Cognitive and linguistic predictors of literacy in Namibian Herero-English bilingual school children

By

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Thesis submitted for the degree of Doctor of Philosophy

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Guildford, Surrey
United Kingdom
2003

Abstract

This study assessed two conflicting viewpoints regarding the development of literacy amongst bilingual children: the central processing and script dependent hypotheses. A cross-sectional study tested the reading and spelling ability of Grades 2-5 Herero/English bilingual children in Namibia and investigated possible predictors of literacy among measures of cognitive/linguistic processes. The findings indicated that children showed evidence of acquiring Herero (L1) literacy skills faster than the same skills in English (L2), while at the same time there was evidence for common underlying cognitive/linguistic predictors of literacy ability in both languages. The results showed that literacy in both languages could be reliably predicted by L1 listening comprehension and L2 phonological awareness.

A second study provided a longitudinal perspective on the gains in literacy made by a subset of the cohort over a one year period. Again, the results were consistent with faster gains in Herero literacy development and there was evidence for similar underlying cognitive/linguistic predictors of literacy skills achieved in both Herero and English. In particular, phonological skills influenced literacy development in both languages. Generally, the findings of this study confirmed the conclusions derived from the first study.

A final stage of the research focused on individual children who showed signs of literacy difficulties. The results suggested that deficits seemed as likely in the more transparent script as in the less transparent one. The different types of difficulties presented by these single cases were consistent with those that might be predicted from the literature on specific literacy difficulties.

Overall, the data reported were consistent with both theoretical positions, indicating the need for a combined framework with which to understand biliteracy development. Conclusions lead to a consideration of issues for further research and practical implementation.

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Acknowledgements

Four years have come and gone. When I came to the University of Surrey in September 1999, I wanted to research one thing. A certain man persuaded me to research something else. Initially, I had reservations about his proposal and even considered changing universities. However, after careful considerations, especially the fact that changing universities would mean getting my family on the move again, I reluctantly settled for his proposal. My reservations turned into enthusiasm for what I ended up researching thanks to this man, Dr. John Everatt, who became my academic supervisor. Words would never be enough to express my heartfelt gratitude for the excellent advice, guidance, and support he has given me over the years. His understanding, patience, and encouragement made the completion of this project possible, even when I felt like abandoning it and go back home. A million thanks, John. I am also grateful to Prof. Ian Davies for his assistance in ways more than one. Many things in my personal life at Surrey would have been impossible were it not for his intervention.

I would like to thank the University of Namibia, through its Staff Development Committee, and the Association of Commonwealth Universities for the generous financial support that enabled me to undertake these studies. Also, I would like to express special thanks to Prof. Lisa Plattner, then Head of the Psychology Department at the University of Namibia, for wholeheartedly supporting my nomination for this scholarship opportunity. Similarly, thanks are due to Caroline Kapitango for assisting me with data collection. Your time with me kept you away from your family. I would like to thank them for the understanding and maturity they have shown throughout this research project.

Certainly, my parents Anton and Erica, have always supported me throughout my educational career. Through their encouragement and love, I managed to get this far. Mom, Dad, I thank you from the bottom of my heart for all you have done for me, even as an adult. I would fail if I did not extend my thanks and gratitude to my uncle, Dr.

Vetumbuavi Veii. His inspiration put me on a course to pursue doctoral studies, his emotional and financial support when things were not going well enabled me to see this project to completion. We shall celebrate!!

Finally, I would like to thank my wife, Jacqueline and our three children, Tuakondja, Himumuine, and Ketoveni for the continuous support they have shown me throughout the years as we trotted the globe: from America to Antigua to Namibia and to the United Kingdom. Your love has prevailed over the pressure of living under tight financial conditions and my long hours away from you. Ketoveni, your love, kisses, and hugs have always kept me floating, especially when things got bad. Himimuine, your sense of humour made me forget about my troubles. Tuakondja, your mature behaviour when mommy was not around enabled me to concentrate on my research. Of course, Jacqueline, your love, your care, your financial contribution to the family even under the most of difficult circumstances made the difference between day and night. There are no words to express how much I appreciate what you and the children have done for me.

I LOVE YOU ALL.

Chapter One

INTRODUCTORY BACKGROUND

This part of the dissertation provides some basic background information that motivated the undertaking of this research project. In particular, it covers the levels of English experience in Namibia, language-teaching policy in Namibian schools, the differences between the Herero and the English orthographies, the approaches to the instruction of literacy in Namibian schools and the extent of research on Namibian children's literacy development.

1.1. Language and literacy in Namibia

1.1.1 Language environment and low levels of English experience in Namibia

As little as 13 years ago, Namibia emerged from 75 years of apartheid South Africa's colonial rule. During the 1950s, the National Party had promoted the use of Afrikaans, a language spoken by the Afrikaners who administered apartheid South Africa. Afrikaans was, therefore, imposed on Namibians and made the official language of the country as well as the medium of instruction in most schools. By the end of the 1960s, Afrikaans had become the main lingua franca in Namibia in virtually all social settings (Maho, 1998). As a result, the majority of Namibians, especially those who did not go into exile during Namibia's occupation by South Africa, are conversant and literate in Afrikaans. According to Maho (1998), in the 1980s 85% of the total Namibian population claimed to speak and/or understand Afrikaans.

Vernaculars, or indigenous languages, were used to facilitate the pursuit of apartheid in education, resulting in the development of orthographies and terminologies for these languages (Maho, 1998). Maho further alleges that to further serve the interest of apartheid, the South African colonial administration introduced instruction in the mother tongue at the primary school level. The colonialists reasoned that such an exercise would serve to promote the cultural identity of the colonized and help to set them apart from the colonialists. Besides serving as the media of instruction in primary schools, indigenous languages remained the medium of communication at home and amongst the various ethnic groups. They were widely used in church services around the country, particularly in the rural areas. Thus, for those who were not literate in Afrikaans and/or English, vernacular literacy enabled them to read the bible and sing hymns from the church hymnbooks.

Although English did not remain in total obscurity during this period, it certainly did not enjoy the same degree of usefulness as Afrikaans did. It was taught in schools as a second or third language but was not commonly or widely used in commerce and industry to the extent Afrikaans was. Consequently, very few Namibians ever gained sufficient proficiency in the English language, both in its spoken and written forms. In other words, the majority of Namibians have very low levels of English experience. Following independence in 1990, the new Namibian government instituted English as the official language of the country. This means that English replaced Afrikaans as the medium of instruction in schools and the language in which business is conducted. In comparison to Afrikaans, English is now the more common language used by school children in the urban areas. However, it still remains a language known to few. Except in schools, the use of English in rural areas is virtually non-existent. After school children go back to their everyday linguistic environments and revert to their respective home or first languages. As such, English is hardly used by the majority of Namibians.

1.1.2. Instructional language policy in Namibian school

Following independence from apartheid South Africa in 1990, the then Ministry of Education, Culture, Youth, and Sport (now the Ministry of Basic Education, Culture, Youth and Sport) embarked upon formulating an instructional language policy that would be satisfactory to stakeholders in education. To this end, the Ministry consulted widely and hosted the Namibia National Conference on the Implementation of the Language Policy for Schools where a compromised but satisfactory-to-many policy was agreed upon, adopted, and implemented (Swarts, 1996; 2000; Ministry of Education and Culture, 1993).

The newly adopted language policy aimed to promote, among other things, the following:

(1) to have primary education facilitate the school children's acquisition of reasonable competence in the official language (English) at the end of their elementary school cycle so that they can become effective participants in society or continue their education beyond elementary school;

(2) to have schools teach at least two languages, a mother-tongue and English as subjects, in order to enhance the chances of the children becoming bilingual; and

(3) to introduce vernaculars as the media of instruction for the first three years of elementary school (grades 1-3), with the fourth year (grade 4) being a transitional year where the mother tongue and English are used more-or-less equally. Beyond the fourth grade, English was to become the medium of instruction and the children's L1 was to remain a school subject. The Ministry's rationale for introducing the vernaculars as the media of instruction in grades one to three was based on scientific and pedagogical reasons, arguing that it was ideal for children to learn through their L1 during the early years of schooling when the basic skills of reading, writing, and concept formation are still developing (Ministry of Education and Culture, 1993).

The Ministry's rationale for adopting and implementing this policy was indeed a sensible one, particularly if looked at from Cummins' (1979) linguistic interdependence hypothesis. Briefly, this hypothesis states that one's L1 is the foundation for learning a subsequent language. Thus, a child's enhanced and consolidated L1 processing skills (such as, phonological awareness), can transfer to any subsequent language that a child is to acquire later on. Available literature (see discussions in chapter 3, section 3.2) states that the acquisition of L2 is very much dependent on the transfer of phonological processing skills from L1 to L2. Thus, in Namibia, the child's first language is intended to support learning while English is introduced and taught gradually. This implies that children in grades as low as two may show evidence of being able to read a few words and name a few objects in English. English language acquisition in the early grades may be particularly evident in the urban schools where the heterogeneity of racial, ethnic, and tribal groups renders teaching in the mother tongue somewhat difficult.

The policy of teaching in the child's mother tongue for the indicated period of learning implies that literacy instruction and, therefore, literacy development, in the first and second (English) language occurs in tandem rather than simultaneously, first in the home language and then in the second language. This arrangement provides the opportunity to assess the impact that learning to read and write first in the home language may have on learning to read and write in the second language some time after first language literacy has already been acquired.

1.1.3. A brief Herero language background

Herero is a Southwestern Bantu language spoken mainly in Namibia and is designated as R. 30 in Guthrie's classification of Bantu languages (Marten, Kavari, Cooke, Hong, Toft & Vogl (2000). According to Marten et al. (2000), there are 141,000 Herero-speaking people in Namibia and another 18,000 Herero speakers in neighbouring Botswana. Maho (1998), however, states that the 1991 Namibian census estimated that there are 113,000 Herero-speaking people in Namibia.

The Herero people are subdivided into four groups namely, the central Hereros in central Namibia, the Kaokolanders in Northwestern Namibia (Kaokoveld), the Ovambanderu or Eastern Hereros in eastern Namibia and the Botswana Hereros. However, Marten et al. allege that in Namibia Herero speakers live mainly in Kaokoveld in Northwestern Namibia and in the central part of Namibia. As such, according to these authors, there are two corresponding dialects of the Herero language, the central dialect spoken by the central Hereros and referred to as Central Herero or just Herero and the northern dialect. Maho (1998) adds a third dialect, Otjimbanderu, spoken by the Ovambanderu or Eastern Hereros. The Central Herero dialect is said to be the basis for standardization for Herero dialects (Maho, 1998).

It is assumed that in the past the Otjimbanderu dialect was different from Central Herero. However, due to the influence of the standardisation of Central Herero, the Otjimbanderu and Herero dialects have merged such that the Otjimbanderu is now very similar to Central Herero (Maho, 1998). The sample that was selected for this study is mainly from Central Herero. Even if, among the sample, there may have been children speaking other dialects of Herero, the difference is so minute it would not have made any significant differences in the reading and spelling performance of the children as the words in these dialects are spelled and read the same. Owing to the influence of Central Herero as the standardisation for the Herero dialects, the dialect that is taught in schools and at the university level is the Central Herero, or just Herero. Thus, all the children learn to read and write (Central) Herero dialect in school.

1.1.4. Herero and English orthographies varying in depth

Languages differ in that each has its own specific sounds, or phonemes, that characterise it. In the different orthographies that represent these languages, these sounds are represented by written symbols. In the case of most alphabetic scripts, phonemes are represented by written symbols referred to as graphemes. As the phonemes of languages vary from language to language, so too do the way graphemes represent those phonemes. The Herero orthography is highly transparent, meaning that there is an almost perfect correspondence between a grapheme and the phoneme it represents. For example, in Herero, the letter "u" is always pronounced as "oo" (as in omuvero, meaning door). This can be contrasted with English where the same grapheme can be pronounced in many different ways: as "uh" as in the word "but" or "oo" as in the word "flute" or even producing an "er" sound in combination with the letter "r" as in the word "purpose". In Herero, irrespective of the word, the letter "u" will always be pronounced as "oo" and will never change, whereas in English this changes from word to word. In other words, a given sound in English may be represented by different spellings (e.g. due, dew) and one letter or sequence of letter strings may represent one or more sounds (e.g. "ch" in chord, chore, and chute) and the "ea" sound in heal vs. healthy.

Furthermore, while Herero is characterized by regular words, and therefore, direct correspondence between graphemes and phonemes, English has many irregular words that do not lend themselves to direct correspondence to the grapheme-phoneme correspondence rules. Some words can be learned by analogy with other words – e.g., a novice reader confronted with a word like "wave" may read it by analogy with "gave" or "have". However, words such as "yacht" and "draught" cannot be pronounced by rule or by analogy and must, therefore, be learned individually. Compared to Herero, this makes English a less transparent or a more "opaque" orthography that does not always allow a direct correspondence between its graphemes and phonemes. As such, unlike Herero, English requires of the (beginning) reader to master more rules when learning to read. For that reason, developing literacy skills in Herero would be expected to progress with more ease than in English.

Other differences between the two languages relate to the number of letters of the alphabets and how these letters combine to represent phonological units. For example, English has 26 letters that map onto 36 phonemes. In order to determine the value of some phonemes, the reader needs to consider more than one letter, such as 'th' and 'qu' (see discussions in Geva & Siegel, 2000). However, the letter combination 'th' does not occur in the Herero orthography. Similarly, there are some letters in Herero that do not appear independently of other letters. For instance, unlike in English, the letters "b", "d", and "g" do not occur without the letters "m" and/or "n" preceding them. For example, the "m" is always found in front of "b" (e.g. "mb") and "n" is always found in front of "d" and "g" (e.g. "nd" and "ng" respectively). These preceding letters also affect pronunciation. Thus, a Herero-speaking person with a heavy mother tongue influence reading and/or speaking English may pronounce words such as door "ndoor", book as "mbook", and get as "nget". This being the case, such a person may have difficulty perceiving the phonemes represented by the letters "b", "d", and "g" independent of the additional phonemes in front of them. This may be evident in spelling, where the additional phoneme may be perceived to be present and an English spelling error may be produced.

In contrast to English, Herero has 21 letters, with the letters "c", "f", "l", "q", and "x" excluded, the remaining letters are identical across the two orthographies. This implies that those phonemes ("c","f", "l", and "x") represented by the 'missing' graphemes do not exist in the Herero language. However, "c" is an exceptional case compared to the other three phonemes. For example, one of the phonemes represented by "c" can be represented by "k" in Herero. Therefore, the same phoneme may be represented by different graphemes in the two languages. A word with the same phonemes across the two languages may be spelt differently (e.g., "koka kora" versus "coca cola"). Also in contrast to English, Herero uses markers below letters to change the phoneme represented; e.g., "t̲", "n̲", "nd̲". Words containing letters with markers differ in meaning and pronunciation from words not characterized by markers. For example, "onde" (long) vs. "ond̲e" (fly), "tara" (look) vs. "t̲ara" (hide), "okunanga" (to become slimy) vs. "okun̲anga" (to invite or to attract one's attention). These markers are important not only in pronunciation but also in spelling as failure to insert a marker where it is supposed to be results in misspelling. Similarly, English-speaking individuals are expected to encounter difficulties with these phonemes in both the spoken and written forms of Herero.

Differences in the phonology and depth of the two orthographies are abundant (there may be some similarities in the grapheme and sounds of the two languages) and as a result may differentially affect the development of literacy in Herero and English.

1.1.5. Approaches to literacy instruction in Namibia

The Namibian Government (2000), through the National Institute of Educational Development (NIED) conducted an observational study to determine the literacy approaches primary school teachers apply in literacy instruction. The majority of teachers were found to use the whole word method, phonics, or a combination of the whole word method and phonics. The study further revealed that teachers tended to constantly use the particular method they were more familiar with. If, for example, a teacher were more familiar with the whole word method, he/she would use that method at the exclusion of other methods even if he/she were aware of them. The teachers at all the schools where the data presented in this thesis was obtained confirmed that they tended to use one method over another. Upon questioning by the researcher as to which reading method they used in literacy classes at their respective schools teachers indicated that they used the whole word method. Hengari (1995) noted similar observations at one of the primary schools from which a sample of the children studied in the present study were selected. Some teachers, especially those with Basic Education Teachers Diploma (BETD), a professional qualification for lower primary school teachers introduced in 1993, indicated that they did not know what the phonics method was and only used the whole word method. However, the current researcher noticed that at times it appeared as if the children attempted to read words by phonics as they would sound the letters in the words but then not blend these sounds to form the desired words (they would stop at sounding the letters). This created the impression that some teachers may have attempted literacy instruction via the phonics method.

The Namibian Government (2000) study conducted by the NIED also revealed little evidence of teachers using remedial approaches to helping students who had difficulty reading, or decoding unknown words. What remedial strategies were used involved verbalizing the correct word and asking the student to repeat the verbalized word, or to ask another student to give the correct answer. Verbalizing whole words and asking the student to repeat those words is indicative of a whole word strategy being used. There seems to be no attempt on the teacher's part to demonstrate to the student how to break down the word into sounds and how to couple these sounds together to form a word. Thus, in the final analysis, the whole word method of literacy instruction may indeed be the approach widely used in Namibian literacy instruction classes. The potential effects of the whole word method on literacy development in a shallow orthography provide more opportunities for research into literacy development in shallow and deep orthographies.

1.1.6. Lack of research on child literacy development in Namibia

Many areas and topics in Namibia remain under-researched. In particular, there is a severe lack of research in the area of children's literacy development in different languages, particularly as far as the factors predictive of literacy are concerned. To date, the current researcher is aware of only two studies conducted in the area of children's literacy, the current study being the third. While the current study took a psychological/psycholinguistic approach to children's literacy, the other two studies approached the same topic from educational and special education perspectives respectively. The objectives of the NIED study referred to earlier were:

(1) to investigate the reading competency of the primary school children across all grade levels;
(2) to identify reading problems; and
(3) to establish whether the literacy instruction methods employed were appropriate.

The Namibian Government (2000) study conducted by NIED focused on whether or not the BETD teachers were well prepared to develop primary school children's basic literacy skills. Furthermore, it aimed to identify the literacy instruction methods BETD teachers used in teaching literacy.

Hengari's (1995) study, on the other hand, sought to create an understanding of the nature of the school children's reading problems and to attempt to identify the appropriate literacy instruction method teachers could use to help their students who were struggling with reading. To some extent, this study attempted to identify the causes of the children's reading problems. The current study aimed at identifying the cognitive-linguistic factors that predict the development of literacy and literacy difficulties in children learning to read and write in two languages. Given the dearth of work in this area, it is clear that there is need for more research. This was a compelling reason for the current researcher to undertake this project in Namibia. Other reasons that motivated the undertaking of this research project included (but are not limited to) the experience and status of the English language in comparison to the home or first language. Of both theoretical and pedagogical interests here is the development of literacy in English as an alternative language on the one hand, and the development of literacy in the first languages on the other. Furthermore, the differences in the orthographic depth and the phonology of the two orthographies and how literacy develops given these differences, motivated undertaking this research project.

1.2. Structure of the dissertation

The first chapter outlined the aims, importance, and rationale of the research project that culminated in this dissertation. Many research projects are afflicted with constraints and limitations that may affect their external validity. This project was no exception. Some of these limitations are outlined here. The instructional language policies formulated and implemented by the Namibian Ministry of Basic Education and Culture, and the rationale for these policies, are briefly discussed in the section that follows. Legislation governing the provision of special educational services is presented and discusses in the following section. The discussion includes a brief critique of this legislation. This last section of the first chapter provides an outline of the rest of the dissertation.

The second chapter presents the literature review on a number of literacy issues. The first section of this chapter gives a brief definition of what literacy is. Different disciplines study various aspects on literacy and literacy development. While the social (ecological) perspective of literacy describes the environmental and contextual influences on children's literacy development, the educational perspectives highlight the variations in educational approaches to literacy in different societies and the outcome of these approaches. Another approach is taken by the psychological perspective, which analyzes and describes the cognitive and linguistic processes underlying the development of literacy in children's language or languages. The following section of this chapter focuses on the psychological perspectives on the development of literacy in children's L1 and L2. Speech and language development influence the acquisition of literacy. Thus, the next section of the chapter will consider the development of language and its subsequent contribution to, or inhibition of, the development of literacy in children. The final section of the second chapter discusses prevention and intervention approaches, as well as methods necessary to help children with literacy difficulties overcome their pitfalls.

The definition of bilingualism/multilingualism is a rather contentious issue. In the first section of the third chapter, an attempt at defining bilingualism/multilingualism is made and the perspective taken in the present research is presented. In a similar manner to that found in monolingual literacy development, it will be assumed that certain cognitive-linguistic processes are also involved in acquiring literacy in a second language. However, the question is still open to debate as to whether the factors that account for L1 literacy development also account for L2 literacy development. The following section of this chapter, therefore, considers the processes involved in L1 and L2 literacy development. There have been debates as to whether or not bilingualism affords the individual more cognitive benefits than the monolingual or whether it is altogether perilous to the bilingual child, although researchers today might not argue that this is indeed the case. Thus, the third section addresses the cognitive benefits and/or disadvantages of bilingualism. This section then focuses on literacy and the potential nature of literacy difficulties in bilingual children. Issues such as the potential for a bilingual individual to have literacy difficulties in both L1 and L2 simultaneously or in either language are considered. If a bilingual child experiences literacy difficulties in both L1 and L2, we need to consider whether the same or different factors are responsible for this problem. These issues will be raised before a final section dealing with how the assessment of literacy difficulties in bilinguals can be carried out.

Various theoretical models provide different explanations for, and empirical evidence in support of, the development of literacy. Thus, chapter four briefly describes the theoretical framework informing this research project. Theories described are the central processing hypothesis and the script dependent hypothesis/orthographic depth hypothesis. Empirical evidence for and against these theories are outlined.

Chapter five enumerates the measures that were used to generate data for this research project. The research question(s) and hypotheses, participants, and schools participants were selected from are also outlined. The tests used, how they were developed, the rationale for selecting the measures used, and how these measures were administered are enumerated in this chapter. Furthermore, chapter five presents the results of the first (cross-sectional) study of this research project. These data formed the basis on which the script dependent and the central processing hypotheses were assessed. The rate at which literacy in the sample's L1 and L2 develop is presented, so are the factors predicting initial literacy in both L1 and L2. The sixth chapter describes the longitudinal study performed as part of the research. The research questions and hypotheses, participants, tests used, and the general procedures are all enumerated in this chapter, and so are the results. The third study, outlined in the seventh chapter, identified literacy difficulties in the sample studied. The research questions and hypothesis of this study are enumerated here as well, along with the participants, the tests used in this study, and the results. Chapter eight includes the general discussions of the entire research project, its conclusions, and its recommendations.

1.3 Aim(s) of the study

The research presented in this thesis comprised cross-sectional, longitudinal, and single case investigations of potential cognitive-linguistic predictors of initial literacy skills among young dual language learning children. The study aimed to assess the ability of measures that have been found to be related to literacy acquisition in monolingual English language children to predict single word reading and spelling skills in children learning literacy in their first language, Herero, and their second language, English.

1.4. Importance of the study

This study looked at identifying those linguistic-cognitive factors that enable young children to acquire literacy in more than one language, in this case, Herero as the first language (L1) and English as the second language (L2). Knowing how children acquire literacy in more than one language and what impact bilingualism may have when children begin to learn to read and write is indeed of great importance to researchers, educators, and legislators. Hence, the findings of this study are expected to have implications for the design of pre-school and elementary school educational programmes so that they can emphasize those linguistic-cognitive skills that play a major role in the children's acquisition of literacy in both their first (L1) and second languages (L2). Such programmes, if carefully designed and successfully implemented, may increase the chances of our children becoming truly bilingual and biliterate. It is further hoped this study will influence not only the teaching methods of the vernacular languages and the English language, but also the approaches to, and methods of, teaching reading in Namibian schools. As a result, language policy legislation in schools, especially elementary schools, may benefit greatly from the findings of this study as legislators may have some empirical evidence that will inform them as to when and at what stage to emphasize which language in the school curriculum.

Finally, this study may hopefully shed light on the early identification of, and intervention in, children at-risk for reading disabilities/difficulties. Although the work may be seen as more applicable to a research point of view, it should also inform procedures for the clinical identification of such populations. Special education curriculum designers, planners, implementers, and legislators may also draw benefits from the findings of this study when planning the provision of special educational services for children with special needs, particularly literacy difficulties.

1.5. Rationale of the study

Like many other children around the world, most Namibian children are fluent in their first language (L1) before they begin formal school and start to learn to read and write. As such, they are capable of using their spoken language to express themselves verbally and to understand spoken language, although their language development may not be complete. However, what we do not know is whether or not these children will eventually acquire literacy both in their mother-tongue, Herero, and English, the second language in which they receive instruction at school. We do not know because at this stage of the children's development we are not yet able to detect potential reading problems until the children start to receive reading instruction. Besides, merely having an average to an above average command of spoken language does not necessarily mean that one is automatically equipped with the required linguistic and cognitive skills necessary for the acquisition of literacy. Irrespective of the eventual literacy skills these children may or may not acquire, what we need to identify, understand, and explain not only for theoretical reasons but, primarily, for pedagogical reasons, are the linguistic and cognitive factors that predict literacy acquisition and reading disabilities in the Namibian children.

Phonological processing skills have been well established as significant contributors to the development of literacy skills in monolingual English-speaking children (see discussion in chapter 2, section 2.4). The same skills have also been shown to contribute significantly to literacy acquisition in children of other linguistic backgrounds such as Chinese, Norwegian, Hebrew, Spanish, as well as other linguistic groups (see discussion in chapter 2, section 2.4). However, it is not quite clear whether or not the same phonological skills play similar roles in the acquisition of literacy of children receiving instruction in a second language. Namibian children, by virtue of learning in English at school, are learners of an alternative language. Yet, a significant majority of these children receive the same instruction in English as their Namibian first language English-speaking counterparts. Thus, for pedagogical reasons, it is of vital importance to know and understand whether or not phonological skills (as well as other linguistic and cognitive factors) play the same role in contributing to literacy development in the Namibian children learning to read and write in two languages differing in the depth of their orthographies.

The Herero orthography encodes phonology more directly, and as a result, is characterized by more regular grapheme-phoneme correspondence rules. In contrast, the English language lacks transparency. Its sound retrieval processes are more complex due to its reduced regularity; consequently, its graphemes and phonemes do not demonstrate a consistent, predictable, one-to-one correspondence (Gholamain & Geva, 1999). Given the transparency of the Herero orthography, one would predict that Herero children's literacy acquisition in their L1 would be easier and faster. This assumption is based on the fact that phonological skills might be important for Herero children acquiring literacy in a deep orthography such as English, which is characterized by irregularities, inconsistencies, and ambiguities in the spelling-sound system. Besides, learning to read in English is a crucial component of these children's academic career and success. The complexity of the English orthography would require heavy cognitive and linguistic demands to process English literacy skills. Therefore, a wide range of cognitive and linguistic pre-literacy skills, including phonological and visual processing skills, would be necessary to aid in the acquisition of both L1 and L2 literacy. Given these differences between the two languages, in which the Namibian children are acquiring literacy, understanding the effects Herero might have on English literacy acquisition and vice versa, and indeed, on Herero itself, is of great instructional importance and relevance.

Increasing evidence suggests that the lack of orthographic transparency in English seems to have powerful and negative effects on the development of reading skills in English-speaking monolingual children. For English-speaking monolingual children with (specific) learning disabilities the lack of orthographic transparency spells even more problems when learning to read (Spencer, 2000). Whether or not potential inherent phonological processing deficits may hinder children's literacy acquisition in their L1 and L2, or only in the L1, or only in the L2, will have implications for the identification of potential literacy difficulties and the provision of special educational services to the children who need it the most. Therefore, finding answers to these and other similar issues constitutes part of the justification for this study.

Generally, the acquisition of literacy is one of the most difficult tasks facing children. Children with special educational needs (SEN), such as dyslexia and other reading difficulties, and children learning in English as an alternative language (EAL), may encounter more specific and severe problems in the process of literacy acquisition compared to their literacy able or monolingual peers, particularly English literacy. A combination of SEN and EAL may exacerbate the literacy problems and lead to even greater learning difficulties. The lack of familiarity with the English language, combined with the use of a different language at home, compound the problems and difficulties children encounter in the process of literacy acquisition (Fawcett & Lynch, 2000). The transition to secondary education and eventually to tertiary education with poor (English) literacy skills, where the children have to cope with a wide range of new subjects at a more advanced level of difficulty, may further exacerbate these difficulties. At this stage of their education, the literacy difficulties they encountered earlier spill over into their academic functioning and compromise the entire process of learning and ultimately, their academic success. This is even more reason for a study of this nature, as it will hopefully lay the foundation for the early identification of developmental dyslexia and other reading and learning difficulties before they are fully entrenched.

Fawcett & Lynch (2000) report growing evidence that problems in literacy become increasingly hard to manage as children grow older. Thus, the earlier we are able to identify them, the more effective and less costly the intervention is likely to be. Children with literacy difficulties usually tend to be severely frustrated, sometimes exhibiting emotional and/or behavioural difficulties associated with their inability to learn to read. Early identification and intervention may help reduce these psychological problems accompanying children's inability to read, and, ultimately, help avoid children dropping out of the educational system as a result of frustrations and discouragement.

The effects of being reading disabled are not confined to reading alone. They also permeate and contaminate other academic areas of learning across the curriculum, including math learning. As a result of the failure to recognise and realise the relationship between literacy skills, learning, and academic performance, educators are dumbfounded when seemingly intelligent children cannot perform to expectation across the curriculum. The response to such an encounter is to label and categorise the children as learning disabled, with the result that the children may be placed in special education school and/or classes. Such responses, in a significant number of cases, may stem from ignorance of the linguistic-cognitive processes that underlie literacy acquisition in general, and in a second language in particular. Moreover, the inability to distinguish reading problems associated with normal second language reading acquisition from actual warning signs of reading disabilities may strongly contribute to our erroneous decisions to assign children to special schools and classes. Through research such as the one described in this thesis, we should learn more about issues in first and second language literacy acquisition as well as literacy difficulties.

The concerns outlined above formed the rationale for this study. Since the Namibian children receive their instruction in a second language that lacks transparency, they may be affected by the problems associated with this language. The effects may be even be more serious if these children have an inherent learning difficulty/disability of some kind, such as deficits in phonological processing skills, which are so characteristic of children with specific reading difficulties (dyslexia). The objective of the work reported in this dissertation was to inform the process of identifying the factors that are predictive of not only literacy acquisition but also, the identification of the early linguistic and cognitive warning signs of reading disability/difficulty among Namibian bilingual school children. The work will also help to identify the normal type of transitory reading problems associated with learning to read in a second language. Unearthing such difficulties will increase our understanding of why some children find it difficult to learn to read and why others do not. As a result of the data the proposed study will generate, we may be better able to devise appropriate intervention programmes to help our Namibian children with their literacy problems, potentially before they begin school, and experience difficulty with the acquisition of reading and writing skills.

1.6. Limitations of the Study:

This study, like any other study, is limited in its scope. Ideally, a representative sample of all the non-English speaking children would have been included in the study. Due to time constraints, however, it was impossible to do so. Besides, designing parallel tests for the other Namibian language groups is a task far beyond this researcher's linguistic ability. Hence, the decision to focus on the Herero-speaking children for the time being until time will permit investigations involving the other language groups. Furthermore, this study did not deliberately exclude English-speaking Namibian children. Since this research project targeted children who speak one language at home and learn another at school, usually a second language, the English-speaking children of Namibia who speak English at home and in school were unsuitable for this particular research project.

Another limitation of the study is the perennial methodological problem of task equivalence that is common in bilingual research. When targeting the same component processes in two different languages, it is ideal to have material and instruments of equal item structure, e.g. word length, word frequency, word familiarity, syllable structure, etc. Unfortunately, designing parallel tests in two different languages equally along these dimensions is in many cases impossible (Geva & Siegel, 2000). This study is certainly no exception to this dilemma. Constructing words of equal syllabic length was a difficult task, with the result that not all words (and non-words) in this study are of equal syllabic length and structure. A lot may be compromised as a result. At the same time, however, the educational importance and significance of carrying out a study of this nature cannot be denied. Since literacy acquisitions difficulties are a potential area of literacy problems that can, and does, confront Namibian children, studies that investigate children's literacy development in both their L1 and L2 are of vital pedagogical importance. It is in this light, with all the limitations in mind that this study was carried out.

1.7. Special Education Legislation and Definitional Issues in Learning Disabilities

In order for any psychological condition or disorder to be well understood, it needs to be well defined, both operationally and conceptually. This means that the existence and labeling of any condition should be understood in terms of its etiology, identifying characteristics or diagnostic criteria, prognosis, and response to intervention (Pumfrey & Reason, 1991). Precise definitions of a given disorder serve to provide guidelines to identify and classify children (or adults) with particular disorders, to communicate with others in the field concerned with both research and the delivery of services, as well as providing rational grounds for generating theories and formulating hypotheses (Hammill, 1990). Thus, the absence of such clear and precise definitions can potentially lead to confusion among professionals in the field. As such, they may or may not know who does or does not have a particular psychological disorder and how that disorder can be treated.

While the clear and precise definition of a given disorder is a consensus among professionals, defining, in particular, learning disabilities and identifying children with learning disabilities still remains controversial. This controversy arises from the vague definitions that have plagued the area of LDs, resulting in inconsistent and difficult implementations of identifying criteria of the disorder. For these reasons, a widely accepted definition of LDs is essential for the future of the area concerned with LDs. According to Hammill (1990) the field has made steady and considerable progress towards agreement on a definition since Kirk (1962) attempted to define learning disabilities.

In Namibia, the Directorate of Special Education executes the Ministry of Basic Education and Culture's policy on special education. Through its mandate to provide education and training to all, including children with special needs, the Namibian Ministry of Basic Education and Culture has adopted a policy that guides it in its provision of services to children with special educational needs. Its objective is to provide special educational services to learning disabled children as early as possible, and to assist them to become fully integrated into society. This policy is informed by the recent global educational reforms that have focused on education for all and inclusive education. Inclusive education has been premised on the understanding that all learners should be taken into account, embraced and considered as viable members of educational communities. Through this policy, the Namibian government has made efforts to define those learning disabilities that impede children's learning and academic performance.

In spite of this guiding policy, it is questionable as to how well the government meets the special needs of the children in question. This is because the policy does not seem to provide conceptual and operational definitions of learning disabilities, or any other conditions it considers an impediment to learning. As a result, it is likely that there are no sound guidelines that can assist with the correct identification of children with learning disabilities, such as literacy difficulties. Furthermore, the policy does not seem to make provisions for clear-cut diagnostic criteria of the various learning disabilities. In addition, there are virtually no suitably qualified professionals in Namibia (e.g. educational/school psychologists) to make the diagnosis. Thus, the pertinent question here is since there are no suitably qualified professionals to make diagnoses of LDs, and no diagnostic criteria for LDs, how are children identified as being learning disabled? What constitutes LDs in the Namibian school systems?

The absence of relevant professionals, and the lack of appropriate definition/ conceptualization of LD, and diagnostic criteria for any disorder, makes formal diagnosis near impossible. Because no proper, formal diagnosis can be made, relevant, pertinent, and effective remedial services cannot be delivered to meet the needs of the affected children. Mowes (1997) and Zimba (1999) report that overburdened Namibian teachers have very little, or no, specialised training in special education. As a result, they are not able to meet the needs of children with special educational needs in the classroom, let alone carry out a preliminary screening of possible LDs, including literacy difficulties.

The policy on special education does distinguish between children who are educationally disadvantaged and/or with specific or severe learning difficulties and children with compound/multiple learning difficulties. Children with compound/multiple learning difficulties are those children with learning difficulties from one or more of the various categories of special educational needs. These categories include children who may have cerebral palsy, children who may be mentally challenged, those who may have sensory-motor disability, and those with behavioral problems (Supplement to the Pilot Curriculum Guide for Formal Education: Special Education, 1999, pp.4-5). Depending on the particular type of special educational needs a child may have, his/her needs may be provided for either in remedial education classes, special classes, special schools, senior special schools, special schools for the hearing and visually impaired, industrial schools, or the National Institute for Special Education.

The policy defines, for example, children with severe learning difficulties as children who are chronically deprived and/or having learning difficulties (Supplement, 1999, p.5). However, it fails to define both chronic learning deprivation and learning difficulties operationally and conceptually. It is not clear what constitutes these disabilities and what their diagnostic criteria are. Thus, the question again arises as to what guidelines the policy uses in arriving at a decision to place a child in either one of the special education need categories. The policy document states that medical personnel, social welfare officers, and/or school counselors/psychologists may refer a child either to special schools, special classes, or remedial education, depending on the nature and severity of the child's disability. The referral these professionals make can be on the basis of specific learning/developmental impairments and/or other medically or psychologically diagnosed impairments (all of which the policy document does not provide clear-cut definitions and diagnostic criteria for).

Hengari (1995) makes reference to learning problems being a challenge facing many Namibian teachers everyday. He goes on to talk about various categories of students with learning problems including mental retardation, learning difficulties/disabilities, emotional, and behavioural disorders. Mowes (1997) also makes a distinction between "learning difficulties" and "slight learning difficulties. Neither Hengari (1995) nor Mowes (1997) provide any definition of these disorders, what their diagnostic criteria are, who diagnoses them, and who decides on the right course of intervention. Given that it is questionable whether there are suitably qualified personnel to carry out diagnoses and treatment, the validity of the categories of LDs and other psychological disorders children are diagnosed with, must also be open to quarry.

According to Mowes (1997), a child is referred for special education if he/she has repeated the same grade twice or if a child has failed two grades consecutively. It is evident that these criteria are not informed by a particular scientific theory. The problems (if there are problems) that land a child in a special education facility are not operationally defined or informed by any theoretical perspective. Using such uninformed, unscientific criteria for referral and placement purposes is a rather inadequate way of identifying children with LDs. Children can potentially be misdiagnosed and wrongly categorized as being in need of special educational services. Or, if they may be truly needy of such services, they may be in a wrong category of special needs. Besides, a child's poor academic performance may not necessarily be due to an LD. Other factors such as emotional problems, neglect, abuse, or a mere lack of motivation and interest may be the underlying factors contributing to a child's poor academic performance. Therefore, a referral for, or placement in, a special educational needs programme may not serve the purpose since the remedial services being provided may not be addressing and meeting the specific needs of those children.

While countries like the US and the UK have operationally defined LDs and have designed diagnostic criteria to guide them in identifying LD children, Namibia does not appear to have the advantage of such measures. The lack of the necessary personnel adds to the problem facing Namibia in correctly identifying the children with LDs and to provide them with the relevant and effective remedial services. As a result, children with special educational needs do not seem to receive the support they need in order to become fully functioning members of society.

Although there is a lack of operational and conceptual definitions of psychological disorders, diagnostic criteria, and suitably qualified professionals to render the right type of services to the needy children of Namibia, there is at least the will to turn the situation around. The formulation and the implementation of this policy is in itself a token of the government's commitment to addressing learning disabilities among Namibian children. Furthermore, this will and commitment are evident in the teacher's training programmes of the University of Namibia and the teacher training colleges. These programmes now include sensitising the trainee teachers to children with special needs (Zimba, 1999). To succeed, these programmes need the support, financial and otherwise, of the primary funding agent of education, namely, the Namibian government. The support of the student teachers in these training and educational programmes is also of great importance to ensure the success of the programmes.

Inclusive education and teacher training programmes to educate the pre-service, as well as in-service teachers have been put in place. This needs to be strengthened by developing a comprehensive, clear, and implementable policy on the education of Namibian children with special needs because the current policy needs rethinking, revision, and enhancement (Zimba, 1999). While this is a good initiative, which is hoped will gain momentum and eventually come to fruition this is only part of the equation to solve the problem. In addition to policy formulation and teacher training in the area of LDs and other special educational needs, Namibia needs to embark upon a massive training of psychologists, particularly educational and school psychologists, who will also contribute their part in addressing the special educational needs of those affected children.

Chapter Two

LITERACY

2.1. Definition of Literacy

Conventionally, literacy is defined as the ability to read and write. A common definition of literacy considers only the written aspects of language, namely, reading and writing. However, a much broader definition of literacy would take into account both spoken and written language. In this case, literacy would be defined as the mastery of spoken language and reading and writing (Garton & Pratt, 1998). A 1998 report titled *Preventing Reading Difficulties in Young Children* by the National Academy of Sciences in the US extended the conventional definition of literacy to include reading, writing, other creative or analytic acts, and knowledge and skills in specific subject matter. Literacy is not just a matter of decoding and mapping the correct letters onto the correct sound, nor is it about the conversion of sound to print; it also involves meaning and comprehension of the text within a given context as well as the analysis of purpose of the text. Thus, comprehensive literacy involves more than just the immediate message of the text both in terms of content and analysis.

Further definitions of literacy look at literacy as a set of complex multidimensional skills that improve over the life-span of the individual from childhood to adulthood. Others consider it a social practice embedded in a given social context to perform certain functions. This implies multiple literacies, each responding to a particular social need. For example, some forms of literacy may be used for recitation of religious text while other forms may serve the purpose of encouraging creative thinking and interpretation (Damon, 1991). According to Bruner (1991), literacy is an issue that far transcends the mere mastery of reading and writing and has a deep history in the cultural history of mankind and although it is learned through explicit instruction, primarily in formal educational settings, it is not a skill that can be divorced from other social contexts (Wasik, Dobbins, & Herrmann, 2001).

The above definitions of literacy imply that everyone does acquire the ability to read and write, or automatically masters both spoken language, reading and writing and comprehending the message contained in the text. As is well known, this is indeed not the case. Many children the world over fail to master spoken language; consequently, they fail to develop the necessary preliterate cognitive and linguistic skills that eventually facilitate the acquisition of literacy. Among those children who may be able to decode single words even with difficulty there may be some who may fail to comprehend the text they read. Thus, literacy difficulties among some children (and adults) may involve more than the lack of the ability to read and write to include failure to comprehend the material read. Looking at literacy as a social activity also takes into consideration the child's socio-economic status, his/her parents' beliefs and attitude toward literacy as well as the environment in which the child is developing. All these factors have a bearing on the child's ultimate literacy development.

2.2. Perspectives on Literacy

The study and development of literacy can be viewed from different perspectives, namely, anthropological, psychological, and educational perspectives. The anthropological perspective considers literacy in terms of individuals and communities that engage in literacy activities in different contexts. The educational perspective, on the other hand, underscores the variations in educational approaches to literacy in different societies and the outcomes of these approaches. The psychological perspective, which is the orientation of the current project, analyzes the cognitive development of children as they acquire literacy not only in their mother-tongue, but in a subsequent language as well. Psychological testing involving word recognition, spelling, reading comprehension, and affective responses to literacy constitute this perspective's approaches to studying children's literacy development in both languages (Durgunoglu & Verhoeven, 1998).

Two psychological perspectives, namely, behaviorism and cognitive science, have been particularly influential in past and current views of literacy and literacy learning. These perspectives have generally shaped the ways in which literacy has been defined.

Along with influences on definitions of literacy, psychology has alienated reading from other language processes. Instead, it has placed more emphasis on the component skills and subskills of literacy. Thus, its central question pertaining to literacy focuses on what constitutes literacy competency and skills and knowledge an individual considered literate possesses. However, psychology has suffered criticism for neglecting the cultural and the social contexts in which literacy occurs. In so doing, it has decontextualised literacy and failed to consider its role as a social practice people engage in for various purposes (Hiebert & Raphael, 1996).

Below is an account of how each of these perspectives has viewed literacy.

2.2.1. Behaviourism

For long, behaviourism has influenced both research and practice, with its legacies being evident in various school practices such as seatwork and criterion-referenced test. The behaviourist perspective views literacy as an observable and measurable behaviour, thereby focusing specifically on aspects such as handwriting, grammar, word recognition, and knowledge of the relationship between graphemes and phonemes.

The behavioural perspective studied such observable aspects of literacy to the exclusion of comprehension and meaning of text. If meaning was studied, the focus was more on vocabulary development, a more easily measurable and definable aspect of literacy. Failure to comprehend text, for example, was a function of poor vocabulary, in which case an individual would assign the wrong levels of importance to particular words, or fail to monitor his reading. All this suggests that behaviourism adopted a simplistic view of literacy, considering reading as nothing but just reading words and writing nothing but just writing down words (Hiebert & Raphael, 1996). Thus, psychology, under the influence of behaviourism at the time, failed to shed much light on the complex, cognitive processes underlying literacy and literacy learning.

Instead of pursuing research on the processes of reading (rather than on its products), the behaviourists, Thorndike and his colleagues in particular, pushed for the application of the laws of learning across various school domains, especially to reading and writing. For example, Hiebert & Raphael (1996) report that the law of readiness, for example, was used to sequence recognition of frequently occurring words, a behaviour considered to be of most crucial significance to literacy. The laws of identical elements and exercise, on the other hand, were used to advocate the repeated practice of specific target words in order to ensure a link between the stimulus and the response. Furthermore, the law of effect positively reinforced correct responses such as reading of a story comprising target words, or completing target words within a workbook. Thus, the manifestations of the laws of learning are evident in workbook exercises where students practice one element of reading, then the next, and so on (Hiebert & Raphael, 1996).

With the advent of Skinner's (1954, 1965) operant conditioning theory in the middle of the 20th century, behaviourist approaches to literacy instruction got a new life. Researchers devised a hierarchy of infinite literacy skills, all of which consisted of a number of subskills. This type of research activity made the acquisition of literacy the center of research attention. Despite this, however, solutions to improving literacy skills remained simplistic, with the lack of phonics instruction having been identified as the cause of children's inability to learn to read and write (Fleschu, 1957). As a result, phonics instruction constituted the components of a curriculum of skills and subskills of literacy acquisition. Tasks and activities that could help with the development of phonemic awareness also comprised many teaching batteries. However, this was still not enough to address the underlying cognitive processes of literacy development as phonics instruction was primarily devoted to matching letters and sounds (Hiebert & Raphael, 1996).

Through its emphasis on studying only those observable and measurable aspects of literacy and literacy learning, behaviourism curtailed the investigation of the many underlying processes of literacy, which may inform theories of reading and teaching practice. However, behaviourism cannot be entirely dismissed, as its influences still remain embedded in many school practices. For example, a study on the academic instruction of students found that workbook exercises that reinforce isolated skills still remain an important part of learning for many school children (Knapp, Shields, & Turnbull, 1992).

2.2.2. Cognitive Science

The emergence of cognitive science brought about a paradigm shift in the study of literacy and literacy learning. The focus now shifted from studying literacy as an observable and measurable behaviour to studying it as an unobservable mental process. Thus, psychologists in the late 1960s and 1970s focused more on the extensive description of the underlying cognitive processes involved in literacy and literacy development. Unlike behaviourism, cognitive science made meaning construction, or text comprehension, an important research component of literacy during the 1970s. In such studies, the reader was assumed to construct the meaning contained in the text by actively using his/her background knowledge, knowledge of the text structures, and knowledge of the relationship among words (Hiebert & Raphael, 1996).

Background knowledge as a means of constructing meaning from text formed the basis for extensive research on how the reader organizes information in memory and how activating background knowledge at different points affects reading comprehension. Studies of background knowledge assessed its potential effects on how the reader recalls, retells and summarises text. Indeed, the reader's background knowledge has been found to be crucial to constructing the meaning the writer intends to convey (Anderson & Pearson, 1984; Andersen & Montague, 1977). Another component involved in making meaning, or comprehension of text is metacognition, or "cognition about cognition" (Schunk, 1991). It involves knowing about one's own cognitive processes and the control of that knowledge as one engages in cognitive activities such as reading or writing. Metacognition was thought of as a way of controlling processes related to meaning construction and, therefore, is considered to play an important role in writing and reading comprehension.

Similarly, the way writing was perceived changed radically with the advent of cognitive science. Writing was now considered a process with an identifiable set of behaviours and cognition (Hull, 1989). It is a problem-solving process, constrained by the writer's need for integrated knowledge of the subject at hand, general linguistic knowledge of how the language system works, and the purpose and projected role of the writer in the text to be produced (Flower & Hayes, 1981). To research the writer's knowledge about how to address these constraints is indeed to research the role metacognition plays in the process of writing (Hiebert & Raphael, 1996).

The emphasis on processes, rather than on products, of literacy within cognitive science provided understanding about the underlying cognitive processes that enable individuals to decode and comprehend text. Such an understanding shed light on what impedes literacy development in at least some children. For example, it has been argued that children who are in the process of acquiring literacy need to have certain pre-literacy skills such as the ability to translate letter-to-sound codes (Gough & Hillinger, 1980). This emphasis has greatly contributed to our understanding of the role of processes such as phonemic awareness and automaticity in the successful development of literacy. Automaticity, in this case, is the ability to accurately, rapidly and effortlessly process lower level perceptual information critical to the efficient decoding of print. This is said to free the attention of the reader to concentrate on higher levels and more complex cognitive processes such as comprehension (Hiebert & Raphael, 1996). LaBerge & Samuels (1974) examined how efficient readers distributed attention across the different processes required in proficient reading. These included perceptual processes involved in identifying letters, processes involved in translating letters, processes that enabled the identification of familiar spelling patterns and processes involved in comprehension such as those that identify the meaning of the words. Given that readers in general are limited in the amount of information they can process, LaBerge & Samuels proposed that proficient readers acquire the knowledge and skills to distribute their attention effectively between decoding and comprehending text. This view often sees decoding as an automatic process that allows the proficient readers to use their conscious cognitive processes for text comprehension. On the contrary, emergent readers lack the ability to distribute their attention as effectively as proficient readers. Thus, they devote most of their attention to identifying letters and their patterns, to recognize phonemes and blend them to produce the desired word. Consequently, little attention remains to pay to constructing the meaning of the text. Similarly, poor readers who struggle with word recognition will be left with little processing capacity to devote to text comprehension. Thus, when decoding is rapid, accurate and effortless, comprehension of text is immediate.

A further contribution of cognitive science to understanding literacy development was their identification of phonemic awareness as a skill children learning to read and write successfully possess. Phonemic awareness is a set of skills that involve the ability to analyse words into phonemes (Hiebert & Raphael, 1996). While behaviourism had identified phonics as an important skill in children's literacy development, cognitive science and linguistics clarified the process of phonemic awareness and established it as the ability to manipulate and think about sounds that are critical to the development of literacy (Adams, 1990). Since then, researchers have identified numerous dimensions of phonemic awareness, which eventually served as the basis for instructional interventions in literacy difficulties.

With the historical perspective of literacy considered, attention should now be turned to considering the theoretical explanations of how the process of reading unfolds. The dual route model and the simple view of reading are the two theoretical perspectives that will be reviewed briefly.

