyncratic frames).

SECTION 5.7

DISCUSSION: BENEFITS OF THERAPY

Despite the small number of sessions (5 sessions) involved in the therapy study, both participants demonstrated improvement in terms of producing discourse samples which resembled more closely that of the nurse auxiliaries following therapy, and maintained most of the gain after an interval following therapy. Martin initially produced few of the essential frames as determined by their inclusion by all or most nurse auxiliaries, whilst producing many frames not mentioned by the nurse auxiliaries. Following therapy, and at an interval following therapy, Martin increased the number of essential frames he produced to be near or within normal range where pictures were visible to the listener. Where the

pictures were not visible to the listener, Martin's performance resembled more closely that of the nurse auxiliaries, but remained outside the normal range for where the pictures were not visible to the listener. Whereas nurse auxiliaries increased the amount of information they provided as a result of them being made aware that the listener would not have access to the pictures, Martin did this, but to a lesser extent.

It is possible that Martin's performance could reflect a decreased appreciation of the requirements of presupposition, where presupposition involves taking a communication partner's perspective and forming assumptions about what that person already believes or knows to guide one's own contributions (refer to section O.4 earlier). Martin's performance is consistent with Martin having benefited from therapy in that he applies the framework to varied discourse samples, including those not addressed within therapy. Martin does not, however, appear to understand what information he needs to include as a result of the particular situational context, e.g. whether additional information is available to the listener. Without a further therapy programme it is unclear whether Martin would be able to benefit from a therapy focus on 'presupposition'. It is possible that Martin is only able to apply a rule such as that offered by a framework, whilst remaining incapable of adapting the information he provides to particular elements of the situational context. Nevertheless, therapy enabled Martin to produce discourse samples that resembled more closely the target discourse samples. Further feedback as to the benefit of the therapy programme came from the patient himself and from other members of staff. Martin described a number of ways in which he observed the benefits of therapy. This included him finding that he was able to talk to a larger number of people because he 'knew what to

say'. Staff members volunteered that Martin was more assertive, noting situations where Martin offered his opinion, or asked questions which they considered he would not have done prior to therapy, stating these as benefits. However, it must be remembered that these characteristics are not always valued within an institution. Within an institution staff do not always reinforce 'more assertive' behaviour. This suggests the integral part staff education should play within any therapeutic programme so that all staff are working towards similar goals wherever possible, or minimally appreciate the achievement of goals set within therapy.

Michael similarly produced discourse samples following therapy, and at an interval following therapy, to reflect more closely the target discourse samples as produced by the nurse auxiliaries. Whereas initially Michael's discourse samples differed substantially from those of the nurse auxiliaries in that he produced a large number of essential frames, this pattern of performance was modified after therapy. Post-therapy Michael's inclusion of non-essential frames was within the range of the nurse auxiliaries, with only a slight reduction in his inclusion of essential frames. This suggests that Michael was able to reduce his lengthy discourse samples to demonstrate recognition of the relative degree of importance of varied frames. Michael spontaneously noted how this therapy had benefited him. He mentioned that when speaking to his cousin on the telephone he now spoke for a shorter period, felt that he had mentioned all that he wished to report, and found out about his cousin, all of which he had been unable to do prior to therapy. He also noted that he had begun to use opportunities for interaction with staff more appropriately in that he no longer added more information each time staff said "yes", previously viewed as

encouragement to say something further, but rather thought about what he needed to convey. Michael cited a number of examples of when he used this newly found skill. This benefit was reinforced by a comment from his responsible medical officer, who noted that Michael had spoken to him in an assertive manner, demanding answers to the questions that were significant to him.

These findings would suggest that participants with what appeared functionally to be very different difficulties (saying too little, and saying too much respectively) benefited within their daily life from a very short therapy programme involving focusing their attention on discourse frameworks. Furthermore, they experienced some carryover at a short interval following the end of therapy.

SUMMARY

Language presentation is a key factor in the diagnosis and appraisal of individuals with schizophrenia. It is commonly acknowledged that current descriptions of the language of persons with a diagnosis of schizophrenia are inadequate. Within this study, a linguistic framework was used to describe the language of twelve participants with schizophrenia. This framework provided the basis for the development of measures that were demonstrated to have clinical validity and both interrater and intrarater reliability. The measures also provided the basis for theoretically driven therapy. Participants with varied symptomatology demonstrated improvements over a course of five sessions of therapy, with 'carryover' of the benefits of therapy extending to their everyday lives. Thus, objectives one and three of the study were satisfied (with objective two discussed later in the summary).

The study findings also had more widespread significance. It would appear that individuals with schizophrenia might perform significantly better on particular linguistic tasks including those commonly used by mental health professionals for assessment purposes. Suggestions are made as to how the measures used in this study could be developed further in order to provide a valuable role in tasks such as risk assessment of individuals with schizophrenia. It is also suggested, on the basis of findings in the literature and the findings in this study that measures such as those developed in the study may be particularly valuable in other client populations, including persons with a range of related disorders and possibly even children. Finally, suggestions are made as to how to

develop the measures even further to facilitate the analysis of a wider range of discourse types.

As for the relationship between cognitive difficulties and language symptomatology suggested by the second objective in this study, unfortunately it is not possible to provide a definitive answer to the specific objective. However, it is noted that within the study many hypotheses were made as to the possible relationship(s) between cognitive and linguistic variables. These hypotheses were accompanied by practical suggestions as to methods for testing the hypotheses in future studies and clinical practice. It is therefore possible to conclude that the study provided valuable information in response to the three objectives suggested at the outset of the study, and also providing guidance for future studies.