2.2.3. The Dual-Route Model of Print to Sound

When dealing with issues of literacy development, it is indeed important to include a description of how literacy, or reading, in this case, is achieved. It is argued that there are two separable indirect and direct routes to the mental lexicon of the reader. One classical view of the reading process holds that reading, or word recognition, is always mediated via phonology, or the indirect route (see Van Orden, Pennington, & Stone, 1990). An opposing view argues that the identification of words occurs via the direct access to the mental lexicon of the reader, thanks to a word-specific process that utilizes the direct association between a whole-word orthographic pattern and its meaning (Colombo & Tabossi, 1992). Both these views have enjoyed empirical support, with the result that the dual route model of print to sound has been proposed (Carr & Pollatsek, 1985; Coltheart, 1978 & Morton & Patterson, 1980). The dual route model, therefore, postulates that reading words is based on various pathways that connect the word to its sound and its meaning. One pathway, known as the lexical pathway utilizes the direct association between the whole word and its meaning as well as its pronunciation. It is, therefore, referred to as the direct route and is characterised as visual (Doctor & Coltheart, 1980). The second pathway allows identifying the word indirectly via the use of phonology or sublexically and, as such, relies on the application of the grapheme-phoneme correspondence rules, which are the association between smaller-sized orthographic units such as letters or clusters of letters, and the corresponding sounds (Colombo & Tabossi, 1992). This approach to reading is considered to be a slow but very important process in the early stages of literacy development and in later encounters with unknown words. However, there is an assumption that with repeated reading an experienced reader can establish a faster and more direct route to the mental lexicon (Olson & Gaya, 2001). Hence, skilled readers are said to rely on the direct route when reading words as they recognise the meanings of words automatically on the basis of their visual patterns without having to consciously decode them into sound (Berninger, 1996). However, both pathways may be used in beginning reading, and Van Orden (1987) has shown that the indirect phonological route is also used in skilled reading.

Theorists in favour of the dual route model are of the opinion that the two routes to the lexicon provide an explanation for how irregular words and non-words are read. For example, utilising the grapheme-phoneme correspondence rules to process irregular words leads to faulty identification of these words; therefore, it is advisable to apply the visual route. Non-words on the other hand, have no lexical entry, and the only way to read them is via assembled phonology, or the application of the grapheme-phoneme correspondence rules. The visual pathway and the phonological pathway of processing words are thought to operate in parallel to each other; consequently, competition for reading aloud ensues between them (Paap, Noel, & Johansen, 1992). For example, utilising each of the pathways when processing regular words produces a consistent pronunciation of these words; however, for irregular words, the two pathways interfere with each other and produce different pronunciation, with the phonological pathway being more likely to produce a faulty pronunciation for irregular words. This point explains why regular words are named faster than irregular words (Colombo & Tabossi, 1992).

From the description given above it is plausible to argue that the dual route model seems to present a good explanation for how children, or beginning readers, develop literacy skills. Similarly, this model also seems to provide yet another good explanation for the different subtypes of specific literacy difficulties, or dyslexia. According to Olson & Gayan (2001), individuals with "phonological" or deep dyslexia are said to be relatively weak in reading unfamiliar non-words (*e.g.* "spige", "girf") compared to their ability to read regular and exception words they are already familiar with. It is, therefore, plausible to reason that difficulty to read non-words would be the symptoms to be associated with phonological dyslexia. Surface dyslexics, on the other hand, are capable of reading non-words and regular words without much difficulty; however, they experience difficulty reading exception/irregular words that are dependent on specific memory for their unusual orthographic-phonological correspondences (e.g. "yacht"). Thus, the inability to read irregular words would be the symptoms characterising surface dyslexics.

2.2.4. The Simple View of Reading

The simple view of reading is a theoretical position on reading proposed by Hoover & Gough (1990). This view argues that decoding and linguistic comprehension are the two major elements that constitute reading and that reading ability cannot be said to exist if one of the components of reading is deficient. Thus, adequate decoding ability that is not accompanied by sufficient linguistic knowledge would be tantamount to reading without comprehension (of the material read), a condition known as hyperlexia. On the other hand, possession of sufficient linguistic competence that is not equally matched by strong decoding ability would be characteristics of a reading disability referred to as dyslexia.

The simple view defines decoding as efficient word identification. With efficient word identification ability an individual can gain access to the correct mental lexicon. In turn, access to the correct mental lexicon allows for the recall of semantic information at the word level. Thus, from the simple view perspective, decoding is inclusive of both the phonological and semantic aspects of word reading. When children, or even adults, learn to read they learn to represent knowledge with linguistic and phonological equivalents. These representations access the list of words stored in memory. However, the beginning reader may not have as many words represented phonologically in his/her mental lexicon as the skilled reader. Therefore, accessing the mental lexicon for the beginning reader may be a challenging task. With increased and repeated exposure to print, words become orthographically represented and are stored as whole units in the mental lexicon. Consequently, through orthographic representation of words, skilled readers gain direct access to the words stored in their mental lexicon without resorting to their phonological representation.

2.3. Language Processes in Literacy

This section will consider the relationship between a child's development of spoken language (speech) and his/her subsequent development of literacy. Phonological awareness constitutes an array of speech-processing skills, which serve as the foundation for the child's eventual development of literacy. Thus, a child with persistent speech problems may be at a disadvantage when processing tasks that require the use of his phonological awareness skills. As such, he may be at-risk for literacy difficulties given that his speech processing (language) is underdeveloped (Stackhouse & Wells, 1997). However, it is not conclusive that children with speech (language) impairment prior to beginning school will inevitably experience literacy difficulties (Snowling & Nation, 1997; Tallal, Allard, & Curtiss, 1997). According to Leonard (1982), findings from longitudinal and follow-up studies of language impairment conducted in the 1970s by Aram & Nation (1978); Scott & McVean (1978); Wolman & Nation (1978); Morley (1973); Weiner (1974) and Kerchensteiner & Huber (1975) suggest that children affected by language impairment continue to experience linguistic difficulty throughout their life-span (from childhood to adolescence and into adulthood). The long-term effects of the impairment, however, may differ from one child to another, depending on the nature and severity of the impairment, with the least affected child having a better prognosis (Leonard, 1982).

Specific-language impairment is the failure of normal oral language development despite normal intelligence, no known hearing, physical, or emotional problems, and an adequate learning environment (McArthur, Hogben, Edwards, Heath, & Mengler, 2000). It is characterized by the late onset and slow development of language in children whose general intellectual abilities are not significantly below those expected for their chronological age (Leonard, 1982). Specific reading disability is the failure to learn to read despite at least average intelligence, intact peripheral perceptual abilities, no known neurological, physical, emotional, or social problems, and an adequate opportunity to learn to read (see Vellutino, 1979). Both these definitions make reference to failure in, and mastering of, written and oral language communications skills despite being "normal" in other areas of processing or

(McArthur, Hogben, Edwards, Heath, & Mengler, 2000). These definitions suggest a relationship between specific language-impairment and literacy difficulties. However, before considering the evidence for and against the impact of speech (language) impairment on literacy development, it might be helpful to consider a theoretical model that outlines the development of speech and its relation to literacy development.

Stackhouse & Wells (1997) have proposed a speech-processing model of literacy as well as a phase model of speech development to demonstrate the relationship between language and literacy skills. According to the speech-processing model, in order for the child to develop the phonological awareness required for literacy development, he has to have a well-developed and intact speech-processing system. Three basic components constitute the speech-processing system: the ear, or the input channel, lexical representations, and the mouth, or the output channel. The ear serves as the recipient of incoming spoken, auditory information. It is important that the input channel functions well in order to enable the child to effectively process the different sounds of language, both spoken and written. Lexical representations store previously processed information. Speech production comes via the output channel, or the mouth. When this speech-processing system is well developed in children, it enables them to develop awareness of the sounds and structure of their language. In turn, the awareness of the sounds and structure of language enables the children to match spoken language with written language. An underdeveloped speech-processing system leaves children with poor phonological awareness, and ultimately, with a poor foundation for the development of literacy skills. It is therefore not surprising that children with problematic phonological awareness often have associated speech and literacy problems.

Like literacy development, the development of speech also progresses through a series of sequential developmental stages. Failure to pass smoothly through these stages has an impact on the development of speech, and ultimately, on literacy development. It is important to take into account the fact that these stages are not definite and may, therefore, overlap. They may also vary from one language structure to another. The first stage of speech development, the prelexical phase, is characterized by the neonate's response to sounds and its ability to detect phonetic differences between syllables. As the neonate develops, it begins to form phonological and semantic representations of familiar words as perceptual wholes. In the ninth month, babble sequences start to resemble the language that surrounds the child (Stackhouse & Wells, 1997).

The next phase is the whole word phase. This is when the child utters the first spoken words. Throughout this stage the child's vocabulary grows, and he learns to reproduce the phonetic features of the words he hears around him. The systematic simplification phase, the third stage of speech development, sees more systematic and efficient speech production by the child. Simplifying processes such as fronting, stopping, cluster reduction, and phonological mapping rules emerge, too (Ingram, 1989). Clear phonological awareness is not yet fully developed at this stage; however, a good number of children are able to remember and sing nursery rhymes as well as enjoy sound games. To acquire phonological awareness, it is necessary that the child attain this stage of speech development. In turn, successful progression through this phase paves the way for the child's attainment of the alphabetic stage of literacy development.

Continuous use of simplifying processes beyond the systematic simplification phase indicates retardation of speech development. Speech and language therapy intervention becomes necessary in such cases. If a child, however, progresses through the previous stages without any difficulty, he may surmount his speech problems through relevant intervention or may remediate spontaneously as he grows older. Fixation at this stage at the time of beginning school (at age 5 in the UK) is likely to leave the child susceptible to phonological problems and related literacy difficulties (Bishop & Adams, 1990; Bird, Bishop, & Freeman, 1995).

The usage of words in combination with other words rather than single independent words characterizes the assembly stage. Children learn more about the morphology to know that "a goat" is appropriate but "a animal" is inappropriate. This is when children learn to deal with words of increasing syllabic length and with the pronunciation and articulation of words with complex clusters. Phonologically disordered children (dyslexic children) experience difficulties passing through this stage (Stackhouse & Wells, 1997) and have persistent speech problems with the junction of words. Children get to the final stage, the meta-phonological stage, of speech development when they are able to successfully and efficiently employ the speech processing skills they have acquired in the earlier stages. Once children attain this final stage, they use these skills to store and produce speech as well as to process phonological awareness tasks such as rhyme, syllable, and sound segmentation. Children on a normal course of development do reach this stage at about the age of five when they are ready to learn to read and write (Namibian children who begin school between age six and seven may have consolidated these skills and literacy learning ought not to be a struggle provided the right methods of literacy instruction are applied).

It is important that children pass through these stages of speech development and literacy development (see section 2. 4) smoothly and at the right time. Failure to do so results in abnormal speech and literacy development. Arrested development of speech at a particular phase also leads to difficulties with literacy development. For example, if children experience problems before they get to the systematic simplifications phase of speech development, it is ultimately unavoidable that they will encounter serious problems with literacy development. Smooth progression through this stage is necessary if the children are to be able to handle smaller units of words (Stackhouse & Wells, 1997). Children who have persisting speech problems beyond the age of five are at risk for literacy problems if they fail to reach the meta-phonological stage of speech development in time to fully benefit from literacy learning at school.

Some children with preschool speech-language impairments have been found to develop literacy difficulties, while others have not. Recent researchers have tried to identify the factors that may account for this inconsistency. Studies have now shown that literacy difficulties these children experience may vary as a function of the nature of the speech-language impairment. Semantic-syntactic impairments, for example, place children at a higher risk for literacy difficulties than language impairments confined to articulation or phonology (Catts, 1993). In fact, children with articulation impairment have been reported to have normal literacy skills. Children with language impairments, on the other hand, frequently have literacy difficulties (Bishops & Adams, 1990). A number of studies have provided evidence that, as a group, children with language-impairment encounter academic difficulties. For example, Hall &

Tomblin (1978) assessed the academic performance of 18 children with language impairment from grades 3-12. They used 18 other children with only articulation problems as controls. The language impaired children, as a group, showed academic deficits across all grades, especially in reading.

A study by Bishop & Adams (1990) of pre-school children with specific language-impairments also found that literacy can develop normally in the early school years. Language-impaired children who overcame their language problems before the age of five, with good prognosis, showed normal reading accuracy and comprehension at the age of eight. On tests of non-word reading and spelling, they also performed within normal limits. Those children who continued to present specific language impairments at age five, however, still presented literacy problems at the reading comprehension level at the age of eight.

Catts (1993) carried out a study to further examine the relationship between speech-language impairments and literacy difficulties. Children diagnosed with speech-language impairment were identified in preschool and administered a battery of standardized speech-language tests and nonstandardised language measures. Some of the nonstandardised measures included phonological awareness measures. This group of children was followed from grade one to grade two. They were tested on reading ability, including measures of written word recognition and reading comprehension. Thirty children without a history of speech-language difficulties participated as controls. The results of this study indicated that children with speech-language impairment are at an increased risk for literacy difficulties. Most of the language-impaired participants in this study had started falling behind the normal-language peers in reading achievement. Their difficulty was primarily in the areas of word recognition in the first and second grades and measures of reading comprehension in second grade. Those children with semantic-syntactic language impairments and phonological awareness and rapid naming deficits most often have literacy difficulties.

In broad-based longitudinal study, Tallal, Allard, Miller, & Curtiss (1997) assessed the outcomes of specific language-impaired children diagnosed at the age of four and matched control children. The children were assessed annually for four years from the age of four to eight years. Among other things, the researchers wanted to find out whether preschool children with language impairment show deficits in pre-reading skills as well as in academic achievement. Furthermore, they wanted to know whether or not academic deficits, if found, would be across all domains or be confined only to language-based subjects, including literacy. The results showed that many language impaired children performed more poorly than their normal counterparts on each measure of pre-reading, namely, visual discrimination, letter forms, and letter sounds at the age of five. By the age of six, most of the normal children had reached ceiling performance on these pre-reading measures while a significant number of the language-impaired children had not. These findings suggest that many language impaired children encounter difficulty performing a number of basic skills presumed to be prerequisite for later literacy development. Deficits were also evident among the language-impaired children in the academic domains tested, which included decoding, reading vocabulary, reading comprehension, spelling, and mathematical computations. Between the ages of 6 and 8 (grades 1-3), the language impaired showed noticeable deficits in all academic domains; namely, math, spelling, decoding, reading vocabulary, and comprehension. These results clearly demonstrated that language-impairment before school years predicted the academic difficulties affected children would experience later at school. Further analysis showed that language impaired children, as a group, more frequently showed literacy difficulties than controls. From these results, the researchers concluded that children with language impaired prior to beginning school are at risk for developing deficient academic skills in the early school years. These deficits are global in nature, extending to literacy skills and other academic domains for most of the affected children, although some of the language impaired children did show specific literacy difficulties.

More recently, Snowling, Bishop, & Stothard (2000) tested 71 15-year old children who had been assessed as part of the original Bishop and Adam's (1990) study. They found that these children's reading scores were quite variable. As far as reading accuracy was concerned, the children with good prognosis at age five and normal literacy skills at age eight performed worse than controls at the age of 15. Their word spelling and reading comprehension skills were within normal range; however, they scored poorly on non-word reading and spelling. Those children who by the age of five had not resolved their spoken language problems, and presented poor reading comprehension skills at age eight, continued to present poor reading comprehension skills at age 15. Their problems now included poor reading accuracy as well. Thus, this study showed that a substantial number of children with a history of speech and language impairment reach school leaving age with significant literacy problems. This is attributed to the substantial drop in reading accuracy between age 8.5 and 15 years and a corresponding increase in the rate of specific reading retardation (Snowling, Bishop, & Stothard, 2000).

McArthur, Hogben, Edwards, Heath, & Mengler (2000) analyzed reading and oral language scores of 110 children with a specific reading disability and 102 children with a specific language-impairment they have studied. The objective was to find out what percentage of the children with specific reading disability or specific language impairment could be equally classified as having specific reading disability or specific language impairment. Furthermore, the researchers wanted to establish what percentage of children with specific reading disability would have impaired oral language. Finally, they wanted to know the percentage of children with specific language impairment that would have literacy difficulties. The results showed that 53% of the children with specific reading disability and children with specific language impairment could be equally classified as having specific reading disability or specific language impairment. Over half (55 %) of all the children with specific reading disability had impaired oral language, and 51% of the children with specific language impairment had literacy difficulties (reading at a level one standard deviation or more below that expected for their age) as defined by McArthur et al, 2000.

Taken together, all these studies concur that a significant number of children with language-impairment experience literacy difficulties. Most children with literacy difficulties are significantly impaired on oral language tasks that require phonological awareness skills as well as in their ability to name objects and process speech in noise. Overall, children with literacy difficulties have been shown to have problems on oral and written language tasks (Tallal et al, 1997). A group of children who struggle throughout their school careers present longstanding problems that initially begin in the preschool years as a specific oral language disorder and eventually manifest themselves in the early elementary school years as literacy difficulties and other related academic deficits. These underlying language-processing difficulties, which affect childhood literacy development, can potentially persist into adulthood.

2.4. Literacy Development

The previous section considered how speech/language problems interfere with the development of literacy in children. This section will now outline theories that attempt to describe the course of normal literacy development. That is, how literacy development occurs provided the child has all the pre-literacy skills necessary for the development of literacy.

A child's acquisition of reading and writing is a major developmental milestone in any society that greatly values literacy. Once acquired, literacy skills form an important basis for children's later academic achievement. Children who read more turn out to be good readers. This practice affords them the opportunity to acquire more knowledge in a variety of domains, including the development of sound phonemic awareness. A middle-class child keen on reading is estimated to read approximately 10, 000, 000 words per year by middle-school whereas his less keen counterpart manages a mere 10, 000 words in the same time period (Whitehurst & Lonigan, 2001). Through extensive reading, keen readers build up a strong word power and acquire wider content knowledge. Those children who read little, be it due to poor literacy skills or due to lack of interest, on the contrary, get less practice on reading. Consequently, they fail to develop efficient reading comprehension strategies, find literacy material to be too difficult to cope with, and eventually develop negative attitudes toward reading. Ultimately, this leads to a "Mathew effect" (Stanovich, 1986), a situation where children who read well and widely develop better literacy skills and those who do not drop further behind in reading and other literacy and academic domains.

Literacy development is gradual and sequential. A process that begins with rudimentary levels of literacy development, it eventually culminates in more advanced literacy skills. Theories proposed by Marsh, Friedman, Welsch, & Desberg (1981) and Frith (1985) argue that children go through a series of developmental stages in the acquisition of skilled, adult-like reading and writing. In Marsh et al's four stage-theory, the first stage is known as the Linguistic Guessing stage. This is when children have little or no phonic skills to decipher unknown words, especially when presented out of context (Ellis, 1993). As a result, they read words logographically, or merely guess them. Thus, reading is dependent on the visual aspects of words and/or the content within which a word is placed. Spelling is non-phonetic and shows no sound-letter correspondence understanding (Stackhouse & Wells, 1997). In the second stage, the Discrimination net-learning stage, or Sophisticated Guessing stage, the children develop a sight vocabulary upon which they rely to read words (Snowling, 2000). Phonics skills are undeveloped; consequently, they are still unable to use grapheme-phoneme correspondence rules to decode unknown words. In the third stage, the Sequential Decoding stage, children acquire decoding skills and, as a result, they are able to apply grapheme-phoneme correspondence rules to decode unknown words. Decoding at this stage involves segmenting and then blending letters in words. Thus, children become gradually more independent at reading words. In the fourth stage, the decoding skills become more sophisticated such that children are able to read words by analogy. The efficiency and scope of their literacy skills continue to be refined. However, the nature of the total system does not undergo any further qualitative changes beyond this point (Ellis, 1983; Rayner & Pollatsek, 1989).

Frith's (1985) model also proposes an initial stage in reading and spelling that is depended on gross or highly salient visual features of the word; for example, the initial letter, its length or shape or some non-letter cue such as colors. In Frith's second stage, children advance to the alphabetic stage when they are able to apply letter-sound correspondence rules. Thus, when reading, children sound out letters of the word and then blend them to form the target word. At the same time, their spelling becomes semi-phonetic because their knowledge of the alphabetic system remains rather rudimentary. Arbitrary extra letters, incomplete spelling, and/or lack of vowels characterize semi-phonetic spelling (Geva & Wade-Woolley, 1998). In the third and final stage, the orthographic stage, children are now able to read unfamiliar words more efficiently by analogy with words they already know. This is because they can now segment words into constituent phonemes and they have knowledge of grapheme-phoneme correspondence rules, which allow them to take full advantage of the alphabetic system. Later during this stage, children transfer their reading skills to spelling and use their orthographic skills to spell words conventionally.

Although the stage models proved to be popular, they were characterized by certain shortcomings. For example, they proposed that literacy was universal and developed in a particular sequence, with each next stage building on the previous one. However, this assertion was challenged by other research findings that showed that not all children progress through the stages as these models proposed (Stuart & Coltheart, 1988). Similarly, these stage theories were mainly derived from studies of monolingual English-speaking children. Children acquiring literacy in regular, transparent orthographies provide strong evidence against a universal sequence. In German, a more transparent orthography than English, Wimmer (1996) showed that the logographic stage is generally bypassed. Similarly, Snowling (2000) argued that there is also evidence to suggest that developmental dyslexic children proceed straight to the orthographic stage without passing through the alphabetic stage. Such evidence suggests that there are individual differences in attaining literacy that do not necessarily conform to the stage models and that individuals can take different routes to attaining the ultimate phase of literacy. Clearly, the stage models need to be revised if they lead to the bizarre argument that dyslexics attain the highest stage of literacy in easier stages than those experienced by non-dyslexics. Further weaknesses of the Marsh et al's model include limitations in its attempt to account for the process of literacy development in children based on Piagetian stages (Piaget, 1952). Instead of demonstrating how the children's reading performance relates to their underlying cognitive competencies, it merely illustrates those words that children can read and spell at the various stages. Furthermore, the model fails to distinguish between the different strategies children use when attempting to decode known words on the one hand, and unfamiliar words on the other (Snowling, 2000). Given that Frith's (1985) model was based on that of Marsh et al, similar criticisms have been made of both models. Despite their limitations, the stage theories remain useful in tracing children's literacy development and in providing a framework against which to assess literacy acquisition across language domains.

Cognitive and linguistic factors are also involved in seeing the process of literacy acquisition to completion. Under certain circumstances, deficits in these factors may lead to literacy development being arrested within or between stages. Developing literacy requires a wide scope of skills, including linguistic and background knowledge to achieve fluency in reading. Adequate vocabulary knowledge, understanding of the syntactic and the discourse processes in the language, and an understanding of how symbols represent spoken language are all necessary linguistic skills that can facilitate the development of literacy (Oney & Durgunoglu, 1997). For children acquiring literacy in a subsequent or second language, these skills are of utmost importance. In addition, phonological awareness (onsets, rimes, and phonemes) is a crucial underlying skill that has been shown to predict literacy development in children. Thus, in order to be able to learn to read and write a child has to know that among other things, letters map on to sounds of speech. This explains why the segmentation of phonemes is central and crucial to the development of literacy. However, without effective and reliable phonological awareness skills, phoneme segmentation cannot take place.

There is abundant research evidence to demonstrate that phonological awareness correlates well with children's early literacy development (see reviews in Adams, 1990; Goswami & Bryant, 1990; Snowling, 2000). Through phonological awareness processing skills, children develop the necessary procedural knowledge about the grapheme-phoneme correspondence rules. Children learn to translate letters into their corresponding sounds and then combine the sounds to read words. Learning to spell, too, is depended on phonological processing skills, particularly in alphabetic languages (Whitehurst & Lonigan, 2001). Children use phonological processing skills to break down, or segment the sounds in words and then map the sounds to corresponding letters to spell words. Many different researchers (Bradley & Bryant, 1983; Lundberg, Frost & Peterson, 1988) have demonstrated that children's literacy skills can be predicted from the phonological awareness they develop during their pre-school years. Studies from different language backgrounds have also provided further evidence that training children in phonology yields positive results as far as reading attainment is concerned, especially when this phonological training is linked to orthographic instruction (Bradley & Bryant, 1983); Hatcher, Hulme, & Ellis (1994) and Tunmer (1994).

Central to the development of phonological awareness is phonological representations. Phonological representations unfold to influence the course of the development of phonological awareness, and hence, literacy development (and difficulties). According to the phonological representations hypothesis (Goswami, 2000), as children grow older and their vocabulary increases, their phonological representations become progressively more segmental and particularly specified in terms of phonetic features. That is, children gradually become able to represent syllables and phonemes in words and to differentiate between the different sounds in these words. For example, they are able to distinguish between the /b/ and the /d/ sounds.

The specification of these phonological representations is a gradual process. The theory states that representations are specified at the syllabic and onset-rime levels before literacy instructions. However, phonological representations organized at the phoneme level develop during and after children learn to read and write. Thus, the representations of phonological awareness at the phonemic level should grow exponentially as the child's literacy skills improve. Consequently, the extent to which this process unfolds influences the child's ultimate development of literacy. That is, if the restructuring of phonological representations fail to take place to the degree that it should, the child's development of phonological awareness will be compromised, and ultimately, so will his/her literacy development.

The theory goes on to state that transparency of the language in which a child is acquiring literacy can also influence the phonological restructuring proposed by Goswami (2000). The more transparent the language, the faster the rate at which phonological representations are organized at the phonemic level, the faster the child's literacy development will take place. This is attributable to the fact that the direct grapheme-phoneme correspondence rules make it possible for the emergent reader to make use of this knowledge more efficiently to decode words. Thus, the phonological transparency of shallow orthographies puts children learning to read and write in these orthographies at an advantage in terms of literacy development. However, a child acquiring literacy in an opaque orthography such as English or French, might take longer to restructure the phonological representations at the phonemic level because of the less consistent grapheme-phoneme and phoneme-grapheme correspondences in these languages. Thus, phoneme level restructuring would be expected to be difficult for children with weak phonological processing skills learning to read and write in less transparent orthographies (Goswami, 2000).

Orthographic processing skills are other factors involved in literacy development. Defined as the ability to form, store, and access the orthographic representations of words or meaningful parts of words, these skills reflect a child's knowledge of the letters and their sequence in words. It is with the help of this knowledge that children are able to read words by sight and spell them from memory. Like phonological processing skills, orthographic skills also contribute to the development of reading; however, their contribution is independent of that phonological processing skills make. Children acquire orthographic processing skills through their reading experiences as they develop broader knowledge of the relationship between spelling and sound (Arab-Moghaddam & Senechal, 2001).

The development of literacy in stages and its underpinnings by phonological and orthographic processing skills can be seen in how the contribution these skills make change as the child acquires more literacy skills. For example, in Frith's second stage of literacy development, children rely on phonological processing skills to read words. In the third stage, however, children rely more on their orthographic processing skills to read and spell words. Because alphabetic scripts vary in terms of their depth or transparency, the contribution phonological and orthographic processing skills make to literacy development should be considered in accordance with each script.

In addition to phonological and orthographic processing skills, comprehension and decoding are another set of linguistic skills necessary for the development of literacy. Oney & Durgunoglu (1997) consider them to be the building blocks for the development of reading and writing fluency. The ability to comprehend language presented out of context relates well to literacy development. Decoding orthography, on the other hand, is important for extracting phonological information from words, for when it is inefficient, comprehension is compromised. Thus, quick and automatic decoding of words, or word recognition, is an indispensable part of fluent reading, and ultimately, effective comprehension.

Comprehension and decoding themselves need to be facilitated in order to play their role in literacy development. Thus, functional awareness, syntactic awareness, as well as phonological awareness all constitute a set of metalinguistic skills that facilitate the processes of decoding and comprehension. Syntactic awareness involves the child's ability to reflect upon the grammatical structure of sentences. As such, it enables the child to closely observe the comprehension process and recognize irrelevant or inappropriate words that may appear in the text. Furthermore, it impacts upon reading by verifying the incomplete visual and phonological information a child extracts in the process of decoding unfamiliar words in a text (Oney & Durgunoglu, 1997). Functional awareness, on the other hand, is the child's developing notions of the functions and conventions of written language, all of which the child develops with increasing experience with reading and writing. Thus, functional awareness is related to the ability to discriminate among letters of the alphabet and to phonological awareness (Lomax & McGee, 1987). Thus, with more and more experience with print, these sets of interwoven skills and subskills become increasingly strategic and automatic and, ultimately culminate in the child's fluent execution and coordination of word recognition and text comprehension (Scarborough, 2001).

The self-teaching model of literacy development provides one other account of literacy development. It assigns phonological skills a central role in the development of literacy skills. Its assumptions are that emergent skills in phonological decoding (which consists of letter-sound knowledge and a basic level of phonological awareness) provide the basis for the development of accurate orthographic representations for words from the outset of the literacy learning process. Thus, it postulates that children with well-developed phoneme awareness and phonological decoding skills should be able to decode unknown words and deal with their orthographic details with more precision. Ultimately, they should be able to set up more accurate and readily accessible orthographic representations for whole words (Olson, Wise, Johnson & Ring, 1997). Failure to develop alphabetic reading skills will, in all probability, result in unspecified orthographic representations which, in turn, will lead to inefficient literacy skills (Torgesen, Wagner, & Rashotte, 1997).

Seidenberg & McClelland (1989) advocated a connectionist perspective of literacy development, and argued that learning to read involves establishing connections between orthography and phonological awareness. According to this view, children who have well-developed phonological representations are at a greater advantage when learning to read. A well-developed phonological representations system enables an individual to establish smooth links between the orthographic representations corresponding to written words and the phonological forms of spoken words. Furthermore, this perspective states that being able to map sounds to letters in reading enables children to read new words without resorting to conscious rules. The revised version of this connectionist perspective by Plaut, McClelland, Seidenberg, & Patterson (1996) better discusses the link between the phonological and orthographic representations and semantics. During the initial stages of literacy development the pathway that connects orthography and phonology is established (phonologically deficient children become prone to literacy problems at this time). However, as literacy development unfolds further, pathways connecting the orthographic, phonological, and semantic representations become involved in the process of literacy development. For English monolinguals, the activation of the semantic pathway is rather important as it facilitates their reading irregular words that are difficult to decode via the phonological pathway alone (Snowling, Bishop, & Stothard, 2000).

2.5. Literacy Difficulties

Successful developmental progression through the stages of speech and literacy development referred to above has been proposed as an important and necessary prerequisite for the eventual attainment of literacy. Children who fail to progress smoothly through the stages of literacy and speech development are likely to encounter literacy problems when they start to learn to read and write (Frith, 1985). Phonological dyslexia, for example, is a prime example of literacy difficulties that arise when a child's literacy development stagnates at the logographic stage. That is, such a child can only recognize words he/she already knows and has difficulty decoding words encountered for the first time. In addition, such a child also has poor memory for phonological information as well as poor verbal repetition and naming skills. Spelling is more non-phonetic than that of her/his peers, especially in longer and more complex words (Snowling, Goulandris, & Stackhouse, 1994). In other words, the process whereby emergent readers combine letters with sounds and blend sound segments to form words is the source of literacy difficulties among children when it fails to develop.

In some cases, biological factors beyond the individual's control may constrain the development of literacy. Biological factors attributed to the failure to acquire literacy difficulties are primarily hereditary. For example, Thomas (1905) speculated that reading disabilities might be hereditary because they ran in families. Early in the 1930s researchers documented that literacy difficulties tended to occur across generations in some families, with the probability being higher for the first-degree relatives than for second-degree relatives (Berninger 1996). Further evidence that literacy difficulties run in families has emerged since these early days of this research field. For example, Finucci, Guthrie, Childs, Abbey, & Childs (1976) found that more than half of the adult siblings and parents of children with literacy difficulties also had residual literacy problems. They further showed that 33 % of these reading disabled children had children who were reading disabled. Having assessed children in families with a history of literacy difficulties at the ages of two, five, and in grade 2, Scarborough (1989, 1990) showed that some of these children became normal readers and others went on to develop literacy difficulties. These results suggest that a history of literacy difficulties in the family places children at risk for literacy difficulties; however, this does not mean that the child will necessarily develop literacy difficulties.

Although literacy difficulties (dyslexia) may be biological in origin, they are better understood if explained and described at three levels, namely, the biological, cognitive, and behavioural levels, all of which are interlinked (Frith, 1985). The biological origin of literacy difficulties is attributed to some form of genetic brain abnormality (Frith, 1985). This genetic abnormality results in a specific deficit such as poor learning of a given orthography. In turn, the specific deficits lead to specific impairments such as poor literacy skills at the behavioural level, where observation and assessment of literacy problems should take place. Thus, while the behaviour (poor literacy skills) is explained by a cognitive dysfunction (poor learning of writing system), the cognitive dysfunction is explained by biological factors (brain abnormality). In this model, the biological level of explanation is where the cause of literacy difficulties could be found. It should be borne in mind, however, that the explanatory link among these three levels should be understood within the context of environmental and cultural influences (Frith, 1985).

One of the most widely quoted causal explanations of literacy difficulties is the phonological core deficit hypothesis. This hypothesis holds that (specific) reading difficulties are a linguistic deficit that primarily affects the phonological system (Locke, Macaruso, Roberts, Lambrach-Smith & Guttentag, 1997). The currently held view is that phonological processing skills are a strong predictor of literacy development. Children who fail to acquire literacy have a core phonological deficit that hinders the development of phonemic awareness and, consequently, leads to literacy difficulties. Weak phonological awareness compromises the child's ability to decode words, or translate them into sound (Hutchinson, Whitley, & Smith, 2000). The inability of disabled readers to apply phoneme-grapheme correspondence rules in deciphering new and unknown words during the reading process and in spelling words is reflective of their compromised phonological awareness (Wade-Woolley & Siegel, 1997). Citing Ball & Blachman (1988), Vernon-Feagans, Hammer, Miccio, and Manlove (2001) state that pre-readers with the poorest phoneme segmentation skills are the most likely to become the poorest readers. Similarly, children who early on demonstrate poor phonemic segmentation have the tendency to fall further behind in reading development (Stanovich, 1987).

A great deal of research evidence (e.g. Adams (1990); Rack, Snowling, and Olson (1992); Stanovich (1992) has confirmed through various studies with monolinguals that children who experience reading difficulty are those who have limited ability to perform sublexical manipulation tasks. These deficits compromise the children's ability to establish the sound-letter mapping rules. Independent of their perceptual, linguistic, or intellectual profiles, children with poor phonological awareness/representation encounter difficulty learning the correspondence between orthographic and phonological units (Lock, Hodgson, Lambrecht-Smith, and Guttentag, 1997). The result is that reading becomes a problematic and frustrating experience for these children. Therefore, poor phonological skills translate into difficulty acquiring literacy skills. The dominant view in the dyslexia field is that phonological deficits/delay impact upon learning to read and write as children fail to manipulate the sounds of language, e.g. mapping sounds of letters onto letters to form a word (see Working Party of BPS, 1999).

From McClelland & Seidenberg's (1989) connectionist perspective, children with literacy difficulties present deficits at the level of phonological representations. Their ability to master the skills to map orthography onto phonology fails to develop as a result (Hulme & Snowling, 1992). Further evidence that children with literacy difficulty have poor phonological representations derives from findings that their language difficulties are also inclusive of speech perception, speech production, verbal short-term memory, and deficits in object naming skills (Snowling, 1995).

Although considerable progress has been made in phonology-based research, there are still certain aspects of literacy difficulties (dyslexia) that do not lend themselves wholly to theoretical explanations and interventions based on the phonological core deficit hypothesis (Wolf & Bowers, 2000). This is in view of the fact that some diagnostic tests sometimes fail to detect children with poor literacy skills who may have reasonably good phonological decoding skills (Rudel, 1985). Yet other children with literacy difficulties do not reap remedial benefits from phonologically based intervention methods, prompting Torgesen, Wagner, & Rashotte (1994) to refer to such children as "treatment resisters". Incidences of relapse among some children who surmount their initial literacy difficulties are a common occurrence. Such cases suggest that the phonological core deficit model may not account for all of the literacy difficulties children experience.

Bowers & Wolf (1993) and Wolf & Bowers (1999) have proposed the double-deficit hypothesis as an alternative explanation for literacy difficulties. This hypothesis posits that, in addition to phonological processing deficits, naming speed deficits represent a second core deficit in literacy difficulties that is largely independent of phonology and, therefore, not subsumed under it (most current conceptualizations of naming speed subsume it under phonological processes). Furthermore, this hypothesis depicts phonological deficits and the processes that underlie naming-speed deficits as two independent sources of literacy dysfunction that result in three different subtypes of impaired readers. The double-defect hypothesis classifies the impaired readers as two subtypes with single deficits and one subtype with a double deficit. For example, phonologically impaired children have phonological processing difficulties characterized by low word and non-word reading accuracy and poor reading comprehension. These children, however, do not present naming speed deficits.

Naming deficit children, on the other hand, present below average reading speed and reading comprehension and low word reading accuracy but not significant deficits in phonological awareness. The double-deficit readers, however, present deficits in both phonological and naming speed problems. According to Wolf & Bowers, children impaired in both phonological processing skills and naming speed are the worst affected readers since the double deficit affords them no opportunity to develop compensatory mechanisms.

Bowers, Sunseth, & Newby-Clarke (1998) examined the relationship between rapid naming and reading progress among second and third graders. They assigned children to four groups consisting of typical readers (normal phoneme deletion and normal naming skills), poor phonological readers (phonological deficits), slow naming speed readers (naming speed deficits), and readers deficient in both phonological skills and naming speed (double-deficit). The sub-categorization of the children in accordance with the various causes of literacy difficulties as espoused by the double-deficit hypothesis was quite evident. Children with naming speed deficits were significantly slower in reading speed compared to the phonologically deficient children; however, they showed accurate reading of both words and non-words. The phonologically deficient children, on the other hand, showed low reading accuracy rates. The double-deficit group did very poorly in reading. Bowers et al, interpreted the double-deficit as affecting the children's ability to process both top-down and bottom-up reading, and thereby curtailing their use of compensatory reading strategies.

Naming, or word retrieval, is but just the surface of a system of interconnecting perceptual, cognitive, and linguistic sub processes. Each of these sub processes is necessary for the normal retrieval of words (Wolf, 1997) and therefore, makes naming correlate well with literacy skills. Geschwind (1965) first proposed the notion that the underlying requirements of naming could possibly be related to literacy development. Subsequently, he hypothesized that the best predictor of reading readiness would be the young child's ability to name colors. The hypothesis was based on the premise that the naming of colors, like reading, calls upon cognitive, linguistic, and perceptual processes that underlie the retrieval of verbal labels for an abstract visual symbol without expecting the child to have any letter knowledge. The hypothesis Geschwind (1965) proposed was the foundation for further investigations by Denckla (1972) and

Denckla & Rudel (1974, 1976a, 1976b) that led to their developing Rapid Automized Naming tasks which indicated that basic symbol naming speed discriminated between children with literacy difficulties and average readers. The work of Wolf and colleagues (e.g. Wolf & Bowers, 2000) is an extension of the work that began in the 1960s.

Initially, it was not clear whether naming deficits co-occur with, cause, or are the result of literacy difficulties. Consequently, they were subsumed under phonological processing deficits. However, recent evidence (Bowers & Wolf, 1993) has shown that rapid naming speed only correlates moderately with phonological skills. On the basis of this finding, it has been argued that rapid naming deficits form part of a second but independent characteristic of children with literacy difficulties, making them co-morbid with phonological deficits.

Other explanations of literacy difficulties involve the capacity of poor readers' short-term memory. Deficits in short-term memory (STM) are one of the most reliable characteristics of children with literacy difficulties (Rack, 1994). It should be noted that children with literacy difficulties experience problems with verbal or linguistically coded information such that they can remember fewer verbal items than expected for their age (Hulme, 1981; Shankweiler, Liberman, Mark, Fowler, & Fischer, 1979). According to Snowling (2000), dyslexics have also been found to perform poorly on digit span tasks that involve the recall of digits in forward and backward order. This memory impairment in dyslexics and other poor readers is interpreted as impaired representations of the phonological forms of words and, limits the number of verbal items they can store in memory (Snowling, 2000). Deficiencies in STM, therefore, may result in problems with the storage of verbal information. Problems may be particularly acute when storage is required while processing of related information occurs. The inability to store letter details in words implies that the literacy development of reading disabled children becomes fixated at the phonetic cue reading stage. This is the stage where children rely mainly on initial and/or final consonant information to identify words, rather than applying sound-symbol correspondence rule to identify new words (Ehri & Saltmarsh, 1995). According to Stanovich, Siegel, & Gottardo (1997), phonologically disabled readers' STM deficits are attributable to processing problems at the phonological level. Cautioning against perceiving STM as a unitary concept, Hulme & Roodenrys (1995) are of the opinion that STM problems of disabled readers are not causally related to their poor reading. Rather, they are a manifestation of other phonological deficits that are themselves the cause of literacy difficulties.

Other forms of phonologically based literacy difficulties involve reading disabled children's inability to use rime-based orthographic analogies to read unknown words spontaneously. This may be a result of reading disabled children's inability to break down syllables into their intrasyllabic subcomponents. Alternatively, it is also possible that they posses the necessary skills to segment the syllables into onsets and rimes, that they know the initial letter-sounds, and that they are capable of reading via sight vocabulary. They, however, may not know how to apply these skills and knowledge to identify new words. Instead, they seem to resort to employing ineffective partial letter-sound cues (Greaney, Tunmer, & Chapman 1997). The outcome is poor literacy skills characterized by poorly specified lexical representations in semantic memory. The question then is why do disabled readers rely on such ineffective word reading strategies (partial letter-sound cues and contextual guessing) when their normally developing peers outgrow these strategies early on in the course of their literacy acquisition? There are several possibilities for this phenomenon: it could be that the majority of the children who eventually end up with literacy difficulties lack the necessary phonological sensitivity early on in learning to read and write. Alternatively, rather than await phonological development, those children without phonological skills at the beginning of learning to read and write develop inefficient coping mechanisms, which once heavily entrenched, become difficult to undo (Greany, et al, 1997).

In principle, there is an assumption that the phonological deficit hypothesis could also account for literacy difficulties in all alphabetic orthographies, of which Herero is one. This assumption rests on two arguments: (a) that all alphabets operate on the basis of graphemes representing abstract phonemic units of language. These phonemic units are not easily accessible because they are embedded in the speech stream, and (b) that children with phonological impairment struggle to access these abstract phonemes, and as a result, experience difficulty in mapping graphemes on to phonemes (Landerl, Wimmer, & Frith, 1997). It follows from this assumption that literacy difficulties are a universal phenomenon. However, the extent of orthographic consistency is likely to affect literacy development and difficulties differently. Thus, as stated elsewhere in this text, literacy acquisition in shallow orthographies would be expected to proceed more smoothly and faster than in deep orthographies. Despite this advantage, however, some children from shallow orthographies still experience literacy difficulties (Spencer, 2000).

The severity of the literacy difficulties experienced in shallow orthographies does not compare to the difficulties found in deep orthographies. For example, shallow orthography children with deficient phonological processing skills may learn to apply the grapheme-phoneme correspondence rule successfully provided that instruction is effective. Consequently, they may experience little or no delay in literacy development (Landerl et al, 1997). Furthermore, these children are capable of sublexical rather than lexical word recognition (Oney & Durgunoglu, 1997) despite their deficient phonological processing skills. This suggests that transparent orthographies allow even deficient readers to read words and spell nonwords correctly. This state of affairs leaves the core phonological deficits of specific literacy difficulties hard to detect in children acquiring literacy in transparent languages (Snowling, 2000). Thus, the detection of literacy difficulties in shallow languages is better achieved by employing tasks requiring implicit phonological processing such as verbal short-term memory, visual-verbal paired associated learning tasks, and rapid naming (Wimmer, Mayringer, & Landerl, 1998).

It follows from the above that symptoms of literacy difficulties of children learning to read and write in transparent orthographies differ from those of children acquiring literacy in deep orthographies. Instead of presenting problems with decoding words, children developing literacy in shallow orthographies are poor at reading fluency (but not reading accuracy) as they tend to read very slowly. As a result of slow decoding, poor comprehension of the little they read ensues (Wimmer et al, 1998). Nikkopolous (1999) also reported similar findings with Greek-speaking dyslexics who, despite being accomplished in using alphabetic skills, were impaired in their speed of reading. In a series of studies with German dyslexic children, Wimmer (1993, 1996a, b) showed that these children presented persistent specific speed deficits for non-word reading. Similarly, 10-year old Dutch dyslexics presented fewer problems with words and non-words processing under conditions with unlimited time (this implies that under restricted time conditions the error rate increased) (Yap & van der Leij, 1993). As is characteristic of literacy difficulties in orthographically transparent scripts, these children presented more difficulties (slow) in decoding non-words, long non-words, and infrequent words, all of which put heavy demands on phonological processing.

An alternative to assuming that the poor performance in phonological measures is due to a core deficit in phonological processing (Rack, Snowling & Olson, 1992) is that these simply reflect a delay in the development of the phonological skills in dyslexics, or children with literacy difficulties (Rack et al, 1992). The proponents of this position are of the opinion that children with literacy difficulties learn to read just like typically developing readers learn. It also accedes to the notion that dyslexics are predicted to be poor on phonological reading tasks. However, the difference is that dyslexic readers read more slowly than normally developing readers. This hypothesis further alleges that although disabled readers may have poor phonological processing skills, their weakness in this area of literacy is equivalent to that of normally progressing readers who are at a corresponding level of reading development. In essence, the problems experienced by children with literacy difficulties are the same as those problems beginning readers do encounter. Thus, the differences that exist between disabled readers and developing readers are simply a matter of degree rather than a matter of kind. The developmental lag/delay hypothesis acknowledges the importance of phonological processing skills in the development of literacy. However, it argues that phonologically deficient readers and spellers cannot acquire word reading skills far beyond the level of phonological skills they already posses (their word recognition skills will be only commensurate with the level of their phonological processing skills). According to this hypothesis, children with phonologically based literacy difficulties do not have the benefit of developing compensatory reading/spelling strategies and, are therefore, unable to develop sight vocabulary or acquire reading via other strategies (Rack et al, 1992).

Rack et al. (1992), in a review of studies on the non-word reading deficit in developmental dyslexia, quote studies that provide evidence for and against the developmental lag/delay hypothesis. For example, Snowling (1980) conducted a study using a cross-modal matching task to assess phonological skills. In the critical condition, subjects saw a written non-word and then heard a spoken non-word. The subjects had to tell whether or not the two stimuli were the same. The differences between the stimuli were very subtle as they were created by transposing the center two letters of the stimuli (e.g. "torp-trop", "sint", "snit"). The stimuli were all single-syllable non-words containing four letters, with the letters corresponding to three ("torp") or four ("sint") phonemes when pronounced with a Southern England accent. Results showed that dyslexics differed from reading level matched normal readers in the critical visual-auditory matching condition; however, there were no differences between the dyslexic and reading level-matched control groups in the visual-visual and auditory-auditory control conditions. Snowling's interpretation of these results was that the dyslexics' problem was phonological in that it was specific to the condition that required non-words to be recoded into phonological forms.

Snowling (1981) conducted another study investigating the same phenomenon as in the previous study. Asking the subjects to read 18 single-syllable and 18 two-syllable non-words consisting of one, two, or no consonant clusters, she recorded the time the subjects took to pronounce the stimuli in groups of six. "Wut" and "tegwop" are examples of stimuli that contained no consonant clusters, and stimuli containing one cluster included "blem" and "twamket". Results showed that overall, dyslexics were slower than the reading level matched controls when reading non-words aloud. However, they did not differ from their counterparts on reading single syllable non-words. Their phonological deficit became more evident when reading the two-syllable stimuli, especially those with consonant clusters. According to Snowling, the phonological structure of the non-words was an important factor in influencing performance.

Baddeley, Ellis, Miles, & Lewis (1982) conducted a similar study. They presented subjects with 17 single-syllable words and 17 single-syllable non-words (*e.g. stane, frute, dake, selt*). Half of these non-words were homophonic with words. Results showed that the dyslexic group and the reading level matched control group performed similarly on words; however, on non-words the dyslexic group committed more errors compared to the control group. These results confirmed Snowling's (1980 and 1981) findings that dyslexics had difficulty processing non-words, a phonologically based task.

Further confirmations of these findings come from Olson, Wise, Connors, Rack, & Fuller's (1989) large scale study where they compared 172 dyslexics with an average age of 15.6 years with a reading level match group 172 normal readers with a mean age of 10.3 years. Subjects had to read 85 one- and two-syllable non-words and, a combination of accuracy and pronunciation latency data was used to assess performance. Forty-five of the 85 non-words were monosyllabic and ranged in complexity from relatively simple strings (e.g. "seed", "tar", "dun") to more complex strings (e.g. "stale", "catch", "plan") and, 40 of the 85 non-words were two-syllable (e.g. "tegwop", "blinders", "pelting"). Again, the dyslexics performed significantly worse than the normal readers, with their average score being approximately three quarters of the standard deviation below the mean for the normal group. At least superficially, all of these studies (including many others not cited here) show a consistent picture of dyslexics being worse than their younger normal reading counterparts on measures of phonological reading skills, thereby revealing the fact that dyslexics or poor readers' problem is deficient phonological skills rather than delay in the acquisition of phonological skills as the developmental hypothesis argues.

Rack et al. also reviewed studies that provided evidence for the delay hypothesis. As such, these studies pose a challenge to the phonological deficit hypothesis. Beech & Harding (1984) failed to find a specific non-word reading deficit among dyslexics. Basing their investigation on Baron's (1979) materials, they asked dyslexics and reading level matched normal readers to read matched regular words (R), exception words (E), and non-words (N). Examples of matched trios included: suffer (R), "sugar" (E), and "soother" (N); "signal" (R), "sign" (E), and "signet" (N). Five of the regular, seven of the exception words, and seven of the non-words were of two syllables. Results showed that the two groups performed similarly on the two real word measures. However, performance of the two groups on the nonwords was equally poor, prompting the researchers to conclude that the dyslexic group is developmentally delayed rather than deficient in phonological reading skills.

Conducting a similar study, and using Baron's material, Trainman & Hirsch-Passé (1985) tested subjects on matched sets of single-syllable regular, exception, and non-words (e.g. "bone", "done", "yon"). Except for two non-words, the rest were homophonic with real words (e.g. "haul" and "scarce"). There were 32 items from each category. Results showed again that the dyslexic group performed similarly to the younger readers on measures of regular, exception, and non-word reading, once again contradicting the tenets of the phonological core deficit. Johnston, Rug, & Scott (1987) provided another failure to find a non-word reading deficit among dyslexics. Using a sentence verification task, they showed subjects sentences containing a non-word, e.g. *She least her bike* in one condition. In a second condition, they used non-words that acted as controls for pseudo homophones, e.g. *Can you past this letter*? In a third condition the subjects read sentences containing inappropriate words, e.g. *he went to boy a book*, and these were controls for sentences containing inappropriate homophones, e.g. *she ran down the rode*. On a subsequent occasion the subjects were asked to read the distractor non-words in isolation as opposed to being presented in context as was the case on previous occasions. At both age levels, performance on the non-word task was equivalent for dyslexic and normal readers. These studies, and many others, have provided evidence to support the developmental lag hypothesis, thus suggesting that there is not a specific phonological reading deficit in dyslexics.

Although these studies referred to above provided evidence for and against the developmental lag hypothesis (and the phonological core deficit hypothesis), Rack et al. (1992) considered them to be methodologically flawed and, the inconsistency of the results were due to this handicap. Of these studies, two-thirds of them showed that dyslexics had a specific phonological reading problem and none of them found the dyslexic groups to be better than their younger reading level matched controls. Based on their analysis, and the results of the studies Rack et al. reviewed, the fact still remains, therefore, that the majority of dyslexics have a specific deficit in phonological reading.

Even if literacy difficulties in shallow orthographies may be of a lesser magnitude than in deep orthographies, and irrespective of the cause of the literacy difficulties (phonological deficits or developmental lag), it is plausible to conclude that literacy difficulties do exist in all orthographies, and, therefore, must be dealt with. For that reason, the difficulties children experience in the process of learning to read and write clearly indicate the need for the early identification of, and intervention, in those children who fall victim to literacy difficulties.

2.6. Interventions in, and Prevention of, Literacy Difficulties

Historically, teachers and educators have left children to fail to learn (to read) before helping them (Strictland, 2001). In the USA, for example, the response in these cases has been retention without focused intervention. In Namibia, too, retention is the practice, although new regulations stipulate that a child cannot repeat the same grade twice. When the child fails the same grade again, he is automatically transferred to the next grade where, in spite of under-performance due to poor literacy skills or other difficulties, he does not receive any attention. Retention for another grade then seems likely.

Retention is (was) based on the belief that children with literacy difficulties underachieve because they lag behind in development. Therefore, retaining them without intervention was (is) deemed appropriate, for a year's repetition was (is) believed to afford them the opportunity to catch up with their peers. This practice was institutionalized because of the constructivist educational policies of the 1960s (Foorman, Francis, Shaywitz, Shaywitz & Fletcher, 1997). According to Foorman et al, the constructivist view holds that the development of a child takes place in stages aided by appropriate environmental stimulation, until the child is capable of more advanced problem solving. Furthermore, this view considers the child as an active, independent explorer who constructs knowledge for herself/himself; therefore, teaching her/him something prematurely might deny her/him the opportunity to discover it for herself/himself. It was because of these constructivist views that the practice of retention without intervention was institutionalized. Foorman et al further allege that the advent of the psychometric definitions of learning difficulties that emphasize the discrepancy between IQ and achievement also formed part of the reason for the institutionalization of developmental lag notion for low achievers that led to the practice of retention without intervention. This discrepancy is determined by comparing standard scores from tests of IQ and achievement, and regression formulas that adjust for the correlation of the IQ and achievement tests. If a child's discrepancy between IQ and achievement is not yet great enough, depending on which formula used, the child is considered ineligible for intervention. This approach, according to Foorman et al, provided and reinforced the "wait-for-failure" attitude before intervention could take place.

Some children's literacy difficulties may be attributable to external factors such as experiential and instructional inadequacies. For other children, failure to acquire literacy may be due to inherent factors such as specific language-impairment and/or the inability to process and manipulate the sounds of language that results in the inability to acquire accurate and fluent word reading skills. This difficulty to read words resides in an inefficiency to process the phonological features of language. Thus, developmental lag, as research evidence has shown, does not seem to have anything to do with these children's literacy difficulties (Foorman, Francis, Shaywitz, Shaywitz, & Fletcher, 1997). This evidence renders retention alone ineffective for some children with literacy acquisition problems. Therefore, a better way to ameliorating children's literacy difficulties is through early identification, prevention and intervention.

There are a number of reasons for early prevention and intervention. Empirical evidence shows that children's literacy difficulties begin early in their school career. Those children for whom literacy difficulties begin early fall behind their normal peers, and, chances are they remain poor at literacy tasks. Going through elementary school with weak literacy skills may invoke a sense of failure and defeat in affected children. They may, as a consequence, drop out of school despite attempts to help them. Thus, prevention and early intensive intervention tailored in accordance with the strengths and weaknesses of these children can potentially help them attain functional literacy, especially those children for whom literary difficulties are due to experiential and instructional adequacies. In addition, intensive early intervention can serve as a diagnostic tool and separate true poor readers impaired by genuine basic cognitive deficits from poor readers impaired by experiential and instructional inadequacies (Vellutino, Scanlon, & Sipay, 1997; Vellutino & Scanlon, 2001). Furthermore, early intervention is less costly than years of retention and protracted remediation, not only to educational authorities and social services, but also to reading disabled children's self-esteem (Strictland, 2001).

Prevention should involve the identification of children who may be at risk for literacy difficulties before literacy instruction begins and then train the children in phonological awareness and other skills necessary for literacy acquisition. If literacy instruction begins in grade 1, for example, identification might start in the preschool year through language-based measures such as letter identification, phoneme awareness, and rapid naming. Thus, rather than wait until after a year of literacy instruction before intervention, deficiencies in literacy can be identified and corrected early. Intervention, on the other hand, should provide training in phonological awareness and other skills prerequisite to literacy development to children already diagnosed as having literacy difficulties. A common view is that the focus of prevention and intervention, therefore, should target the development of the deficient phonological awareness to enable children to learn to decode words. Being able to decode words means that children will be able to do three things: identify letters of the alphabet, attach a sound value to each letter, and blend the letters to produce a word. Therefore, the argument goes, including letter-names and letter-sounds in phonological awareness training means that children will learn to decode words (Stahl, 2001), and ultimately, will develop accurate and fluent text-based word reading skills (Torgesen, Wagner, & Rashotte, 1997).

Procedures for stimulating phonological awareness have included oral language activities that exclude letters or writing and spelling activities embedded in the context of reading instruction. While these options may produce results, it is questionable as to which is more effective. One option may be to stimulate the growth of phonological awareness through articulatory feedback. According to Lindamood, Bell, & Lindamood (1997), who focus their intervention approach at the phonemic level of phonological awareness, children with literacy difficulties have deficient phoneme awareness. They do not process articulatory feedback fully like those with naturally occurring phoneme awareness do. Therefore, they need to develop phoneme awareness in order to have cognizance of the motor aspects of phonemes. This can be achieved by directly stimulating their articulatory feedback, which, in turn, aids them in developing phoneme awareness. Articulatory feedback involves providing sensory feedback from the mouth rather than from print. For example, children are made conscious of the specific mouth movements required to produce each phoneme. They also learn labels for each phoneme that describe the relevant mouth movements and positions. Once they gain a substantial level of oral awareness of phonemes, they perform exercises that represent different phonemes with either mouth-form or with concrete objects. This exercise is meant to sensitise the children to the order in which sounds occur in syllables. This procedure is very much embedded in speech-language related aspects of literacy learning.

While training programmes emphasise phonological awareness training as a means of increasing gains in literacy skills for children with literacy difficulties, there is evidence to question the centrality of phonological deficits in literacy difficulties. This is especially in view of the fact that, despite well-controlled treatment methods, some children do not respond to treatment. According to Olson, Wise, Johnson, & Ring (1997), a number of studies comparing methods of phonological training and other methods have shown that phonological awareness cannot be the only factor influencing literacy difficulties. Without explicit training and comparable gains in phonological skills non-phonological awareness based training programmes have produced, nevertheless, similar outcomes in word recognition gains to their phonological awareness based counterparts. In phonological awareness training programmes, participants have gained greater phonological awareness and decoding skills; however, these skills have not necessarily translated into better word recognition skills. This has raised questions about phonological awareness as a self-teaching device for children's literacy development and word recognition skills.

Problems with simply training phonological awareness have led researchers and practitioners to look for alternative remediation. Wolf's double-deficit hypothesis (discussed in the previous section) has provided the basis for one of the alternatives. It proposes that phonological and naming speed deficits are two separate deficits that, in combination, constitute the extreme forms of literacy difficulties in children. Wolf & Segal (1999) conducted two pilot intervention studies to investigate whether naming and naming deficits are related to literacy development and to literacy difficulties, and if they potentially constitute a separate core deficit. Furthermore, they wanted to find out if naming and naming deficits would be responsive to intervention if they indeed constituted a separate core deficit. Specifically, the first pilot study examined whether targeted word-retrieval skills can be changed while the second one investigated whether gains in word-retrieval skills can transfer to reading. Twenty-eight dyslexic children aged 12-14 years old received an 8-week intensive intervention training programmes aimed at increasing the depth and breadth of their knowledge of a specific list of target words and improving their ability to retrieve these and other related words rapidly and accurately.

Results showed extensive gains in vocabulary knowledge for the words that children were trained on. In addition, abilities to give semantic associations and to use a variety of linguistic contexts also improved compared to pre-intervention levels. Most importantly, improvements were also evident in the naming rate on an untrained specific, continuous naming-speed task, the Rapid Alternating Stimulus. These tentative findings suggest that some aspects of word-retrieval problems found in some dyslexics are responsive to intervention. There were also further indications to suggest that gains in retrieval rate may transfer to other naming-speed tasks. The second pilot study also showed gains in vocabulary knowledge and it revealed that the trained retrieval-deficit group improved in their reading comprehension. These findings, although only suggestive until duplicated in other studies, show that older dyslexics can be trained in retrieval skills and that naming-speed deficits may be susceptible to improvement.

Such findings may also explain why some children are responsive to intervention and why others are resistant to it if it is assumed that specific deficits require specific interventions. Children whose literacy difficulties reside in naming-speed deficits rather than in phonological deficits may not benefit entirely from phonologically based training programmes, as such programmes may not be addressing their specific needs. Similarly, those children for whom the cause of literacy difficulties may be phonological deficits may not benefit much from training in naming-speed and retrieval skills. Thus, a solution to "treatment resistors" may lie in accepting that naming-speed deficits and phonological deficits can exist and contribute independently to, and in combination with, each other to produce literacy difficulties in children (Wolf & Bowers, 1999).

Another form of intervention may target another area of phonology. It is pointed out elsewhere in the text (see previous section) that some reading disabled children's literacy difficulties are characterized by the use of faulty, partial letter-sound cues and contextual guessing to read unfamiliar words. Intervention for these children cannot be at the phonemic level as they struggle to access phonemes. In contrast, rimes seem to be easily accessible to children with such literacy difficulties; therefore, focusing intervention on rime-unit analogies may develop in them greater awareness of sublexical relationships between written and spoken words. With such awareness, the disabled reader may start relying on medial word information rather than on peripheral word information when decoding new words (Greany, Tunmer, & Chapman, 1997).

In prevention and intervention, it is important to know what the child brings to learning to read and write. Similarly, it is also important to know what environmental support for the child can contribute to facilitate his literacy development. The child's initial hypothesis of how written language represents spoken language is a point of departure in determining the child's contribution to his acquisition of literacy. Byrne, Fielding-Barnsley, Ashley, & Larsen (1997) showed that initially, children lack the knowledge that print represents the phonological and morphological structures of language. It is, therefore, impossible for them to acquire this knowledge and understanding without explicit instruction. Therefore, it is essential to train them in phonemic awareness (and how print represents sound). It is only by teaching them about the principles of phonemic segmentation of speech (which letters represent which phoneme) that children can have a grasp of the alphabetic principle and develop decoding skills. This is especially true of those children who are somehow disadvantaged but whose cognitive profiles approach those of normal readers and, therefore, can be readily remediated (Vellutino et al, 2001).

It is important that the intervention in some children's cases is carefully planned. The severity of the literacy difficulty should be the yardstick on which to base the duration and the intensity of the intervention. This will allow determination of the learning outcomes for remedial teaching. Given that some children have severe profound literacy difficulties, intervention in such cases has to be intensive, and should be based on one-to-one tutoring bases. It must also be delivered with the highest degree of sensitivity and care, for the danger of persistent lack of improvement despite intensive teaching may cause negative feelings in these children and, eventually, lead the children concerned to abandoning the intervention efforts (Byrne et al, 1997).

Chapter Three

BILINGUALISM / MULTILINGUALISM

3.1. Definition of Bilingualism

The definition of bilingualism is a problematic issue. As a result, there is no consensus as to what it means to be bilingual. For example, it is debatable whether an individual who speaks a standard and a nonstandard dialect should or should not be considered a bilingual.

In the midst of this confusion, however, some definitions have arisen. Definitions have varied in accordance with the disciplines studying this phenomenon. Sociolinguistically, bilingualism has been broadly defined as the alternate use of two languages (Weinreich, 1953). From a psycholinguistic view, however, bilingualism is the ability to produce complete and meaningful utterances in two languages (Haugen, 1956). A broader, psychosociolinguistic definition of bilingualism has emerged out of the sociolinguistic and psycholinguistic definitions. Thus, bilingualism is the alternate use of two languages, either vernacular or standard varieties, manifested in complete and meaningful utterances in each of the languages (Kessler & Quinn, 1982).

Hornby (1977) viewed bilingualism as a characteristic of the individual that may exist to varying degrees from minimum ability to complete fluency in more than one language. This definition makes reference to the extent an individual can be bilingual. While some individuals do not attain high degrees of bilingualism, others do, and become balanced bilinguals, or ambilinguals. Ambilinguals, although they reach advanced levels of bilingualism, still do not process L2 in the same way as native L1 speakers do. They are confronted with what is known as the problem of ultimate attainment in L2 learning (Cook, 1997). Available evidence indicates that ambilinguals differ in grammaticality judgments from L1 native speakers; thus, they process L2 less swiftly than the L1 speakers. According to Cook, this does not mean that balanced bilinguals lack the syntactic and lexicon knowledge of the L2. Rather, it is a matter of their processing the L2 slowly.

However bilingualism is defined, the sociocultural contexts, or milieu, in which it occurs, are indeed important in how it may relate to the children's eventual attainment of bilingualism and biliteracy. The value, interest, and appreciation placed on the child's L1 and L2 ultimately determine whether or nor the child will attain full biliteracy. These qualities are captured in the nature of bilingualism: whether additive or subtractive. Additive bilingualism is when the L1 is dominant and prestigious and does not face the danger of being replaced by the L2. Subtractive bilingualism, on the other hand, is when the child's L1 is less prestigious compared to the L2 and runs the risk of being replaced by the L2 (McLaughlin, 1982; Durgunoglu, 1997). This is more or less the case with urban Namibian primary school children. Unlike the rural schools, which teach in the child's mother tongue for the first three years of formal school given the ethnic homogeneity of the student population, the urban schools have not had the benefit of a classroom of children with the same home language, especially in the now racially-integrated schools following independence. These schools have cited the heterogeneity of the student population as a reason not to teach in the child's mother tongue in the first three years of formal schooling. The result is that children who attend these schools fail to acquire L1 literacy, as they do not receive any literacy instruction in the L1. Hence, they fail to become biliterate, although they do become bilingual by virtue of learning an L2 after already having acquired the L1.

Besides the heterogeneity of the student population that is claimed to be an impediment to implementing the government instructional policy of teaching in vernaculars, the low status accorded vernaculars during South African colonialism has led many people to think of their native languages as less prestigious, to say the least. Thus, many people have aspired to gaining command of the foreign languages, especially English. With the advent of independence and the introduction of English as the medium of instruction, many parents, especially those who can afford it, have opted to send their children to the integrated schools, previously reserved for whites only, and to private schools where teaching in a home language is not enforced or implemented. According to Maho (1998), this is because parents want their children to gain proficiency in a language society favours and considers to be an educational language. During the colonial period, English was favoured over Afrikaans as Afrikaans was considered by the oppressed as symbolising the oppressive South African repressive apartheid ideology and English as the language of liberation from the South African yoke of colonialism and as representing non-ethnicity and anti-South African attitudes (Maho, 1998). Therefore, despite the lower levels of competency in the English language, English remains the preferred language among Namibians (Maho, 1998).

At the integrated public and some of the private schools, literacy instruction begins in the L2 (i.e. English) and never takes place in the children's L1. The possible benefit that may accrue from this early submersion type of educational programmes is the early acquisition of proficiency in the L2. The drawback, however, is that L1 literacy development is delayed, or compromised, with the result that these children do not become (fully) biliterate. This sets a potential trend of developing biliteracy in foreign languages at the expense of the home languages as students, particularly at the secondary school level, opt for French, German, or simply continue with learning Afrikaans as one other language. Thus, some degree of subtractive bilingualism might be evident and indeed, imminent in the Namibian context. Failure to emphasize and consolidate L1 linguistic skills (e.g. phonology, semantics, syntax, etc.) may have detrimental effects when learning to read and write as the foundation for learning an L2 is not strengthened.

3.2. Development of Literacy in Bilingual Children

As has been mentioned elsewhere in the text, studies with first language/monolingual, especially English-speaking children, have consistently shown that knowledge of phonological awareness is related to the ability to acquire literacy. The evidence that derives from studies with monolingual populations does not contribute much to the knowledge base of literacy development in bilingual populations, especially literacy development in the second language. Considerable research has been conducted on the acquisition of a second language among young children. However, relatively little research has focused on L2 literacy development (Geva & Siegel, 2000), and even less work has been done on the parallel development of literacy in L1 and L2 among bilingual children (Durgunoglu & Hancinn, 1992; Verhoeven, 1990).

Literacy development in bilingual children is not only of theoretical importance to researchers but it is also of critical, practical importance to legislators and, especially, teachers who have to teach bilingual children. A better understanding of the cognitive processes involved in bilingual children's acquisition of literacy in both their L1 and L2 can inform teachers and curriculum designers how to better structure their language teaching and instructional plans. Literacy instructional plans based on theoretical understanding and empirical evidence in support of L1 and L2 literacy acquisition may benefit the bilingual children and greatly enhance their chances of becoming truly bilingual and biliterate.

Any child, monolingual or bilingual, needs to have certain pre-literacy language skills that form the basis for the acquisition of literacy skills. In addition, it has been argued that the development of second language literacy skills depends on the extent to which a child's first language skills are developed. The Linguistic Coding Differences Hypothesis (LCDH), espoused by Sparks, Artzer, Ganschow, Miller, Hordubay and Walsh (1998), posits that native language skills such as phonological and orthographic processing skills, syntactic and semantic skills serve as the foundation for learning a second or foreign language. This viewpoint, if correct, highlights the importance of children's developing their first language skills, for the stronger the children's native language skills, the easier their acquisition of the second language will be, and ultimately, their second language literacy development. Cummins' (1979) Developmental Interdependence Hypothesis also addresses the relationship between L1 and L2. Its tenet is that the level of competence that the children have already attained in their L1 determines their L2 competence. Thus, children's exposure to intensive L2 is likely to contribute to high levels of L2 competence without compromising L1 competence if their L1 has been well developed. On the other hand, if L1 is underdeveloped, intensive exposure to L2 curtails further L1 development and, in turn, hampers the development of L2 (Kessler & Quinn, 1982).

The development of strong L1 linguistic skills and L1 competence requires sustainable support of L1 and L1 literacy skills. This can be achieved by delivering instruction and literacy instruction in the children's first and still stronger language before exposing them to the L2. Thus, provided children have no inherent problems that can prevent them from learning to read and write they will acquire literacy in their L1. L2 and L2 literacy instruction, on the other hand, must be delayed for some time until the children are proficient enough in the L2 (Tabors & Snow, 2001). After acquiring the necessary L2 proficiency, L2 literacy instruction can then begin. Thus, by the time L2 literacy instruction begins, L1 linguistic skills and competence will have been well established, and will facilitate the acquisition of L2 linguistic skills, competence, and literacy. In other words, the knowledge of, and literacy development in, L1 will transfer to L2 knowledge and literacy development.

According to Tabors & Snow (2001) and Durgunogly (1997) the development of L1 skills and literacy before exposing the children to L2 literacy instruction is achieved through programmes known as transitional bilingual educational programmes. Such programmes aim to provide adequate support for the children's bilingualism and literacy development in both L1 and L2. Hence, it is important that instruction in L1 is not discontinued once children attain the necessary proficiency in L2. Nor should they be hurried into mainstream L2-only classrooms. Such moves can place the children's L1 literacy skills at risk if these skills are still developing and need to be practiced and consolidated if literacy is to become fluent and pleasurable. L1 literacy instruction must remain an ongoing stimulus for language development; this way, risks to L1 skills will be avoided. Continued exposure to L1 literacy and other instruction will help the children gain more advanced vocabulary and more complex syntax as well as other skills such as phonological awareness, all of which are necessary linguistic skills for the development of L1 and L2 literacy skills.

As discussed in the previous sections, literacy is a very difficult and multifaceted cognitive academic skill to master as it involves many interactive processes that depend on a number of subskills. Thus, children who successfully decode and spell unknown words correctly have mastered the alphabetic principle. Acquiring this skill seems to be depended on a number of developmentally linked factors. First, the children must know the grapheme-phoneme correspondence rules that pertain to the language of literacy. Secondly, they must be able to use the correspondence rules to learn more words. As they progress through the reading process with the help of these rules, they must refine these rules such that decoding words becomes automatic. Finally, once decoding skills are automatic, the children must develop and perfect processing skills that enable them to process more complex words and rapidly extract meaning from these words (Hakuta & McLaughlin, 1996). Furthermore, the views discussed in the previous section suggest that children must also possess bottom-up and top-down cognitive and linguistic skills in order to become skilled readers. Bottom-up processing skills include the ability to store information in STM, the ability to differentiate between visual information, and the ability to differentiate or recognize discrimination features within the text. On the other hand, top-down processing skills comprise syntactic knowledge, semantic knowledge and the ability to use context, together with the ability to go beyond the single sentence in drawing inferences about the text being read (Hakuta & McLaughlin, 1996). Bilingual children acquiring literacy in L2 need to have these decoding skills in order for L2 literacy to develop smoothly.

By virtue of their exposure to two (or more) language systems at an early age, it is possible that bilingual children develop sensitivity to the sounds of the two or more languages they are exposed to. This being the case, the knowledge of two or more sound systems should augment bilingual children's literacy development in the L2 as well as in the L1 (Byalistok & Herman, 1999). The concurrent development of phonological processing skills in bilinguals' languages may put them at an advantage when learning to read and write in these different languages because of the potential for cross-linguistic transfer of phonological awareness. For example, L1 phonological awareness may facilitate L1 literacy development. At the same time, L1 phonological awareness may transfer to L2 literacy development while L2 phonological processing skills may also generalize to L1 literacy development. Finally, second language phonological awareness may facilitate the development of literacy in the second language. Thus, if L1 phonological awareness does indeed contribute to L2 literacy development, and L2 phonological awareness facilitates L1 literacy development, then cross-linguistic transfer of phonological awareness is indeed a reality (Comeau, Cormier, Grandmaison, & Lacroix, 1999). Furthermore, the prediction of L1 and L2 literacy development within and across languages may be an indication that similar cognitive processes underlie literacy development in both L1 and L2. As such, individual differences in phonological processing skills can be an indication of smooth or problematic development of L1 and L2 literacy skills (Geva, 2000).

There is some evidence to suggest that knowledge and skills acquired in the L1 can transfer to the L2 and facilitate the development of L2 literacy. For example, through a correlational study with first grade Spanish-speaking children, Durgunoglu, Nagy, & Hancin-Bhatt (1993) found that phonological awareness in Spanish and Spanish word recognition predicted word recognition in English. From their study, Durgunoglu et al. concluded that:

> *A child who already knows how to read in L1 and who has a high level of phonological awareness in L1 is more likely to perform well on L2 word and pseudo-word recognition tests. In contrast, a child who has some L2 word recognition skills but low phonological awareness tends to perform poorly on L2 transfer tests.*
> (p. 462)

A similar cross-linguistic study by Cisero & Royer (1995) is consistent with this perspective. Therefore, from the findings of such studies, it seems plausible to hypothesize that bilingual children will transfer their phonological awareness from their L1 to their L2 during literacy acquisition. However, the evidence presented only shows that the transfer is from L1 phonological awareness to L2 literacy development, and not vice versa. Such findings make this phenomenon appear to be universal as it occurs across various language combinations such as English-French, English-Hebrew, English-Spanish, and English-Farsi (Geva, 2000). Comeau et al. (1999) provided further evidence of the cross-linguistic transfer of phonological awareness. Their study showed that this transfer could also be bi-directional. That is, L1 phonological awareness can transfer to L2 literacy development and L2 phonological awareness can transfer to L1 literacy development. Thus, this study not only confirmed the findings of the two previous studies, but it also extended these findings by showing the reverse transfer of phonological awareness from L2 to L1.

The cross-transfer of phonological awareness in these studies is between similar languages, e.g. Spanish and English (Durgunoglu et al, 1993; Cisero et al, 1995) and French and English (Comeau et al, 1999). However, other studies have shown that some skills and knowledge also do transfer between languages that differ completely in their orthography such as Japanese and English (Cummins, 1991) and Chinese and English (Bialystok, 1997). That is, decoding skills in dissimilar orthographies do correlate positively, and children's literacy skills can be predicted from similar skills developed in the L1 (Verhoeven & Aarts, 1998). Thus, underlying cognitive and linguistic processing skills, such as phonological skills, memory, orthographic processing skills, and the speed of processing, can somehow predict individual differences in the development of decoding skills in both L1 and L2 (Geva & Wade-Woolley, 1998). Despite the findings of the transfer of skills between languages, there is little understanding of the cognitive processes that underlie successful transfer, the conditions that maximize the successful transfer, and the differences between those children who cross-transfer these skills successfully and those who do not (Cline & Shamsi, 2000). Suffice it to say that cross-transfer does seem to occur and support bilingual children acquire L2 literacy faster and perhaps earlier than they otherwise would have. Thus, the empirical evidence discussed confirms the benefits that L2 literacy development accrues from developing, strengthening, and consolidating L1 skills.

It should be noted, however, that while strong phonological skills in L1 affords the bilingual speaker the ease with which to acquire word decoding skills in L2 literacy and vice versa, other factors (non-cognitive) are also important for the bilingual to attain the necessary proficiency required in L2 reading. According to Guron (2000), one such factor is motivation, which itself is comprised of sense of purpose, willingness to learn more about the L2 culture, and the intrinsic desire to read. Thus, the L1 reader must have a sense of purpose; that is, he/she must know what and why he/she is engaging in reading L2 text. He/she must have an interest in the L2 culture to provide him/her with familiarity of that culture. This familiarity helps the L2 reader to develop text processing skills such as lexical inferencing, plot prediction, and text interpretation that help him/her to better comprehend the text as he/she learns how to integrate the new information into an established framework of cultural references. Finally, the L2 reader must be intrinsically motivated to read L2. That is, the reader must enjoy reading in general and in L2 in particular to gain maximum benefit from the text and in the process, improve his/her proficiency in L2 and L2 literacy. Maintaining close contact with native speakers is also important for the L2 reader, for it can provide him/her with the confidence he/she needs to process the L2, and ultimately, tackle unknown or strange L2 text (Guron, 2000).

The call for the L2 reader to engage in L2 culture to enhance his/her L2 literacy development arises from the differences in bilingual and monolingual's cultural schemata for reading. Generally, bilingual children know less about topics included in second-language texts (Garcia, 1991; 2000). A linguistically complex text can also hinder the bilingual reader's performance on culturally relevant text. For example, Turkish and Moroccan third graders learning Dutch as a second language performed worse than their Dutch L1 counterparts on Dutch text emphasizing Dutch culture. However, their performance on linguistically simple texts based on their own respective cultures was better than that of the Dutch children (Droop & Verhoeven, 1998). Poor vocabulary knowledge also contributed to Latino student's poor performance on an English reading test (Garcia, 1991). Thus, the complexity of the L2 text, coupled with L2 low proficiency and vocabulary, do negatively affect L2 readers' reading efficiency.

Attainment of proficiency in L2 is important in L2 literacy development, especially for fluent text processing and comprehension. Automaticity, or rapid access to lexical material and accuracy in reading, is important for text comprehension both in L1 and L2 reading. Reading individual words presented out of context requires accurate decoding skills. In contrast, text reading calls upon contextual scaffolding and other L2 linguistic skills to achieve fluency, and therefore, efficient comprehension of the text. Thus, when L2 readers do not have the lexical and syntactic knowledge of the L2, their L2 reading becomes inefficient and less automatic (Geva, Wade-Woolley, & Shany, 1997). In the process, their L2 text comprehension is compromised. It is under such circumstances that proficiency of the L2 plays an important role in L2 text reading. Below the minimal threshold of proficiency, L2 readers experience difficulty coping with L2 text, especially if it emphasizes L2 culture. This requires some degree of L2 fluency for the L2 learner, for the better his/her fluency, the better his/her chances of making the correct inferences in the process of L2 literacy tasks. Thus, in addition to L2 literacy instruction, L2 language skills have to form part of the formal curriculum for the L2 reader in order for L2 literacy, including comprehension, to be optimal and fun (Guron, 2000).

3.3. Literacy Difficulties in Bilingual Children

Interference from L1, limited proficiency in the L2, limited background knowledge of the L2, and L1 reading proficiency are all factors that contribute to the differences between literacy acquisition in the L1 and the L2. For these reasons, problems encountered in L2 learning and literacy acquisition have in the past been investigated from what is known as the L1 interference perspective. The L1 interference perspective defines these problems in terms of the differences between languages at different levels: phonology, orthography, morphology, syntax, and discourse levels. However, L1 interference is not the only source of L2 literacy difficulties (Verhoeven, 2000). This being the case, what is the nature of the problems that L2 readers encounter in the process of acquiring L2 literacy?

Limited lexicon, or vocabulary, can affect L2 learners' reading vocabulary because they do not develop a strong L2 reading vocabulary. A limited vocabulary denies an L2 learner the ability to make use of contextual cues in reading and reading comprehension, as deeper comprehension of a text requires familiarity with almost all of the words in the texts (Verhoeven, 2000). Reading at both the word level and text/sentence level may also be impaired as a result of a limited vocabulary, although research has indicated that most L2 readers do not experience particular problems in decoding print at the word level. Their problems are primarily with particular linguistic and cultural challenges with reading material at school at the sentence and text level. Miscue analysis, for example, has shown that the majority of the L2 readers learning English as a second or alternative language do not utilise contextual cues to the same extent as the L1 children do. Their lack of a broad-based L2 vocabulary and a well-established understanding of the L2 syntactic structures all contribute to L2 readers' difficulty in coping with L2 literacy, particularly comprehension (Cline & Shamsi, 2000). Thus, compared to reading problems at the word level, the lack of access to these L2 resources is likely to be a much bigger and more serious problem for many L2 learners (Durgunoglu, 1997).

As much as cross-linguistic effects can facilitate the acquisition of L2 literacy (as well as L1 literacy), they can also be an impediment to the development of L2 literacy skills. Because L2 learners acquire literacy in an orthography that differs from their own in terms of the basic representational units, the phonology of the L1 may limit the L2 learner's ability to attend to the L2 sound system. This handicapping condition is attributable to the fact that the L2 learner processes the sounds of the L2 in accordance with the sound structure of his L1 (Wade-Woolley, 1999). Processing L2 phonological information in terms of the categories and structures of their L1 is a result of not having mastered processing L2 phonology. This results in inadequate L2 phonological representations and, in turn, poor L2 phonological representations lead to problems in L2 oral comprehension and expression (Wade-Woolley & Siegel, 1997).

A number of studies have demonstrated that individuals who have learnt to use a non-alphabetic orthography show a weakness in using English grapheme-phoneme correspondence rules. Japanese, for example, is a logographic orthography where there are no analyzable phonological segments. As a result, there is an assumption that lexical access in naming occurs directly from print to meaning, and that phonological representation is accessible only via semantic mediation. Compared to Spanish and Arabic speakers, both of whom are from alphabetic orthographies (Brown & Haynes, 1988), Japanese speakers performed the worst on tasks of integrating the phoneme-grapheme information necessary for naming. However, the Japanese subjects performed very well on same-different judgments about pairs of English words. In another study using the same language groups as the Brown &

Haynes (1985) study, Koda (1988) required participants to identify which of two pseudowords sounded the same as real English words (phonological task) and to determine which of two homophonic items was the correct spelling of an English word (orthographic task). In the absence of orthographic information in the phonological tasks, Japanese participants performed the worst compared to the two groups of alphabetic orthographies (Koda, 1988). These studies suggest that sound perception and processing may be specific to a particular language and are acquired early on in the process of the L1 development. Thus, even highly fluent L2 speakers may carry on applying less effective underlying strategies to read L2 words. However, the extent to which L2 bilinguals are affected by differences in the phonology of various orthographies depends on the degree of similarity between the orthographies they are required to acquire (Wade-Woolley, 1999).

Studies assessing the extent to which the similarities and differences between orthographies affect phonological representations in L2 have been conducted. Wade-Woolley (1999), for example, examined the similarities and differences in basic processing involved in word reading among Russian and Japanese English L2 readers. She focused specifically on phonological and orthographic processes in the context of language transfer from L1 (Russian or Japanese) to L2 (English). Results indicated that the Russian participants were better at manipulating sublexical phonological segments such as deleting specified phonemes. The researcher attributed these effects to the similarity to the English phonological system of the Russian phonological system. Thus, there may have been a positive transfer from the L1 to the L2 that facilitated the Russians' manipulation of the English phonology. The Japanese, on the other hand, showed greater speed and accuracy at recognizing correct English spelling patterns, thus showing greater sensitivity to the visual information as conveyed by orthographic patterns. Each of the groups drew on the strength their respective L1 orthographies and phonologies provided to process the phonological and orthographic information in these tasks. The difficulty the Japanese participants showed at isolating individual phonemes and manipulating sublexical units of speech may be attributed to the absence of consonant clusters in their L1, which affected their ability to delete and isolate phonemes from a set of complex onsets. Thus, for the Japanese subjects, negative transfer from L1 to L2 may have inhibited their ability to process the English phonology. As such, processing non-words (or new words) may be a source of difficulty for L2 readers whose L1 is logographic. Logographic L1 readers, without much exposure to alphabetic scripts, have to process alphabetic L2 words, may be disadvantaged when they have to decode new or unknown words, as they will be unlikely to assemble phonology using grapheme-phoneme rules. Instead, they may be more likely to resort to visual analogies or lexical retrieval strategies to attempt to process unknown words.

The literacy problems amongst L2 children referred to above, which in some cases occur at the sentence and text levels, are primarily a result of limited L2 linguistic knowledge and cultural obstacles. They are not a function of deficient phonological processing skills as such. However, this should not be construed as saying that L2 learners do not experience specific literacy difficulties at the word level. These problems are merely characteristic literacy difficulties typically occurring in the process of acquiring L2 literacy as most of them seem to be centered around the interpretation of the L2 text rather than being phonologically-based. A (smaller) number of bilingual children do experience severe and continuing literacy difficulties at the word level. However, these may go undiagnosed because officials usually associate these problems with low levels of L2 proficiency, and think that with increasing exposure to the L2, may disappear.

What happens when L2 learners have inherent phonological processing deficits? The Linguistic Coding Differences Hypothesis shows that children who encounter problems in learning a foreign or second language are likely to have weaker mother-tongue skills than children who encounter few or no difficulties learning a foreign/second language. Testing the validity of their hypothesis, Sparks, Artzer, Patton, Ganschow, Miller, Hordubay, & Walsh (1998) found that students with foreign language learning problems have weaker phonological and orthographic skills compared to students who did not encounter problems learning a second language. Those considered to be "at-risk" foreign language learners were students who had significantly poorer phonological, orthographic, and syntactic skills in their first language. These poor first language skills transferred to learning a foreign language and, consequently, complicated second language literacy acquisition.

Overall, bilingual children show a similar pattern of weak phonological skills being related to poor literacy to that found in monolinguals (Cline & Shamsi, 2000).

As far as word decoding and word spelling are concerned, L2 children experience specific difficulty with the phonemic recoding of letter strings or phonic mediation. L2 learners present difficulty in differentiating between sounds in the L2, with the result that converting graphemes to their phonological forms is impaired (Guron, 1997). Consequently, decoding skills fail to develop, and hamper literacy acquisition in the L2, resulting in difficulty segmenting and spelling L2 words phonemically. Furthermore, poor auditory discrimination between phonemes might lead to a distortion of the pronunciation of letters, and therefore, L2 words (Verhoeven, 2000).

3.4. Assessment of literacy difficulties in bilingual children

This section of the chapter will consider ways of assessing literacy difficulties in bilingual children, especially in their second language, as well as the factors that have to be taken into account when carrying out such assessment.

The major problem facing those wishing to assess a child's second language literacy resides in distinguishing genuine literacy difficulties from transitory difficulties associated with the acquisition of literacy in a second language (Frost, 1997; Geva, 2000; Hutchinson, Whitley, and Smith, 2000). This can have the effect of leading to over-representations or under-representations of L2 children in special education classes. In certain cases L2 children may constitute the majority in special education classes because their literacy difficulties are not attributed to their lack of knowledge of the L2 and are all considered learning disabled. On the other hand, under-representation can occur when factors such as low socio-economic status are thought to be responsible for the L2 children's literacy problems (Deponio, Landon, Mullin, & Reid, 2000). In addition, professionals may delay the diagnosis of L2 children as learning or reading disabled to allow second language proficiency to develop. The rationale for this is that diagnosis can be reliably carried out only when a certain degree of L2 proficiency has been achieved (Limbos & Geva, 2001). However, this results in the exclusion of the L2 children with genuine, phonologically based literacy problems from remedial services. A lack of understanding of the processes involved in acquiring literacy in a second language can only aggravate these problems.

To ensure the appropriate allocation of resources and learning strategies, it is important to guard against diagnosing L2 readers as having literacy difficulties when they actually do not have such difficulties. Equally, it is important to avoid failure to diagnose literacy difficulties where they actually do exist, for such a mistake can result in denying a child the support he/she so badly needs at an early age. As a consequence, literacy difficulties may become more entrenched as the L2 learner grows older and goes through the educational system. The use of discrepancy methods of diagnosis that involve IQ tests may further compound the identification of L2 learners, as they require some degree of L2 proficiency. Thus, children with low levels of L2 proficiency are more likely to under-perform on such tests, reducing the likelihood of finding such a discrepancy. This may minimize the chances of correct and positive identification of the L2 learner with specific literacy difficulties.

Such IQ tests need to be considered along with any other tests used in bilingual assessment in terms of potential linguistic and/or cultural biases. Again, such biases may lead to inappropriate assessment results and diagnosis. In order to avoid wrong assumptions about the bilingual's state of literacy skills, a comprehensive examination is necessary. This examination should include details of the child's family, medical, linguistic, and educational history as well as evidence from other professionals. Since the risk of misdiagnosis is greater when the bilingual children are assessed in a language they have not mastered, the language of assessment should also be considered. Language and language related disorders might be reliably assessed if someone fluent in both L2 and the child's mother tongue carries out the assessment (Frost, 1997). Thus, the first step in assessment should be to evaluate the bilingual child's knowledge and use of his L1 and the L2. The focus of the evaluation should be on the child's proficiency for every day interpersonal communication and academic purposes. Whatever steps follow hereafter should consider the implications of the language assessment outcome. This will inform the assessment process as to which language assessment should be carried out. However, assessment in the child's L1 does not necessarily put him at an advantage. After all, this is a language the child may hardly use for academic purposes and may not even contain the vocabulary needed for the material studied at school. This is why the decision as to which language the child should be assessed in should be based on the outcome of the initial evaluation of the child's knowledge of the L1 and the L2 (Cline & Shamsi, 2000). At the same time, for bilingual children in the early stages of learning L2, assessment in their L1 may be a better option.

Given the current discussion and findings reported in this and previous chapters, it seems appropriate that cognitive and linguistic skills should form part of the assessment of bilingual children who may be at risk of literacy learning deficits. Owing to the establishment of the relationship between phonological processing skills and L1 literacy development, researchers are now investigating the possibility of applying similar L1 predictors to L2 learners. Recent studies with L2 children suggest that universal cognitive and linguistic factors such as phonological awareness, working memory, orthographic processing skills, and rapid naming are predictive of literacy acquisition in both L1 and L2. If these factors can predict literacy development in L1 and L2, they would be expected to account for literacy difficulties in L1 and L2 as well. Thus, diagnosis of L2 children's literacy difficulties can consider these cognitive and linguistic factors that underlie the process of literacy development in L1 and L2 (Limbo & Geva, 2001).

Geva, Yaghouzadek, & Schuster (1999) investigated whether the linguistic and cognitive factors used in the identification of at-risk L1 learners could be applicable to assessing at-risk L2 learners. In both the English and Hebrew language groups, phonological processing skills significantly predicted non-word reading. In addition, rapid naming significantly predicted non-word reading in both L1 and L2. Word reading too, was predicted by phonological processing skills. These findings suggest that, irrespective of the language and oral language proficiency, individual differences in phonological processing skills and rapid naming can play a major role in explaining variability in literacy development. Individual differences in these skills should, therefore, also predict difficulty in, or smooth acquisition of, later literacy difficulties in L2 children.

In a similar study, Chiape & Siegel (1999) examined the role of phonological processing skills and syntactic awareness in English literacy acquisition and literacy difficulties in native and non-native speakers (Punjabi-speaking) of English in their first grade. The results showed that the performance profiles of the Punjabi-speaking children closely resembled those of the native English-speaking children. For both groups of children, reading difficulties occurred with more or less the same frequency. The two groups' error patterns on word recognition tasks were similar, suggesting that their phonological processing skills were not significantly different from each other, although the Punjabi-speaking children did experience more difficulties with English syntax. Furthermore, Punjabi-speaking and native English-speaking children who performed poorly on all measures of phonological processing skills were very similar in their profiles. These findings suggest that phonological awareness distinguished between the good and poor readers in both groups of children on the basis of their literacy skills rather than on their first languages.

Everatt, Smythe, Adams, & Ocampo (2000) studied Sylheti-English bilinguals in London. Among other things, the objective of this study was to compare the performance of these bilingual children with a group of matched monolinguals on measures of phonological processing, rapid naming, and short-term memory, as well as visual and motor skills. Results indicated that phonological awareness measures identified those children with literacy difficulties irrespective of their linguistic background. These results were consistent with the conclusions reached by Frederickson and Frith (1998) with an independent group of Sylheti-English bilinguals. Hutchinson et al. (1997) also showed similarities between bilingual and monolingual children on most measures of phonological processing skills, in addition to reading accuracy, memory, and visual discrimination. However, children learning to read and write in their second language performed more poorly on measures of reading comprehension, listening comprehension, grammatical knowledge, and word knowledge in that second language.

The studies reviewed here all seem to have generated the same results, pointing to similarities in the role phonological processing skills play in L1 and L2 literacy development and literacy difficulties. These findings suggest that tests of phonological skills designed for monolingual children can be applicable to L2 children (Hutchinson et al, 1997). The parallel development of phonological skills in bilingual children, and the use of these skills in diagnosing literacy difficulties in L2 children, suggest that assessing these skills should differentiate between L2 children with and without literacy difficulties with the same degree of relevance as they do amongst monolingual children (Everatt et al, 2000). Thus, L2 children with literacy difficulties can be identified for intervention and prevention based on more or less the same characteristics as the L1 children.

Furthermore, the fact that phonological skills in one language can significantly account for reading skills in another is indeed of great importance in the context of assessing reading skills in a multilingual context. In such a context, waiting until the second language learner achieves oral proficiency in that second language before detecting potential reading difficulties may not be necessary nor useful to the second language learner who may need urgent intervention with potential threatening literacy problems. Assessing phonological skills the same way a first language learner would be assessed is one way of detecting reading problems in second language learners (Geva, 2000).

3.5. Cognitive consequences of bilingualism

According to Cook (1997), the question as to whether or not bilingualism has effects (negative or positive) on the cognitive processing of the bilingual individual has been considered from two perspectives, namely, the monolingualist view and the multilingualist view. The former view holds that monolingualism is the norm and, as such, any person who is capable of more than one language is odd deviant and, indeed, deficient. The latter view reasons that bilingualism is the norm; therefore, being monolingual constitutes an abnormality.

The monolingualist approach leads to the subtractive view of bilingualism, implying that being bilingual minimizes the efficiency with which an individual executes mental operations through the L2. Another version of the monolingualist view considers the deviation of bilingualism from the monolingual norm as a positive experience. This is the additive view of bilingualism, which argues that the L1 processing of L2 users may be richer, and their mental processes more efficient and more effective (Cook, 1997). Thus, whether or not cognitive benefits accrue from being bilingual depends on the orientation of who is asking the question. However, evidence from research conducted since the 1960s has consistently shown increasing positive cognitive consequences of bilingualism, particularly in terms of cognitive flexibility (most of the research that showed negative effects of bilingualism on cognitive functioning were conducted between the 1920s and 1960s).

Cognitive flexibility, along with field independence/dependence and divergent thinking, are cognitive styles that bear particular relevance to bilingualism and second language studies. Cognitive styles focus on the form rather than on the content of cognitive activity; therefore, by definition they are individual variations in how one perceives, thinks, solves problems, learns, and relates to others (Kessler & Quinn, 1982). When acquiring an L2, the individual learns to distinguish and organize rules from a background of complex linguistic rules and structures of the L2. Thus, the concept of field independence/dependence is useful in examining the cognitive styles the individual engages in when he/she processes the complex rules of the new language he/she is acquiring. Cognitive flexibility, when considered in terms of L2 development, affords the individual the ability to easily manipulate the structures of a language as well as to organize verbally presented material. Furthermore, cognitive flexibility allows children advanced performance on Piagetian tasks of concrete operational thinking (Ben-Zeeve, 1972). Thus, cognitive flexibility may be seen as a positive feature in the bilingual's cognitive functioning (Kessler & Quinn, 1982). Divergent thinking is a special type of cognitive flexibility. It reflects the individual's rich imagination and ability to rapidly produce diverse solutions to a variety of problems.

Having said that, how does being bilingual affect the individual's cognitive processes? As stated earlier, the answer depends on the orientation of who is asking the question. Thus, empirical evidence shows support for both the subtractive and the additive views of bilingualism, although there is more evidence for the positive cognitive consequences than there is for disadvantages. Arsenian (1937) reviewed 32 studies of the impact of bilingualism on cognitive processes and found that 60%

concluded that bilingualism has significant negative impact on intellectual processes. Of the rest, 30% showed very small effects of bilingualism on cognitive process, and 10% indicated that no negative effects were present. However, most of the studies reviewed by Arsenian were methodologically flawed, failing to take into account a number of psychosocial variables, control for levels of linguistic proficiency, and having been administered in the standard language. The standard language in this case was a confounding variable, especially when considering that the bilingual children were speakers of a vernacular rather than English. Hence, their findings could not really be generalized to all bilinguals. Besides, most of these studies found the negative effects of bilingualism on intellectual processing to be in the areas of verbal and academic achievement, areas that directly relate to bilingual's insufficient levels of linguistic proficiency (Cummins, 1976).

More recently Cook (1997) conducted a study on the negative effects of bilingualism on cognitive process. The results were supportive of the subtractive view, stating that bilinguals process their L2 less efficiently compared L1 users. Lehtonen & Sajavaara (1988) conducted an acceptability judgment experiment with Finns learning English as an L2. On average, Finns took longer than L1 native speakers seconds to judge visually presented sentences. Processing auditory sentences took the L2 learners also longer, compared to native speakers. The fact that L2 users process their L2 more slowly than the natives is no surprise given that they are still developing in the L2. Thus, this cannot be considered as truly subtractive, for whatever the degree of their L2 skills, the fact that they are capable of utilizing it to some degree may be a more positive consequence rather than remaining monolingual (De Groot & Kroll, 1997).

Another finding supporting the subtractive viewpoint is that L2 users lose efficiency and speed in processing their L1. Thus, knowing an additional language robs an individual of the efficiency to process his L1 effectively. Magiste (1979) provided evidence to this effect. Studying German 13-18 year olds learning Swedish in Sweden, she timed how long the children would take to name objects in L1 and L2. The German children, after having spent more or less five and half years in Sweden, responded as fast in Swedish as they did in German. Gradually, they became even faster in Swedish. After 17 years, the Germans were still slower than the Swedish L1 children on naming task. However, their speed in German did not improve; it remained just about the same. Furthermore, the children who had spent 10 years in Sweden responded slower in German than those who had spent only one year there, indicating that performance in their native German had diminished. Compared to German and Swedish monolinguals, the German-Swedish bilingual children were consistently slower on decoding tasks (e.g. marking the third letter from the left). This finding supported the view that bilingualism detracts from L1 processing.

In a second study Magiste (1986) found the same results with a younger cohort of children (aged 6-11 years old). Magiste's (1992) third experiment showed that this switch to faster naming in the L2 occurred very quickly, with children aged, on average, eight years old showing the switch after only one year and older children showing the switch after two years. Overall, these results confirmed Magiste (1986) view that "the very fact of having available more than one response to the same stimulus may lead to slower reaction times unless the two response are hermetically isolated from each other" (pg. 118).

There is also evidence that bilinguals' STM and working memory capacities are smaller in L2 than in L1 and that their long-term memory of text presented in L2 is deficient compared to that of L1 native speakers. However, the majority of these deficits, as well as the deficits in the speed of processing the L1, are only modest. Thus, the tremendous gains bilinguals make in acquiring and using an additional language, and via that language, become acquainted with a culture other than their own, could be argued to balance out those modest cognitive losses attributed to bilingualism (Cook, 1997).

Contrary to the subtractive view of bilingualism, the alternative perspective argues that the cognitive capabilities of the bilingual individual expand, rather than decline, as a result of knowing more than one language. This is because the bilingual has exposure to a variety of situations and experiences that the monolingual does not enjoy. Peal & Lambert (1962) studied middle-class monolingual and bilingual 10-year olds to assess the effects of bilingualism on intellectual functioning of bilingual children. Controlling for the extent of bilingualism, they used French-English bilingual children who had attained a balanced high level of linguistic proficiency in both English and French. Bilingual children performed significantly better than their monolingual peers on tasks of cognitive flexibility, concept formation, picture completion, and figure manipulation. These findings suggest that bilinguals have a greater cognitive flexibility and a more diversified set of mental abilities than the monolingual children do. Bilingualism can have positive consequences on the structure and flexibility of thought (Kessler & Quinn, 1982).

A study by Balkan (1970) in Switzerland confirmed Peal & Lambert's findings that ambilinguals outperformed matched monolinguals on measures of cognitive flexibility. In addition, Balkan found that bilinguals who had acquired both languages earlier than the age of four did better than those who acquired the L2 after four years of age. Thus, acquisition of an L2 at an earlier age can have stronger positive cognitive consequences. Ben-Zeeve (1972) working with Hebrew-English bilinguals, and Ianco-Worral (1972), studying Afrikaans-English bilinguals in South Africa, reported bilinguals to be more capable of processing language more thoroughly than monolinguals. Ben-Zeeve found that bilinguals are more capable at a younger age than monolinguals of differentiating between the structure of language and the phonological representation of words. Furthermore, bilinguals in this study showed evidence of more advanced levels of concrete operational thinking. Like Ben-Zeeve, Ianco-Worrall found bilinguals to be more capable of separating meaning of words from their sounds.

On measures of divergent thinking, a type of cognitive flexibility, French-English bilinguals significantly outperformed monolinguals in the third, fifth, and sixth grades (Bruck, Lambert, & Tucker, 1973). Landry (1974) also found that sixth grade bilinguals who have attained substantial proficiency in the L2 performed much better than monolinguals on tasks of divergent thinking that emphasized flexibility, originality, and fluency. However, younger bilinguals in the first and fourth grades who were less proficient in the L2 did not perform better than monolingual controls. This suggests that L2 proficiency is an important variable in bringing about positive cognitive benefits of bilingualism.

De Avila & Duncan (1979) studied bilingual first and third graders in the US and Mexico. Controlling for relative proficiency and socio-economic status, they compared fully proficient bilingual (in L1 and L2) children with children who were fully competent in only one language on measures of cognitive functioning. Results showed bilingual children to be better than the monolinguals at Piaget-type conservation tests and Witkin-type cognitive style measure of field independence /dependence. In a cross-sectional study of English-Spanish bilinguals, the same researchers placed groups of bilinguals in categories ranging from proficient bilinguals to late language learners with low proficiency in the L1 and the L2. Result showed a positive relation between the degree of proficiency and the extent of cognitive consequences. Thus, higher levels of linguistic proficiency in two languages were predictive of higher performance on cognitive measures of field independence/dependence. These findings derive mostly from balanced bilinguals. Under certain circumstances, however, positive cognitive consequences of bilingualism have also been found with non-balanced bilinguals.

Metalinguistic skills, defined, as the awareness of language itself and the ability to use it to reflect on language, is another consequence of being bilingual. These skills enable the bilingual individual to analyze the structure of language itself, rather than its production and the message it conveys. According to Bialystok (1991), metalinguistic skills aid with the development of literacy, particularly reading development. They involve high levels of selective attention, itself a core mechanism of cognitive performance. In terms of the development of an L2, to pay selective attention to aspects of language means being able to separate individual words from meaningful sentences, to focus only on the meaning of a word under distracting circumstances, as well as to reassign familiar names to other objects. The ability to engage in linguistic activities that require selective attention such as words and their boundaries is an essential, fundamental part of employing language for advanced and specialized purposes such as literacy.

Bialystok (1987, 1991) has shown in a series of studies that bilingual children are superior to monolinguals in activities that demand meta-linguistic and selective attention skills as described above. Translation is also one other example of metalinguistic tasks; it is indicative of bilingual children's linguistic sensitivity, for many bilingual children show great skills at translating between languages. To do so, the bilingual has to be able to switch between codes in input and output. What the bilingual decodes in input in one language system he should encode in output in the other language system. That is, the message conveyed in one language must be translated and matched with the intended message in the other (McLaughlin, 1982). However, the extent to which bilinguals can translate between languages depends on their degree of bilingualism. The more ambilingual they are, the better they will be at decoding and encoding messages between and amongst languages. From Cummins' (1979) threshold hypothesis point of view, this implies that bilinguals must attain at least the minimum threshold of the L2 as well as the L1 competence before they can enjoy the cognitive benefits of two languages.

While early research has provided evidence for the detrimental effects of bilingualism on cognitive processes of bilingual children, more recent research evidence has refuted or contradicted those findings. This evidence appears to question the assumption that bilingualism intrinsically underlies the academic difficulties some bilinguals sometimes experience. At the same time however, bilinguals may be at-risk for certain academic difficulties if they fail to attain minimum levels of competence in L2, particularly if it is the medium of instruction at school. For a child with inherent linguistic and literacy difficulties such as dyslexia, the learning situation may be even more difficult (Frost, 1997).

Chapter Four

THEORETICAL FRAMEWORK OF THE STUDY

The different orthographies of the world differ in the extent to which their phonology and morphology can be matched to their written form. That is, their orthographies differ in terms of the correspondence between their written and spoken forms (Seidenberg, 1992). Thus, alphabetic orthographies also vary in their degree of dependence on the alphabetic principle, with the range of correspondence between grapheme and phoneme varying in consistency and completeness (Katz & Frost, 1992). The extent to which orthographies vary in their dependence on the alphabetic principle has implications for the psychological processes involved in literacy.

There are a number of ways in which words can be recognized, or print can be transformed into speech, when reading an alphabetic orthography. One way is that the reader tries to recognize words on a visual basis. By so doing, the reader recognizes the letter strings as forming a particular lexical unit and accesses the meaning stored with or connected to this unit as well as its pronunciation. This is known as "direct access"(Seidenberg, 1992) or "addressed route", or lexical route of word recognition, where the orthographic input lexicon directly activates a semantic lexicon and the phonological output lexicon (Besner & Smith, 1992). An alternative way of word recognition is by utilizing grapheme-phoneme correspondence rules. In this case, the reader translates sub-word orthographic segments directly into phonological segments and then assembles these phonological segments to form the correct pronunciation of the word. Seidenberg refers to this way of word recognition as "phonologically-mediated access", while Besner & Smith call it "assembled access". Other terms used to refer to this form of word recognition are the indirect or sub-lexical route of word reading. Besner & Smith also distinguish between accessing the name of a word directly from the input lexicon and via semantics. In the latter case a word activates its lexical entry in the orthographic input lexicon which, in turn, activates the semantic system and, finally, the phonological output system (these concepts are discussed in chapter 2, section 2.2.3).

Some orthographies are "deep" or opaque, others are "shallow" or transparent; as a consequence, there is an assumption that the oral reading of shallow orthographies differs qualitatively from that of deep orthographies. Deep, or opaque, orthographies use more complex, inconsistent relationships between written symbols and speech sounds. As such, they do not allow the sole use of phonological recoding and readers must, therefore, learn the unusual pronunciation of irregular words such as "yaçht" in English (Besner & Smith, 1992). In contrast, consistent transparent orthographies permit a simple, direct one-to-one correspondence between letters and sounds (Geva & Siegel, 2000) and therefore, afford a phonological recoding strategy (Seidenberg, 1992) which enables the reader to read new words correctly provided they know and understand the grapheme-phoneme correspondence rules. Thus, the degree to which a reader accesses a word via the phonologically-mediated/assembled/indirect route or via the direct /addressed route may depend upon the linguistic characteristics of the particular orthography concerned. This somehow informs the reader to adjust her/his word processing strategies in line with the requirements of the orthography. Katz & Feldman (1981, pp. 85-86) summarized this view as follows:

> *The kind of code that is used for lexical access depends on the kind of lexical orthography facing the reader. Specifically, it depends on how directly the orthography reflects the phonetic surface. Languages in which the spelling-to-sound correspondences are simple and invariant (as in Serbo-Croatian) will readily support information-processing structures for reading that utilize the language's surface phonological features. On the other hand, in an orthography that bears a complex relation to speech (a deep orthography such as English), phonologically structured mechanisms for processing words will be less developed.*

Two competing, predominant theoretical perspectives that attempt to account for children's literacy development in a variety of orthographies informed this study in view of the afore-mentioned reading strategies readers in different orthographies employ. These theoretical perspectives differ as to what facilitates the development of literacy in various orthographies, and once acquired, how it is processed in the different orthographies. One view asserts that the development of literacy in the different writing systems, orthographies, varies as a function of some common underlying cognitive and linguistic processes. The other view holds that the depth of orthography determines how different orthographies process literacy and influences the development of literacy and the rate at which this development occurs. These views are the central processing hypothesis and the script depended, or orthographic depth hypothesis.

4.1. The Script Dependent/Orthographic Depth Hypothesis

The script dependent/orthographic depth hypothesis argues that word reading, or naming, in shallow orthographies bypasses the orthographic input lexicon. According to this hypothesis, where the spelling-sound correspondence is direct and consistent, the reader does not need to develop associations between orthographic patterns and semantics. Thus, word accessing in a shallow orthography is through the assembled route or via phonologically-mediated access (Katz & Frost, 1992; Besner & Smith, 1992). By implication, accessing words via the addressed or lexical route should occur only in deep orthographies because of the inconsistency in the grapheme-phoneme correspondence rules (Besner & Smith, 1992).

Turvey, Feldman, & Lukatela (1984) arrived at this conclusion following their study on the Serbo-Croatian orthography. They argued that the Serbo-Croatian orthography does afford its readers with the phonological route as a strategy for reading that language. The following expresses this theoretical view:

> *To conclude, the Serbo-Croatian orthography is phonologically very regular (permitting a valid prediction of how a word sounds solely on the basis of their letters comprising the word) and as such encourages neither the development of options for accessing the lexicon, nor, relatedly, a sensitivity to the linguistic situations in which one option fares better than another. (Turvey et al., 1984, p. 88).*

The same view is echoed by another researcher who states that:

> *Completely regular languages...are read with strategies that differ from those used with less regular ones. In many regular languages, a small set of grapheme-phoneme correspondences can unambiguously define all of the utterances in the language. It is possible that in these languages the lexical route simply does not exist...(Bridgeman, 1987, p.331).*

These are views of the strong version of the script dependent/orthographic depth hypothesis. The weak version of this hypothesis is less radical, and as such, makes provision for the use of phonology in word reading under certain circumstances in deep orthographies. Thus, according to this version, word reading in shallow orthographies is not an exclusive function of phonologically-mediated or sublexical processes alone, lexical or direct access to words is also possible. Furthermore, the extent to which lexical or sublexical routes of word recognition predominate depends on the structural relationship between orthography and the lexical entry. Similarly, word recognition in deep orthographies is also possible via phonologically-mediated access (Katz & Frost, 1992).

The script dependent/orthographic depth hypothesis further alleges that the differences in orthographic depth (transparent or opaque) of the different languages and writing systems influence literacy development and the rate at which it develops in different orthographies (Gholamain & Geva, 1999). Furthermore, the prevalence and patterns of literacy difficulties are also likely to vary from language to language as a result of these factors (Gholamain & Geva, 1999; Geva & Wade-Woolley, 1998). Thus, the "deeper" the orthography, the more complicated the process of phonetic encoding and, ultimately, the more prevalent and severe the literacy difficulties.

4.2. The Central Processing Hypothesis

Unlike the script dependent/orthographic depth hypothesis, the central processing hypothesis assumes a universal approach to the development of literacy. It posits that orthography. Rather, common underlying linguistic and cognitive processes such as working memory, verbal ability, serial naming, and linguistic components such as phonological skills, influence the development of literacy within and across languages and in first and second languages alike. Therefore, children with deficiencies in these skills, irrespective of their orthographies and languages, are more at-risk for developing literacy difficulties (Gholamain & Geva, 1999).

4.3. Support For and Against the Script Dependent/orthographic Depth Hypothesis and the Central Processing Hypothesis

The strongest form of the orthographic depth hypothesis claims that word perception in shallow orthographies can be achieved only via the sub-lexical route and in deep orthographies via the lexical route. Few studies (Katz & Feldman, 1981) have provided support for the orthographic depth hypothesis, in its more radical version and these could be argued to be flawed in terms of the tasks they used. In addition, contradictory evidence indicates that the assumptions of this version of the orthographic depth hypothesis are incorrect as far as the relationship between the depth of an orthography and word recognition is concerned (see Seidenberg, 1992; Besner & Smith, 1992; Katz & Frost, 1992). The empirical evidence generated so far suggests that alphabetic orthographies seem to share many similarities in terms of how they are processed. They all seem to involve phonology in word recognition (Seidenberg, 1992). Furthermore, all alphabetic scripts employ a combination of lexical and sub-lexical procedures for reading words. These findings are more consistent with the weak version of the orthographic depth hypothesis rather than with its strong version (Katz & Frost, 1992; Besner & Smith, 1992). However, the indirect, phonologically-mediated route contributes more to word reading in shallow orthographies than in deep orthographies.

Consider Serbo-Croatian and (unvowelised) Hebrew in view of the weak version of the orthographic depth hypothesis. Simple and consistent letter-phoneme relationships characterized Serbo-Croatian. This direct relationship enables the reader to decode words with ease via the phonologically-mediated route. In contrast, unvowelised Hebrew affords the reader, especially the emergent reader, only the direct, addressed route to word recognition as it lacks vowels and has many ambiguous consonants. These two orthographies represent two languages at the extreme ends of the opaque-transparent continuum of orthographies. Some orthographies form the middle ground of this continuum and, as such, should show a relative balance in the application of lexical and sub-lexical routes to word recognition in such orthographies.

English uses an orthography that is relatively deep, but still makes use of both routes. Which route is used may be determined, to some extent, by word types (Seidenberg, 1992). Thus, there are cases where English, like Serbo-Croatian, could be phonologically mediated as when a reader encounters a regular but relatively unfamiliar (low frequency) word. Even in unvowelised Hebrew, when available, phonology is preferred for word naming, suggesting that although word recognition is normally mediated through the lexical route, the reader can resort to the indirect, phonologically-mediated alternatives to access the meaning of words (Katz & Frost, 1992). Similarly, it is also possible to access words in shallow orthographies via the lexical route. For example, Persian is a shallow orthography with consistent spelling-sound correspondences. Despite this, some of its words are best processed using the direct, lexical route rather than the indirect, sub-lexical route because they are phonologically less transparent than others (phonologically transparent words are those words which contain vowel letters whereas those with diacritics are less transparent) (Baluch & Besner, 1991). Thus, from the evidence provided, it is evident that assembled and addressed routes are not used exclusively, although they may remain the preferred options to the extent that they are not a laborious and less effective method of accessing word meaning. Chances are that whenever necessary and appropriate, reading in both shallow and deep orthographies will utilize a combination of assembled phonology and visual orthographic coding. Thus, the specific orthography will alter the degree to which the reader will resort to the one or the other strategy.

All orthographies, deep and shallow, have words that occur more frequently than others do and it is word frequency that is one of the factors that seem to determine the appropriate route a reader will opt for to access the lexicon. Thus, those words that are more frequent become familiar visual orthographic patterns to the reader.

Such words are better and faster processed visually as phonological recoding will be slower to access the word. Less frequent words, in contrast to frequently occurring words, are processed better using phonology (Seidenberg, 1992). Thus, in learning to read new unknown words, particularly regular ones, a child might rely more on the sub-lexical route than on the visual route, as visual orthographic coding may be taxing for him as a beginning reader. However, when he becomes a proficient reader, accessing words from lexical memory may be a faster and more effective strategy to use. Phonological mediation, on the other hand, remains a useful tool that the child can refer to any time the need to do so arises. Having said all this, word recognition in shallow orthographies may still remain largely depended on sub-lexical routes given the direct and consistent relationships between graphemes and phonemes.

With regard to the development of literacy, and the rate at which it develops, there is evidence in support of the script dependent hypothesis. Various studies have shown that the rate at which the acquisition of basic literacy skills develops varies from one orthography to another, with the complexity of each orthography affecting it differently (Geva & Siegel, 1991; Geva et al, 1993; Gholamain, 1992). For example, Geva et al (1997) found that word recognition and word attack skills in English as the first language and Hebrew as the second language were highly correlated. However, the rate of accuracy and the type of decoding errors children committed were specific to the two orthographies. To their surprise, accuracy rates were achieved faster in Hebrew, the second language, than they were in English. These authors attribute this phenomenon to the fact that voweled Hebrew is a relatively shallow orthography and therefore, easier to decode than English. These findings lend support to the script dependent hypothesis.

The central processing hypothesis has also enjoyed considerable support from various empirical studies. For example, Geva & Siegel (2000) cite studies by So (1989) and Stevenson, Stigler, Lucker, Hsu, and Kitamura (1982) which point to misconceptions regarding the extent to which the nature of logographic-based orthographies are free from literacy difficulties. These studies suggest that there are no differences in the incidence of reading problems among children learning to read logographic (e.g. Chinese, Japanese, etc.) and alphabetic languages (e.g. English, Spanish, French, etc.). Furthermore, such studies indicate that individual differences on various underlying cognitive skills contribute significantly to children's reading in various orthographies. Earlier claims that phonological processes were irrelevant to reading a logographic script have been refuted by several studies (e.g. Leong, Cheng, and Mucahy, 1987); Peereman, 1992); Perfetti & Zhang, 1991); Seidenberg, Waters, Barnes, and Tanenhaus, 1984). Clinical case studies by Obler (1989), Petri and Geva (1991), and Wiss (1987) of bilinguals with reading problems in both their first and second languages lend further support to the central processing, LCDH, and Cummins' linguistic interdependence hypotheses. All these studies suggest that regardless of the orthographies involved, bilinguals who encountered reading problems in their first language also encounter similar problems in the second language (Geva & Siegel, 2000). However, the type of reading errors the bilinguals committed in these studies were in accordance with the properties of the orthographies; thus, supporting the script depended hypothesis.

The evidence in support of each of the two hypotheses above makes them appear to be contradictory. However, further studies assessing the role orthographic and cognitive factors play in the concurrent development of basic reading skills in two different languages have yielded results in support of both the central processing and the script dependent hypotheses. For example, basic reading skills in the first language and the second language correlate significantly. Furthermore, individual and developmental differences in underlying cognitive and linguistic factors such as working memory, speed of letter naming and non-verbal intelligence predict significantly, although to a limited extent, basic reading development in two different orthographies; in the case of Gholamin & Geva (1999), Persian and English, and in the case of Geva & Siegel (2000), Persian and Hebrew. These findings provide support for the central processing hypothesis. Moreover, whereas the acquisition of the grapheme-phoneme correspondence rules of the regular orthographies was sufficient to enable the children to accurately decode both known and unfamiliar words, heavy reliance on these rules for the children learning English literacy was not enough. This may be determined by the depth of the English orthography, which required the children to learn to access words through a visual route in order to be able to read irregular words such as "yacht", "tough", and "though"(Gholamain and

Geva, 1999). In this case, the findings lend support to the script depended hypothesis. With data providing support for both theoretical frameworks, the conclusion drawn was that the two alternatives are complementary rather than contradictory in accounting for individual differences in learning to read in different languages. Geva & Siegel (2000, p. 26) summarized it as follows:

> *When the script is less complex, young children appear to develop their word recognition skills with relative ease, even in the absence of sufficient linguistic proficiency. When the script is more complex, children take longer to develop command over the full set of rules and rule exceptions, even when it is their first language. In fact the development of basic L2 decoding skills in a shallow orthography may be less dependent on L2 proficiency than when deep orthography is involved. At the same time, a more accurate picture of what facilitates L1 and L2 reading development is enhanced when individual differences in underlying cognitive skills are considered as well.*

Given that Herero is a very transparent language with a simple, direct phoneme-grapheme mapping, the script dependent hypothesis implies that reading difficulties in Herero will not be as prevalent as they would be in English. Similarly, the pattern of reading difficulties would also differ from that of English. This may indeed be the case as the Herero orthographic consistency may mask most of the marked phonological deficits and, ultimately, reading difficulties of the Herero-English bilingual children. However, when considering that orthographic, cognitive, and phonological factors alike influence the acquisition of literacy, both the central processing and the script dependent hypothesis may, although to varying degrees, account for the acquisition of literacy in Herero-English bilinguals.

Chapter Five

STUDY 1-CROSS SECTIONAL STUDY

5.1. Research Questions and Hypotheses

The current study tested the assumptions of the two theories discussed in the previous chapter. The study addressed the nature of the Namibian bilingual children's literacy skills in Herero and English by considering:

(i) Whether the degree of transparency of Herero and English influences the rate of literacy acquisition in these two languages in Namibian Herero-English bilingual school children. Given the high degree of transparency of Herero, the prediction is that children will gain Herero literacy skills faster than English literacy skills. ANOVA will be used to assess the interaction between language (Herero and English) and grade (Grades 2-5).

(ii) Whether common underlying cognitive processes and/or the orthographic transparency of each of these two languages influences literacy acquisition in Herero and English in bilingual children. This leads to the prediction that both underlying cognitive factors and the degree of transparency of the Herero and English orthographies will influence the development of literacy. Multiple regression analysis techniques will be performed to determine the common predictors of literacy in both languages.

These issues were addressed by assessing reading and spelling skills of the bilingual children using measures of basic literacy skills such as single word reading and single word spelling. In addition, a non-word reading task was included to assess the children's ability to decode unfamiliar letter strings. Each of these literacy and literacy-related measures were performed in Herero and English. Basic language competence was also assessed in both languages by using language comprehension measures. A non-verbal measure of reasoning skills (Raven's matrices) was included to assess general non-verbal functioning. In addition, measures of phonological skills in each language were assessed. These included the ability to assess the initial or end sound of verbally presented words, the ability to repeat verbally presented digits and non-word sequences and the ability to rapidly name visually presented colours and objects. Auditory and semantic processes were assessed by sound discrimination tasks and semantic fluency tasks in both languages, together with a non-language based semantic categorization tasks. A spatial sequencing task assessed non-verbal short-term memory skills. Finally, a word interference task (Stroop test) in each language was used to assess the level of automatisation of word reading achieved in Herero and English by the children.

5.2. Research participants

The sample consisted of 117 primary school children of whom 56 were boys and 61 were girls in Grades 2-5, ranging in age between 7 and 12 years old. The sample was selected from four public primary schools, one urban (Theo Katjimune Primary School) and three rural (Omatjete, Ozondati, and Okakarara Primary Schools). These schools were chosen because of their predominantly Herero-speaking student populations and long-standing history of teaching the Herero language – a Namibian language belonging to the African family of Bantu languages. All these schools implement the Namibian government policy of delivering instruction in the children's mother tongue for the first three years of formal schooling. English is introduced and taught only as a second language at this stage. However, from Grade 4 to Grade 12, English becomes the medium of instruction in all the school subjects. Herero now becomes a taught school subject and ceases to be the medium of instruction. However, it remains the predominant language of the sample that participated in this study. They speak it at home as well as at school when in social contact with other children, and it is the only means of communication in their wider communities. English, on the other hand, is hardly or never used outside the school setting, particularly in the rural areas.

Participants were randomly selected from classes. There was no prior assumption or determination of their basic literacy skills. Any child selected who was non-Herero speaking was replaced with another randomly selected child in order to ensure that the final sample consisted entirely of first language Herero-speaking children who had English as a second language. Given the ethnic homogeneity of the population from which the sample for this study was selected, especially at the three rural schools, very few non-Herero speaking children were rejected for not being Herero-speaking. The Theo Katjimune Primary School, being an urban school, has a somewhat linguistically diverse population of school children compared to the three rural schools. However, the majority of the children at this school are Herero-speaking. As such, very few non Herero-speaking pupils were rejected as unsuitable for this study, with only one child in Grade 3 and two in Grade 4 at the Theo Katjimune Primary School being excluded.

Furthermore, although parental level of education and socioeconomic status of the pupils at these schools was not formally established, it can be said with a high degree of confidence that the majority of the children at these schools share the same socioeconomic status. This may be especially true when one considers the fact that parents higher up the socioeconomic ladder prefer to send their children to what they perceive to be "the good schools", usually expensive private schools or the former all-white public schools. This information, as well as the age of each child, was determined by interviews with teachers and parents.

5.3. Test Development

Tests were developed in Herero and English. Parallel forms were produced to assess the literacy skills of the bilingual children in both Herero and English. Non-language measures of non-verbal reasoning skills and non-verbal memory were also included. All tests were based on those used in the literature on literacy development, literacy difficulties, and bilingualism.

5.3.1. Description of the Measures/Tests Used

Measures of Literacy:
- Herero and English Word Reading

The Herero words were selected from reading books prescribed by the Ministry of Basic Education and Culture while the English words were adapted from the International Test of Dyslexia (Smythe, 2002). The list of words started out with simple words, but became progressively more difficult. Initial words were mainly monosyllabic and final words multi-syllabic (five or more syllables).

Groups of 10 words were selected to correspond to those that would be expected to be familiar to children in progressively higher grades-from grades 2-5 with Herero and English backgrounds. In total, there were 70 single words for both the Herero and English versions of these tasks (e.g. ryaa, tjetu, and ombandjarero for Herero and sit, brother, and classification for English). The Herero words were presented on one card and the English words on another. Children were required to read aloud as many words as they could in the language represented. Testers recorded any errors made by the children and timed (in seconds) their responses. Testing stopped when the child committed 10 consecutive errors. The total number of words read correctly and the number of words read correctly in one minute provided the measure of performance on the tests. Before administering the tests, children were given a brief practice session to ensure they understood the tasks.

- Herero and English Single Word Spelling

Like the Herero reading words, the Herero spelling words were also selected from reading books the Ministry has prescribed for the various grades studied here. The English spelling words, however, were adapted from the International Test of Dyslexia (Smythe, 2002). There were 40 single words for both Herero and English versions of the spelling task. This task was administered as a group task where all the children were seated in a quiet classroom. The tester dictated each word, followed by a sentence context. The tester then repeated the target word before signalling to the children to write down the target word. The children wrote the words on a response sheet provided. Each version of the spelling task took roughly 20-30 minutes to administer, with the criterion for this measure being the total number of words spelled correctly.

Measures of Decoding:

- Herero and English Non-word Reading

English non-words were taken from the International Test of Dyslexia (Smythe, 2002) and comprised pronounceable letter strings that do not occur within the English language. The researcher constructed the Herero non-words by substituting one letter of a common and frequently occurring word with another letter, either at the beginning or in the middle of the word, or by reversing letters in a word, ensuring that the letter string produced remained pronounceable. Single and multisyllabic non-words were used in both Herero and English versions (e.g. "kyaa", "vundu", and "tjiratindji" for Herero and "gat", "higure", and "clabnag" for English). The same procedures as those used for the word reading tasks were implemented. The children had to read all ten non-words aloud, with the tester recording the number of non-words read correctly. A brief practice of four non-words ensured the children understood the task

Measures of Phonological Awareness
- Herero and English Beginning Phonemes

The researcher constructed the Herero and English beginning phoneme tests using the International Test of Dyslexia (Smythe, 2002) as an example. There were 10 trials in each of the Herero and English tests. Each trial consisted of a string of three words, two of which possessed the same initial phoneme (e.g., 'cold bald cult' for English and 'sava sina zuva' for Herero). The testers presented each set of three words orally to the children who had to identify the word with the different initial sound. The testers recorded the children's responses as they gave them. A child's request to repeat either one word or the entire string of words was equal to a half point for that response if it was correct. Performance was measured on the basis of the number of correct responses (i.e. the total of full or half marks recorded). A brief practice before the tests ensured the children understood the tasks.

- Herero and English Ending Phonemes

The researcher developed versions of Herero and English ending phonemes in the same fashion as the beginning phoneme tests. The administrative procedures employed in the beginning phoneme test were also used in the ending phoneme test. However, in this case, the children had to identify the word with the different final phoneme (e.g., 'show tow tone' for English and 'ekuva eyova eyovi' for Herero).

Measures of Memory Span
- Herero and English Verbal Short-term Memory Tasks

Forward and reverse digits span procedures were administered in Herero and English. Items and procedures were based on those used in a number of dyslexia-related assessment tools, including the Bangor Dyslexia Test (Miles, 1993) and the

Wechsler scales (Wechsler, 1992). For the forward digit span task, series of two to seven digits were orally presented to the children who were asked to repeat back the sequences in the same order and in the language presented to them. For the reverse digit span task, different sequences of digits were presented and the children had to repeat the sequence of the digits presented orally in the reverse order, again in the language of presentation. There were 12 trials in each of the digit span tasks, with two examples of each sequence length. Total numbers of correct trials were used to indicate the level of performance on each of these tasks. A brief practice session was held before the test was administered to ensure the children understood the task.

- *Herero and English Non-word Sequence Repetition*

These tasks (based on Smythe, 2002) involved sequences of non-words produced in the same way as in the non-word reading task (e.g., the English words 'held' and 'girl' became 'keld' and 'girf' respectively; the Herero words 'toora' and 'omuvero' became 'voora' and 'orevumo' respectively). There were 12 Herero and 12 English non-word sequences, with the series increasing in length from one to a maximum of six non-words (there were two instances of each sequence length as in the digit span tasks). Testers presented the sequences orally to the child. The child was asked to repeat the sequences back to the experimenter in the same order. Test administrators recorded the responses of the children with the number of correct sequences being used as the measure of performance on this task. A brief practice session was provided prior to the tests.

- *Non-verbal Short-term Memory Tasks (Spatial Span)*

This task consisted of black squares arranged randomly on an A4 size stimulus card. The task was used to assess the child's ability to follow sequences of spatial arrangements. Testers pointed to a specified sequence of squares and then asked the children to repeat these pointing movements in the same order. As in the digit span task, an increasing sequence was used, with two sequences of two through to seven movements being used. For the reverse spatial span task, the children were required to repeat each sequence in the reverse order. Again there were 12 trials in each procedure, with the number of correct responses reflecting the level of performance. A short practice was conducted with the children before the actual test began.

Measures of Rapid Automised Naming

- Herero and English Rapid Colour Naming and Line Drawings of Familiar Objects

These tasks incorporated two types of stimuli: rapid colour naming and rapid naming of line drawings of familiar objects. There were four distinct items in each task: the colours green, yellow, blue and red for the rapid colour naming task and the line drawings of a ball, house, elephant and clock for the line drawings of familiar objects task. Both the colours and the line drawings were presented on two different stimulus cards in a mixed array that included repetitions of items so that there was a total of 40 colours and 40 line drawings, respectively. Where necessary, children were presented with the names of the items before the test. Practice was also given to all the children before the tests started. In both tasks, the experimenters asked the children to rapidly name the colours or the line drawings. The testers then recorded the time, in seconds, taken to complete each stimulus card.

The rapid colour-naming task was based on that used by Everatt, Warner, Miles, & Thompson (1997) while the rapid naming of line drawings was adopted from the International Test of Dyslexia (Smythe, 2002).

Measure of Interference:

- Word Interference Task

This task, also derived from Everatt, Warner, Miles & Thomson (1997), was similar to the above colour naming task in that it involved naming instances of colours presented in a random array on a stimulus card. However, in this case colours were presented as incongruous words, e.g. the colour red written in blue ink. Children were told that their response was to rapidly name the colour in which the colour word was written rather than naming the colour itself. The tester then recorded the time in seconds the child took to complete task.

The task was carried out in both Herero and English, with one card containing Herero colour words and another English colour words. The sequence of the colours, however, was rearranged for each of the two languages to avoid possible memorization by the children of the sequence of the colours. Colour naming in Herero was required for the word containing Herero incongruous words. Similarly, colour naming in English was required for the word containing English incongruous words. Where necessary, the children were presented with the names of the colours. A brief practice was given to all the children before the actual test began. The score for this task is the time taken to name the colours in seconds. A measure of word interference is calculated by taking the time taken in the colour naming task from the time taken in this task. The score thus indicates the level to which the word has slowed down the naming of the colour; i.e., interfered with colour naming. Automatic word processing will, therefore, lead to large interference scores.

Measures of Semantic Fluency:
- Naming of colours and body parts

The researcher developed both versions of this task, which were based on the procedures used in test batteries such as the Phonological Assessment Battery (Frederickson, Frith & Reason, 1997). It consisted of verbally producing the names of colours or body parts in either Herero or English. The children had one minute in which to name as many colours as they could, first in Herero and then in English. The same procedure was repeated for body parts naming. The number of items produced in one minute was used as the measure of fluency in each language.

Auditory Perceptual Measures:
- Herero and English Sound Discrimination

The researcher constructed the Herero version of this task while the English version was adapted from the International Test of Dyslexia (Smythe, 2002). The task consisted of 20 words taken from each of the two languages. Testers presented pairs of words orally to the children who had to judge whether or not the words sounded the same or different. Half the items comprised the same words (e.g., 'sit sit' for English and 'konda konda' for Herero). The other half of the items comprised different words (e.g., 'bed bad' for English and 'osona osiona' for Herero). Tests were administered individually in both languages. The total number of correct responses was the measure of performance on these tasks. A brief practice session was held before the actual tests started.

Measures of Categorization:
- Object Semantic Categorization

This task consisted of a series of pictures of living and non-living objects familiar to the children. These pictures were selected from Snodgrass & Vaderwart's (1980) standardized set of 260 pictures which have been used extensively in studies investigating differences and similarities in the processing of words and pictures. The procedures were based on those used by Ellis, McDougall and Monk (1996). There were 16 line drawings of living things and 16 line drawings of inanimate objects, making a total of 32 items. The children were asked to decide whether or not the objects belonged to a category of living or non-living by ticking "yes" if the object was a living one or "no" if it was not. This task was not timed, and the total correct responses indicated the children's performance on this task. Prior to the actual testing, a brief practice session was held to ensure children understood what was required of them.

Measure of Comprehension

- Herero and English Listening Comprehension

The researcher developed this test based on that of Ocampo's (2002). This task consisted of four short stories presented in Herero and four presented in English. Each of the stories was orally presented to the children, after which they were asked a series of questions pertaining to the stories. Children were asked to indicate simple YES/NO answers to the questions by marking appropriate sections of an answer sheet provided. A total of 25 questions were used for each of the comprehension tests. The total number of correct responses was used as the measure of performance on this task. Below is an example of extracts from the stories in both languages and the pertinent questions that followed:

English: *Koto decided to go to Windhoek.*
Question: Did Koto decide to go to Windhoek?
Response: YES.........NO.........

Herero: *Rukuru otji pari omuhona ngwaa hasora okurara uṯuku.*
Question: Omuhona aa sora okurara uṯuku?
Response: II......KAKO......

Measures of General Non-Verbal Abilities:

- Coloured Progressive Matrices (Raven, 1962)

This task consisted of 36 trials. Each trial comprised of an array of abstract patterns that formed an incomplete sequence. A number of alternative additional patterns were presented with which to complete the sequence. Only one of these alternatives correctly completed the sequence and the child's task was to indicate this correct alternative.

5.3.2. Rationale for the Measures/Tests Used:

This section provides the rationale for the selection of the measures that were used in this study.

Single Word Reading:

The single word reading test in this study was used to assess the children's basic reading skills, i.e. in terms of recognizing and naming correctly individual written words. Words varied in terms of familiarity and complexity, with varying degrees of performance on this task being used as a means of discriminating between good and poor readers.

Single Word Spelling:

The spelling test in this study was used to assess the extent to which the children could or could not spell words correctly. As with the word reading task, performance on this measure was used as an assessment of the children's basic literacy skills. Spelling words was used in addition to reading to support the conclusions derived from the reading measure. Both of these single word measures have been considered to be the primary behavioural outcomes of dyslexia (Working Party of the British Psychological Society, 1999).

Non-word reading:

Non-word reading is the most direct measure that assesses children's ability to decode letter strings they have not encountered before (Snowling, 2000). Consequently, non-word reading is considered to be a task with the greatest emphasis on phonological ability (Ellis et al, 1996). As a measure that assesses basic reading skills, it draws heavily on phonological and orthographic processing skills (Geva & Siegel, 2000). By their very nature, non-words are such that readers are unlikely to have encountered them before and, hence, they cannot be recognized directly. As such, the only way to read a non-word aloud correctly is by applying the letter-sound correspondence rules, thereby forcing children to employ their phonological skills. Performance on non-word reading, therefore, provides an indication of the children's phonological processing skills and the use of the indirect route to pronunciation. Several studies have reported that children with specific reading difficulties perform poorly on non-word reading tasks compared to reading age controls (Rack et al, 1992). Children with phonological deficits would be expected to stumble over this task.

Beginning and Ending phoneme (phoneme segmentation):

The phoneme represents the level of phonological structure that corresponds most directly to the letters of the alphabet (Locke, Hodgson, Macaruso, Roberts, Lambrecht-Smith, and Guttentag, 1997). As such, the phoneme plays an important role in reading development. Furthermore, understanding the alphabetic principle requires the ability to break down the speech streams into units of phoneme size. Phoneme segmentation has, therefore, been considered a core prerequisite for reading and spelling development in children (Lundberg, 1998) and a good predictor of reading and spelling skills (Hatcher & Hulme, 1999).

Several studies have found that dyslexic children are worse at phoneme deletion tasks than matched non-dyslexics (Muter, Hulme, Snowling, & Taylor, 199.8). These studies have been used as evidence to argue that dyslexics have poor levels of phonological skills and, hence, are worse at decoding words, leading to low levels of literacy skills.

The phoneme test in this study assessed the children's ability to recognize phonemes at the start or end of a word. Both measures were included since the initial phoneme in a word may also correspond to the word's onset (see Goswami & Bryant, 1990), whereas the final phoneme task requires the segmentation of rime or syllable units.

Verbal working memory

Successful reading may be contingent upon the child's ability to retain material in memory during the reading process in order for the syntactic and semantic analyses necessary for text comprehension to take place (Scarborough, 1998). These processes make verbal working memory an important cognitive factor in reading. Similarly, it has been argued that reading unfamiliar words requires temporary storage of phonological segments as part of the decoding process (Locke et al, 1997).

Verbal memory has sometimes, but not always, been found to be deficient in reading disabled children (Scarborough, 1998). Locke et al. (1997) reported that dyslexic children experience difficulty on working memory tasks. As a result, dyslexic children's deficiency in working memory is considered to be one aspect of a broader linguistic impairment at the phonological level. Working memory deficits in reading disabled children also manifest themselves in certain numerical tasks (Van Daal and Van der Leij, 1999). This includes tasks such as forward and reverse digit span.

Both tasks were included in the present study. Forward digit span is often considered to be a measure of simple short-term phonological storage, whereas reverse digit span requires the storage and manipulation in working memory of the same phonological forms. However, both tasks involve known lexical items and, therefore, have been shown to also involve long-term memory. Non-words do not have a lexical entry and, therefore, repetition of these items provides a test that is less likely to be contaminated by long-term memory (see Gathercole & Baddeley, 1993). Non-word repetition may also be a measure of the ease with which one can establish new phonological representations. Such representations should aid the ability to read or decode words and non-words (Snowling & Nation, 1997). Consistent with the phonological representation hypothesis, Snowling & Nation (1997) report that children at risk for dyslexia seem to have difficulty establishing phonological representations long before they begin to read. The non-word sequence repetition test in this study, therefore, can also be used to assess the extent to which children can establish and access phonological representations.

The working memory measures in this study were used to assess the relationship between memory skills and reading ability and determine whether children who show deficits in memory skills also show difficulties in literacy tasks.

Non- verbal memory (Spatial Span):

Usually, dyslexic children, or children with specific learning difficulties, do not perform worse than controls in tasks involving material that can be coded in non-verbal memory (Locke et al, 1997). Their problems are more with materials that involve verbal memory. The spatial span task involves remembering a sequence of movements over a series of uniform collared blocks and, hence, requires the subjects to recall spatial relations. Such a task should present a few problems for those with specific literacy problems.

Furthermore, there is a developmental trend in the development of working memory span. Younger children seem to rely more on visual span for processing information. With advancement in age and cognitive development, children begin to rely more on verbal span to process information. This has been found to be the case with English-speaking monolingual children (Hitch & Halliday, 1983).

This task assessed the relationship between the children's literacy skills and their ability to remember the sequence of the movements since deficits in sequencing have been said to be related to literacy difficulties.

Rapid Serial Naming:

Many studies, including the early studies by Denckla and Rudel (1976), have shown that a slowed rate of rapid naming is a correlate of dyslexia (Meyer, Wood, Heart and Felton, 1998). Lovett (1987) found in a group of 9-11 year olds that naming speed deficits for all rapid automatic naming stimuli discriminated fluent, normal readers from weak readers in both rate and accuracy. Although rapid naming of objects may be a visual processing task, the name retrieval involved in this process requires phonological processing skills. As such, poor performance in rapid naming could be interpreted as a part of phonological deficits in dyslexic children (Ellis, McDougall and Monk, 1996) and a tool to assess the automaticity with which children access linguistic information.

Research conducted in the neurosciences has shown ample evidence that many severely disabled readers are deficient in rapidly recognizing and retrieving visually presented linguistic stimuli, that is, they have naming-speed deficits (Wolf & Bowers, 1999). Since rapid naming correlates well with reading abilities, this task was used to assess the relationship between the children's ability to rapidly name objects and their literacy skills.

Object Semantic Categorization:

This task was used to assess the extent to which the children perceived, or failed to perceive objects as similar to one another. In addition, the children's categorization of the objects is expected to reveal some information about their general understanding of linguistic concepts. Problems in this domain may be indicative of general learning difficulties rather then more specific deficits associated with dyslexia.

Coloured Progressive Matrices (CPM):

This test was used as a measure of general problem-solving ability. Typically, Raven's matrices are associated with fluid intelligence (e.g. Carpenter, Just, & Shell, 1990) and used to avoid bias against children with language-based problems. As with the previous measure, they can be used in order to distinguish those with literacy problems due to general cognitive deficits from those with specific language-related difficulties.

Semantic Fluency:

According to Snowling (2000), a strong vocabulary supports the process of learning to read as it helps children to achieve a pronunciation for words they can decode only partially. When a child is struggling to decode a word, for example, he/she resorts to his/her semantic representation to help him/her facilitate the reading of the word.

In spelling, a strong vocabulary or semantic representation will help the child discriminate between two or more words for which he/she may erroneously have the one and the same phonological representation. That is, if the child knows the meaning of two similar sounding words, he/she will have two semantic representations for these words. This may lead to the child recognizing the two words as distinct (Stackhouse & Wells, 1997).

The semantic fluency task in this study was used to assess the children's access to semantics or vocabulary. The measure used assessed the children's knowledge of body parts and colour names, where a good performance was indicative of a strong vocabulary.

Word Interference Task:

In this task, participants were required to name the colour in which a word was written. For example, if the word "red" was written in green, the participant was asked to name the colour green. This condition is known as an incongruent word condition. In comparison to control conditions, the colour word slows down the naming of the colour of the ink. The explanation given for this interference effect argues that word reading is an automatic process that competes for response with the less automatic process of colour naming (Everatt et al, 1997). The Word Interference task in this study was used to assess the extent to which word reading is an automatic process in the children.

Sound (auditory) discrimination:

Sound or auditory discrimination was used to assess recognition and discrimination of linguistic information. Difficulty in this skill may be a possible cause of reading failure because learning to read and write may require the child to learn to differentiate between sounds. The child must also know how to group together words which are different but which have common sounds. Difficulty in categorizing words according to the sounds representing them may be a significant source of difficulty in learning to read (Bradley & Bryant, 1978). Children who fail to detect similar sounds or sequences of sounds in clusters will lay down imprecise phonological representations of two or more words with similar sounds and clusters, leading to problems in literacy, particularly spelling. The sound discrimination task in this study assessed the extent to which the children were or were not able to discriminate between sounds in spoken language and how this ability or inability affects their literacy acquisition.

Listening comprehension:

Listening comprehension was used as a measure of language ability. In order to perform well in this task, children have to know word meanings and understand syntactic and semantic relations. Knowledge of word meanings and understanding of semantic relations enable one to comprehend text. Listening comprehension was used here to provide a measure of children's comprehension of spoken rather than written language.

In retrospect, when reflecting upon the research project, some measures that were used for data collection were found not to be really useful and were subsequently dropped from the analyses. An example is the Lexical Decision task where the children were required to distinguish between real words and nonwords. It was felt that this task might distort the results of the study as the scores on this task did not reflect the true literacy abilities of the children. Measures that might have been useful but were not included are other forms of phonological awareness in addition to those that were included.

5.3.4. General Procedures

Prior to commencing with data collection, a research assistant was recruited and trained on how to administer and score the tests. As part of her training, she was afforded the opportunity to administer the tests to the principal researcher so as to get a practical experience of administering the tests. After the training, the trainee worked closely with the principal researcher, undertaking the same load of work as the principal researcher at Time 1, the only time that she was available. There was no investigation of inter-tester reliability of the tests carried out by the two testers.

Following the granting of permission to perform the research by the respective school principals, meetings were arranged and held with them and the Herero and English language teachers of all the schools where the data were collected. The purpose of these meetings was to inform these personnel about the research, its objectives, and the potential benefits that could be accrued from this research project. Assessments were divided into Herero and English sessions. Each of the sessions took two days to complete and lasted approximately 40 minutes per school day. Testing of each child was performed over a four-day period to allow rest periods. Herero testing was completed prior to testing in English. All data were collected within a four-month period. Individual testing was conducted during school hours. Group tests were conducted after completion of these individual tests. Classrooms to accommodate ten or more children at a time were not available during the normal school hours as they were all occupied for the daily lessons. Consequently, the group tests were carried out after school hours.

It is worth mentioning here that there is a variation in the number of subjects in most of the group measures and some of the individual tests. Two factors led to variations in the number of children taking particular tests. First, at one of the primary schools, parents removed their children from the school because of some discontent with events at that school unrelated to the research. This action resulted in some children missing some of the subsequent tests, both individually and group administered tests. Secondly, the group administered tests had to be conducted after school hours when there were empty classrooms to accommodate the children. Testing children at this time proved to be very difficult. Although attempts were made to reach any child who missed a testing session, not all could be contacted and so some missing data was inevitable. In all cases, reasons for missing tests were unrelated to the specific questions investigated and were more to do with parental/school problems and distance travelled to and from school.

5.3.5. Results

5.3.5.1. Descriptive Statistics Across the Different Schools in Terms of Their Literacy Abilities.

Tables 5.0 (a-b) below provide the descriptive statistics for the different schools in terms of their literacy skills. It is important to note that although Grades 2-5 were tested, some schools did not have Grades 2 and 5 tested. This is due to the fact that when it was realised that the majority of second graders were not capable of reading yet (given that testing took place at the beginning of the academic year when these children were just beginning to learn to read and write), a decision was taken to include fifth graders in the testing. Thus, at the Theo Katjimune Primary School, where testing began, no fifth graders were tested while at the Okakarara Primary School no second graders were tested. The Ozondati Primary School did not have a Grade 5; therefore, second graders were tested (in stead of fifth graders). It is also noticeable that the same school does not have complete statistics on the literacy measures (word reading and single word spelling). This is because of the same explanation given earlier for the variation in the number of subjects for some of the tests (see section 5.3.5). Thus, for comparing performance differences in the literacy abilities, this school will not be considered. Looking at the tables, there seem to be no obvious differences between the schools in terms of their literacy abilities. Where one school appears to perform better than the other school in a particular measure of literacy, the other school performs better in another measure of literacy. Thus, the differences in performance across schools are not really that conspicuous to notice particular school effects in terms of their literacy abilities. However, for some strange reason, there are obvious with-in group differences in performance on literacy measures by third graders at the Okakarara Primary School. These children outperformed both the fourth and the fifth graders on Herero Word Reading and Herero Single Word Spelling, suggesting that something that is not happening with the other two grades is happening with the Grade 3 children at this school, perhaps a teacher effect. Such performance would be expected from children developing literacy via the phonics method of literacy teaching, although it cannot be said with certainty that it is in deed the case. This performance could very well be due to other factors internal to the children themselves (they may simply be a group of good readers), or it may be due to chance as well. Whatever the case may be, school, grade, sex, and language abilities will all be controlled for in the subsequent multiple regression analyses to avoid contaminating the results of these analyses. In fact, due to the high zero scores in Grades 2 and 3, particularly on English literacy measures, analyses of predictors of these literacy measures will be repeated with Grades 4 and 5 only (to exclude Grades 2 and 3) to ensure that the same results are evident in groups that are not so negatively skewed (see pg. 138).

Furthermore, second graders from the Theo Katjimune Primary School, an urban school, seem to have better scores than their counterparts from the rural schools on the English literacy measures. By virtue of the fact that these children reside in an urban area, this finding may suggest that they may have greater exposure to English (as they are more likely to interact with children from other ethnic groups and have the advantage of television at their disposal) and, therefore, should perform better than the rural children on English literacy measures. While this observation may make a case for this argument, these differences begin to disappear as the rural school children progress further on in the education system and actually perform better than the urban children. Based on this, it might be plausible to conclude that there are perhaps no major school differences in terms of literacy abilities.

Tables 5.1 (A-D). *Mean differences between schools in Word Reading and Single Word Spelling in Herero and English.*

A. Theo Katjimune Primary School

Grade	Herero Word Reading	Herero Single Word Spelling	English Word Reading	English Single Word Spelling
2 mean	6.54	3.00	5.15	2.46
std. dev.	18.62	9.36	14.07	5.71
N	13	13	13	13
3 mean	7.06	2.13	5.56	3.31
std. dev.	14.46	2.78	6.43	3.36
N	16	16	16	16
4 mean	42.20	14.67	23.20	4.89
std. dev.	23.72	10.92	19.19	5.95
N	10	9	10	9

B. Omatjete Primary School

Grade	Herero Word Reading	Herero Single Word Spelling	English Word Reading	English Single Word Spelling
2 mean	10.00	7.00	1.33	1.17
std. dev.	15.31	9.75	1.51	1.60
N	6	6	6	6
3 mean	27.07	13.70	7.21	3.20
std. dev.	26.55	14.74	10.11	3.99
N	14	10	14	10
4 mean	29.60	13.10	12.20	4.50
std. dev.	30.40	12.52	14.67	4.45
N	10	10	10	10
5 mean	56.70	18.40	21.60	6.00
std. dev.	19.97	7.38	11.12	3.06
N	10	10	10	10

C. Ozondati Primary School

Grade	Herero Word Reading	Herero Single Word Spelling	English Word Reading	English Single Word Spelling
2 mean	36.67	-	16.00	-
std. dev.	23.50		-	
N	3		1	
3 mean	55.00	-	-	-
std. dev.	-			
N	1			
4 mean	37.00	-	9.50	-
std. dev.	23.39		13.44	
N	3		2	

D. Okakarara Primary School

Grade		Herero Word Reading	Herero Single Word Spelling	English Word Reading	English Single Word Spelling
3	mean	53.80	26.80	21.00	6.00
	std. dev.	19.74	11.10	16.33	3.23
	N	10	10	10	10
5	mean	39.60	20.20	18.30	8.60
	std. dev.	34.26	17.62	17.43	3.23
	N	10	10	10	10
6	mean	42.70	17.78	29.40	13.83
	std. dev.	29.31	15.49	24.72	9.06
	N	10	9	10	6.

5.3.5.2. Description of Herero and English Literacy Skills Among Namibian Bilingual School Children

- The Relationships Amongst Corresponding L1 and L2 Measures.

Tables 5.2 and 5.3 present the means and standard deviations on Word, Non-Word Reading, Spelling, and Word Interference in both Herero and English for each grade. As can be seen, the Herero means were far better than English means. However, in both the L1 and the L2, the means improved from grade to grade, with the improvement being greater in L1 than in L2. Similarly, Herero word spelling means were better than English word spelling means, and spelling improved from grade to grade in both languages, although the improvement was greater for L1 than for L2. The better performance in L1 reading and spelling comes as no surprise, as Herero is the language in which literacy instructions begins. Due to high levels of zero scores in Grades 2 and 3, particularly on English literacy measures, analyses of predictors of these literacy measures will be repeated in Grades 4 and 5 children only, to ensure that the same results are evident in groups that are not so negatively skewed.

Table 5.2. *Means, standard deviations, minimum and maximum scores, and number of cases by grade of the Herero literacy measures.*

GRADE		Herero Word Reading	Herero Single Word Spelling	Herero Non-Word Reading	Herero Word Interference
2	mean	11.59	4.11	1.63	6.30
	N	22	22	22	22
	std. dev	20.32	9.36	2.65	22.85
	min	.00	.00	.00	-40.03
	max	66.00	34.00	9.00	71.55
3	mean	26.46	12.19	3.87	6.21
	N	41	36	41	41
	std. dev	27.44	14.11	4.11	16.65
	min	.00	.00	.00	-24.51
	max	68.00	38.00	10.00	51.31
4	mean	37.12	16.03	5.18	5.64
	N	33	29	33	33
	std. dev	28.46	13.93	4.07	14.12
	min	.00	.00	.00	-22.07
	max	70.00	40.00	10.00	47.94
5	mean	49.70	18.11	6.60	9.97
	N	20	19	20	20
	std. dev	25.44	11.58	3.73	11.37
	min	.00	.00	.00	-13.00
	max	70.00	39.00	10.00	36.78

Table 5.3. *Means, standard deviations, minimum and maximum scores, and number of cases by grade of the English literacy measures.*

GRADE		English Word Reading	English Single Word Spelling	English Non-Word Reading	English Word Interference
2	mean	4.55	2.05	.90	-3.36
	N	20	19	20	20
	std. dev	11.66	4.78	1.55	26.66
	min	.00	.00	.00	-74.77
	max	51.00	21.00	5.00	69.05
3	mean	10.00	4.03	2.03	9.43
	N	40	36	40	39
	std. dev	12.38	3.63	2.54	21.13
	min	.00	.00	.00	-71.74
	max	49.00	11.00	8.00	48.36
4	mean	17.38	6.03	3.06	6.71
	N	32	29	32	32
	std. dev	16.95	6.71	2.64	22.75
	min	.00	.00	.00	-78.53
	max	57.00	23.00	8.00	45.91
5	mean	25.50	8.94	3.75	10.72
	N	20	16	20	20
	std. dev	19.80	6.95	2.67	33.15
	min	.00	.00	.00	-81.60
	max	58.00	25.00	8.00	81.90

Tables 5.4 and 5.5 present the summary data for the other variables in the study. The beginning and ending phonemes means for L1 and L2 are not that dissimilar. This might suggest that the children were capable of processing L1 and L2 sounds with more or less equal ease. The same trend was also noticed for L1 and L2 non-word repetition. There was a general improvement in beginning and ending phoneme tasks from grade to grade.

Interestingly, L2 forward digit span means were much better than L1. However, the trend was reversed for the reverse digit span, with the performance in this task being better in L1 than in L2. The better L2 performance in forward digit span might be explained in terms of the relatively long and multi-syllabic nature of Herero words. Typically, short-term recall of short, monosyllabic words is easier than recalling longer, multi-syllabic words. Therefore, better performance in L2 forward digit span task would be expected. The better performance in L1 reverse digit span, however, seems to contradict this explanation provided of the L2 forward span performance. Performing digits or any other task in the reverse order might be more challenging than performing a task in its natural order. Thus, if Herero is characterized by words with a long pronunciation, and recalling items in the reverse order is more challenging, then one might expect L1 reverse digit span performance to be poorer than L2 performance consistent with the forward digit span task.

Looking at rapid naming, the line drawings and colour naming means were higher (poorer performance) in L2 than in L1. The poorer performance in L2 rapid naming was expected given that the children were less familiar with the English equivalent terms for a number of line drawing items and colours. Consequently, they took longer to name the items in both tasks in L2 as they struggled to find the correct English terms for the items presented. However, an improvement from grade to grade in both languages was noticeable, suggesting that the children's L2 familiarity improved as they progressed through the education system. Listening Comprehension in both languages did not seem to improve from grade to grade.

Table 5.4. *Means, standard deviations, minimum and maximum scores, and number of cases by grade of the Herero variables.*

GRADE		Herero Non-word Repetition	Herero Beginning Phoneme	Herero Ending Phoneme	Herero Digit Span (forward)	Herero Digit Span (reverse)	Herero Rapid Naming (line drawings)	Herero Rapid Naming (colour)
2	mean	4.14	5.10	5.18	4.91	3.95	52.07	72.47
	N	22	22	22	22	22	22	22
	std. dev	1.32	1.54	1.90	1.51	2.28	10.80	25.91
	min	1.00	1.00	2.50	2.00	.00	32.97	46.56
	max	6.00	7.00	9.50	9.00	9.00	83.25	140.87
3	mean	4.12	6.15	5.65	4.98	4.24	51.02	62.43
	N	41	41	41	41	41	41	41
	std. dev	1.33	1.80	1.61	1.31	1.79	11.82	14.84
	min	2.00	1.00	2.00	2.00	2.00	32.97	41.00
	max	8.00	10.00	10.00	7.00	9.00	83.25	118.82
4	mean	4.48	6.39	6.05	5.64	4.58	46.60	54.80
	N	33	33	33	33	33	33	33
	std. dev	.97	1.52	2.10	1.19	1.80	11.75	18.84
	min	3.00	4.00	2.50	4.00	2.00	32.03	32.78
	max	8.00	9.00	10.00	8.00	9.00	73.90	107.19
5	mean	4.80	6.68	6.50	6.20	5.80	39.99	44.88
	N	20	20	20	20	20	20	20
	std. dev	1.40	1.36	2.18	2.10	2.40	9.23	11.18
	min	3.00	4.00	3.00	3.00	2.00	23.69	27.75
	max	8.00	10.00	10.00	12.00	10.00	61.28	77.25

Table 5.4, continued

GRADE		Herero Colour Semantic Fluency	Herero Body Parts Semantic Fluency	Herero Stroop Task	Herero Sound Discrimination	Herero Listening Comprehension
2	mean	6.500	12.45	78.75	18.18	16.56
	N	22	22	22	22	18
	std. dev	2.35	3.45	23.94	2.36	4.49
	min	2.00	7.00	38.37	10.00	6.00
	max	12.00	22.00	132.00	20.00	24.00
3	mean	5.80	13.15	68.13	17.93	19.14
	N	41	41	41	41	36
	std. dev	1.69	3.16	18.74	2.35	3.43
	min	2.00	8.00	37.25	11.00	10.00
	max	9.00	22.00	128.12	20.00	24.00
4	mean	6.00	13.73	60.59	18.97	18.14
	N	33	33	33	33	29
	std. dev	1.54	2.68	19.55	1.40	4.44
	min	1.00	9.00	37.75	14.00	9.00
	max	9.00	19.00	113.28	20.00	25.00
5	mean	6.35	14.25	54.88	19.30	19.16
	N	20	20	20	20	19
	std. dev	1.63	2.27	14.17	1.49	4.71
	min	3.00	9.00	35.06	15.00	4.00
	max	10.00	18.00	85.16	20.00	24.00

Table 5. 5. *Means, standard deviations, minimum and maximum scores, and number of cases by grade of the English variables.*

GRADE		English Non-word Repetition	English Beginning Phoneme	English Ending Phoneme	English Digit Span (forward)	English Digit Span (reverse)	English Rapid naming (line drawings)	English Rapid naming (colours)
2	mean	3.95	5.55	4.82	6.45	3.60	87.39	83.13
	N	20	20	20	20	20	20	20
	std. dev	1.57	1.18	1.66	1.70	2.01	45.43	26.42
	min	.00	3.50	2.00	3.00	.00	53.19	47.93
	max	8.00	8.00	8.00	9.00	8.00	261.50	159.86
3	mean	4.53	6.59	5.63	6.93	3.70	61.27	67.37
	N	40	40	40	40	40	40	39
	std. dev	1.24	1.52	1.78	1.99	.97	25.37	22.56
	min	2.00	2.50	2.00	2.00	2.00	31.50	40.06
	max	7.00	9.00	9.50	12.00	5.00	184.90	157.34
4	mean	4.63	7.06	5.41	7.78	3.78	54.89	63.45
	N	32	32	32	32	32	32	32
	std. dev	1.54	1.45	2.17	1.77	1.26	15.53	32.89
	min	.00	5.00	.00	4.00	2.00	30.87	34.65
	max	8.00	10.00	10.00	12.00	7.00	102.97	189.16
5	mean	4.80	6.95	6.80	7.45	5.00	49.90	57.59
	N	20	20	20	20	20	20	20
	std. dev	1.44	1.72	1.85	1.85	2.20	17.19	24.16
	min	2.00	3.50	4.00	4.00	2.00	33.19	30.81
	max	8.00	10.00	10.00	11.00	10.00	115.23	121.13

Table 5. 5, continued

GRADE		English Colour Semantic Fluency	English Body Parts Semantic Fluency	English Stroop Task	English Sound Discrimination	English Listening Comprehension
2	mean	5.60	6.35	79.76	16.45	10.68
	N	20	20	20	20	19
	std. dev	1.85	2.41	18.70	2.42	3.33
	min	3.00	.00	38.34	12.00	3.00
	max	9.00	10.00	116.98	20.00	16.00
3	mean	6.40	8.15	75.88	15.95	12.83
	N	40	40	39	40	36
	std. dev	3.10	3.04	22.06	2.67	3.80
	min	.00	.00	37.93	9.00	2.00
	max	14.00	14.00	140.05	20.00	23.00
4	mean	6.84	7.97	70.20	17.16	14.31
	N	32	32	32	32	29
	std. dev	1.95	2.57	24.80	1.95	3.69
	min	1.00	2.00	32.15	12.00	8.00
	max	9.00	12.00	154.01	20.00	22.00
5	mean	6.00	8.40	68.31	16.85	13.25
	N	20	20	20	20	16
	std. dev	2.36	3.55	24.11	4.49	2.44
	min	2.00	2.00	39.53	.00	10.00
	max	11.00	16.00	145.52	20.00	20.00

Table 5.6 presents means and standard deviations of the non-language based predictor variables. Performance in the forward and reverse Spatial Span tasks improved from grade to grade, and the difference in performance between the two tasks was marginal.

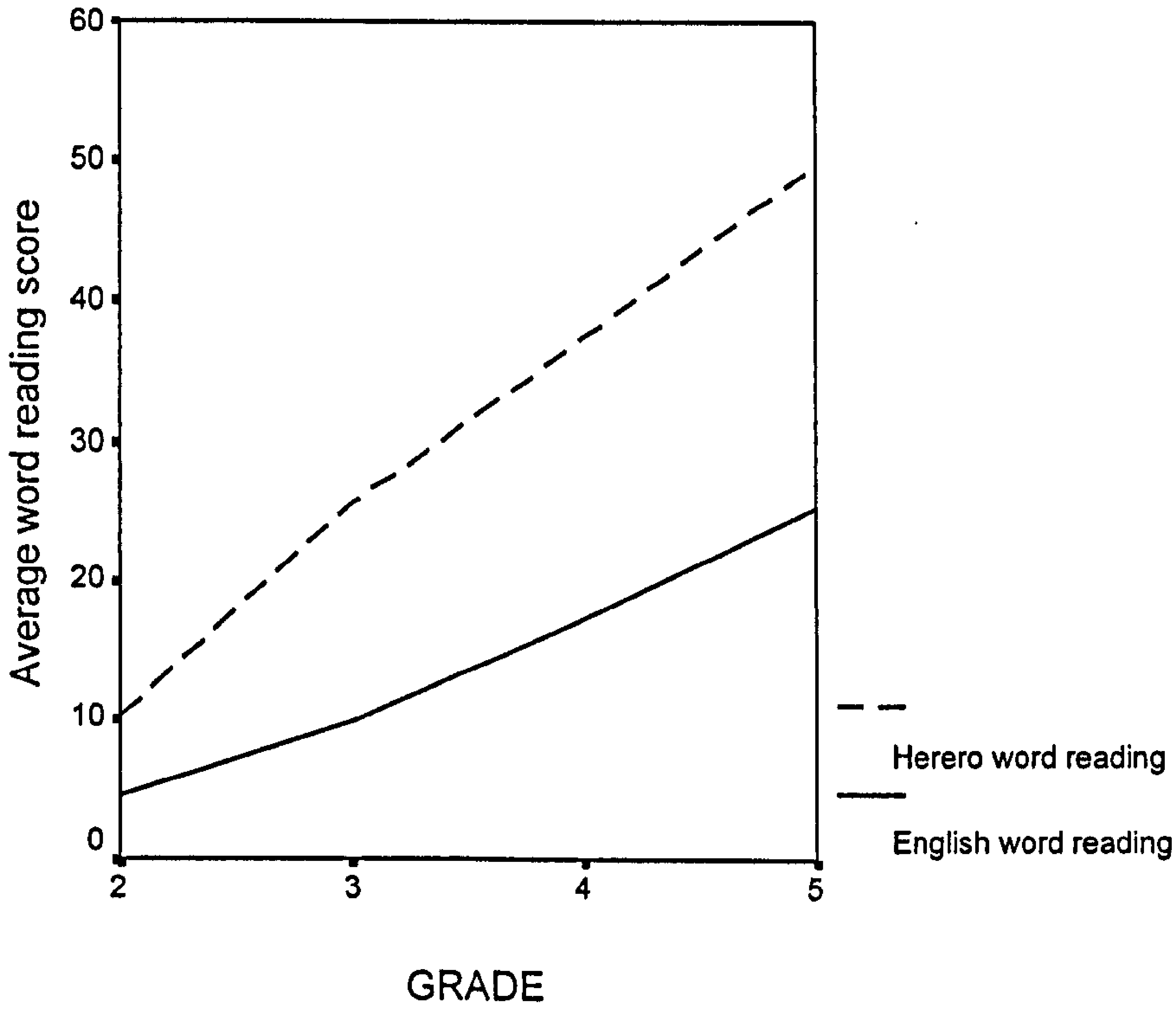
Table 5. 6. *Means, standard deviations, minimum and maximum scores, and number of cases by grade of the non-language based variables.*

GRADE		Forward Spatial span	Reverse Spatial span	Raven's Progressive Matrices	Object Semantic Categorization
2	mean	6.57	6.48	13.53	25.00
	N	21	21	19	18
	std. dev	2.13	2.06	3.61	6.16
	min	.00	.00	4.00	7.00
	max	9.00	10.00	21.00	30.00
3	mean	7.75	7.20	16.56	27.11
	N	40	40	36	36
	std. dev	1.80	1.30	5.50	5.84
	min	4.00	5.00	2.00	.00
	max	12.00	10.00	29.00	31.00
4	mean	7.91	7.44	14.38	27.00
	N	32	32	29	29
	std. dev	1.59	1.05	4.92	5.56
	min	4.00	5.00	9.00	8.00
	max	10.00	10.00	27.00	32.00
5	mean	8.30	8.50	16.74	28.89
	N	20	20	19	19
	std. dev	1.81	1.36	7.85	1.66
	min	5.00	5.00	.00	27.00
	max	11.00	11.00	30.00	32.00

- Developmental Patterns in Learning to Read and Write in Herero and English

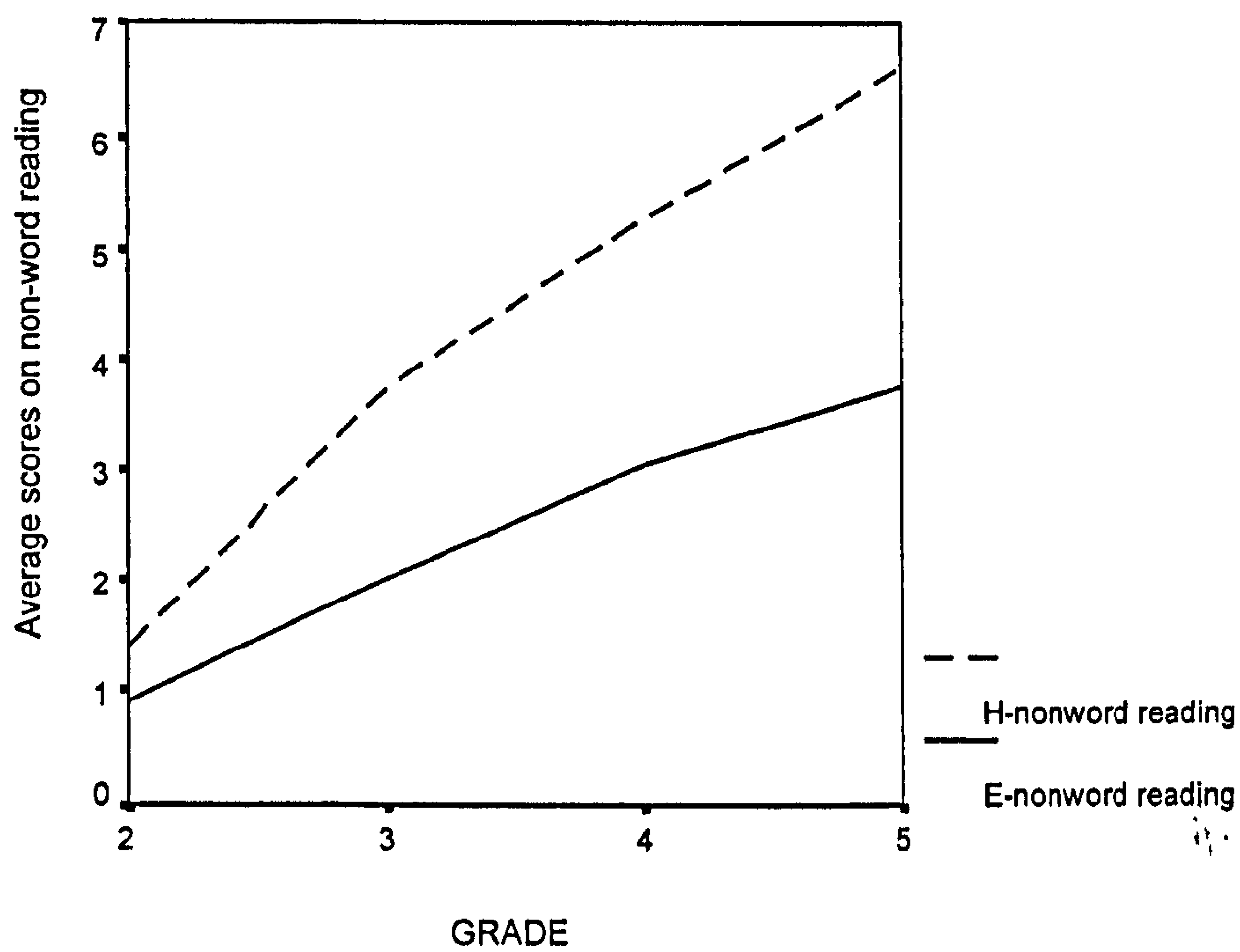
Analyses of variance (ANOVA) were performed on word reading and non-word reading to investigate the interaction between grade (2 to 5) and language (Herero versus English), and to assess the individual effects of language and grade on these literacy measures. For word reading, the interaction between language and grade was significant ($F = 4.04$ $df = 3$ and 108, $p < 0.0001$). Graph 5.1 presents this interaction and shows that Herero word reading skills improved at a faster rate than English word reading skills across the grades. ANOVA also showed that the grade and language effects were significant ($F = 9.44$ $df = 3$ and 108 $p < 0.0001$ and $F = 84.65$ $df = 1$ and 108 $p < 0.0001$ respectively).

Graph 5.1. Average scores on Reading in Herero and English across the grades



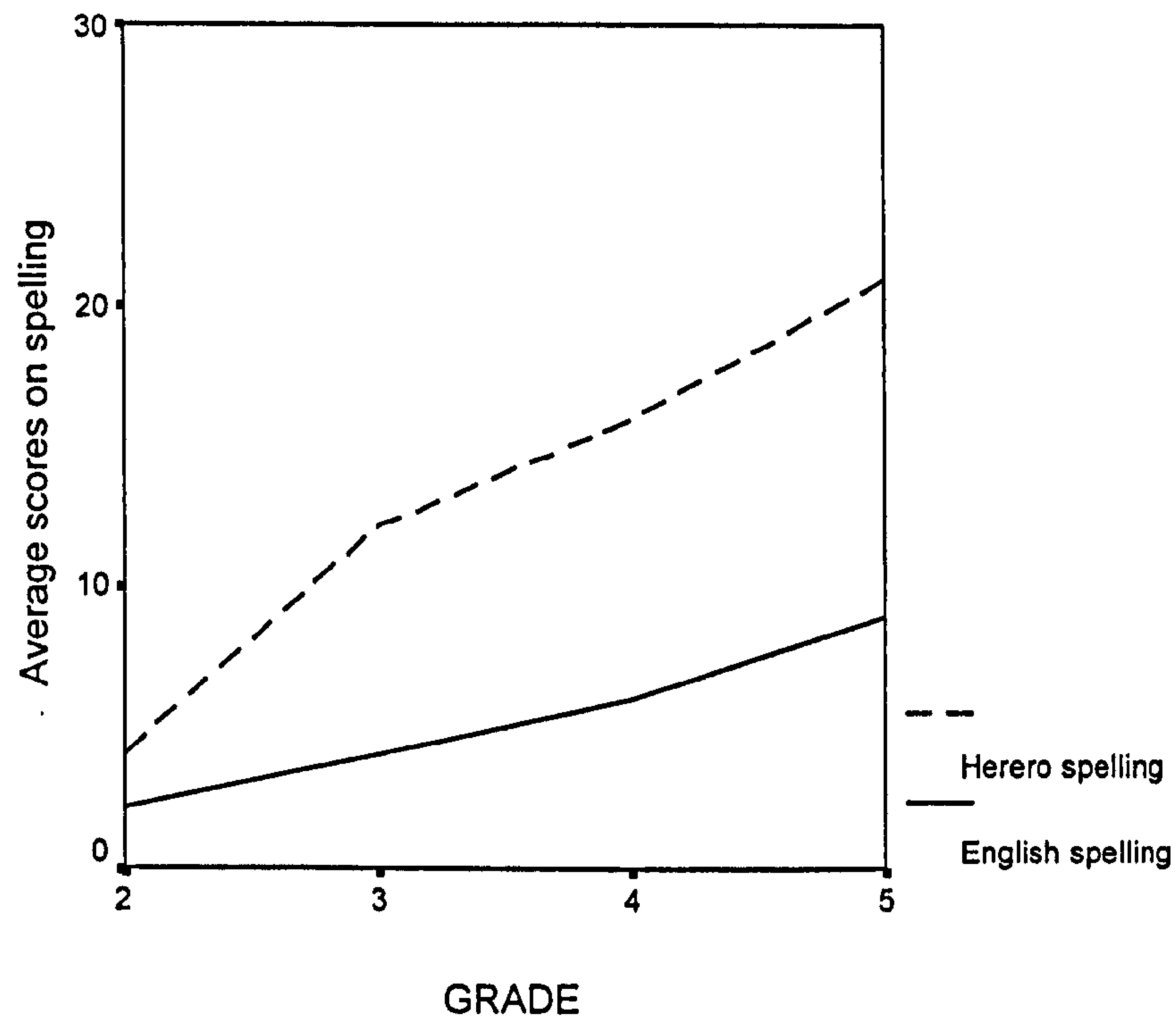
Similarly, non-word reading showed a trend for an interaction between language and grade ($F = 2.43$, $df = 3$ and 108, $p = 0.07$). Again, Graph 5.2 indicates that decoding skills were developing at a faster rate in the more transparent script (Herero), consistent with the predictions of the script dependent hypothesis. Furthermore, as was the case with word reading, ANOVA showed that both language and grade effects were also significant ($F = 40.36$ $df = 1$ and 108 $p < 0.0001$ and $F = 7.93$ $df = 1$ and 108 $p < 0.001$).

Graph 5.2. Average scores on Non-Word reading in Herero and English across the grades.



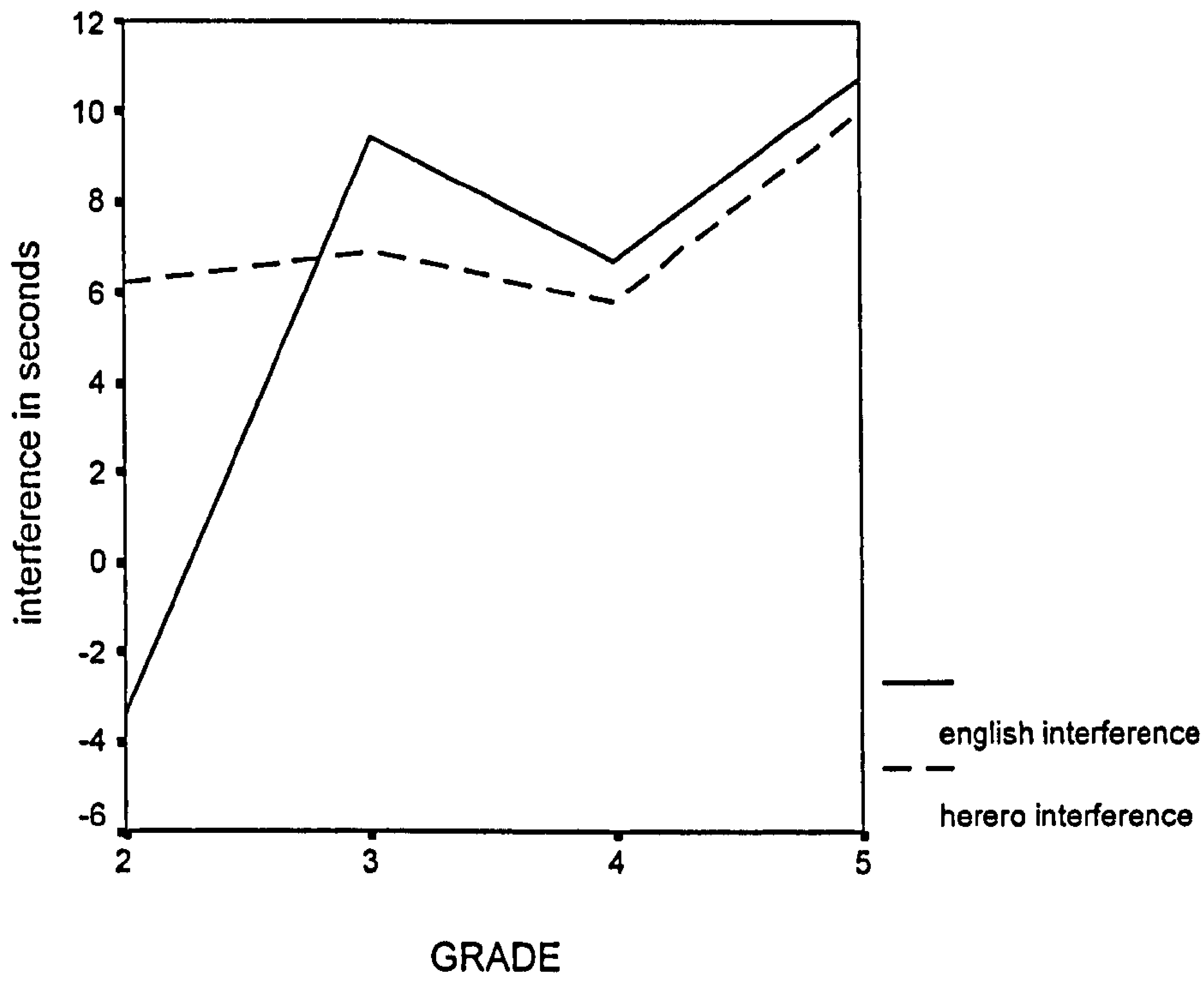
For Herero and English spelling, ANOVA revealed a significant interaction between language and grade ($F = 3.59$, $df = 3$ and 95, $p = 0.017$). Graph 5.3 presents this interaction and shows that Herero single word spelling skills also improved at a faster rate than English single word spelling skills across the grades, again supporting the script depended hypothesis. Furthermore, the analysis of spelling scores showed a significant grade effect ($F = 6.12$, $df = 3$ and 95, $p = .001$) and language effect ($F = 59.79$, $df = 1$ and 3, $p = .001$).

Graph 5. 3. Average scores on single Word Spelling in Herero and English across the grades



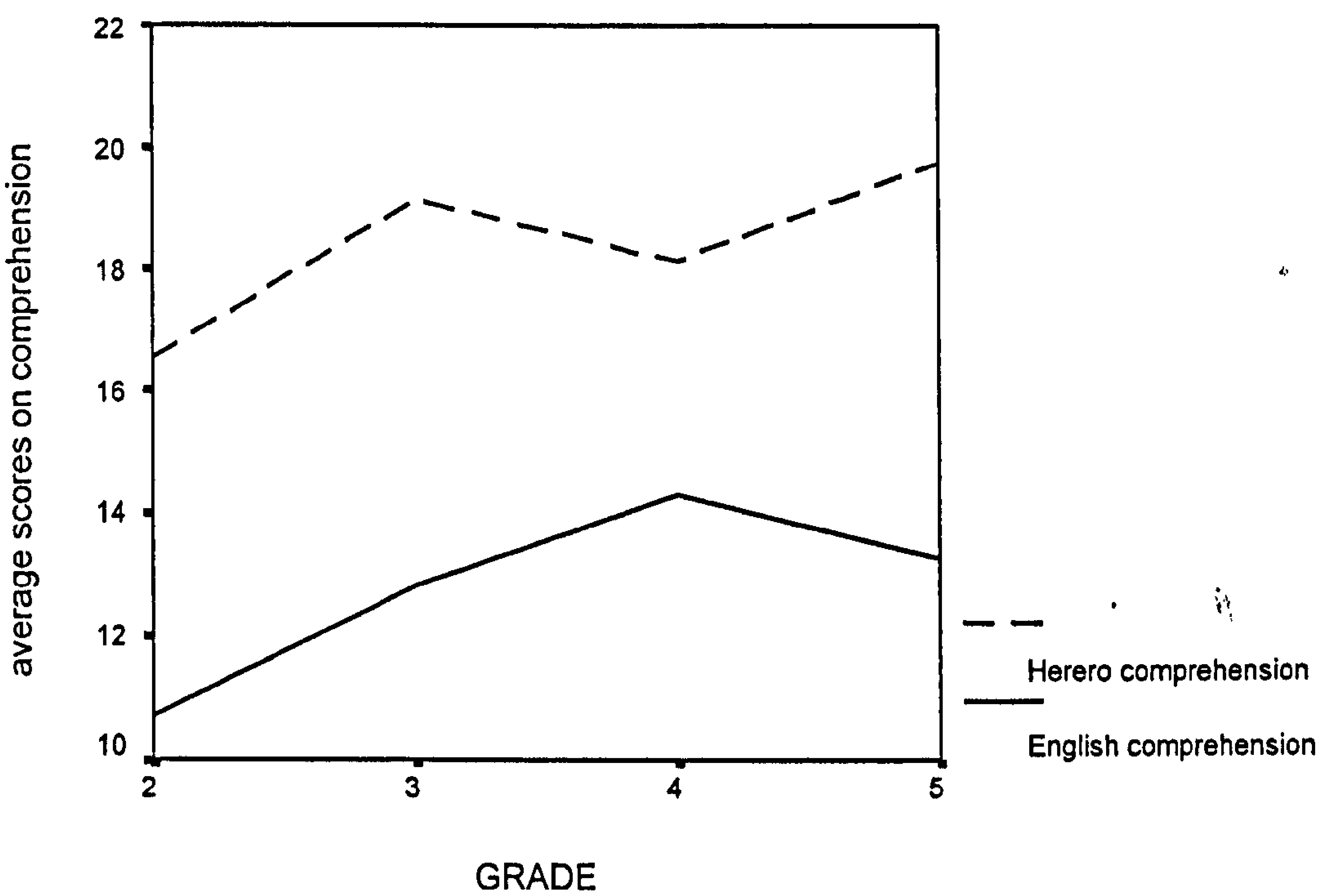
In contrast to the above results, there was no significant interaction between language (Herero and/or English) and Grade (1 to 5) on the measure of word interference (F = .910, d = 3 and 107, p = .439). This may be attributed to the number of children, especially in the lower grades (grades 2 and 3) who were not capable of (single word) reading. Thus, reading did not interfere with the naming of the colours. However, graph 4 depicts a somewhat different picture. This suggests little evidence of interference amongst grade 2 children in the English task, but more-or-less equivalent levels of interference across the other conditions. If interference is indicative of automatic processing, then from grade 3 onwards, roughly equivalent levels of automaticity can be found in both languages. Consistent with this interpretation, both the language and grade effects were not significant (F = .24 df = 1 and 107 p = .62 and F = 1.16 df = 3 and 107 p = .33 respectively).

Graph 5.4. Average scores on the Word interference task in Herero and English across grades.



For listening comprehension, ANOVA indicated that there was a significant language effect (F = 135.24, df = 1 and 3, p = .0001), reflecting the fact that performance in L1 listening comprehension was much better than in L2. Similarly, the effect of grade was significant (F = 3.39, df = 1 and 3, p = .021) suggesting that children in the lower grades were poorer at listening comprehension, especially L2 listening comprehension, than their peers. However, there was no significant interaction between language and grade (F = 1.97, df = 1 and 3, p = .123). These results are presented in Graph 5.4.

Graph 5.5. Average scores on Listening Comprehension in Herero and English across grades.



Similar analyses of variance were performed on the remaining language-related measures used in the study. The results of these analyses can be found in Table 5.7. The only significant interaction was that in the analysis of the times on the Rapid Naming of Line Drawings task. Inspection of the mean scores for the grades in Tables 5.4 and 5.5 indicates that this interaction is due to a larger improvement in the speed of processing for the English language task compared to the Herero language task. This is most likely indicative of improved processing of English terms over the grades tested, although Herero naming times were still faster than English naming times even by grade 5.

Table 5. 7. *Results of analyses of variance for the different measures in the study and the effects of grade, language and their interaction as appropriate (bolding is used to indicate significant effects at the 0.05 level).*

Measure	values	Grade Effect	Language Effect	Interaction
Nonword	Df	3 and 108	1 and 108	3 and 108
Repetition	F	1.99	.275	.609
	p	.119	.601	.610
Beginning	df	**3 and 108**	**1 and 108**	3 and 108
Phoneme	F	**5.349**	**9.985**	376
	p	**.002**	**.002**	.770
Ending Phoneme	df	**3 and 108**	1 and 108	3 and 108
	F	**3.218**	1.013	1391
	p	**.026**	316	.249
Forward Digit	df	**3 and 108**	**1 and 108**	3 and 108
Span	F	**3.613**	**97.186**	1.495
	p	**.016**	**<.001**	.220
Reverse Digit	df	**3 and 108**	**1 and 108**	3 and 108
Span	F	**4.613**	**13.067**	.205
	p	**.004**	**<.001**	.893
Rapid Naming-	df	**3 and 108**	**1 and 108**	**3 and 108**
Line Drawings	F	**9.109**	**39.473**	**5.552**
	p	**<.001**	**<.001**	**<.001**
Rapid Naming-	df	**3 and 108**	**1 and 108**	3 and 108
Colour	F	**7.511**	**14.282**	363
	p	**<.001**	**<.001**	.780
Semantic Fluency-	df	3 and 108	1 and 108	3 and 108
Colour	F	.280	.043	1.710
	p	.839	.837	.169
Semantic Fluency-	df	**3 and 108**	**1 and 108**	3 and 108
Body Parts	F	**2.699**	**218.428**	.476
	p	**.049**	**<.001**	.700
Sound	df	**3 and 108**	**1 and 108**	3 and 108
Discrimination	F	**2.393**	**53.017**	.298
	p	**.072**	**<.001**	.827
Forward Spatial	df	**3 and 109**		
Span	F	**3.55**		
	Sig	**.017**		
Reverse Spatial	df	**3 and 109**		
Span	F	**5.41**		
	Sig	**.002**		
Raven's Matrices	df	3 and 99		
	F	1.17		
	Sig	0.33		
Object Semantic	df	3 and 98		
Categorisation	F	1.39		
	Sig	0.25		

One-way ANOVAS assessing the effect of grade (2 to 5) were also performed on the non-language based measures (the Spatial Span task, Raven's matrices and the Object Semantic Categorization task). These again can be found in Table 5.7.

Correlations between variables were then analyzed to investigate relationships between the literacy measures of Word Reading, Nonword Reading, Word Spelling, and Word Interference and the potential predictor variables. These can be found in Tables 5.8 to 5.13, which present the correlations between the literacy measures and the respective within-language cognitive-linguistic predictor variables as well as the cross-linguistic correlations between literacy measures and the cognitive-linguistic variables across all grades.

Table 5.8. *Pearson correlations between Herero literacy measures (word reading, word spelling, non-word reading and word interference) and the Herero cognitive-linguistic predictor variables across grades.*

Predictor Variables	Word Reading	Word Spelling	Nonword Reading	Word Interference
Non-Word Repetition	.313**	.266**	.435**	.290**
Beginning Phonemes	.548**	.537**	.531**	.081
Ending Phonemes	.449**	.488**	.488**	.211**
Forward Digit Span	.408**	.287**	.304**	.110
Reverse Digit Span	.433**	.439**	.376**	.103
Rapid Naming-Line Drawings	-.363**	-.316**	-.339**	-.111
Rapid Naming-Colours	-.418**	-.355**	-.403**	-.375**
Semantic Fluency-Colours	.037	.068	.281**	.094
Semantic Fluency-Body Parts	.194	.212*	.464**	.060
Sound Discrimination	.228*	.210*	.310**	-.018
Listening Comprehension	.392**	.407**	.193	.093

NB. ** correlations significant at the 0.01 level
* correlations significant at the 0.05 level

Table 5.9. *Pearson correlations between English literacy measures (word reading, word spelling non-word reading and word interference) and English cognitive-linguistic predictor variables across grades.*

Predictor Variables	Word Reading	Word Spelling	Non-Word Reading	Word Interference
Non-Word Repetition	.462**	.357**	.435**	.323**
Beginning Phonemes	.632**	.531**	.585**	.436**
Ending Phonemes	.552**	.488**	.506**	.384**
Forward Digit Span	.504**	.304**	.499**	.397**
Reverse Digit Span	.481**	376**	.426**	.379**
Rapid Naming-Line Drawings	-.376**	-.339**	-.365**	-.357**
Rapid Naming-Colours	-.427**	-.403**	-.418**	-.363**
Semantic Fluency-Colours	.303**	.281**	.274**	.243**
Semantic Fluency-Body Parts	.430**	.464**	.444**	.340**
Sound Discrimination	.332**	.310**	.336**	.226**
Listening Comprehension	.253*	.193	.216**	.112

NB. ** correlations significant at the 0.01 level
* correlations significant at the 0.05 level

Table 5.10. *Pearson correlations between English literacy measures (word reading, word spelling, non-word reading and word interference) and the Herero cognitive-linguistic predictor variables across grades.*

Predictor Variables	English Word Reading	English Non-Word Reading	English Spelling	English Word Interference
Herero-Non-Word Repetition	.279**	.283**	.246**	.167
Herero Beginning Phoneme	.505**	.443**	.443**	.328**
Herero Ending Phoneme	.488**	.432**	.425**	.307**
Herero Forward Digit Span	.411**	.406**	.275**	.289**
Herero Reverse Digit Span	.429**	.406**	.417**	.256**
Herero Rapid Naming-Line Drawings	-.331**	-.301**	-.340**	-.198*
Herero Rapid Naming-Colours	-.346**	-.310**	-.338**	-.208**
Herero Semantic Fluency-Colours	.067	.083	.048	.031
Herero Semantic Fluency-Body Parts	.120	.115	.137	.132
Herero Sound Discrimination	.148	.209**	.155	.102
Herero Listening Comprehension	.378**	.385**	.376**	.256**

NB. ** correlations significant at the 0.01 level
*correlations correct at the 0.05 level

Table 5.11. *Pearson correlations between Herero literacy measures (word reading, word spelling, non-word reading and word interference) and the English cognitive-linguistic predictor variables across grades.*

Predictor Variables	Herero Word Reading	Herero Non-Word Reading	Herero Spelling	Herero Word Interference
English Non-Word Repetition	.471**	.477**	.450**	.158
English Beginning Phoneme	.603**	.551**	.583**	.121
English Ending Phonemes	.634**	.610**	.672**	.229**
English Forward Digit Span	.462**	.425**	.373**	.197*
English Reverse Digit Span	.439**	.384**	.348**	.227**
English Rapid Naming-Line Drawings	-.347**	-.309**	-.290**	.119
English Rapid Naming-Colours	-.391**	-.323**	-.379**	.038
English Semantic Fluency-Colours	.145	.091	.102	.042
English Semantic Fluency-Body Parts	.374**	.304**	.401**	.066
English Sound Discrimination	.306**	.308**	.316**	.094
English Listening Comprehension	.162	.119	.105	.021

NB. ** correlations significant at the 0.01 level
* correlations correct at the 0.05 level

Table 5.12. *Paired correlations between age, Herero and English literacy measures (word reading, word spelling, and non-word reading) across grades.*

	Age	Herero Word Reading	Herero Word Spelling	Herero Nonword Reading	Herero Word Interference	English Word Reading	English Word Spelling	English Nonword Reading	English Word Interference
Herero Word Reading	.204**	1	.920**	.934**	.328**	.795**	.698**	.793**	.527**
Herero Word Spelling	.084	.920**	1	.880**	.298**	.755**	.732**	.775**	.519**
Herero Nonword Reading	.155	.934**	.880**	1	.308**	.717**	.613**	.699**	.494**
Herero Word Interference	.048	.328**	.298**	.308**	1	.355**	.284**	.271**	.174
English Word Reading	.292**	.795**	.755**	.717**	.355**	1	.808**	.850**	.558**
English Word Spelling	.163	.698**	.732**	.613**	.284**	.808**	1	.689**	.478**
English Nonword Reading	.211**	.793**	.775**	.699**	.271**	.850**	.689**	1	.522**
English Word Interference	-.019	.527**	.519**	.494**	.174	.558**	.478**	.522**	1

NB ** Correlations significant at the .01 level
* Correlations significant at the .05 level

Table 5.13. *Pearson correlations between Herero and English literacy measures and non-language based predictor variables across grades.*

Predictor Variables	Herero Word Reading	Herero Word Spelling	Herero Non-Word Reading	Herero Word Interference	English Word Reading	English Word Spelling	English Non-word Reading	English Word Interference
Forward Spatial Span	.174	.143	.215*	-.018	.169	.198*	.101	.073
Reverse Spatial Span	.334**	.272**	.346**	.012	.260**	.254*	.162	.060
Raven's Matrices	.134	.089	.151	-.024	.259*	.210*	.100	.192
Object Semantic Categorization	.300**	.213*	.253*	.211*	.236*	.229*	.233*	.061

NB ** Correlations significant at the 0.01 level
* Correlations significant at the 0.05 level

- Prediction of L1 and L2 Basic Literacy Skills

Word Reading

The next stage in the analysis used multiple regression procedures to investigate the extent to which the cognitive and linguistic measures explained variability in Herero and English word reading. For each analysis, demographic control variables (sex, age, grade, and the child's school) were first entered as a block into the analysis. These were followed by Raven's matrices to control for non-verbal ability amongst the children and then listening comprehension in the language for which literacy was being predicted to control for the effects of language competence. Potential predictor variables were then added in a stepwise procedure – these variables were Nonword Repetition, Beginning Phonemes, Ending Phonemes, Forward Digit Span, Reverse Digit Span, Rapid Naming of Line Drawings, Rapid Naming of Colours, Semantic Fluency of Colours, Semantic Fluency of Body Parts, Sound Discrimination (auditory perceptual measures), Forward Spatial Span and Reverse Spatial.

The first set of analyses focused on within language predictors of Herero Word Reading (see Table 5.14). The demographic control variables explained 29% of the variance, with Herero Listening Comprehension adding a further 8% to the prediction. Herero Beginning and Ending Phoneme measures accounted for an additional 16% of the variance, with Herero Rapid Naming of Line Drawings and Herero Non-Word Repetition collectively adding a further 3% to the prediction of Herero Word Reading.

Table 5.14. *Regression analyses for Herero Word Reading*

Variable entered	*Predictor order for stepwise procedure*	R^2	Adj. R^2	R^2 Change	Sig. F Change
Block 1. sex, age, grade, and school – enter		.32	.29	-	-
Block 2. Raven's matrices – enter		.32	.28	0	.98
Block 3. Herero Listening Comprehension - enter		.41	.37	.09	<.00
Block 4. Predictor variables - stepwise	Herero Begin Phoneme	.51	.48	.11	<.00
	Herero Ending Phoneme	.56	.53	.05	.001
	Herero Rapid Naming-Drawings	.58	.54	.02	.04
	Herero Non-Word Repetition	.60	.56	.02	.04

The corresponding analysis, focusing on within language predictors of English Word Reading (see Table 5.15), indicated that the demographic variables accounted for 22% of the variance, with Raven's Matrices and English Listening Comprehension increasing this to 25%. English Beginning Phoneme added another 20% to the level of prediction, with English Non-word Repetition providing an additional 6%. English Semantic Fluency and English Ending Phoneme measures increased the level of prediction by 3% and 2% respectively. The forward version of the Spatial Span task and the English Sound Discrimination task explained a further 1% to 2% of the variance. These analyses indicated that basic phonological skills were reliable predictors of reading ability in both languages.

Table 5.15. *Regression analyses for English Word Reading*

Variable entered	*Predictor order for stepwise procedure*	R^2	Adj. R^2	R^2 Change	Sig. F Change
Block 1. sex, age, grade, and school – enter		.25	.22	-	.-
Block 2. Raven's matrices - enter		.29	.25	.04	.03
Block 3. English Listening Comprehension - enter		.31	.27	.02	.08
Block 4. Predictor variables - stepwise	English Begin Phoneme	.51	.47	.20	<.00
	English Non-Word Repetition	.57	.53	.06	.001
	English Semantic Fluency	.60	.56	.03	.008
	English Ending Phoneme	.62	.58	.02	.03
	Forward Spatial Span	.64	.59	.02	.05
	English Sound Discrimination	.66	.61	.02	.05

The next analysis considered whether literacy in the second language could be predicted by including first language cognitive-linguistic variables in the stepwise procedure of the regression analysis. The steps in the analysis, as well as the levels of prediction up to English Semantic Fluency, remained unchanged. English Beginning Phoneme still remaining the main predictor of English Word Reading at 20% following the initial stages of the regression. However, adding Herero Word Reading as a potential predictor of English Word Reading did change the results of the analysis. In this case, first language literacy predicted an additional 41% of the variance in second language literacy over that of the 25% predicted by the demographic variables, Raven's Matrices and English Listening Comprehension. English Semantic Fluency and Herero Ending Phoneme added a further 3% and 2% respectively to the level of prediction. Including Herero Listening Comprehension in this analysis did not alter the results of the analysis.

To ensure that the findings were not simply due to the low levels of English literacy ability found in the initial two grades assessed (see Table 5.3), analyses were re-run and excluded Grades 2 and 3 from the assessment of within language predictors of English literacy. English

Beginning Phoneme still remained the main predictor of English Word Reading predicting 33% of the variance, an increase of 13% compared to the analysis where grades 2 and 3 were included. Similarly, English Non-Word Repetition's level of prediction increased to 8% from 6%. Thus, English Beginning Phonemes and English Non-Word Repetition still remained the major predictors of L2 literacy. These results suggest that basic phonological processing skills still remain reliable predictors of literacy even when the children with low levels of English literacy are not taken into account.

The findings suggest that, after controlling for the demographic variables and Raven's Matrices, second language listening comprehension predicted very little additional variance in second language literacy, in contrast to measures of the ability to recognize basic sounds in that language (English Beginning and Ending Phoneme tasks) and repeat novel sequences of such sounds (English Non-word Repetition). These same skills were also related to first language literacy. Table 5.16 presents the correlations between first and second language literacy and listening tasks, as well as measures of phonological awareness and non-word repetition for Grades 2-5. For Listening Comprehension, the first language measure was more predictive of literacy in either language than second language Listening Comprehension. In contrast, for measures of phonological awareness and non-word repetition, the second language measures were more related to literacy skills in either language than the first language measures.

Table 5.16. *Pearson correlations of the cognitive-linguistic measures predictive of Herero and English Word Reading across grades.*

	HWR	EWR	HListCom	EListCom	HBegPhon	EBegPhon.	HEPhon	EEPhon	HNWRep	ENWRep
HWR	1	.80**	.39 **	.16	.55 **	.60 **	.45 **	.63 **	.31 **	.47 **
EWR	.80 **	1	.38 **	.25 *	.51 **	.55 **	.49 **	.63 **	.28 **	.46 **
HListCom	.39 **	.38 **	1	.32 **	.41 **	.39 **	.38 **	.41 **	.16	.31 **
EListCom	.16	.25 **	.32 **	1	.14	.15	.43 **	.56 **	-.12	.06
HBegPhon.	.55 **	.51 **	.41 **	.14	1	.58 **	.40 **	.53 **	.08	.39 **
EBegPhon.	.60 **	.63 **	.39 **	.15	.58 **	1	.43 **	.56 **	.11	.36 **
HEPhon.	.45 **	.49 **	.38 **	.18	.40 **	.43 **	1	.58 **	.22 **	.38 **
EEPhon.	.63 **	.55 **	.41 **	.19	.53 **	.56 **	.58 **	1	.14	.49 **
HNWRep	.31 **	.28 **	.16	-.12	.08	.11	.22 *	.14	1	.21 *
ENWRep	.47 **	.46 **	.31 **	.06	.39 **	.36 **	.38 **	.49 **	.21 **	1

Note: HWR = Herero Word Reading
HlistCom = Herero Listening Comprehension
HBegPhon = Herero Beginning Phoneme
HEPhon = Herero Ending Phoneme
HNWRep = Herero Non-word Repetition
EWR = English Word Reading
ElistCom = English Listen Comprehension
EBegPhon = English Beginning Phoneme
EEPhon = English Ending Phoneme
ENWRep = English Non-word Repetition

* p < .05   *** p < .01

A final series of regression analyses confirmed these conclusions (see Table 5.17). Combining first and second language Listening Comprehension measures did not increase the level of prediction of either first or second language reading skills over that provided by first language Listening Comprehension alone; i.e., an increase of about 8% in variability explained over that of the demographic variables and Raven's Matrices which were forced as first and second steps in the analyses. However, second language measures of phonological awareness predicted more variability in both first and second language literacy than first language phonological awareness measures (28% compared to 16% for Herero Word Reading and 25%-26% compared to 21% for English Word Reading, in addition to demographic variables, Raven's Matrices and Listening Comprehension) and equal levels of variability to those explained by both language tasks combined. A similar pattern was found for the Nonword Repetition measures, with second language skills predicting more variance in first and second language literacy (increases of 8% and 14% over demographic variables, Raven's Matrices and Listening Comprehension) than first language Nonword Repetition (approx. 2% increase), and roughly equivalent levels to that explained by both language measures in combination. Rapid Naming seems to have yielded mixed results and to have explained only small amounts of variability in Herero and English reading skills. Overall, these findings indicate that first and second language reading skills seem to be best predicted by first language verbal comprehension and second language phonological awareness.

Table 5.17. *Cross-linguistic comparisons of the predictive levels of common or unique variability for Single Word Reading explained by phonologically-based and language measures.*

Predictors	Herero Word Reading (Adjusted R^2 Change-R^2 Change)			English Word Reading (Adjusted R^2 Change- R^2 Change)		
	Separate		Combined	Separate		Combined
	Intra	*Inter*		*Intra*	*Inter*	
Listening Comprehension	8-9 %	0-1 %	7-8%	2-3 %	8-9%	7-8%
Beginning and Ending Phoneme	15-16%	27-28%	27-28%	25-26 %	21%	25-27%
Nonword Repetition	2-3 %	8%	9%	14-15 %	2%	15%
Rapid Naming	3%	3%-4%	4%-6%	7%-8%	4%-5%	6%-9%

NB. All measures significant to the p < .001 level.

Single Word Spelling

The same regression analysis procedures as those used in the single word reading analysis were also used to investigate the extent to which the cognitive and linguistic measures explained variability in Herero and English single word spelling.

For Herero Single Word Spelling (see Table 5.18), the demographic control variables explained 32% of the variance, with Herero Listening Comprehension adding a further 9% to the prediction. Herero Beginning and Ending Phoneme measures accounted for an additional 13% and Herero Rapid Naming for another 2% of the variance in Herero Single Word Spelling.

Table 5.18. *Regression analyses for Herero Word Spelling*

Variable entered	*Predictor order for stepwise procedure*	R^2	Adj. R^2	R^2 Change	Sig. F Change
Block 1. sex, age, grade, and school – enter		.35	.32	-	-
Block 2. Raven's matrices - enter		.35	.31	.00	.98
Block 3. Herero Listening Comprehension - enter		.44	.40	.09	<.00
Block 4. Predictor variables - stepwise	Herero Begin Phoneme	.53	.49	.09	.<00
	Herero Ending Phoneme	.57	.53	.04	.003
	Herero Rapid Naming-Drawings	.59	.55	.02	.033

The corresponding analysis of English Single Word Spelling (see Table 5.19) indicated that the demographic variables accounted for 20% of the variance, with Raven's Matrices increasing this to 23 %. While English Listening Comprehension added nothing to the variance, English Beginning Phoneme added another 15% to the level of prediction, with English Semantic Fluency providing an additional 5%. As in the word reading analysis, these findings suggest that basic phonological skills were reliable predictors of spelling ability in both languages.

Table 5. 19. *Regression analyses for English Word Spelling*

Variable entered	*Predictor order for stepwise procedure*	R^2	Adj. R^2	R^2 Change	Sig. F Change
Block 1. sex, age, grade, and school – enter		.23	.20	-	-
Block 2. Raven's matrices - enter		.26	.23	.04	.04
Block 3. Herero Listening Comprehension - enter		.28	.23	.02	.15
Block 4. Predictor variables - stepwise	English Begin Phoneme	.43	.38	.15	<.00
	English Semantic Fluency	.48	.43	.05	.004

The next analysis considered whether spelling in the second language could be predicted by including first language cognitive-linguistic variables in the regression equation. Few changes occurred in the prediction this time, although Herero Rapid Naming explained 6% of the variance in English Single Word Spelling after that explained by demographic control variables. Adding Herero Single Word Spelling as a potential predictor of English Single Word Spelling indicated that first language spelling predicted an additional 33% of the variance in second language spelling over that of the 23% predicted by the demographic variables, Raven's Matrices, and English Listening Comprehension. English Non-word Semantic Fluency added a further 3% to the level of prediction. Including Herero Listening Comprehension in this analysis did not alter the level of prediction nor the steps in the analysis.

The next set of analyses excluded grades 2 and 3, to ensure that the findings were not simply due to the low levels of English spelling ability found in the initial two grades assessed (see Table 2). The demographic variables' prediction decreased to 18 % from 19% in the previous analysis, while Raven's added 7%, 4% more than in the previous analysis. Second language Listening Comprehension remained at 1% and English Semantic Fluency added 5% more to the prediction, up from 3 % in the previous analysis. When included in the analysis, Herero Word Spelling added 34%, an increase of only 1% from the previous analysis. Thus, the picture remained pretty much unchanged even when the lower grades were excluded from the analysis.

As in Word Reading, cross-linguistic regression analyses also revealed the same pattern of results as those found for Single Word Spelling (see Table 5.20). Combining L1 and L2 Listening Comprehension measures did not increase the level of prediction of either first or second language spelling skills over that provided by L1 Listening Comprehension alone. These measures predicted 8% of the variance for L1 spelling skills compared to 7% of the variance for L2 spelling explained by L2 Listening Comprehension measures. However, L2 phonological awareness (Beginning and Ending Phonemes) predicted more variability in both L1 and L2 spelling than L1 phonological awareness measures, explaining 25% of the variance for L1 spelling skills compared to 14% by L1 phonological measures and 18% of the variance for L2 spelling compared to 14% by L1 measures. A similar pattern emerged for the Nonword Repetition measures, with L2 skills predicting more variance in L1 (8%) and L2 spelling skills (9%) than L1 Nonword Repetition which, explained a mere 1% of the variability for L1 spelling and 3% for L2 spelling skills. As with Word Reading, Rapid Naming measures yielded mixed results, explaining only small amounts of variability in Herero and English spelling. The conclusion to be drawn from these findings is that L1 and L2 spelling skills were also best predicted by L1 language verbal comprehension and L2 phonological awareness and the ability to repeat novel sequences of phonological sounds in the L2. Thus, these regression analyses show a consistent pattern of results between the literacy measures across the two languages.

Table 5. 20. *Cross-linguistic comparisons of the predictive levels of common or unique variability for Single Word Spelling explained by phonologically-based and language measures.*

Predictors	Herero Word Spelling (R^2 Change-Adjusted R^2 Change)			English Word Spelling (R^2 Change-Adjusted R^2 Change)		
	Separate		Combined	Separate		Combined
	Intra	*Inter*		*Intra*	*Inter*	
Listening Comprehension	8%	1%-2%	7%-8%	1%-2%	7%-8%	7%-8%
Beginning and Ending Phoneme	13-14%	24-25%	24%-25%	18-19%	14%-15%	18-19%
Nonword Repetition	1%	7%-8%	8%	9%	3%	9%-10%
Rapid Naming	3%-4%	6%-7%	6%-8%	8%-9%	9%	10%-12%

NB. All measures significant to the $p < .001$ level.

As with word reading, the development of spelling also showed faster progression in the transparent orthography than in the less transparent orthography. Once again, phonological awareness was the better predictor of spelling development than all the other variables in both the L1 and the L2. This finding shows that children who are good at phonological processing skills in each of the two languages are good at spelling single words in the respective languages. It is important to note that L1 spelling also contributed greatly to spelling in L2 not only in the lower grades but in the upper grades as well. Taking both reading and spelling into account, such findings suggest that literacy skills in one language are related to literacy skills in another.

5.3.6. Discussion

The findings of the present study were consistent with the script dependent viewpoint in that faster rates of improvement in literacy were apparent in the more transparent language (Herero) than the less transparent language (English), although an alternative explanation may be the children's familiarity with Herero as it is their L1. Additionally, predictors of Herero and English word reading that are consistent with the importance of underlying phonological and/or lexical access processes are also evident. However, the results also indicate inter-dependence between languages, with literacy, particularly reading in the first language, being partly predicted by second language underlying linguistic/cognitive skills and L2 literacy partly predicted by L1 linguistic skills; a finding that is more consistent with the predictions of the central processing hypothesis. The findings of this study, therefore, reaffirm Gholamain & Geva (1999) and Geva & Siegel's (2000) conclusion that rather than being contradictory, the script dependent and central processing hypotheses are complementary.

These findings are similar to those presented by Geva and colleagues (e.g., Gholamain & Geva, 1999), who suggest that script characteristics influence the developmental trajectories associated with reading skills. However, the present findings are less consistent with Geva and colleagues' view that a transparent orthography should be more dependent on basic phonological processes. The regression analyses reported in this chapter suggest equivalent levels of variability in literacy can be predicted by basic phonological processes no matter which language (the more transparent Herero versus the less transparent English) is considered. They are also similar to Gholamain & Geva's (1999) findings in that L2 linguistic-cognitive skills were predictive of L1 literacy skills. The difference is that in the current study, L1 literacy skills were predicted by linguistic-cognitive skills of an orthographically less transparent L2.

Specifically, the current study shows the effects of L1 and L2 phonological processing skills on literacy acquisition in both languages. Children who are good at phonological processing skills in each of the two languages are good single word readers whichever language is considered. This is consistent with the phonological processing models view. Although phonological processing skills in each of the languages predict literacy skills in each of the two languages, L2 phonological processing skills add significantly to the prediction of L1 literacy skills. That L2 phonological processing skills add to the prediction of literacy skills in L1 is indeed an interesting finding, especially when considering the fact that L2 is a less transparent orthography. This finding seems to reflect the view that bilingualism affords the individual certain cognitive benefits the monolingual individual may lack. As the relevant literature points out, the acquisition of literacy in an alphabetic language is contingent upon establishing sound phonological awareness necessary for attending to the sounds of language. Bilingual children, by virtue of their exposure to more than one language, may have the advantage of utilizing sound systems of two languages to further enhance and consolidate the development of their phonological awareness in both languages. Consequently, the influence of the phonological skills of the one language may extend to the other language and impact upon some aspect of that language. In fact, Comeau, Cormier, Grandmaison, and Lacroix (1999) have shown that exposing children to more than one language can potentially equip them with two sets of phonological processing skills. Possession of such cross-linguistic skills facilitates reading development within and across languages. For example, L1 phonological awareness skills can influence reading development in L1 and in L2. Similarly, L2 phonological awareness skills can impact upon L2 and L1 reading development. Therefore, this study provides further evidence for not only cross-linguistic transfer of phonological awareness skills from L1 to L2 reading development as shown by Durgunoglu, Nancy and Hancin-Bhatt (1993) and Cisero and Royer (1995), but also from L2 to L1 reading development.

What is unique about this study is the fact that the L2-L1 cross-transfer is between two linguistically unrelated languages and scripts. That is, while English and French or Spanish and English may belong to the same group/family of languages, English and Herero are far more removed from each other. Yet, the cross-linguistic transfer of phonological awareness across these languages transcends the linguistic differences that exist between them. Hence, the ability to apply strategic knowledge of processing one language across languages can occur irrespective of the language in which the child develops these strategies and knowledge (Denton, Hasbrouck, Weaver, & Riccio, 2000).

The findings of this study confirm the condition under which L1 literacy can transfer to L2 literacy. In this study, for example, Herero word reading added another 46% to English word reading, and Herero single word spelling added 33% to English single word spelling, over and above demographics, non-verbal and general language comprehension measures. The literacy instruction carried out first in these children's L1, their stronger language, may have made such a transfer possible. In turn, the transitional bilingual type of educational programmes in which these children are embedded may have consolidated their L1 literacy and linguistic skills. Transitional bilingual educational programmes are programmes where literacy instruction begins in the child' mother tongue. L2 is gradually introduced or delayed before it is introduced, and focuses mainly on oral proficiency. When the child is believed to have achieved the required degree of proficiency in L2, instruction is switched to the L2 and L1 instruction is discontinued at this point. Some programmes, however, do continue with L1 teaching while instruction occurs in L2 (Durgunoglu, 1997). Such programmes are meant to support and emphasize L1 language and literacy development before L2 language and literacy are introduced. By so doing, children's chances of becoming both bilingual and biliterate are greatly enhanced (Tabors & Snow, 2001). This is the case in Namibia where it is official government policy that instruction for the first three years of formal schooling be delivered in the child's L1. The results emanating from this study seem to be in line with the rationale and objectives of the transitional programmes in that these children's L1 language and literacy skills, emphasized at the onset of their schooling career, play an important role in predicting (at least in part) literacy skills in their L2.

It is important though, to bear in mind that the mere possession of well developed phonological processing and linguistic skills in either language may not be the ultimate condition for the acquisition of literacy, especially in English. Given the irregularity of the English orthography, the variations in phonological forms between Herero and English, and the potential confusion caused by mapping different sounds on to similar symbols, the Herero-speaking child in the process of acquiring English literacy may encounter heavier demands on cognitive-linguistic processes in English literacy. As a result, English literacy acquisition may be hampered, and subsequently delayed. The situation may be even worse for a child who is in the process of acquiring English literacy and, at the same time, may have inherent phonological processing deficits.

At the present moment, literacy instruction in Namibian employs the whole word method. The rationale for this method rests on the premise that the child at this stage is ignorant of the fact that letters represent sound units. As a consequence, words are taught as wholes rather than broken down in units of sound (Rayner & Pollatsek, 1989). Another rationale is that English is characterized by many irregular words, which can be better learned in part or as wholes in terms of their visual appearance (Rayner & Pollatsek, 1989). While the first rationale for the whole word method of reading instruction may be justifiable in Namibia, the second may not be, particularly with regard to Herero reading instruction. The regularity of the Herero orthography can render such a method less effective in teaching Herero literacy. A better method might be one that incorporates phonics instructions, thereby emphasizing the grapheme and the phoneme and taking advantage of the regularity of the Herero orthography. It is interesting to note that despite receiving literacy instruction using the whole word method phonological processing skills were still among the best predictors of literacy ability in both languages. The combination of well-developed phonological skills with the phonics instructional method may reap more benefits for these children in learning to read than the current approach. Thus, the findings of this study may have serious implications for teaching literacy in Namibian schools in both L1 and L2. Since Namibian children receive instruction in L2, it is of vital importance to determine and understand what cognitive processes are involved in their development of reading skills in the languages they are exposed to.

Chapter Six

STUDY 2-LONGITUDINAL STUDY

6.1. Research questions and hypotheses

The longitudinal study continued to test the assumptions of the central processing hypothesis and the script dependent/orthographic depth hypothesis. In addition, however, this study wanted to find out what the gains of literacy in L1 and L2 in Namibian bilingual school children would be like one year after the initial testing. Of particular interest was the question whether the same cognitive-linguistic factors that predicted L1 and L2 literacy development at time 1 would predict L1 and L2 literacy at time 2?

6.2. Research Participants

The sample for the longitudinal study consisted of 53 of the original 117 children from the cross-sectional study (study 1). These 53 children were those that were available for re-testing out of those tested in Grades 3 and 4 from all four schools the previous year and were now in Grades 4 and 5. For a detailed description of the sample, please refer to the previous study.

6.3. Tests/Measures Used

Fewer tests were used in study 2 than in study 1. As in study 1, children's reading and spelling were assessed by using single word reading and single word spelling measures. These measures were selected as they are the dependent variables that were to be predicted. To assess decoding, and therefore the gains this cohort may have made in their decoding skills, non-word reading was administered for both Herero and English. Listening comprehension and Coloured Progressive Matrices were also assessed at time

2 to determine the level of change in language skills and non-verbal reasoning abilities. Verbal and non-verbal short-term memory, as well as rapid naming were also assessed to assess specific questions about these measures not subsequently analysed in this thesis (although scores will be in single case profiles), but reported here to show range of measures used. The reader is referred to study 1 for a detailed description of the measures used in study 2.

6.4. General Procedures:

Before the data collection process began, the researcher contacted the principals of the schools from which the sample was selected to obtain permission to conduct a follow-up study to the first one. The same administrative procedures used in study 1 were also applied in study 2. Section 5. 3. 5 in Chapter 5 outlines in more detail the procedures used. While study 1 was conducted between February and June 2001, study 2 was carried out between January and March 2002, roughly one year later.

6.5. Results

6.5.1. Description of Herero and English Literacy Skills at Time 2

- The Relationship Amongst Corresponding L1 and L2 Time 2 Literacy Measures.

Tables 6.1 and 6.2 provide the descriptive statistics for the Herero and English literacy measures for Grades 4 and 5 at both times 1 and 2. The means reveal that these children improved in Word Reading, particularly in L1 reading, from time 1 to time 2. This suggests that the children were able to read more words in both Herero and English more accurately at time 2 than they did at time 1; however, they read more and better in L1 than in L2. Their decoding skills, as shown by the Non-word reading means, also improved significantly in both L1 and L2 over the one year period, although more so in L1 than in L2. The improvement in Non-word reading, or in decoding skills, may explain the improved performance in word reading. Single Word Spelling, too, improved significantly across the grades, and as in all the other literacy measures, spelling improvement was much greater in L1 than in L2.

Performance in Herero Listening Comprehension did not differ greatly between time 1 and time 2, although an improvement was nevertheless noticeable across the grades in both Herero and English. The means also show that short-term memory (digit span forward and reverse) performance improved in L1 and L2 at time 2. Furthermore, the means indicate that rapid naming (line drawings) also improved across grades from time 1 to time 2, with the performance being much better in L1 than in L2. This finding may suggest that children now seemed to take less time to retrieve the names of the objects in this task. Detailed descriptive statistics for the measures referred to above are given in table 6.5.

In both versions of the Spatial Span task, a non-language based memory measure, the fourth graders did worse at time 2 than at time 1 as third graders. However, the fifth graders' performance improved in both versions of the same task. Overall, both grades did better in both versions of the spatial span task than those of the digit span tasks (see table 6.5). This finding may suggest that despite the advancement in age and cognitive development, these children do not seem to have undergone developmental change in the skills required for processing information. As a consequence, they seem to remain largely dependent on visual skills rather than on verbal skills to process information.

6.5.2. Developmental Progression in L1 and L2 Literacy Acquisition

Tables 6.1 - 6.5 present the descriptive statistics for the L1 and the L2 cognitive-linguistic measures assessed at time 1 and time 2 for Grades 4-5. The developmental progression of L1 and L2 acquisition was evaluated with ANOVA (repeated measures) on word reading at time 2 to investigate the interaction effect between language (Herero and English) and grade (grades 4-5), the grade effect and the language effect. For word reading at time 2, the interaction between language and grade did not reach significant levels ($F = 1.13$, df = 1 and 51, $p = 0.292$). However, there was a significant language effect for word reading 2 ($F = 123.50$, df = 1 and 51, $p < .001$). Estimated marginal means of 49.87 for Herero and 23.21 for English confirmed language as the stronger determinant factor on word reading performance. Similarly, the grade effect was also significant ($F = 10.46$ df = 1 and 51, $p = 0.002$), with the fifth graders performing better (estimated marginal means of 44.44) than the fourth graders (estimated marginal means of 28.64).

Like word reading, the interaction between language and grade for non-word reading was not significant ($F = 0.197$, df = 1 and 51, $p = 0.659$). Although there was a significant language effect ($F = 60.87$, df = 1 and 51, $p < 0.001$), the grade effect was not significant ($F = 1.78$, df = 1 and 51, $p = 0.189$). This is reflected in the marginal means for non-word reading showing minor differences in performance between the third (5.02) and fourth graders (6.04). Unlike language, grade is not an important factor in influencing the children's ability to decode words correctly and accurately.

Similar results were obtained for single word spelling as for non-word reading. While language had an effect on the ability to spell words in L1 and L2 ($F = 99.53$, df = 1 and 51, $p < 0.001$), grade did not have much of an effect ($F = 2.09$, df = 1 and 51, $p < 0.155$). This may suggest that being in higher grades (Grades 4-5) does not necessarily make the children better spellers than those in lower grades (Grades 2-3). The estimated marginal means, however, seem to reveal a different picture of performance between the two grades. While grade 3 children have an estimated average of 14.57, the fourth graders have 18.15, indeed a significant difference between the two grades. The interaction effect between language and grade did not reach significant levels ($F = 0.396$, df = 1 and 51, $p = 0.532$), although at time 1 the interaction approached significance ($F = 3.59$, df = 3 and 95, $p = 0.017$).

Table 6.1. *Means, standard deviations, minimum and maximum scores, and number of cases by grade of the Herero literacy measures at time 1 and time 2.*

Time 1				Time 2			
Grade	**Word Reading**	**Word Spelling**	**Nonword Reading**	**Grade**	**Word Reading**	**Word Spelling**	**Nonword Reading**
Grade 3				**Grade 4**			
N	41	36	41	**N**	30	28	30
Means	26.46	12.19	3.88	**Means**	41.63	19.59	5.93
Std. Dev.	27.44	14.20	4.11	**Std. Dev.**	25.75	12.05	3.64
Min	0.00	0.00	0.00	**Min**	0.00	1.00	0.00
Max	68.00	38.00	10.00	**Max**	69.00	37.00	10.00
Grade 4				**Grade 5**			
N	33	29	33	**N**	24	24	24
Means	37.12	16.03	5.18	**Means**	59.04	26.67	7.75
Std. Dev.	28.46	13.93	4.07	**Std. Dev.**	19.86	12.56	2.95
Min	0.00	0.00	0.00	**Min**	0.00	0.00	0.00
Max	70.00	40.00	10.00	**Max**	70.00	39.00	10.00

Table 6.2. *Means, standard deviations, minimum and maximum scores, and number of cases by grade of the English literacy measures at time 1 and time 2.*

Time 1				Time 2			
Grade	**Word Reading**	**Word Spelling**	**Nonword Reading**	**Grade**	**Word Reading**	**Word Spelling**	**Nonword Reading**
Grade 3				**Grade 4**			
N	40	36	40	**N**	30	28	30
Means	10.00	4.03	2.03	**Means**	16.58	7.79	3.59
Std. Dev.	12.38	3.63	2.54	**Std. Dev.**	13.90	5.94	2.61
Min	0.00	0.00	0.00	**Min**	0.00	0.00	0.00
Max	49.00	11.00	8.00	**Max**	47.00	19.00	8.00
Grade 4				**Grade 5**			
N	32	29	32	**N**	24	24	24
Means	17.37	6.03	3.06	**Means**	29.83	11.75	5.00
Std. Dev.	16.94	6.71	2.64	**Std. Dev.**	17.11	7.77	2.23
Min	0.00	0.00	0.00	**Min**	0.00	0.00	0.00
Max	57.00	23.00	8.00	**Max**	61.00	25.00	8.00

Table 6.3. *Means, standard deviations, minimum and maximum scores, and number of cases by grade of the Herero predictor measures at time 1 and time 2.*

Time 1					Time 2				
Grade	Listening Comprehension	Forward Digit Span	Reverse Digit Span	Rapid Naming (line drawings)	Grade	Listening Comprehension	Forward Digit Span	Reverse Digit Span	Rapid Naming (line drawings)
Grade 3					Grade 4				
N	36	41	41	41	N	30	30	30	30
Means	19.14	4.98	4.24	51.02	Means	20.00	5.73	4.57	45.88
Std. dev.	3.43	1.31	1.79	11.82	Std. Dev.	3.64	0.91	1.07	9.75
Min	10.00	2.00	2.00	32.97	Min	10.00	4.00	3.00	26.53
Max	24.00	7.00	9.00	83.25	Max	24.00	8.00	7.00	53.56
Grade 4					Grade 5				
N	29	33	33	33	N	22	24	24	24
Means	18.14	5.64	4.57	46.60	Means	21.04	6.21	5.29	40.27
Std. Dev.	4.44	1.19	1.80	11.75	Std. Dev	3.03	1.25	1.08	10.77
Min	9.00	4.00	2.00	32.03	Min	12.00	4.00	3.00	29.94
Max	25.00	8.00	9.00	73.90	Max	24.00	9.00	7.00	73.94

Table 6.4. *Means, standard deviations, minimum and maximum scores, and number of cases for the English predictor measures at time 1 and time 2*

Time 1					Time 2				
Grade	**Listening Comprehension**	**Forward Digit Span**	**Reverse Digit Span**	**Rapid Naming (line drawings)**	**Grade**	**Listening Comprehension**	**Forward Digit Span**	**Reverse Digit Span**	**Rapid Naming (line drawings)**
Grade 3					**Grade 4**				
N	36	40	40	40	**N**	28	30	30	30
Means	12.83	6.93	3.70	61.27	**Means**	15.79	7.76	3.86	52.25
Std. dev.	3.80	1.99	0.97	25.37	**Std. Dev.**	5.05	1.84	0.95	19.38
Min	2.00	2.00	2.00	31.50	**Min**	2.00	5.00	2.00	32.00
Max	23.00	12.00	5.00	184.90	**Max**	23.00	12.00	6.00	120.19
Grade 4					**Grade 5**				
N	29	32	32	32	**N**	22	24	24	24
Means	14.31	7.78	3.78	54.89	**Means**	17.00	7.96	4.50	44.72
Std. Dev.	3.69	1.77	1.26	15.53	**Std. Dev**	3.74	1.92	1.25	10.09
Min	8.00	4.00	2.00	30.87	**Min**	11.00	5.00	3.00	31.00
Max	22.00	12.00	7.00	102.97	**Max**	25.00	12.00	7.00	70.47

Table 6.5. *Means, standard deviations, minimum and maximum scores, and number of cases by grade of the non-language based predictor measures at time 1 and time 2.*

Time 1				Time 2			
Grade	**Forward Spatial Span**	**Reverse Spatial Span**	**Raven's Progressive Matrices**	**Grade**	**Forward Spatial Span**	**Reverse Spatial Span**	**Raven's Progressive Matrices**
Grade 3				**Grade 4**			
N	40	40	36	**N**	30	30	30
Means	7.78	7.20	16.56	**Means**	7.57	6.90	17.07
Std. Dev.	1.80	1.30	5.90	**Std. Dev.**	1.74	1.49	6.59
Min	4.00	5.00	2.00	**Min**	4.00	4.00	4.00
Max	12.00	10.00	29.00	**Max**	10.00	10.00	30
Grade 4				**Grade 5**			
N	32	32	29	**N**	24	24	24
Means	7.91	7.44	14.38	**Means**	8.29	7.88	18.96
Std. Dev.	1.59	1.05	4.92	**Std. Dev.**	1.71	1.80	6.28
Min	4.00	5.00	9.00	**Min**	5.00	5.00	4.00
Max	10.00	10.00	27.00	**Max**	11.00	11.00	29.00

6.5.3. Description of the Predictors of Gains in Time 2 Literacy

- Word Reading-2

As in study 1, this stage of analysis used multiple regression procedures to assess the extent to which the cognitive and linguistic measures at time 1 explained variability in Herero and English literacy skills, in this case, reading skills, at time 2. Each analysis was performed as it was done in study 1; however, the predictor variables entered in the regression equation were based on those that predicted significant amounts of variability at time 1. For example, Beginning Phoneme, Ending Phoneme, and Non-word Repetition for both Herero and English literacy and Herero Rapid Naming (line drawings) for Herero literacy and Semantic Fluency (body parts) for English literacy respectively. For details of analysis procedures, see study 1. Given the small size of the sample, adjusted R square values were used. Tables 6.6 and 6.7 provide the multiple regression analyses statistics for the Herero and English literacy measures. However, tables 6.9 - 6.13 give the descriptive statistics for those cognitive-linguistic measures and cases included in the regression analyses in question at time 1 (grades 3-4) and time 2 (grades 4-5).

The first set of analyses focused on within language predictors of Herero Word Reading-2 (see table 6.6). The demographic control variables explained 7% of the variability. Herero listening comprehension, however, added 24% to the prediction, with L1 Rapid Naming (line drawings) adding another 8%. These analyses seem to suggest that basic phonological processing skills no longer predict the development of basic L1 reading skills in the Namibian Herero-English bilingual school children one year later. While phonological processing skills played a major role in the development of reading at the beginning of learning to read in the early grades (Grades 2-3), other factors assume importance in the acquisition of literacy in the L1 in the later grades (Grades 4-5). L1 reading skills are now seemingly more dependent on sight vocabulary and speed (rapid naming). If this is correct, then it implies the automaticity and fluency with which the children can now access words. Thus, instead of employing the more time consuming sublexical route when reading words, the children now access the words directly via the lexical route, and indeed, rapidly. If this is correct, then this point confirms the view of the less radical version of the script dependent/orthographic depth hypothesis. According to this view, even in transparent languages reading words can also be achieved via the lexical or the direct route, as word reading in shallow orthographies is not an exclusive function of phonologically-mediated or sublexical processes alone (Frost & Katz, 1997).

Table 6.6. *Regression analyses for Herero Word Reading-2*

Variable entered	**Predictor order for stepwise procedure**	**R^2**	**Adj. R^2**	**R^2 Change**	**Sig. F Change**
Block 1. sex, age, grade, and school – enter		.15	.07	-	-
Block 2. Raven's matrices - enter		.15	.05	.01	.92
Block 3. Herero Listening Comprehension - enter		.38	.29	.24	.00
Block 4. Predictor variables - stepwise	Rapid Naming	.46	.37	.08	.00

The corresponding analysis, focusing on with-in language predictors of English word reading at time 2 (see table 6.7), indicated that the demographic control variables explained only 6% of the variance, with Ravens adding nothing to the prediction. English listening comprehension, however, added another 7% to the prediction. English Beginning and Ending Phonemes together accounted for 42% of the variance. These analyses revealed that unlike in L1 literacy development, basic phonological processing skills remain an important factor in L2 literacy development one year later. This implies that the ability to process sounds in the L2 still remains a useful self-teaching mechanism in further acquiring English literacy skills.

Table 6.7. *Regression analyses for English Word Reading-2*

Variable entered	Predictor order for stepwise procedure	R^2	Adj. R^2	R^2 Change	Sig. F Change
Block 1. sex, age, grade, and school – enter		.14	.06	-	-
Block 2. Raven's matrices - enter		.15	.05	.01	.54
Block 3. English Listening Comprehension - enter		.23	.12	.08	.04
Block 4. Predictor variables - stepwise	English Ending Phoneme	.58	.51	.35	<.01
	English Beginning Phoneme	.62	.54	.04	.04

The next analysis considered whether L2 reading could be predicted by including L1 cognitive-linguistic variables in the regression equation. However, this had no effect on the steps in the regression analysis nor on the levels of prediction. Adding Herero Word Reading as a potential predictor of English Word Reading at time 2 indicated that L1 literacy predicted an additional 58% of the variance in L2 literacy over that of the 6% predicted by demographic control variables and the 7% by English Listening Comprehension. English Semantic Fluency and Herero beginning Phoneme added 3% and 2% respectively to the level of prediction. As at time 1, including Herero Listening Comprehension in the analysis did not alter the levels of prediction nor the steps in the analysis. This finding may suggest that, in addition to L2 phonological awareness, these children's ability to read English words also remains partly dependent on their L1 reading skills as was the case at time 1.

The next stage of analysis was a cross-linguistic one. It investigated the degree to which variables in one language would predict reading in another (see table 6.8). For each of these analyses, demographic control variables were first entered as a block into the analysis. The Coloured Progressive Matrices then followed to control for non-verbal ability amongst the children. Listening Comprehension in the language for which literacy was being predicted was then entered in the third block to control for the effects of language competence. In the second set of cross-linguistic analyses, potential L1 and L2 predictor variables were then added. At time 1, L1 Listening Comprehension was more predictive of literacy in either language than L2 Listening Comprehension. In contrast, L2 measures of phonological awareness and non-word repetition were more related to literacy skills in either language than L1 measures at time 1. This trend seems to continue at time 2 with regard to some variables. For example, combining L1 and L2 Listening Comprehension measures did not increase the level of prediction of L1 reading skills (22%) over that provided by L1 Listening Comprehension alone (24%). It did, however, increase the level of prediction of L2 reading skills (32%) over that provided by L2 Listening comprehension measures alone (12%). Nevertheless, L1 Listening Comprehension measures were the better predictors of both L1 and L2 reading skills. However, L2 measures of phonological awareness predicted more variability in both L1 and L2. The picture for the ability of Non-Word Repetition to predict L1 reading at time 2 was rather different from time 1. Neither L1 nor L2 Non-Word Repetition explained any variability in L1 reading. However, L1 Non-Word Repetition emerged as the better predictor of L2 reading skills. L1 Rapid Naming measures predicted L1 reading skills and L2 Rapid Naming predicted L2 reading skills. Overall, these analyses indicate that L1 and L2 reading skills appeared to be best predicted by L1 verbal comprehension skills and by L2 phonological awareness. Table 6.8 illustrates the relationship between L1 and L2 literacy skills on the one hand and the L1 and L2 cognitive-linguistic predictor variables on the other.

Table 6.8. *Cross-linguistic comparisons of the predictive levels of common or unique variability for Word Reading-2 explained by phonologically-based and language measures at time 2 for Grades 4-5 only.*

Predictors	**Herero Word Reading-2** *(Adjusted R^2-ChangeR^2 Change)*			**English Word Reading-2** *(Adjusted R^{2}- R^2 Change)*		
	Separate		**Combined**	**Separate**		**Combined**
	Intra	*Inter*		*Intra*	*Inter*	
Listening Comprehension	23-24%	3%-4%	22%-23%	8%-12%	30-32%	31%-32%
Beginning and Ending Phoneme	0%-2%	13%	10%-14%	39-42%	26-28%	42%
Nonword Repetition	0%-1%	0%-1%	0%-1%	21-23%	1%-2%	21%-22%
Rapid Naming	14-15%	1%-4%	17%-20%	6%-8%	0%-2%	9%-15%

NB. All measures significant to the $p < .001$ level.

Table 6.9. *Means, standard deviations, minimum and maximum scores and the total number of cases for the Herero literacy measures included in the regression analyses at time 1 (Grades 3-4) and time 2 (Grades 4-5).*

Time 1				Time 2			
Grade	**Word Reading**	**Word Spelling**	**Nonword Reading**	**Grade**	**Word Reading**	**Word Spelling**	**Nonword Reading**
Grade 3				**Grade 4**			
N	30	28	30	**N**	30	28	30
Means	26.17	12.00	3.60	**Means**	41.63	19.58	5.93
Std. Dev.	27.53	13.81	3.94	**Std. Dev.**	27.75	12.05	3.64
Min	0.00	0.00	0.00	**Min**	0.00	1.00	0.00
Max	68.00	38.00	10.00	**Max**	69.00	37.00	10.00
Grade 4				**Grade 5**			
N	24	24	24	**N**	24	24	24
Means	37.92	15.87	5.46	**Means**	59.04	26.67	7.75
Std. Dev.	28.04	13.88	4.13	**Std. Dev.**	19.86	12.57	2.95
Min	0.00	0.00	0.00	**Min**	0.00	0.00	0.00
Max	70.00	40.00	10.00	**Max**	70.00	39.00	10.00

Table 6.10. *Means, standard deviations, minimum and maximum scores and the total number of cases for the English literacy measures included in the regression analyses at time 1 (Grades 3-4) and time 2 (Grades 4-5).*

Time 1				Time 2			
Grade	**Word Reading**	**Word Spelling**	**Nonword Reading**	**Grade**	**Word Reading**	**Word Spelling**	**Nonword Reading**
Grade 3				**Grade 4**			
N	30	28	30	**N**	30	28	30
Means	10.33	3.75	2.07	**Means**	16.58	7.79	3.59
Std. Dev.	12.93	3.40	2.55	**Std. Dev.**	13.90	5.94	2.61
Min	0.00	0.00	0.00	**Min**	0.00	0.00	0.00
Max	49.00	11.00	8.00	**Max**	47.00	19.00	8.00
Grade 4				**Grade 5**			
N	24	24	24	**N**	24	24	24
Means	1971	6.30	3.50	**Means**	29.83	11.75	5.00
Std. Dev.	18.06	7.19	2.65	**Std. Dev.**	17.11	7.77	2.23
Min	0.00	0.00	0.00	**Min**	0.00	0.00	0.00
Max	57.00	23.00	8.00	**Max**	61.00	25.00	8.00

Table 6.11. *Means, standard deviations, minimum and maximum scores and the total number of cases for the Herero predictor measures included in the regression analyses at time 1 (Grades 3-4) and time 2 (Grades 4-5).*

Time 1					Time 2				
Grade	**Listening Comprehension**	**Forward Digit Span**	**Reverse Digit Span**	**Rapid Naming (line drawings)**	**Grade**	**Listening Comprehension**	**Forward Digit Span**	**Reverse Digit Span**	**Rapid Naming (line drawings)**
Grade 3					**Grade 4**				
N	30	30	30	30	**N**	30	30	30	30
Means	18.82	4.97	4.20	51.73	**Means**	20.00	5.73	4.57	45.89
Std. dev.	3.67	1.35	1.71	12.11	**Std. Dev.**	3.64	0.91	1.07	9.75
Min	10.00	2.00	2.00	32.97	**Min**	10.00	4.00	3.00	26.53
Max	24.00	7.00	9.00	83.25	**Max**	24.00	8.00	7.00	63.56
Grade 4					**Grade 5**				
N	22	24	24	24	**N**	22	24	24	24
Means	18.87	5.75	4.79	44.67	**Means**	21.05	6.21	5.29	40.27
Std. Dev.	4.48	1.26	1.93	9.97	**Std. Dev**	3.03	1.25	1.08	10.77
Min	9.00	4.00	2.00	33.00	**Min**	12.00	4.00	3.00	29.94
Max	25.00	8.00	9.00	73.90	**Max**	24.00	9.00	7.00	73.94

Table 6.12. *Means, standard deviations., minimum and maximum scores and the number of cases by grade of the English cognitive-linguistic measures included in the regression analyses at time 1 (grades 2-3) and time 2 (grades 4-5).*

Time 1					Time 2				
Grade	**Listening Comprehension**	**Forward Digit Span**	**Reverse Digit Span**	**Rapid Naming (line drawings)**	**Grade**	**Listening Comprehension**	**Forward Digit Span**	**Reverse Digit Span**	**Rapid Naming (line drawings)**
Grade 3					**Grade 4**				
N	28	30	30	30	**N**	28	30	30	30
Means	12.57	6.97	3.73	63.19	**Means**	15.79	7.76	3.86	54.45
Std. dev.	4.07	1.79	0.91	26.40	**Std. Dev.**	5.05	1.84	0.95	17.34
Min	2.00	4.00	2.00	39.21	**Min**	2.00	5.00	2.00	34.69
Max	23.00	12.00	5.00	184.90	**Max**	23.00	12.00	6.00	120.19
Grade 4					**Grade 5**				
N	22	24	24	24	**N**	22	24	24	24
Means	14.22	7.75	3.79	53.61	**Means**	17.00	7.95	4.50	44.72
Std. Dev.	3.98	2.00	1.35	16.74	**Std. Dev**	3.74	1.92	1.25	10.09
Min	8.00	4.00	2.00	30.87	**Min**	11.00	5.00	3.00	31.00
Max	22.00	12.00	7.00	102.97	**Max**	25.00	12.00	7.00	70.47

Table 6.13. *Means, standard deviations, minimum and maximum scores and the total number of cases for the non-language based measures included in the regression analyses at time 1 (grades 3-4) and time 2 (grades 4-5).*

Time 1				Time 2			
Grade	**Forward Spatial Span**	**Reverse Spatial Span**	**Raven's Progressive Matrices**	**Grade**	**Forward Spatial Span**	**Reverse Spatial Span**	**Raven's Progressive Matrices**
Grade 3				**Grade 4**			
N	30	30	30	**N**	30	30	30
Means	7.67	7.13	16.75	**Means**	7.57	6.90	17.07
Std. Dev.	1.58	1.36	5.65	**Std. Dev.**	1.74	1.49	6.59
Min	4.00	5.00	2.00	**Min**	4.00	4.00	4.00
Max	10.00	10.00	29.00	**Max**	10.00	30.00	3.00
Grade 4				**Grade 5**			
N	24	24	24	**N**	24	24	24
Means	7.92	7.50	14.91	**Means**	8.29	7.87	18.96
Std. Dev.	1.79	1.14	5.23	**Std. Dev.**	1.71	1.80	6.28
Min	4.00	5.00	9.00	**Min**	5.00	5.00	4.00
Max	10.00	10.00	27.00	**Max**	11.00	11.00	29.00

- *Single Word Spelling-2*

For Word Spelling-2, the first set of analysis focused on the within language predictors of Herero Word Spelling (see table 6.14). The demographic control variables explained 4% of the variability while Herero Listening Comprehension added 24% to the prediction. Interestingly, none of the cognitive-linguistic variables entered the equation, and therefore, did not explain any variability at all.

Table 6.14. *Regression analyses for Herero Word Spelling-2*

Variable entered	Predictor order for stepwise procedure	R^2	Adj. R^2	R^2 Change	Sig. F Change
Block 1. sex, age, grade, and school – enter		.12	.04	-	-
Block 2. Raven's matrices - enter		.12	.019	.00	.64
Block 3. Herero Listening Comprehension - enter		.35	.26	.23	<.01
Block 4. Predictor variables - stepwise	-	-	-	-	-

Focusing on with-in language predictors of English Word Spelling at time 2 (see table 6.15), the corresponding regression analysis showed that the demographic control variables explained 7% of the variance, with Ravens adding nothing to the prediction. English Listening Comprehension, however, added 5% to the level of prediction. English Beginning Phonemes accounted for 19% of the variance, with English Semantic Fluency (colours) adding another 7%. These analyses show that as in L2 Word Reading, basic phonological processing skills remain important in the development of L2 spelling even when the children progress further in the educational system. In addition, it seems as if these children's ability to spell words is partly aided by the strength of their L2 vocabulary or semantic representation. This seems to be also true for L1 Single Word Spelling and L1 Listening Comprehension above where the contribution of the L2 vocabulary added 24% to the prediction.

Table 6.15. *Regression analyses for English Word Spelling-2*

Variable entered	Predictor order for stepwise procedure	R^2	Adj. R^2	R^2 Change	Sig. F Change
Block 1. sex, age, grade, and school – enter		.14	.07	-	-
Block 2. Raven's matrices - enter		.15	.05	.00	.66
Block 3. English Listening Comprehension - enter		.22	.10	.07	.06
Block 4. Predictor variables - stepwise	English Beginning Phoneme	.40	.29	.18	.001
	English Semantic Fluency (color)	.47	.36	.07	.03

The next set of analyses considered whether L2 spelling could be predicted by including L1 cognitive-linguistic variables in the regression equation (see table 6.15). The analysis showed that L1 Beginning Phonemes added 25% to the prediction over and above that predicted by the demographic variables (7%) and L2 Listening Comprehension (5%). L2 semantic fluency (body parts) added yet another 7% to the level of prediction, thus showing that L2 vocabulary still continues to play a role in their spelling development. The fact that L1 basic phonological processing skills explain significant variance in L2 spelling may confirm the transferability of phonological skills from one language to another, usually from L1 to L2 literacy development (Durgunoglu, 1993 and Cisero & Royer, 1995) and, therefore, a reliance on the L1 basic phonological processing skills for word spelling in English. It may also confirm the notion that strong L1 linguistic skills form the basis for the acquisition of an L2 and L2 literacy skills (Sparks et al, 1998). Overall, this finding may suggest that this cohort may be enjoying the advantage of the sound systems of both Herero and English to spell words in their L2. Furthermore, adding Herero Word Spelling as a potential predictor of English Word Spelling indicated that Herero Word Spelling added an additional 40% of the variance. English Semantic Fluency added another 6% (colour) to the level of prediction. This finding may suggest that in addition to an association between L1 phonology and English Single Word Spelling, this cohort also shows an association between L1 spelling and L2 spelling.

Fluency added another 6% (colour) to the level of prediction. This finding may suggest that in addition to an association between L1 phonology and English Single Word Spelling, this cohort also shows an association between L1 spelling and L2 spelling.

The next stage of analysis was a cross-linguistic one and investigated the degree to which variables in one language would predict spelling in another. The same procedures that were used for Word Reading cross-linguistic regression analysis were also applied here (for details, see pg.158). These analyses showed that combining L1 and L2 Listening Comprehension measures slightly increased the level of prediction of L1 spelling skills (24%) over that provided by L1 Listening Comprehension alone (23%). Similarly, combining these two measures also increased the level of prediction of L2 spelling skills (29%) over that provided by L2 Listening Comprehension alone (7%). As in Word Reading, Word Spelling, and Word Reading-2, L1 Listening Comprehension measures were the better predictors of both L1 and L2 spelling skills. However, the picture for the effects of Beginning and Ending Phonemes on spelling was different at time 2. L2 phonological awareness measures predicted more variability for L1 spelling (6%-8% compared to 0%-1%) whereas L1 and L2 phonological awareness measures predicted more or less the same amount of variability for L2 reading. Nonword Repetition, too was different at time 2. Neither L1 nor L2 Repetition predicted any variability in L1 spelling; however, L2 Nonword Repetition predicted slightly better L2 reading. L1 and L2 Rapid Naming predicted more or less equal amounts of variability in L1 spelling. Overall, these analyses indicate that L1 and L2 spelling skills were best predicted by L1 language verbal comprehension skills and L2 spelling by both L1 and L2 phonological awareness. Once again, these regression analyses show a consistent pattern of results between the literacy measures at time 2. Table 6.16 below illustrates the relationship between the literacy measures and the cognitive-linguistic predictor variables.

Table 6.16. *Cross-linguistic comparisons of the predictive levels of common or unique variability for Word Spelling-2 explained by phonologically-based and language measures at time 2 for Grades 4 and 5 only.*

Predictors	Herero Word Spelling-2 (R^2 Change-Adjusted R^2 Change)			English Word Spelling-2 (R^2 Change-Adjusted R^2 Change)		
	Separate		Combined	Separate		Combined
	Intra	Inter		*Intra*	Inter	
Listening Comprehension	23-24%	3%-5%	24%-25%	7%-8%	28%-30%	29%-30%
Beginning and Ending Phoneme	0%-1%	6%-8%	6%-11%	21%	20%-21%	23%-25%
Nonword Repetition	0%-1%	0%-1%	0%-1%	4%-5%	0%-1%	6%-%
Rapid Naming	4%-7%	2%-5%	7%-13%	4%-8%	0%	4%-10%

NB. All measures significant to the $p < .001$ level.

6.6. Discussion:

Study 2 set out to further examine the degree to which the simultaneous development of basic literacy skills in Herero and English can be understood in terms of the assumptions of the central and script dependent/orthographic depth hypotheses. Alternatively, in terms of the underlying cognitive processes that are common in all languages and the language properties which vary from one language to another. In addition, study 2 also examined the gains this cohort has made in L1 and L2 literacy since they were first tested a year ago. As was the case at time 1, results at time 2 also suggest that both theoretical positions are a useful framework for explaining the concurrent development of basic literacy skills in both Herero (L1) and English (L2).

The elevated means in word reading and word spelling in both L1 and L2 suggest that the children have improved in their reading skills over the one-year period. Similarly, their decoding skills, as shown by the means in non-word reading, have also improved. Thus, it seems plausible to argue that the gains in literacy may be correlating well with the children's improvement in decoding skills, though future research is needed to examined the gains this cohort has made in L1 and L2 literacy since they were first tested a year ago. As was the case at time 1, results at time 2 also suggest that both theoretical positions are a useful framework for explaining the concurrent development of basic literacy skills in both Herero (L1) and English (L2).

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Similarly, better means were obtained in all L1 and L2 cognitive and linguistic predictor measures tested at time 2. An interesting finding is the better performance in spatial span tasks, a non-verbal, spatial memory measure than in digit span (a verbal memory measure) across both grades studied. This finding suggests that this cohort of Namibian bilingual school children continue to be more dependent on their visual skills than on their verbal skills when processing verbal information despite advancing in age, cognitive developmental level, and education. Earlier findings at time 1 also indicated better performance in spatial span tasks than in digit span. It may have been expected that this cohort would be more visually dependent on processing verbal information. However, with their advancement in age and in the educational system, the expectation at time 2 would have been that they would have developed better and stronger verbal processing skills to process verbal information (such as reading). To the contrary, this has not happened, with the result that these children continue to rely on their visual processing skills to process verbal information. Rapid naming also improved at time 2, indicating greater automaticity and fluency of reading at word level. Thus, the children's improved literacy skills in both the L1 and the L2 may be explicable in terms of the improved decoding skills and the greater automaticity and fluency they have acquired over the one-year period, especially in the L1.

ANOVA showed a consistent development of Herero and English literacy skills at time 2. This was evident in the absence of a significant interaction effect between language and grade for word reading, word spelling, and non-word reading. The children showed the same rate of literacy development in both languages across grades two and three, although Herero literacy remained better developed than English. This was confirmed by the grade effect found, and expected as the development of literacy in the L1 at time 1 started off better than in L2. The consistent development of literacy in both languages at time 2 implies that some underlying function may be responsible for this phenomenon. At time 1, there was a significant interaction effect between language and grade ($F = 5.45$, $df = 3$ and 92, $p < 0.002$ and $F = 3.59$, $df = 3$ and 95, $p < 0.017$ for reading and spelling respectively) where literacy development progressed faster in Herero than in English, thereby providing support for the script dependent hypothesis. At time 2, however, this support seems to have dwindled, therefore perhaps raising the speculation that orthographic transparency may only influence the development of literacy in the early stages of learning to read and write but not in the later stages when literacy is already underway. This may then leave room for the central processing hypothesis to account for the ongoing development of literacy beyond the initial stages. ANOVA also showed better gains in literacy for fifth graders than for fourth graders at time 2. Estimated marginal means and means confirmed this, showing better performance for fifth graders than for fourth graders, particularly for reading. This improved performance shows that children become better readers as they progress through the educational system. Similarly, the ability to decode words as indicated by the performance on non-word reading, developed consistently in both languages and across the two grades. Also, the children were able to decode more words in Herero than in English.

While phonological awareness was the significant predictor of L1 and L2 reading skills at time 1, L1 Rapid Naming of line drawings became the significant predictor of basic L1 word reading skills. That rapid naming emerged as a predictor of reading may confirm the automaticity and the fluency referred to above with which the children were able to read at time 2. Language comprehension skills also played a major role in the prediction of L1 reading skills. A general observation emerging from these analyses is that L1 cognitive and linguistic processes significantly predicted L1 reading skills at time 2, lending support to the central processing and the script dependent hypotheses at the same time. For English word reading, phonological awareness at time 1 remained a significant predictor of L2 reading skills at time 2. Thus, rapid naming skills and phonological processing skills may be the respective tools to predict the development of Herero and English literacy in Namibian Herero-English bilingual children. Other cognitive skills such as English Semantic Fluency (body parts) and Herero Beginning Phonemes added their share, albeit small, to the prediction of L2 reading skills at time 2. These findings lend further support for the central processing hypothesis, thus establishing it as an important framework to account for the development of literacy skills in Namibian bilingual school children, although it is certainly not the only theoretical framework explaining this phenomenon.

Although phonological awareness failed to emerge as the main, significant predictor of L1 literacy at time 2, its role in L1 literacy development was not entirely diminished. The cross-linguistic analyses further revealed that there was significant prediction of reading development across the languages at time 2 as there was at time 1. This is yet again an interesting finding this research project has revealed, providing further confirmation that cognitive and linguistic processing skills, like phonological and language processing skills, can also be transferred between languages and aid with the development of literacy across languages.

Further research is needed to determine whether or not skills other than phonological awareness can be transferred across languages. Further research will have to find out why English as an L2 continues to have on impact on L1 reading development. Establishing this fact with the other Namibian language groups would be a good beginning to see whether this phenomenon would also occur between these languages and English. More interesting would be to investigate the same phenomenon between the Namibian non-Bantu languages such as Afrikaans and German respectively as L1s on the one hand, and English as an L2 on the other. The occurrence of similar findings with all or most of these languages might inform us about the advantages of, and the role, bilingualism plays in influencing the development of literacy across languages, at least in the Namibian context.

Chapter Seven

METHODS: STUDY 3-IDENTIFICATION OF SINGLE CASES OF LITERACY DIFFICULTIES

7.1. Research aims

The previous two chapters addressed the development of literacy among Herero-English bilingual children. The conclusion arrived at is that the two prevailing theories examined in this research project can account for the development of literacy of the bilingual children in both their L1 and L2. The cross-sectional study found that the L1 literacy development progressed faster than the L2 literacy development, consistent with the predictions of the script dependent/orthographic depth hypothesis. At the same time, it was found that development of literacy in both scripts was predicted by cognitive and linguistic processing skills of Herero and English, as would be suggested by the central processing hypothesis.

The aim of the previous two chapters was to inform theoretical perspectives of the processes and skills involved in the normal development of literacy in two languages differing in the depth of their orthographies. In contrast, this chapter focuses on children who presented evidence of literacy acquisition difficulties in the languages assessed. The aim of the single case analyses reported in this chapter is to identify factors that may be related to literacy difficulties amongst these bilingual children. As such, this study did not investigate in detail individual children's learning that goes beyond the battery of tests administered in this study and neither observational data nor analyses of reading or spelling strategies was carried out. In addition, this chapter continued to assess the assumptions of the central processing hypothesis and the script dependent/orthographic depth hypothesis with regard to literacy difficulties. From the point of view of the central processing hypothesis, literacy difficulties arise when a child has defective underlying cognitive and linguistic skills common in all languages. In contrast, the script depended/orthographic depth hypothesis states that the depth of the orthography determines the pattern and the severity of literacy difficulties. Thus, the question this study attempted to answer is whether the degree of transparency or defective cognitive-linguistic processing skills of Herero and English will influence the patterns and severity of literacy difficulties in these two languages among the Herero-English bilingual school children.

7.2. Research Participants

Single cases were selected from the original sample of grade 3 children for whom data were available at Time 1 and Time 2 of testing. These children were selected to provide information about the development of literacy over the course of the study as well as to ensure that the child had experienced at least one year of literacy teaching prior to initial testing.

7.3. Selection Procedures

The cases that constituted a sample for the analysis of literacy difficulties were selected on the basis of the following criteria:

(1) Grade:

Cases for the analyses of literacy difficulties were selected from Grade 4. The rationale for selecting this grade was that at this stage the children would have had at least two years of formal literacy instruction in both Herero and English. For diagnostic purpose, this grade would allow the researcher to identify those children who are at least two years behind in reading and writing skills in either language.

(2) Availability of data at time 1 and time 2:

Potential cases of literacy difficulties had to have data at both times 1 and 2.

(3) Availability of data on particular measures:

To be selected, the children in this grade had to have data on literacy measures in both Herero and English, listening comprehension measures in both languages, and on measures of general non-verbal reasoning at time 1 and time 2. Hence, all cases with missing data at both times 1 and 2 were excluded; thus, reducing the pool from which children with potential literacy difficulties would be selected to 30 children.

(4) Poor literacy at time 1 and time 2:

From these 30 children those that showed poor literacy either at time 1 or time 2 in either language were selected. This reduced the sample to 8 cases.

(5) Selection of five cases for detailed discussion based on potential categories of difficulties: From these 8 cases, five cases that presented with literacy difficulties in either language were selected. These cases are representative of the following four categories of literacy difficulties:

(1) literacy difficulties related to non-verbal reasoning deficits;
(2) language-based literacy difficulties;
(3) persistent literacy difficulties in L1 and L2
(4) persistent literacy difficulties in L2.

With the exception of the fourth category, none of the three categories of literacy difficulties were pre-selected. That is, it was not decided before hand that the single case profiles were going to be generated in accordance with these categories. Rather, the outcome of the generated profiles determined what the categories of possible literacy difficulties would be. The rationale for the fourth category was to see whether or not there would be any of the children who would present with literacy difficulties in one language only.

7.4. Data Analysis

For the purposes of comparison across measures, test scores were transformed to *z*-scores. For each single case, *z*-scores were calculated by taking the difference between the single case's score on a test and the average of their year group and dividing by the standard deviation of the year group. Differences were calculated such that a negative value always indicated a poor performance in comparison to the year group. Therefore, for each test, a single case is represented by the number of standard deviations that their score differs from the average for their year group. These data were then presented graphically to show the profile of performance of the cases selected.

For each graph, on the x-axis of each graph lie the measures used, and on the y-axis are the levels of skills acquired on each measure based on the z-scores. The mean, or average ($z = 0$) for each of the measures, is indicated by a heavy black line. Scores within the range of 1 or −1 represent the average range for the grade from which the single case was selected. Thus, if a given child obtains a score below −1, his/her ability in that specific measure is considered to be worse than the average range of abilities for his/her grade. Consequently, a specific deficit in that particular skill may be identified. The tasks are labeled in the same abbreviated manner on all graphs. Note, however, that not all the measures that were used at Time 1 were used at Time 2. Those that were used at Time 1 and Time 2 are abbreviated in the same manner, although the digit 2 has been added to the end of a label to denote that the score is derived from testing at Time 2. Labels are described in Table 7 on the following page.

Table 7.1. *Legends for the graphs showing single case profiles at Time 1 and time 2.*

Abbreviated Labels	Tasks	Abbreviated Labels	Tasks
EWR	English word reading	**HWR**	Herero word reading
ENWR	English non-word reading	**HNWR**	Herero non-word reading
ESWSPEL	English single word spelling	**HSWSPEL**	Herero single word spelling
ENWREP	English non-word repetition	**HNWREP**	Herero non-word repetition
EBEGPHON	English beginning phoneme	**HBEGPHON**	Herero beginning phoneme
EEPHON	English ending phoneme	**HEPHON**	Herero ending phoneme
EDSFOR	English digit span forward	**HDSFOR**	Herero forward digit span
EDSREV	English digit span reverse	**HDSREV**	Herero reverse digit span
ERNLD	English rapid naming of line drawings	**HRNLD**	Herero rapid naming of line drawings
ERNCOL	English rapid naming of colours	**HRNCOL**	Herero rapid naming of colours
ECOLFLU	English colour semantic fluency	**HCOLFLU**	Herero colour semantic fluency
EBPFLU	English body parts semantic fluency	**HBPFLU**	Herero body parts semantic fluency
ESODIS	English sound discrimination	**HSODIS**	Herero sound discrimination
ELISTCOM	English listening comprehension	**HLISTCOM**	Herero listening comprehension
RAV	Ravens' Progressive Matrices	**CORFOR**	Forward spatial span (forward corsi blocks)
OSCAT	Object semantic categorization	**CORREV**	Reverse spatial span (reverse corsi blocks)

7.5. Results

7.5.1. Identification of single cases of severe literacy difficulties

Five single cases that presented evidence of literacy difficulties were selected for discussion. These cases were representative of the four different categories of literacy difficulties identified. A description of the nature of the literacy difficulties each case presents is given below.

7.5.1.1. Literacy Related to Non-verbal Reasoning Deficits

The case presented in this category describes a child with evidence of literacy difficulties that may be based on deficits in non-verbal reasoning.

Case 52:

Case 52 is a 10-year old boy at the Omatjete Primary School who presented evidence of persistent difficulty in measures of non-verbal reasoning (Raven's Progressive Matrices), which may be indicative of deficits in general intellectual functioning. There seems to be further evidence of more deficits in semantic fluency, which may reflect this child's poor vocabulary in both Herero and English (see graph 7.1). His general language comprehension seems to be within the average range. However, the deficits seem to have an impact on his literacy skills in both languages, particularly at time 2 (see graph 7.2).

Graph 7.1. *Cognitive, linguistic and literacy profiles of Case 52 at time 1.*

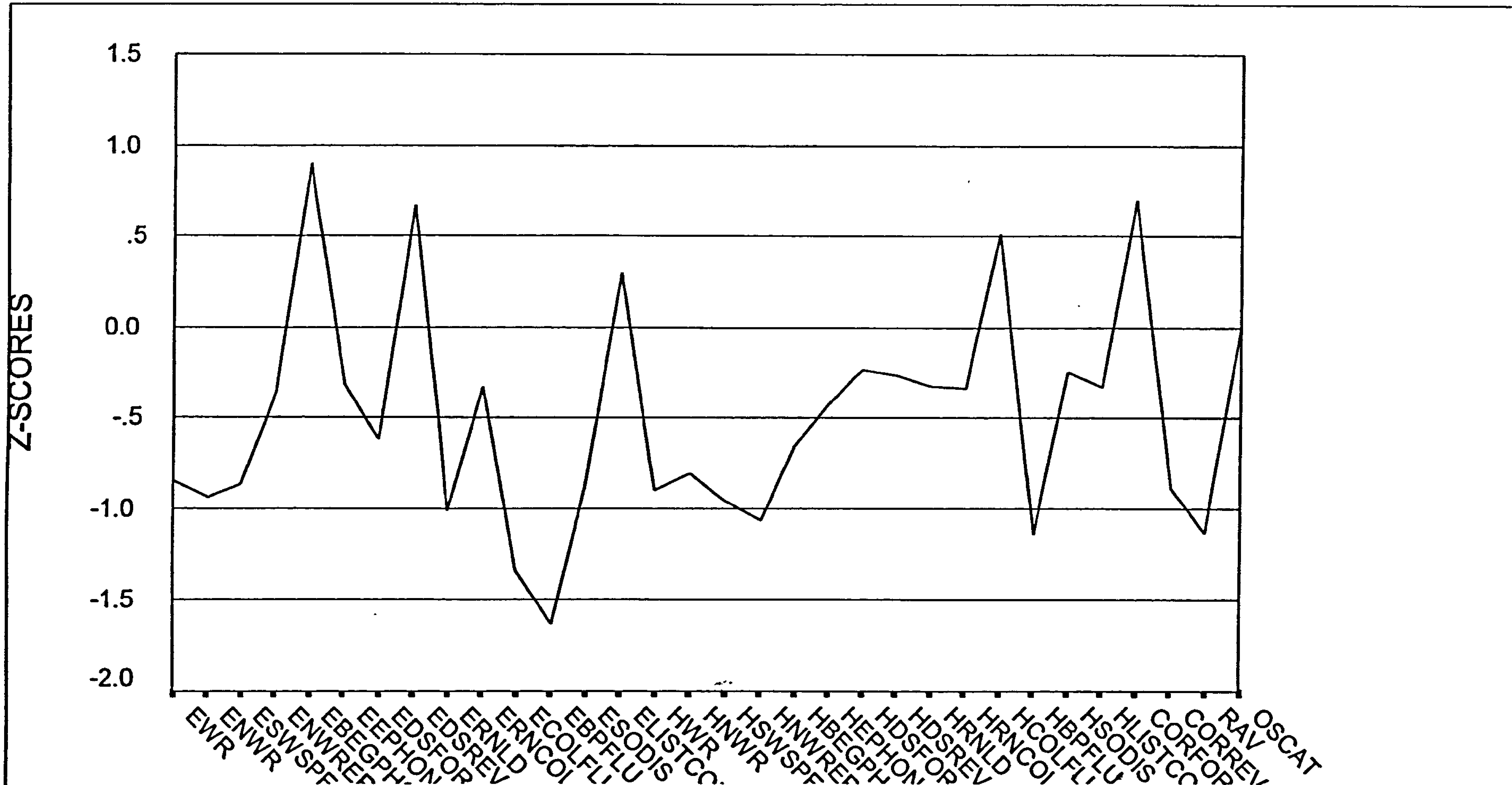
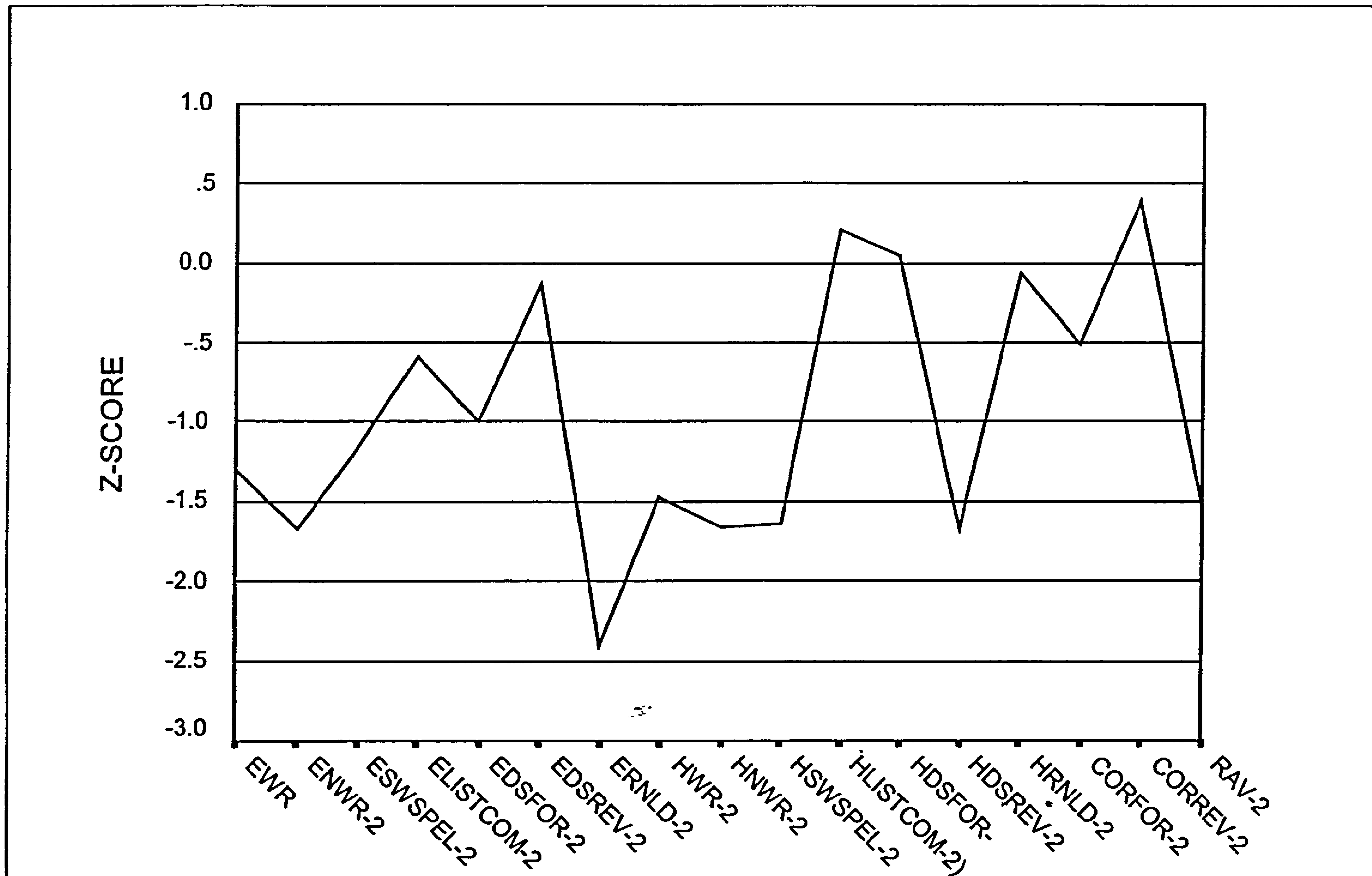


Table 7.2. *Cognitive, linguistic, and literacy profiles of Child 52 at time 2.*



7.5.1.2. Language-based Literacy Difficulties

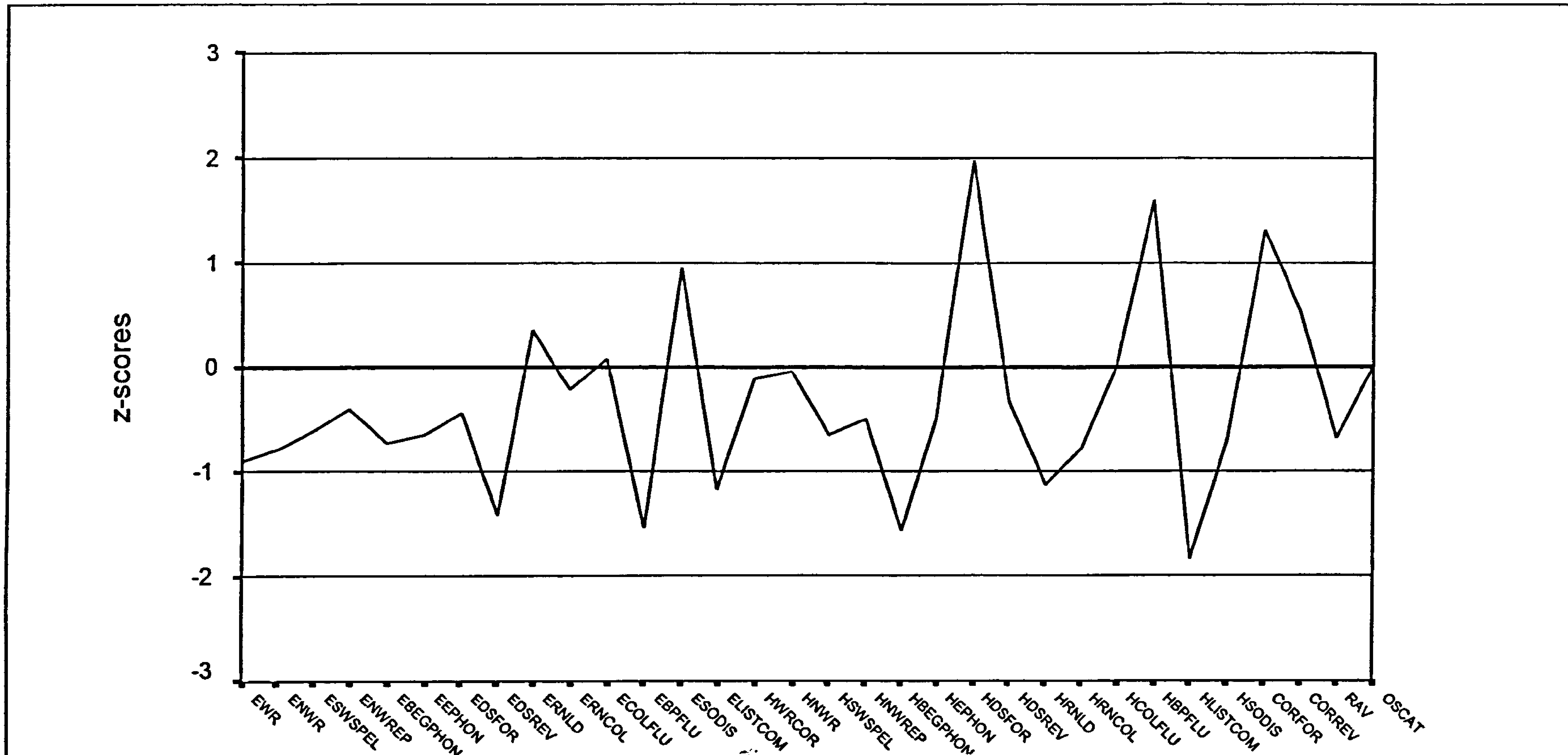
The case presented in this category describes a child with evidence of language comprehension problems in both Herero and English.

Case 85:

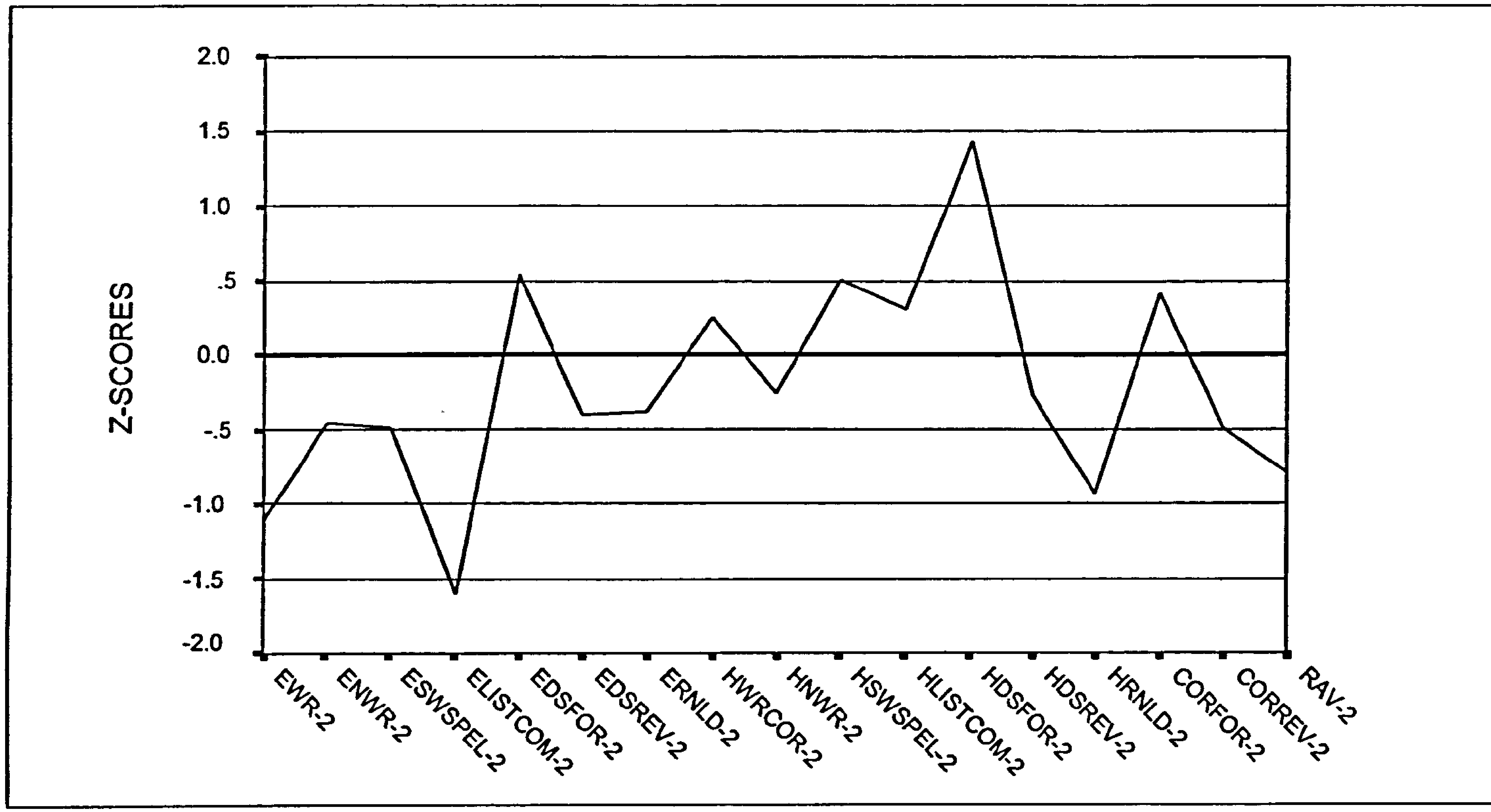
Case 85 is a 9-year old girl from Omatjete P.S. who presented evidence of poor performance on both listening comprehension measures, which may be indicative of a general language comprehension deficit. These deficits are apparent despite her general reasoning and non-verbal abilities appearing to be within the average range. However, at time 1, these comprehension deficits seem to have only a slight impact upon her literacy skills in both Herero and English. Indeed, her performance on the Herero literacy measures seems typical of her peer group (see Graph 7.3).

By time 2, however, there is some evidence of literacy difficulties, but these are confined to English Word Reading (see Graph 7.4) and the problems with listening comprehension also seem to be restricted to English (the second language). These L2 literacy deficits may be attributed to the fact that Case 85's L2 proficiency is still not well developed. According to Cummins (1984), sufficient second language skills may take anywhere from five to seven years to come to fruition before literacy skills, particularly in the L2, can be evaluated. Thus, Case 85's current linguistic profile may be an epitome of Cummins' argument and may be an example of transitory literacy difficulties that may improve with time and sufficient educational experiences, i.e when L2 language ability increases, L2 literacy would also be expected to grow. It may be concluded that Case 85's problems are transitory and with time, and proper educational experiences, may improve.

Graph 7.3. *Cognitive, linguistic, and literacy profiles of Case 85 at Time 1.*



Graph 7.4. *Cognitive, linguistic, and literacy profiles of Case 85 at Time 2*



7.5.1.3. Persistent Literacy Difficulties in L1 and L2

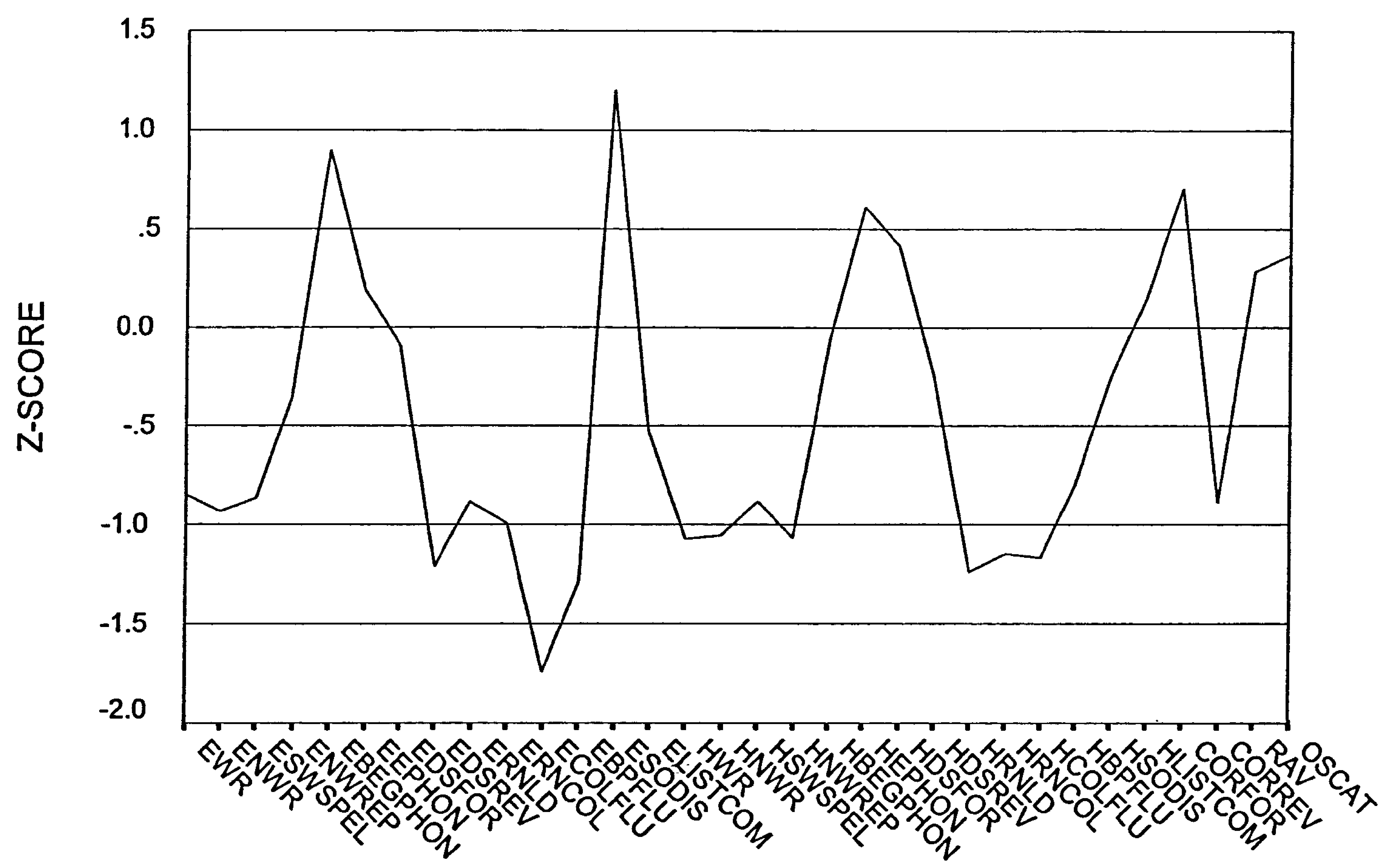
This category describes two children who seem to present with persistent literacy difficulties in both L1 and L2. For one child, the literacy difficulties may be accompanied by deficits in semantic fluency in both languages, verbal memory and language comprehension in L2 and an inability to process a sequence of novel sounds in L1. For the other child, the literacy difficulties seem to be coupled with problems in phonological processing in L2 and deficits in non-verbal memory skills.

Case 114:

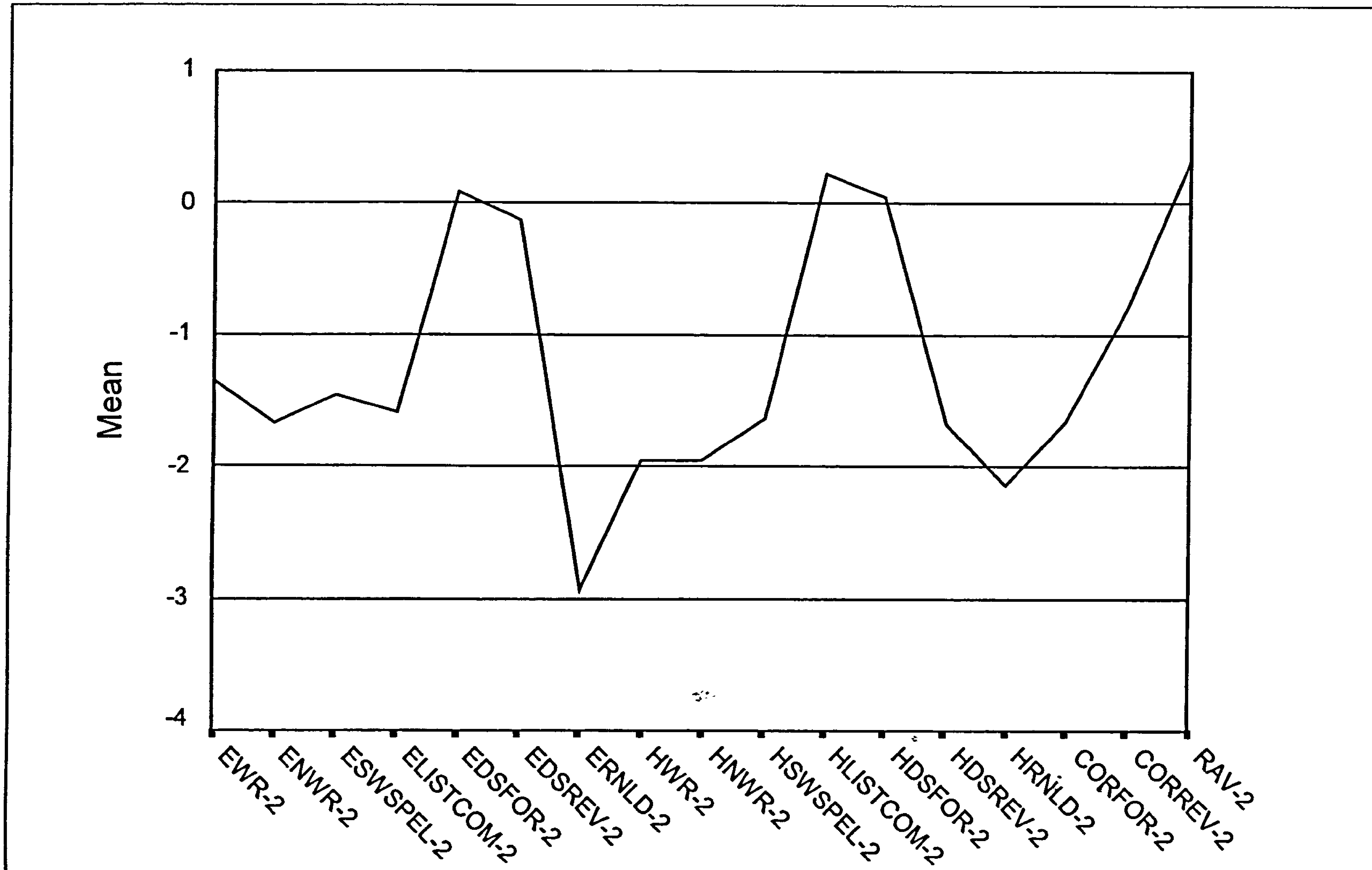
Case 114 is an 8-year old boy at the Okakarara Primary School who presented evidence of poor performance on measures of semantic fluency in both Herero and English, which may be indicative of an underdeveloped vocabulary. At the same time, Case 114 also presents poor performance in L2 verbal working memory and in L1 ability to repeat a sequence of nonwords. These deficits appear to impact more upon L1 literacy skills, particularly on decoding and reading skills at time1 (see graph 7.5).

By time 2, however, Case 114's literacy difficulties do not remain confined to L1 only, but extend to both L1 and L2 literacy skills, with L2 language comprehension problems possibly contributing to this persistent difficulty with literacy. (see graph 7.6).

Graph 7.5. *Cognitive, linguistic, and literacy profiles of Case 114 at Time 1*



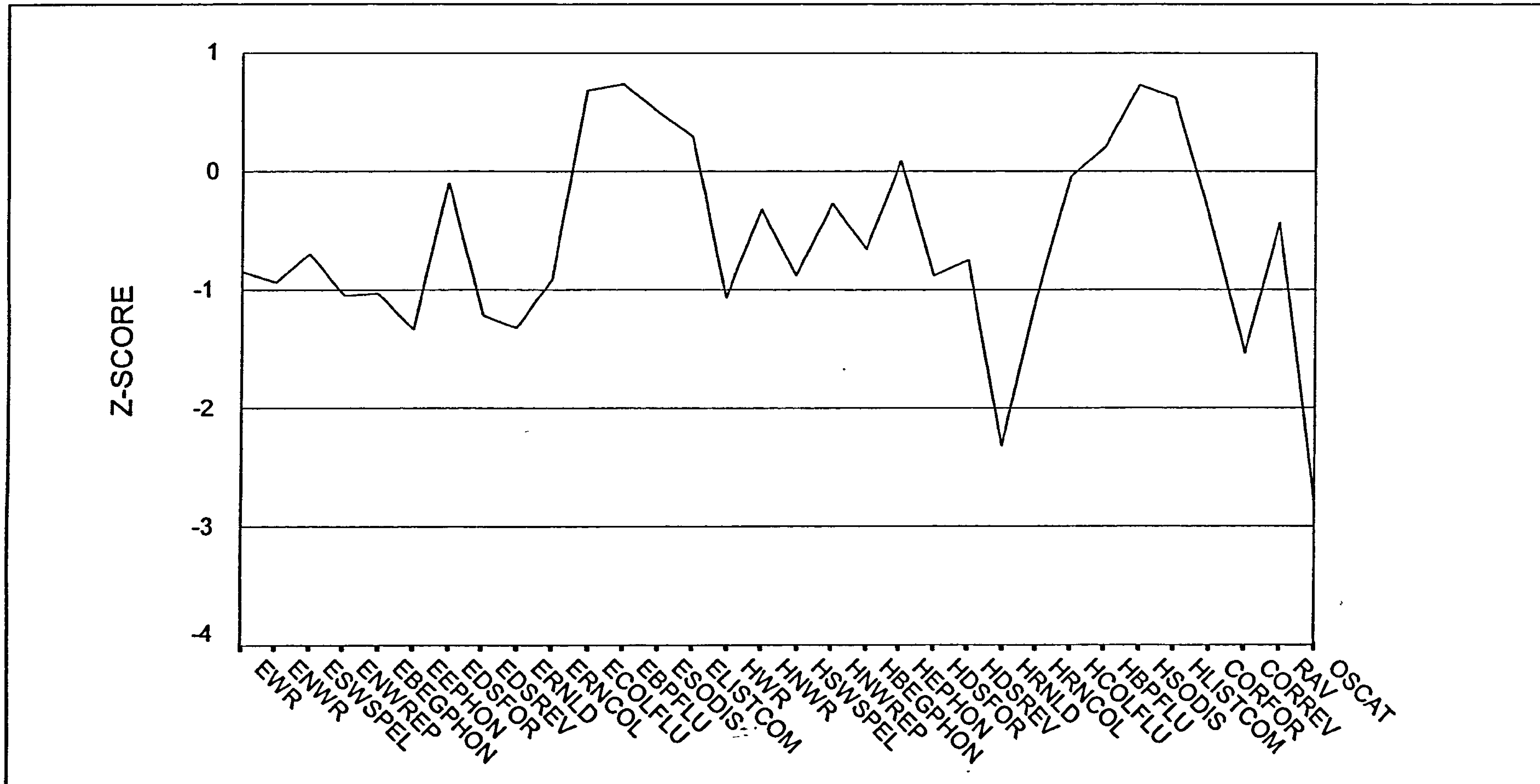
Graph 7.6. *Cognitive, linguistic, and literacy profiles of Case 114 at Time 2.*



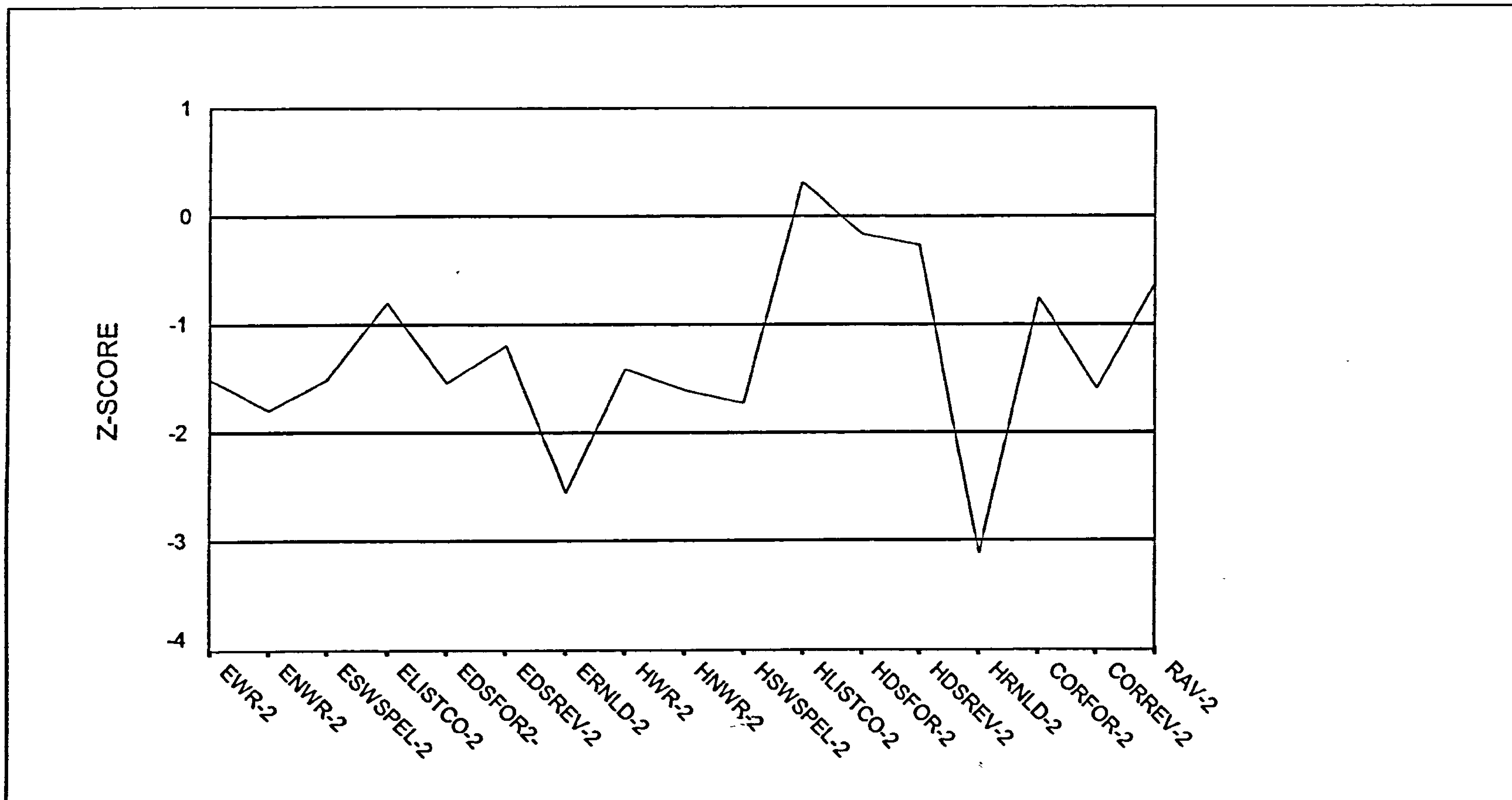
Case 103:

Case 103 is an 11-year old girl attending the Okakarara Primary School who seems to present evidence of deficits in L2 phonological processing skills and L2 and L1 verbal memory. These deficits may be indicative of deficient phonological processing and working memory skills. Her non-verbal reasoning skills seem to be within the average range. The deficits, however, seem to have an impact on Case 103's literacy skills in both Herero and English at time 1 (see graph 7.7). By time 2, there continues to be evidence of literacy difficulties in both L1 and L2, with deficits in L2 verbal memory skills and in non-verbal memory skills still persisting at this time (see graph 7.8).

Graph 7.7. *Cognitive, linguistic, and literacy profiles of Case 103 at Time 1.*



Graph 7.8. *Cognitive, linguistic, and literacy profiles of Case 103 at time 2*



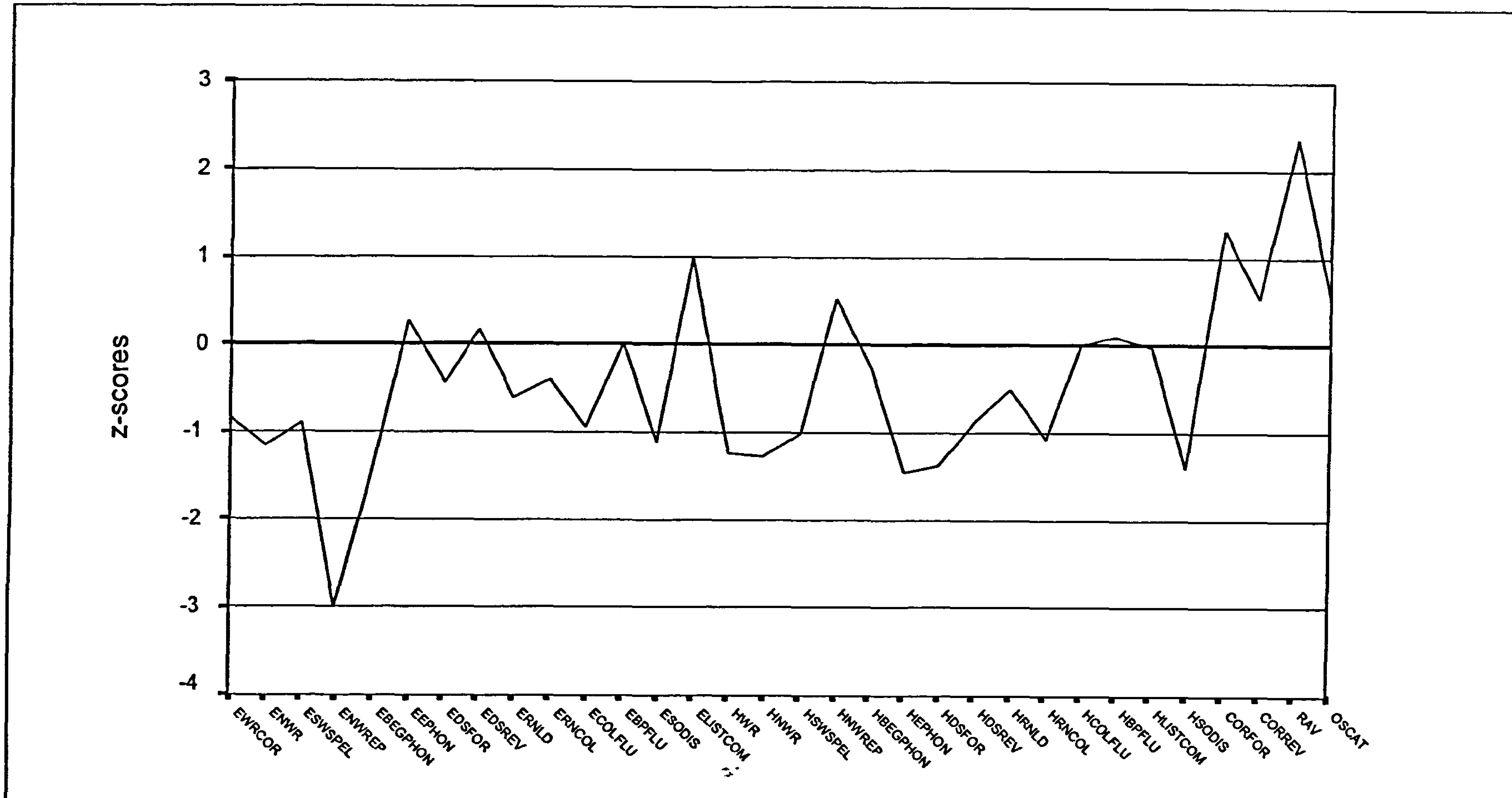
7.5.1.4. Persistent Literacy Difficulties in L2

This category describes a child who shows persistent literacy difficulties in L2.

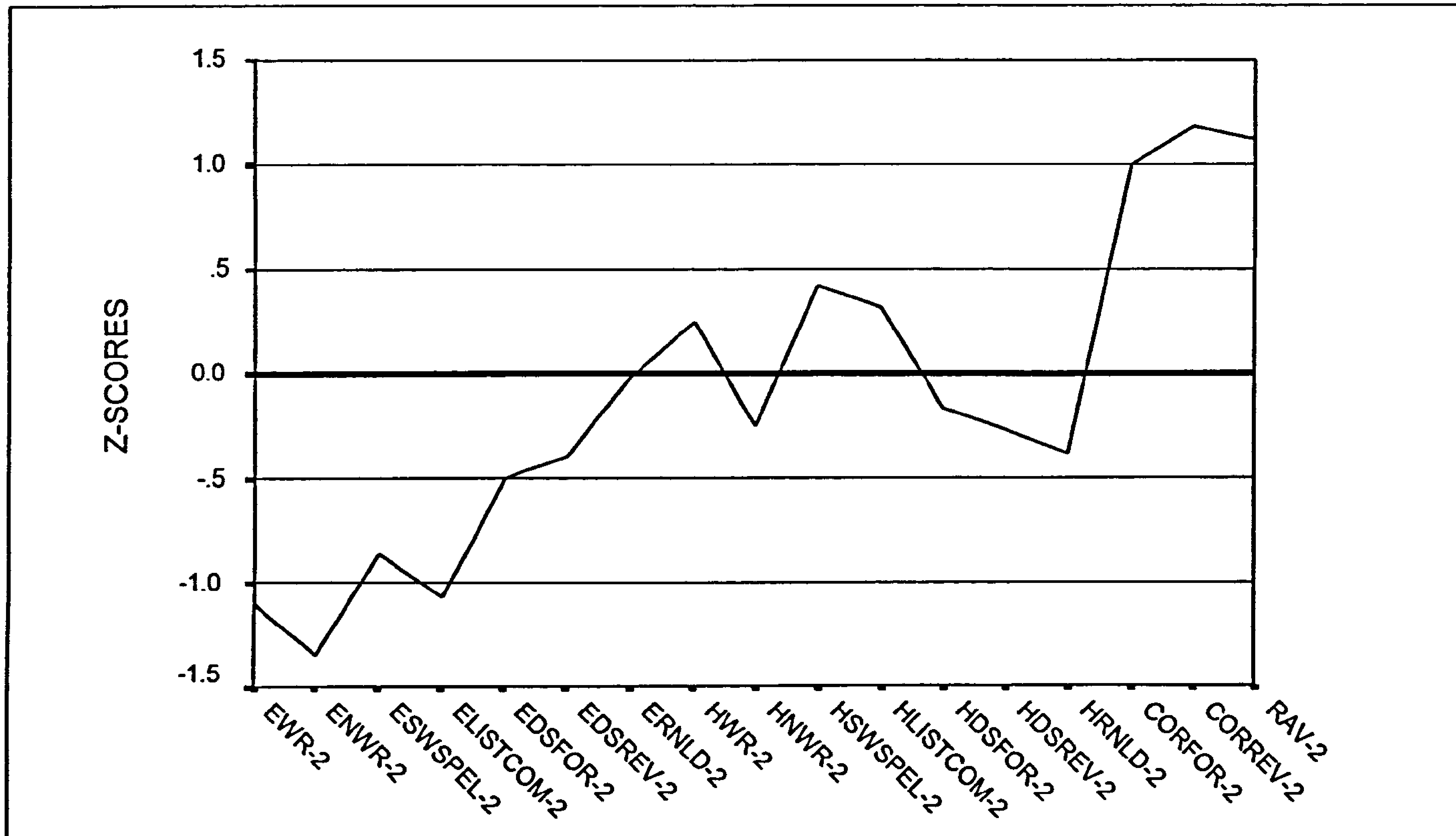
Case 86:

Case 86 is a 12-year old boy attending the Omatjete Primary School. His listening comprehension skills in both Herero and English and his non-verbal general reasoning skills are well within and above average. At the same time, however, Case 86 presents with deficient sound discrimination skills in the L1 and L2 and deficits in L1 phonological processing skills, phonological access to items, and verbal as well as non-verbal memory skills. These deficits seem to have an impact on his literacy skills in both Herero and English at time 1 (see graph 7.9). By time 2, however, there is still evidence of literacy difficulties being confined to L2 only. Similarly, the language listening comprehension problems that arise at time 2 also seem to be confined to L2 only (see graph 7.10).

Graph 7.9. *Cognitive, linguistic, and literacy profiles of Case 86 at Time 1.*



Graph 7.10. *Cognitive, linguistic, and literacy profiles of Child 86 at Time 2.*



7.5.2. General findings

Literacy difficulties, or dyslexia, may exist in one language and not in another. This is all due to the fact that literacy difficulties can be attributable to different underlying cognitive causes and that cognitive deficits that impact upon one language may not necessarily have the same effect in another language (Smythe, 2002). Thus, depending on the magnitude of the cognitive demands of a language, a bilingual is likely to present with symptoms of literacy difficulties in the language with more stringent cognitive demands rather than in both languages. This argument seems to suggest that literacy difficulties are language specific, and therefore, confirm the assumptions of the script-dependent hypothesis.

The evidence provided in this chapter may suggest that this may be possible, although individuals presenting differential literacy difficulties may be rare (Everatt, Smythe, Ocampo & Veii, 2002). Out of the five cases of literacy difficulties presented here, only one (Cases 86) seemed to experience persistent difficulties in L2 literacy. However, these L2 literacy difficulties may be related to poor L2 language skills which, in turn, may be related to the fact that this cohort could be considered, by Namibian standards, to still be in the early stages of L2 and L2 literacy development. Hence, it can be argued that the literacy difficulties they experience may not be deep-seated but transitional and, as such, may be overcome with time and proper literacy instructions.

The rest of the cases discussed here seem to present with literacy difficulties in both languages, indicating that if literacy difficulties occur in one language, they are also likely to occur in the other, consistent with the views of the central processing hypothesis. But given that the two languages studied here vary in their orthographic depth one would perhaps expect the patterns of the literacy difficulties to vary accordingly, with more severe literacy difficulties occurring in English, the less transparent orthography than in Herero. However, the prevalence of literacy difficulties seen here seems to be similar along the assessed cognitive-linguistic measures. The cognitive factors that seem to be related to literacy difficulties in Herero seem to be the same in English literacy difficulties as well. For example, verbal (phonological) memory, sound discrimination, semantic fluency and rapid naming occur simultaneously in both Herero and English as the underlying cognitive factors that may be related to literacy difficulties in either language in at least three of the five cases, even in those cases with persistent literacy difficulties in L2 only. Other factors such as phonological processing skills and nonword repetition occur alternately in one or the other language.

The bottom line here seems to be that the same factors seem to be related to literacy difficulties in both languages. Thus, on the basis of the presented evidence, and despite the differences in their orthographic depth, word recognition in Herero and English seem to place more or less the same degree of cognitive demands on the children presented in this study because, what they seem to be unable to process in one language they also seem to be unable to process in the other. Simply put, the differences in the orthographic depth of Herero and English do not seem to matter in influencing literacy difficulties in this group of children. However, this finding cannot be said to be conclusive until further research can confirm these findings.

7.6. Discussion

This part of the research project continued to test the validity of the central processing and script dependent/orthographic depth hypotheses. The study predicted that those children with defective cognitive and linguistic processing skills were more than likely to experience literacy difficulties in both Herero and English (central processing hypothesis). The hypothesis went on to state that literacy difficulties were more likely to be more severe in English, the less transparent orthography, than in Herero, which is a highly transparent orthography. The five cases of children presenting with literacy difficulties described here appear to have deficiencies in the key areas associated with the development of literacy and literacy difficulties, namely, phonological awareness, verbal short-term memory, rapid naming, and repetition. As such, these findings seem to provide evidence for the central processing hypothesis that literacy difficulties are a function of deficient underlying cognitive and linguistic processing skills. These skill areas constitute various phonological processes, and weakness in them might be indicative of these children's inability to establish new phonological representations. Thus, all the five cases that exhibited poor literacy skills were those that differed from the good readers on the basis of cognitive and linguistic processing skills which influence the development of literacy difficulties. In turn, this implies that individual differences in these skill areas are indeed indicative of difficulty in developing literacy difficulties not only in the L1 but in L2 as well. Owing to this, it is possible that literacy difficulties in these children, and perhaps in other L2 children in Namibia, may be identified early using the same cognitive and linguistic measures designed for English L1 monolingual school children even before they develop proficiency in their second language (Everatt et al, 1997; Hutchinson et al, 1997; Geva, 2000). Furthermore, utilizing these measures might be likely to minimize over-identification and under-identification of literacy disabilities and other learning disabilities among L2 users such as Namibian bilingual school children.

All of the five children who make up the cases with literacy difficulties showed deficient phonological awareness in the L1, L2 or both L1 and the L2. Given that phonological awareness is transferable between languages, and as such influences the development of literacy across languages, it may be plausible to argue that poor phonological awareness in one language might curtail the development of literacy in another language. Thus, deficient L1 phonological awareness, as is presented in these cases, may have negatively affected literacy development in the L2 and vice versa.

As Scarborough (1998) has shown, verbal short-term memory has been found to be deficient in many reading disabled children, although not necessarily all the time. Disabled readers remember fewer verbal items than expected for their age. On the contrary, they show normal memory span for visual information (Snowling, 2000). Disabled readers' memory impairment is attributable to impaired representations of the phonological forms of words, which in turn, limits the number of verbal items disabled readers can retain in their memory (Snowling, 2000). Consequently, this affects their working memory such that remembering the sequence of sounds that can be coupled together to form a word becomes difficult. In this way, the eventual effect is that reading is also affected. As can be seen from these five cases, all the children who showed deficiencies in verbal working memory in either L1 or L2 also showed poor literacy skills in either language. At the same time, although fewer children showed poor visual information processing skills, the majority also showed strong skills for processing visual information, as is reflected in their performance on the spatial span (CORSI blocks) tasks, particularly at time 1. Thus, these may confirm previous findings that disabled readers have difficulty with verbal short-term memory but not with information requiring visual memory span.

According to Wolf (1986), disabled readers, or dyslexics, are slower than same-age normal readers in completing tasks requiring naming familiar objects under timed conditions. The majority of children who presented with literacy difficulties in this study also presented with deficits in rapid naming of objects they were expected to be familiar with. Again, this study may further confirm earlier findings that disabled readers are slow at naming familiar objects. The slowed rate of naming familiar objects can slow down the rate at which these children can read at both the word and sentence levels. They may be slow in automating their reading process, thereby heavily influencing their reading (Bowers & Wolf, 1993) and eventually, the comprehension of what they read. The co-occurrence of phonological awareness deficits with rapid naming deficits in some of these children may spell more severe literacy difficulties for them as a result of a "double-deficit" in both their naming speed and their phonological processing skills.

Dyslexic children show difficulty with the processes of speech production. Earlier on, Snowling (1981) had shown that dyslexic children four years older than their controls had difficulty repeating non-words, but not with the repetition of words. At least three of the five children with literacy difficulties (Cases 86 and 103) also exhibited difficulty with repeating strings of non-words, particularly in L2. This finding seems to have confirmed previous findings that children with reading problems do indeed experience difficulties with the repetition of words unfamiliar to them, or with make-up words. The inability to repeat such words, or non-words, may indicate that the critically important phonological processes that are necessary for the ability to repeat non-words or unfamiliar words may be impaired, and therefore possibly lead to the literacy difficulties these children experience. According to Snowling (2000), defective skills in processing non-words or unfamiliar words can have long-term effects on the nature of the lexical representations that disabled readers can build for words. All aspects of retrieving words can be affected by this inability. This being the case, it is plausible that these children are likely to have difficulty with a whole range of activities that involve word and/or name retrieval and therefore, literacy in general.

At least two of these four children are in their early teens (12 and 13 years old respectively) and are still in primary school. This is obviously a serious delay in progressing through the educational system that may be attributed to the literacy difficulties these children seem to experience. While teachers and parents may be wondering as to what causes this delay, the answer, or part thereof, may lie in the deficiencies these children seem to present. Therefore, it is probably no wonder these children are still in elementary school. The ability to read and write forms the foundation of education. Without these two skills, higher levels of education become difficult if not totally impossible to attain. These two children, and many others in Namibian schools who encounter literacy problems, are an example of what happens when literacy fails to develop either due to lack of proper educational opportunities or genuine cognitive and linguistic deficits. Of course, the particular child with literacy problems ends up being the most disadvantaged victim of an educational system that does not have the capability (probably due to a lack of financial or human resources or both) to provide the necessary and relevant services to children with special educational needs.

One of the objectives of this research project was to identify those factors that may predict the development and failure of literacy skills among Namibian school children. This objective may have been achieved, or at least, this study may have laid the foundation for identifying these problems. Furthermore, it is hoped that the cognitive and linguistic factors that may be related to the literacy difficulties these children seem to present with will become part of the arsenal of tools authorities and all others involved in the delivery of special educational services will use in delivering the right kind of special educational services to those children who need them the most. Of course, further research with Namibian children of the other language groups not included in this study is necessary to be able confirm with a higher degree of certainty the role these cognitive and linguistic processing skills play in the development of literacy across the various Namibian language groups.

Chapter Eight

GENERAL DISCUSSIONS, CONCLUSIONS, AND RECOMMENDATIONS

8.1 Overview of Research Findings

This chapter will present a summary of the aims and objectives and the results of this research project. It will draw together the conclusions derived from the various findings generated by the different sections of the research. These findings should inform perspectives on the development of literacy in the Namibian bilingual school children, in particular the Herero-English bilingual children. They should also provide insights into the processes involved in, and the demands these processes place on the bilingual children in the course of literacy development in two languages such as Herero and English. Although these findings relate to the Herero-English bilingual learners, and therefore cannot be assumed to generalise to speakers of other community languages in Namibia, there may be a lesson to be learned from these findings that may help understand the general process of literacy development in Namibian children of other language backgrounds.

From a practical perspective, this information should support Namibian educators' and legislators' role in distinguishing between a bilingual child who experiences literacy problems due to deficits in cognitive/linguistic processes and a bilingual child who experiences literacy problems as a result of factors such as inadequate or inappropriate literacy instruction, insufficient educational opportunities, lack of access to literacy material, lack of literacy support in the home environment, and the mere lack of knowledge of the second language in which the child has to learn at school. The research investigated the underlying cognitive and linguistic processing skills involved in the development of literacy in Namibian bilingual school children and examined the cognitive and linguistic factors that may lead to literacy difficulties in this population. In a multi-lingual educational context, especially where children have to learn in a second language, educators are confronted with the difficulty of differentiating between constitutional literacy problems and transitory literacy problems related to lack of knowledge of the second language. Thus, the chief aim of this study was to create an understanding of the processes involved in the development of literacy in Herero and English, two languages that differ radically in terms of their orthographic depth. For this reason, the research specifically selected Herero-English bilingual elementary school children who attended Namibian public/government schools both in rural and urban areas where the government's policy of delivering instruction in the child' mother-tongue for at least the first three years of primary school was implemented. Only after the third year does English, the nation's official language, become the medium of instruction, with the child's relevant mother-tongue becoming a school subject. This process is probably best described as a transitional education programme and leads to the current research project differing from others of its kind, such as that found in Gholamain & Geva (1999) and Geva & Segal (2000), in that the second language in which the bilingual children studied forms an integral part of their school curriculum. In addition, the children tested as part of this thesis received their literacy instruction through teaching methods primarily based on whole word recognition. Again, this differs from previous work where research has been confined to teaching contexts that give more emphasis to the relationship between written symbols and language sounds. Despite these differences in bilingual education policy and teaching method, the findings of the present research were consistent with those of the previous work discussed (i.e., Gholamain & Geva, 1999; Geva & Segal, 2000).

This research project was divided into three studies, with the first being a cross-sectional study in that it tested different children from grades 2 to 5. This initial study aimed to investigate the cognitive and linguistic factors that predict literacy in the two languages used by the sample. The findings were consistent with the predictions derived from the literature in that children showed evidence of acquiring Herero literacy skills faster than English literacy skills (potentially due to the different levels of orthographic complexity of the two writing systems), while at the same time evidence was obtained for common underlying cognitive/linguistic processing skills influencing the development of literacy in both languages.

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The data generated by the first study indicated faster rates of acquisition for word reading and word spelling tasks across grades 2 to 5 in the children's L1 (Herero) compared to the children's L2 (English). Although these findings could be related to differential language skills between the L1 and L2, the level of the interaction effect in these literacy measures was not matched by similar effects in listening comprehension and word interference. These findings, therefore, suggest a specific effect in literacy acquisition that is not necessarily related to automatic processing. A similar interaction between grade and language in the nonword reading task suggests that the faster rate of improvement seems more likely to be due to script-based factors, such as the ease with which letter strings can be decoded with a more transparent script. However, the possibility that other factors such as this the amount of exposure to L1 can potentially influence the rate of improvement in L1 literacy cannot be entirely excluded.

However, in contrast to this script-based effect, the data indicated common predictors of Herero and English literacy skills, at least at the word level, which were consistent with the importance of the underlying phonological and/or lexical access processes. Most interestingly, the study showed the presence of interdependence between Herero and English in terms of factors predicting the development of literacy within and between the two languages. Results showed that underlying phonological processing skills that were tested in English were better predictors of the development of literacy in Herero than the corresponding skills in Herero. Such cross-language effects are more consistent with common processes underlying the acquisition of literacy in the two languages.

The second study provided a longitudinal perspective on the gains in literacy made by the cohort over a period of one year and the predictors of those gains. Again, the findings were consistent with faster gains in Herero literacy development and common cognitive/linguistic factors (particularly phonological awareness) predicting the level of literacy achieved by the cohort in both Herero and English. The longitudinal study, thus, reaffirmed the findings of the cross-sectional study in that literacy development continued to develop faster in the more transparent orthography. In contrast, predictors of literacy that are consistent with the importance of phonological processing skills remained evident one year later. These cross-linguistic effects again suggest that common underlying processing skills remain an important factor in influencing literacy development across both languages.

The third study focused on those children in the study who showed signs of literacy difficulties. Evidence was sought to indicate whether literacy difficulties would be more pronounced in the less transparent script (i.e., English) than the more transparent script (i.e., Herero) or whether deficient cognitive/linguistic processing skills lead to literacy difficulties in both languages. Detailed profiles of five single cases that represented the literacy difficulties found amongst the cohort were presented. Although each case presented showed evidence of unequal literacy acquisition between the two scripts, there was no evidence for differential deficits to be specific to one of the scripts; deficits seemed as likely in the more transparent script than the less transparent one. For each case, there was evidence for deficient cognitive and/or linguistic processing skills in one or both languages that may be potential sources of the literacy difficulties these children experience. These suggested five different categories of literacy difficulties of which each case was an exemplar. These categories were based on predictions derived from the literature, but were not necessarily consistent with a strict interpretation of the script dependent hypothesis. For example, while one child's literacy problems may be related to L1 cognitive and linguistic deficits, another child's literacy problems may be related to L2 cognitive-linguistic deficiencies, while a third child's problems may be linked to deficits in both L1 and L2 processes.

The findings of the three studies have implications for the two theoretical perspectives that informed this research, namely the central processing hypothesis and the script depended/orthographic depth hypothesis.

8.2. Theoretical Perspectives: The central processing and script dependent hypotheses account of literacy development in Herero-English bilinguals

The assertions of central processing and script dependent perspectives have been outlined in detail in chapter 4. The basic predictions of the central processing hypothesis are that cognitive and linguistic processing skills are at the centre of literacy development, and that these common underlying processing skills are likely to predict individual differences in literacy skills in L1 and L2. Such skills include phonological processing skills, verbal short-term memory, and orthographic processing skills. As such, basic literacy skills in L1 and L2 can be expected to correlate despite the orthographic complexity and regularity of the two languages. Thus, according to the central processing hypothesis, children who encounter difficulties in developing literacy in the one orthography are also likely to experience the same difficulty in the other orthography. This difficulty will be due to defective cognitive and linguistic processing skills.

The script dependent hypothesis, on the other hand, maintains that the varying degrees of orthographic complexity will influence the development of literacy. In shallow or transparent orthographies, which allow a direct one-to-one correspondence between graphemes and phonemes, literacy development will progress faster than in deeper orthographies. Similarly, literacy difficulties are likely to be more pronounced in deeper orthographies than in shallow ones.

Regression analysis methods performed on time 1 and time 2 data showed that common underlying processing skills predicted performance in word reading and spelling skills in both Herero and English. With the exception of other measures of literacy, underlying phonological awareness skills were the strongest predictors of word reading and spelling in both languages. This cross-language, central processing conclusion is given particular support by the finding that L2 phonological skills were reliable predictors of literacy development in L1. L2 phonological awareness measures predicted more variability in both L1 and L2 literacy than L1 phonological awareness measures. Likewise, L1 language comprehension skills were the better predictors of literacy development in L2. This cross-linguistic prediction of literacy skills between Herero and English shows the role underlying cognitive and linguistic skills play in the acquisition of literacy within and across the two languages. The longitudinal study revealed similar cross-linguistic predictions of literacy development, although to a smaller degree than that shown in the cross-sectional study findings. The fact that the cross-prediction of literacy development occurred at both times 1 and 2 is indicative of the relevance and importance of the common underlying cognitive and linguistic skills in the development of literacy development within and across languages.

The data also provided some support for the script dependent hypothesis. Although individual differences in underlying cognitive and linguistic skills explained the development of literacy in Herero and English, the role of orthographic complexity was indeed noticeable in the rate of literacy development in both languages; i.e., literacy development progressed faster in Herero than it did in English. As Herero is a shallow or more transparent orthography, the likelihood of learning to decode it accurately is much higher. The complexity of the English orthography, on the other hand, places heavier cognitive, linguistic, and orthographic processing demands on the L2 learner let alone on the L1 speaker of English. The end result may be different profiles of literacy acquisition for Herero and English. The findings were consistent with predictions derived from both the central processing and script depended hypotheses. Furthermore, these findings led to the conclusion that although these two perspectives may appear to be contradictory, they are complementary. Similar conclusions were arrived at by Geva and Siegel (2000) and Gholamin & Geva (1999).

Investigations of the profiles of the single cases presented in chapter 7 seem more consistent with the central processing perspective. The analyses performed indicated that the children who presented with literacy difficulties all had deficient underlying cognitive and linguistic processing skills that are prerequisite to literacy development. Compared to the children who performed well in literacy tasks in this study, these five children differed from the good readers in phonological awareness skills and other cognitive and linguistic processing skills associated with poor literacy skills. This finding suggests that deficiencies in specific cognitive-linguistic skills in this cohort may be at the centre of their literacy difficulties, thereby providing further support for the central/universal processing hypothesis. However, the data do not seem to provide conclusive evidence that literacy difficulties in L2 are more severe than in L1. Although children presented with literacy difficulties in both languages, none of these seemed to be more severe in the one language than in the other.

Although it is a commonly held belief about bilingual children's reading development that the processes influencing the development of literacy skills in L1 and L2 differ, Geva (2000) and Geva et al (1999) have shown that this perspective may be incorrect. For example, Geva et al's findings suggested that phonological processing skills explained roughly equal levels of variance in L1 and L2. The research presented as part of this thesis generated further evidence that common processes influence the development of literacy across languages/scripts. The same underlying linguistic processing skills that predicted literacy development in L1 also predicted literacy development in L2. According to the phonological core model, phonological awareness is one of the strongest predictors of literacy development. From the findings of the cross-sectional study, it is clear that phonological awareness featured very strongly as a predictor of literacy development in both Herero and English in the Namibian bilinguals. That is, those children who were capable of perceiving the small units of sound in spoken language in both Herero and English were successful at mapping the right grapheme to the correct phoneme and, hence, were able to decode words in both languages. In addition, their ability to conceptualise and reflect on the sounds of Herero correlated very well with their ability to read and spell words in English and vice versa. This cross-linguistic finding provided further support for the universalist transfer notion of literacy development.

The role of phonological awareness in literacy acquisition amongst English monolinguals, as well as monolinguals from other alphabetic languages, has been widely reported in the literature (Adams, 1990; Goswami, 2000; Snowling, 2000). The research presented in this thesis replicated this pattern in Herero-English bilinguals, extending the evidence for the crucial role played by phonological awareness in literacy development across different languages and orthographies. Herero may be added to the list of those alphabetic languages where phonological awareness predicts variability in the development of literacy skills. Furthermore, the fact that the same phonological processing skills underlie the development of literacy skills in Herero and English, especially when considering that these two languages differ in their orthographic depth, implies that it is possible to assess literacy difficulties cross-linguistically even prior to the development of L2 oral proficiency.

8.3. Future Research

8.3.1. Effects of L2 phonological skills on L1 literacy development

This research project showed that, of the tests used, phonological awareness was the strongest predictor of literacy development in Herero and English in Herero-English bilingual school children. It also showed that among the same children the ability to process English sounds and to repeat a string of non-words in Herero is related to the development of literacy in Herero and English respectively. That English phonological awareness can have an impact on Herero literacy acquisition is indeed an interesting finding, especially when one considers the differences in orthographic transparency between Herero and English. This finding may confirm Durgunoglu's (1997) view that cross-linguistic transfer of literacy skills can be bi-directional; that is, L1 literacy skills can influence L2 literacy skill and vice versa. However, for L2 literacy skills to transfer to L1 literacy skills, literacy instruction must have started in the L2. The findings of this study may suggest that this condition (where literacy instruction is first carried out in L2), although necessary for the transfer of literacy skills from L2 to L1, may not be sufficient to effect the transfer of literacy skills by itself. In addition, cognitive-linguistic factors may aid in the development and transfer of literacy skills across languages, even from the less dominant and less transparent to the more dominant and more transparent language. In the case of this cohort, the English phonological awareness may have been developed well enough to affect the observed transfer despite the fact that literacy instruction starts in the L1. Not much can be made of this cross-transfer of phonological processing skills from an L2 to L1 until further research has been conducted between the other Namibian languages as L1s and English as an L2 to confirm or refute this finding. Besides, the effects of the second language cognitive-linguistic processing skills on

Namibian languages as L1s and English as an L2 to confirm or refute this finding. Besides, the effects of the second language cognitive-linguistic processing skills on the acquisition of literacy in L1 are certainly an area that needs further exploration by future research.

It cannot be assumed that phonological awareness would influence the development of literacy in the other Namibian languages in the same way as observed in Herero. Other potential research projects in Namibia need to determine the predictors of literacy development in these languages. Furthermore, it would be especially interesting to study those Namibian children who begin literacy instruction in the L2, or go through submersion educational programmes as opposed to transitional bilingual educational programmes, and then transfer to schools where literacy commences in L1, to determine the course of literacy development they follow. This interest emanates from observing children during this research project that had transferred from submersion programmes to transitional bilingual educational programmes and appeared to be struggling with literacy. Whether this difficulty is merely transitional, or may be related to the risks involved in beginning literacy instruction in the L2, to deficient cognitive-linguistic processing skills, to underdeveloped L1 as a result of early educational experience in L2, or to some other factors is unclear. Future research would have to tease these issues apart and attempt to determine the factors that may underlie these problems in order to help many other children who may experience literacy problems when in transition between educational programmes in Namibia.

8.3.2. Teaching phonics versus the whole word method

It was mentioned that literacy instruction in Namibian schools seems to be using the whole word method (see sections 1.1.4 and 5.3.7). The findings of this study show that phonological awareness was the strongest predictor of L1 and L2 literacy development. Given the orthographic transparency of Herero, it seems plausible to argue that literacy instruction based on phonics would accelerate the development of literacy in this language. Thus, future studies may compare the effects of phonics teaching and the whole word method on literacy development in Herero and other

Namibian L1 on the one hand, and English on the other over the primary school years (Grades 1-7). Such studies may establish the educational level at which each of these two methods would have the strongest impact on literacy development in L1 and L2. This may help inform literacy teachers and literacy programmes designers to emphasize the method that seems to be more effective in literacy development in a given language.

8.3.3. The effects of the larger units of phonological awareness on L1 and L2 literacy development.

The current study assessed the effects of phonological awareness at the phoneme level (beginning phoneme and ending phoneme) on L1 and L2 literacy development. Future research may investigate the effects other levels of phonological awareness such as syllables and onset-rimes may have on literacy development. The different levels of phonological awareness could be compared to see which levels would predict literacy development in L1 and L2. This may help in the design of literacy instruction for the different languages, with emphasis on the training of phonological awareness being placed on the level that has more predictive power in literacy development in the respective languages.

8.3.4. Spatial span skills and literacy development

Results from this study show that this cohort performed well in spatial span (CORSI blocks) tasks. This is an interesting finding and calls for further investigations to find reasons for such performance.

8.4. Practical implications of the conclusions drawn from these findings

The conclusions drawn from these findings have certain implications for literacy instruction in Namibian primary schools, for the assessment of literacy difficulties in bilingual children in Namibia and, of course, for the prevention of, and intervention, in literacy difficulties of Namibian bilingual children. Each of these will be discussed in the following sections.

8.4.1. Literacy Instruction

The literature on literacy development clearly shows that the basic prerequisite skills for the development of literacy in a host of languages are those that relate to phonological awareness. The current research project has demonstrated the importance of such skills for Herero-English bilinguals. Thus, it seems plausible to suggest that literacy instruction in Namibian bilinguals place more emphasis on developing the children's phonological awareness. This is important when considering the high transparency of the Herero language and the other African languages spoken in Namibia, including some European languages that form part of the Namibian repertoire of languages, e.g. German and Afrikaans. The teachers, therefore, must ensure that they provide a well-designed (whole language) instructional programme that places special emphasis on the alphabetic principle in the early years of primary school. This means that emphasis must be placed on phonological awareness training that involves segmentation and blending of sounds, deletion, word-to-word matching as well as sound-to-word-matching. Letter identification and attaching sounds to letters should also constitute part of phonological awareness training. Therefore, if literacy instruction involved teaching letters and letter sounds the children would be able to identify the letters and attaching sounds to the letters (grapheme-phoneme correspondence rule), and training in blending would enable the children to blend the letters to form words. By following such a training schedule, the children would learn how to decode words (Stahl, 2001).

Similarly, spelling instruction should follow more or less the same sequence, e.g. segmenting the spoken words, assigning sounds to each of the letters in the words, and then writing down the words. However, spelling instructions should involve more than phonological awareness training that teaches the children decoding. Orthographic awareness should also be emphasized, especially in English spelling instruction, for many irregular English words do not lend themselves to phonologically based spelling. The same may hold true for some, although very few Herero words. With literacy instruction that involves heavy phonological awareness training the development of literacy skills in Herero and the other transparent Namibian languages might occur faster and earlier than if instruction was based on the whole word method, which would probably be more effective with English given its orthographic irregularity. At the end of the day, however, the method that works best should be based on the phonological structure of the language being taught.

Phonological awareness training can be supplemented with early systematic phonics instruction, especially in pre-school and first grade literacy instruction programmes, for it is at this stage of literacy instruction that phonics seem to be more effective as well as with those children who struggle to read early in their school years (Stahl, 2001). Phonics instruction involves teaching the children about the direct correspondence between phonemes and graphemes, about the orthographic patterns of words, and the manipulation of sounds in written words via spelling exercises. There are a variety of phonics instruction methods, each emphasizing certain aspects of reading and spelling. As to which one(s) would work better for the Namibian situation would have to be determined by the contents of each method and the needs and characteristics of the children. What is important is that literacy instruction in Namibian languages involves both phonics and phonological awareness training.

8.4.2 Assessment of literacy difficulties in L2 Namibian children

It is popular belief among educators and researchers, especially those who emphasize the development of reading comprehension in L2 learners, that L2 learners experience literacy difficulties in their L2 because they lack the necessary L2 proficiency (Geva, 2000). This belief has led to the assumption that it is difficult to diagnose literacy difficulties in L2 learners until they have acquired the necessary L2 language proficiency. As a consequence, L2 learners are, or have in the past been over-represented in special educational programmes. To combat over-representation of L2 learners in special education programmes, the new trend is to delay the assessment of literacy difficulties among L2 learners until they have established the necessary oral proficiency in their L2. However, this approach has its own drawbacks that do not augur well for the bilingual child who may have genuine literacy difficulties that may warrant immediate intervention.

Research evidence generated by Geva (2000) has questioned this belief, indicating that oral language proficiency in the L2 does not play much of a role in literacy skills at the word level. Of importance for reading at the word level, or for decoding words, are adequate literacy instruction and the degree of orthographic complexity of the L2. Thus, to delay assessment of literacy difficulties until the L2 learners have acquired sufficient L2 oral proficiency is not necessary as oral proficiency is not a good predictor of these basic L2 reading skills. As a matter of fact, Geva suggests that assessment of literacy difficulties should be carried out even in the absence of L2 oral language proficiency. This is possible by employing two alternative complementary sets of procedures of assessing literacy difficulties in L2 children to oral language proficiency indices. The first of these methods involves the assessment of phonological processing and rapid basic reading skills. The second one involves assessing the discrepancy that may exist between the child's reading and listening comprehension skills, with a wider gap between these two indices in favor of listening comprehension skills being indicative of potential reading disabilities and not with verbal comprehension of language. This is, of course, provided the child progresses successfully through the educational system, and receives adequate and consistent literacy instruction.

Designed for use with L1 children, these procedures can also be used reliably with L2 learners to generate profiles of reading difficulties among children who fail to acquire literacy despite adequate literacy instruction and sufficient oral language proficiency. The beauty of these procedures is that they reduce the risk of false positives and false negatives as well as over-representation of L2 learners in special education programmes and the under-representation of L1 learners in such programmes. Furthermore, they allow for assessment of potential literacy difficulties to be carried out as early as the second year of formal schooling. Thus, instead of delaying assessment until a child becomes proficient in the L2, and in the process deny that child the necessary special needs assistance he/she needs, employing these two methods may provide the answer to L2 learners' literacy difficulties. Utilisation of these two procedures is definitely not at the expense of oral proficiency. While the child develops the oral proficiency, he/she should also receive intensive instruction that will help him/her develop strong decoding skills.

dyslexia, or literacy difficulties. The prevalence of literacy difficulties in each of these groups of children was very similar along the measured cognitive and linguistic measures. Owing to these findings Geva et al concluded that L2 learners' literacy difficulties could be diagnosed early on before they have the necessary L2 oral language proficiency. In an earlier study of literacy development in emergent bilingual children, Hutchinson et al (1997) found similarities in performance in cognitive and linguistic measures (reading accuracy/decoding skills, phonological skills) between L2 groups and English L1 groups in measures of decoding skills. This similarity in the levels of performance on these measures has prompted Hutchinson et al to conclude that tests of phonological skills designed for English L1 children can also be used with English L2 children to identify literacy difficulties among them. Everatt et al (1997) also reached the conclusion that bilingual children may stand to benefit from early screening measures designed for English L1 children.

The current research project revealed that phonological awareness skills predict literacy development (at the word level) in both Herero and English, and that all the children who presented with literacy difficulties performed poorly in those cognitive and linguistic measures associated with the development of literacy. This is indeed testimony to the fact that screening tests alluded to above may be used to reliably identify Namibian bilingual school children that may be at-risk for literacy difficulties. Thus, to identify Namibian Herero-English bilingual school children, and possibly all other Namibian bilinguals, who may be suffering from literacy difficulties, tests of phonological processing skills can be used. In addition, children with literacy difficulties can benefit from tests assessing the discrepancy between the children's reading and listening comprehension skills. These tests will enable educators, psychologists, and other professionals to differentiate between those children who are experiencing phonologically-based literacy difficulties and those children who may experience literacy difficulties as a result of inadequate instruction and due to temporary L2 based language based problems.

Findings from recent studies investigating literacy difficulties in bilingual children suggest the possibility that literacy difficulties may exist in one language but not in another (Everatt, Smythe, Ocampo, & Veii, 2002). That is, it may exist in Herero only but not in English, or only in English but not in Herero, a phenomenon referred to as differential dyslexia by Smythe & Everatt (2002). It is, therefore, necessary that assessment for literacy difficulties is carried out in the affected language. It may also be possible that literacy difficulties may exist in both Herero and English (as the cases of literacy difficulties in this project showed-see chapter 7) and manifest themselves in different underlying cognitive and linguistic processing areas in both languages where "cross-contamination" may occur. For example, phonological deficits in Herero may be reflected in rapid naming deficits in English. In that case, assessing literacy difficulties in both languages might be more appropriate to ascertain the language in which a child is experiencing specific literacy difficulties. By so doing, discerning between those children who need special needs assistance and support and those who do not will be facilitated significantly and will lead to scarce resources being utilized effectively and appropriately.

8.4.3 Prevention and intervention of literacy difficulties

Prevention of literacy difficulties in Namibia will be an enormous and costly task, as it will involve testing many children. Government and other bodies will have to demonstrate more than just their obligations to achieve this objective. That is, besides merely fulfilling only obligations, they have to be willing and prepared to invest whatever resources may be necessary to identify, intervene in, and prevent literacy difficulties before they become deeply entrenched. Once children at risk for literacy difficulties have been identified, intervention can then be embarked upon. In the case of the five cases presented here, intervention or support of their learning can be based on the same underlying areas of weaknesses, which seem likely to focus on the phonological processes in the cognitive domain, although support may be necessary to support general linguistic deficits. If a child shows deficits in semantic fluency, for example, then individual interventions for that individual child might include procedures to improve general linguistic knowledge. Similarly, a particular child's literacy and cognitive profiles may also show areas of strength. Thus, teaching and support strategies, or an Individual Educational Plan for a particular child, based on the assessment of literacy difficulties, should also profile strengths and weaknesses, the specific needs of that child as well as the time period and resources necessary to realize the plan (Smythe & Everatt, 2002). It would then be expected that the child would make better gains in literacy if intervention strategies match this profile (Everatt, Smythe, Ocampo, & Veii, 2002).

To be more effective, intervention in literacy difficulties necessitates the review and updating of the Namibian Ministry of Education policy which guides special education. As stated in chapter 1, this policy document seems to lack certain pertinent conceptual and operational definitions and diagnostic criteria of learning disabilities, including literacy difficulties, with the result that this ambiguity makes the correct diagnosis of disabilities impossible and erroneous at times. Thus, the ministry tasked with the provision of special educational services has to make a concerted effort to rethink and rewrite the guideline policies to ensure that diagnosis of learning disabilities and specific literacy difficulties is based on proper conceptual and operational definitions and well-established diagnostic criteria. Such a move may facilitate the diagnostic process and may ensure that the right child gets the right kind of special needs support. Furthermore, it will facilitate the communication process amongst the professionals working with children with (specific) learning disabilities.

It should be noted, however, that in spite of the extensive research in the area of literacy difficulties there is no commonly agreed-upon definition of literacy difficulties such as dyslexia and its underlying causes. Practitioners and other professionals in different countries use different terminologies to refer to literacy difficulties (dyslexia). Thus, it is imperative that Namibia adopts a definition that will guide the diagnostic and treatment process of literacy difficulties in Namibian children. The following definition (Smythe et al, 2002) takes into account features that are important in the diverse monolingual and bilingual educational contexts, and might be worth considering:

> *Dyslexia is a difficulty in the acquisition of literacy skills that may be caused by combination of phonological processing and visual and auditory systems deficits. Lexical confusion and speed of processing difficulties may also be present. The manifestation of dyslexia in any individual will depend upon not only individual*

that are important in the diverse monolingual and bilingual educational contexts, and might be worth considering:

> *Dyslexia is a difficulty in the acquisition of literacy skills that may be caused by combination of phonological processing and visual and auditory systems deficits. Lexical confusion and speed of processing difficulties may also be present. The manifestation of dyslexia in any individual will depend upon not only individual cognitive differences, but also the language used (p.73).*

In addition to this, government and other relevant bodies must invest in the development of human resources such as school/educational and clinical psychologists as well as special education teachers, and reading specialists that will cater to the needs of children with special educational needs. These professionals will have to be trained with a special emphasis in the diagnosis and treatment of literacy difficulties. This, of course, is a long-term and expensive exercise, but it is absolutely imperative that it is embarked upon if Namibia as a nation wants to encourage, promote, and nurture a strong reading culture among its citizens, for it is believed that a nation's economic prosperity is determined by the high rates of its citizens literacy. In fact, many adult literacy programmes in many countries, especially in Africa, are based on the premise that high literacy rates lead to economic development. Therefore, the Namibian government and other partners in education have to sacrifice scarce resources to invest in the development of human resources that will make a change in the lives of those children who otherwise would be condemned to a fate of illiteracy or poor literacy that may not necessarily reflect or match their level of intelligence.

8.5. Recommendations

8.5.1. Language education and instruction policy must be maintained and implemented more widely

The findings of this project have shown how literacy development progresses faster in Herero, the first language, compared to English in the sample of the children studied. This can be attributed to aspects of the script or to the fact that literacy instruction begins in Herero and, as such, more time is spent on learning to read and write in the L1. Furthermore, Herero is the predominant language these children use in their every day life. Therefore, they are more than likely to gain proficiency and literacy first in it than in any other language. For those who are fortunate to have home environment support, they are likely to have a jump-start at reading in Herero, and possibly in English if the parents are literate in the English language.

The Namibian government has instituted a language-education policy in schools that stipulates that instruction be in the child's first language for the first three years of school, with transition to English to be made after some time. The government has based this policy on the premise that learning progresses faster if it is first carried out in the child's mother tongue. The findings of this study argue for the continued use of such bilingual policies. It is, therefore, recommended that the policy be implemented in all public schools, including urban public schools, which currently do not implement this policy. How this policy will be implemented in urban schools where children come from various linguistic backgrounds can be worked out so that children can get an opportunity to receive instruction in their respective L1s. With the implementation of such policies in schools, there should be an increased likelihood that Namibian children will become biliterate, not only bilingual.

It is for a number of reasons that it is strongly recommended that this policy be implemented widely. First, the development of literacy is dependent on sound and well-developed linguistic skills. Therefore, emphasis must be put on developing the children's language skills, which, in the Namibian case, is usually the child's native language. This means that whole language instruction must accompany literacy instruction to ensure that literacy development will be supported by strong first language skills. According to Cummins' (1979; 1980) threshold hypothesis, an L2 is acquired with much more ease when the L1 is developed fully and all its structures are well internalized. Thus, well-developed first language skills will form a strong foundation on which to build the second language skills and, ultimately, second language literacy skills. At the same time, care should be taken not to use the child's native language as a tool for the acquisition of the required proficiency

Furthermore, it is important, and to the advantage of the child for literacy instruction to begin in his/her L1 (or whatever language the child knows best) because reading is a process whereby meaning is constructed from the text. For that reason, it would be difficult and perhaps de-motivating to read words in a language (L2) a child is not familiar with (Collier & Thomas, 1989). The underlying point is that children must have intrinsic motivation and interest in reading, and these qualities must be cultivated early on in the child's process of literacy development. Because they are familiar with their own language, chances are that children will develop the motivation and the interest to learn to read, for they will have the confidence and feel competent to accomplish literacy. Furthermore, the advantage of learning to read and write first in the native language is that literacy acquired in the L1 transfers quickly once the child attains the required proficiency in the L2. Besides, using the child's L1 in the early school years along with the gradual introduction of English, will be likely to prepare the child for an emotional adjustment he/she has to make to the L2 he/she will eventually encounter as the medium of instruction throughout his/her educational career. At the same time, the child will also realize and recognize the functions and the usefulness of his/her own native language (see Jacobson, 1982). Hence, the strong recommendation that government must enforce the implementation of the language-education and instructional policy in all public primary schools in Namibia.

Secondly, beginning language and literacy instruction in the L2 in which the children lack proficiency involves potential risks of reading problems as they are confronted with an utterly unfamiliar language possibly with references to an unfamiliar cultural background (Downing, 1984). This does not necessarily mean that beginning instruction in an unfamiliar L2 will inevitably lead to failure, as many children in Namibia (and elsewhere in the world) have started and successfully acquired literacy in the L2. The point is that there is an increased risk for literacy difficulties for children who begin their literacy instruction in an unfamiliar L2. Given that children have to learn to understand that reading means accessing and construct meaning out of text, learning to read in a language they do not understand and from which they cannot construct meaning may put them at risk for literacy difficulties. This is because in order for children to become fluent in decoding words in the L2, they should have an understanding of the "phonemic distinctions represented graphemically in the L2" (Verhoeven & Durgunoglu, 1998). In order for them to be able to access lexical items through reading, having phonological and semantic representations in their lexical dictionary to facilitate access to these items is an absolute necessity. Furthermore, to become good readers, children will need readily available texts, which they can understand with ease. Providing children with text that they find hard to follow is likely to lead to loss of interest in that reading material. Thus, to develop and maintain the interest and motivation to learn to read, and ultimately acquire literacy with ease, it is important that literacy instruction begins in the child's native language.

Finally, another risk involved in beginning literacy instruction and teaching in the L2 is that children may be denied the opportunity to become biliterate. A focus on teaching literacy in the L2 will increase the likelihood of the children remaining illiterate in their own language. This is likely to be a common phenomenon in Namibia among those urban children who attend the pre-independence all-white schools. This kind of arrangement can hold potential danger not only for the children who may be denied the opportunity to become literate in their own native languages, but to the languages themselves. As children may grow up not showing interest in becoming literate in their native languages, these languages are likely to be left to their own fate, at least as far as literacy skills are concerned. Eventually, native languages, or at least their written forms, will face potential extinction, as the new generations may remain illiterate. In turn, this may significantly reduce the usefulness of the written form of these languages, and ultimately the need for printed material both in and outside of school in Namibian native languages. As a consequence, part of the Namibian culture may be lost, as language could be argued to be an integral part of a culture and losing a language can easily amount to losing a culture. Thus, government is strongly recommended that it adopts a language maintenance policy that will serve to maintain and preserve the Namibian native languages in written and spoken forms, while at the same time it promotes and encourages active participation in the English language, which the government has already done by adopting it as the official language of the nation. Such policy would be expected to lead to better appreciation of what Verhoeven & Durgunoglu (1998) languages in written and spoken forms, while at the same time it promotes and encourages active participation in the English language, which the government has already done by adopting it as the official language of the nation. Such policy would be expected to lead to better appreciation of what Verhoeven & Durgunoglu (1998) call cultural pluralism, as every ethnic group in the country will be likely to consider itself valued, appreciated, and equal to all other ethnic groups. It is important that each group is accorded the support it needs to maintain its identity and culture through language in both the written and spoken forms so that it can be free to express itself. Although English is now the language of power, opportunities, and social advancement in Namibia and, as such, cannot be shied away from, its promotion and elevation cannot be at the expense of literacy in a child's own native language.

Advocating a language maintenance policy should not be misconstrued to mean promoting racism, tribalism, and separate educational facilities for the different ethnic and racial groups of Namibia nor should it be used to achieve such objectives. Some groups may want to use the notion that children learn better if instructed in their mother tongue as a pretext to establish separate private schools for their children where the medium of instruction will not be English but their own language. Such a practice is tantamount to racism and/or tribalism, and government should guard against this. Although the Namibian constitution may not prohibit such practices, establishing such educational facilities, especially if they are to directly or indirectly exclude other groups, should be discouraged and countered by providing opportunities in existing integrated public (and private) schools for literacy instruction to begin in the children's native languages. In essence, this is the same as calling for the wider implementation of the existing government language-education and instructional policy.

These recommendations are made with the understanding that there are certain practical problems that have to be taken into account when the policy of language maintenance has to be implemented. For example, there may not be enough resources, both financial and human (teachers), to run teaching and training programmes in the vernaculars. Similarly, printed material in the vernaculars may be in short supply, some legislators and politicians may object to instruction in the native language on grounds of threatening national unity and retarding national economic and technological advancement. Other stakeholders, such as parents, may argue that instruction in the vernaculars will not serve their children's social mobility and employability needs. Suggestions for the resolutions of these problems are beyond the scope of this dissertation; however, government, parents, other stakeholders in education, the private sector, and all others with interests in education, can collaborate in circumventing these potential problems without compromising national unity. The willingness to save the native Namibian languages while promoting English must be demonstrated by all who hold interests in education and the preservation of our languages.

8.5.2. Teacher training and graduate training programmes must take into account the L2 children with (possible) literacy difficulties

Zimba (1999) states that Namibian teachers are not trained to deal with children's special educational needs, and that new programmes at the University of Namibia are now training teachers in special education and sensitizing these trainee teachers to children with special educational needs. Even so, given that this is a new or recent initiative, the number of graduates from these programmes may still not be sufficient to address the needs of school children with special educational needs, let alone of the L2 learners with special educational needs. It is not clear, however, whether these programmes take into account L2 learners who may have literacy difficulties (dyslexia). Thus, teacher-training programmes at both the University of Namibia and the Colleges of Education have to first recognize the linguistic diversity that prevails among Namibian school children today. Of this diversity, the fact that the majority are learners of English as an alternative language who may be victims of "undetected" literacy difficulties should be appreciated.

Furthermore, it is important to appreciate that these children may display more than literacy problems they are experiencing. They may exhibit behavioural problems associated with failure in school, which itself may be related to the inability to learn to read and write. They may suffer from low self-esteem as a consequence of the literacy difficulties. They may eventually opt to drop out of school because they may believe that they can never learn. All of this can be aggravated by teachers, either in mainstream education or in special education or both, who may not have the special training to deal with special education populations, especially those with potential literacy difficulties in either the L1, the L2, or both the L1 and the L2. Thus, provisions must be made to address these concerns not only in pre-service teacher training programmes but also in in-service teacher training programmes. Such teacher training programmemes must prepare teachers to understand the characteristics of linguistically diverse children, especially the L2 learners with potential literacy difficulties. Such programmes, therefore, must push for bilingual education and special education programmes that meet the needs of the student populations with special educational needs such as literacy difficulties in addition to developing expertise among the English teachers to teach English as a second language.

For those undergoing post-graduate training in psychology, educational/school psychology in particular, and in education and related disciplines, programmes must be developed that prepare them for working with a diversity of young children and their families in early childhood education settings. More emphasis needs to be placed on the teaching of English as an L2 and literacy difficulties amongst children from linguistically diverse backgrounds. Courses and/or modules dealing with teaching reading and writing in multilingual or multicultural environments, the acquisition of an L2 and learning languages, the foundations of multilingual education and pluralism, and how to assess L2 learners would be highly appropriate. Every teacher trainee and graduate student in the field of education and related disciplines must complete a course/module in developmental psychology, special education, and the psychology of exceptional children. The implementation of these training programmes must be guided by government official policy. Care must be taken to ensure that the special educational needs of those individuals with disabilities, including literacy difficulties, are addressed. This will serve to ensure that policies are followed and implemented in accordance with their prescriptions to avoid their under-utilization, which will not serve the student populations they were designed and developed to serve.

practitioners and the general public cannot afford their services. This is why it would be ideal for government to contribute to the development and training of psychologists whom it would then employ in its departments, educational regions, and schools. The same approach used in training nurses and social workers posted in government service after graduation can be used to train psychologist who will be in government service after completion of their training. Although preparing such resources will be a long and costly endeavor, this should not discourage the government from attempting to do the best for Namibian children.

8.6 Conclusions

This research project set out to investigate the factors that may predict literacy development in Herero, the L1 of the cohort and a transparent orthography and, in English, their L2 and a less transparent orthography in view of the central processing hypothesis and the script dependent hypothesis. The research was carried out in three studies, namely, a cross-sectional study which investigated the predictors of literacy development in the two languages, and a longitudinal study that looked at the gains this cohort has made in literacy development since the first time they were tested. The third study aimed to identify factors that may be related to literacy difficulties amongst these bilingual children and continued to assess the assumptions of the central processing hypothesis and the script dependent hypothesis with regard to literacy difficulties.

The cross-sectional study showed that literacy developed faster in the more transparent orthography, consistent with the script-dependent hypothesis. Furthermore, it showed that phonological awareness was the better predictor of literacy development in both languages. Cross-linguistically, it was interesting to find that English phonological awareness, rather than Herero phonological awareness, was the better predictor of literacy development in both languages. The longitudinal study reaffirmed the cross-sectional study's finding in that literacy development continued to develop faster in the L1 and that common cognitive-linguistic factors, particularly phonological awareness, remain an important factor in influencing literacy development in both languages. The single case study showed evidence of deficient cognitive-linguistic processing skills in one or both languages when children presented with literacy difficulties.

The findings of the three studies provided evidence of support for the two theoretical perspectives that informed this research project. Furthermore, the findings generated implications for educational practices such as the teaching of literacy in L1 and L2 in Namibian schools, the identification of children with potential literacy difficulties, and the intervention in children with literacy difficulties.

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HERERO INDIVIDUALLY ADMINISTERED TESTS

HERERO INDIVIDUAL TESTS

CASE NUMBER : ____________________

NAME OF CHILD : ________________________________

GRADE : ____________________

NAME OF SCHOOL : ________________________________

AGE OF CHILD : _________ SEX _______

CHILD'S DATE OF BIRTH : ____________________

EXAMINER : ____________________

SPECIAL CASE : __________ YES _________ NO

Herero Individual Tests

	HWR	HNWR	HNWREP	HBEGPHON	HEPHON	HDSFOR
Total Errors						
Total Correct						
Total Items	70	10	12	10	10	12
% Correct						
Words Correct in 1 min.						
Testing Time						
Complete Row Points						
Longest Span Score						

Herero Individual Tests, Cont.

	HDS REV	CORFOR (Forw.Spatial Span)	CORREV (Rev. Spatial Span	HRNLD	HRNCOL	Color Production	Color Grouping /sorting
Total Errors							
Total Correct							
Total Items	12	12	12	40	40	22	
% Correct							
Testing Time							
Longest Span							

Herero Individual Tests, Cont.

	H-Semantic Fluency:		H-WORD INTEFERENCE	HSODIS
	COL	BP		
Total Errors				
Total Correct				
Total Items			40	20
% Correct				
Testing Time				
Interf. Level				

1. **HERERO SINGLE WORD READING-TIMED TEST**

SCORE ONE POINT FOR EACH COMPLETE ROW. INCLUDE ALL COMPLETE ROWS, EVEN IF THE CHILD MAKES AN EARLIER MISTAKE.

X	✓	WORD
		1. mba
		2. vye
		3. vya
		4. twee
		5. nwaa
		6. rwaa
		7. tje
		8. nduu
		9. t̲aa
		10. ndji
		11. saa
		12. tyee
		13. nyee
		14. ryaa
		15. kaa
		16. ryee
		17. paa
		18. zuu
		19. kee
		20. ze
		21. yaka
		22. nyosa
		23. nana
		24. ese
		25. rumwe
		26. taka
		27. tjetu
		28. n̲in̲a
		29. tjoye
		30. kemwe
		31. pamwe
		32. n̲uka
		33. ovyo
		34. undja
		35. hita
		36. vạnga
		37. zarwe
		38. ondje
		39. ehwa
		40. vyarwe
		41. kaparukaze
		42. yezurura
		43. serekarera
		44. kongotwe
		45. omunamanyando
		46. hwikika
		47. nandarire
		48. omupangure
		49. ozongozu

		50. omuatje
		51. ondjerera
		52. omuyengeri
		53. okuningirirapo
		54. omayarukiriro
		55. oninikizire
		56. kotjiperendero
		57. okunambirahi
		58. ounandengu
		59. katjotjiri
		60. ombandjarero
		61. otjimbumba
		62. okukovera
		63. wamunika
		64. ouhazendu
		65. ondjimbi
		66. ozombangane
		67. ondjiviro
		68. okurooro
		69. ekori
		70. okununisiwa

STOP. END OF HERERO SINGLE WORD READING TEST.

TOT. ERRORS	
TOT. CORRECT	
TOT. ITEMS	
% CORRECT	
WORDS READ CORRECT IN 1 MIN.	
TESTING TIME	
COMPLETE ROW POINTS	

2. NON-WORD READING TEST: TIMED TEST. SCORE IS THE TOTAL CORRECT ANSWERS.

X	✓	WORD	TARG. WORD	X	✓	WORD	TARG. WORD
		1. kyaa	ryaa			6. ndjuhue	ehundju
		2. haa	raa			7. ndjarareo	ondjerera
		3. ata	eta			8. tamaratji	tjiramata
		4. vundu	mundu			9. tjiaratindji	ndjitjitira
		5. arindjo	ondjira			10. tjandjinga	ndjitjanga

STOP. END OF HERERO SINGLE NON-WORD READING.

TOTAL ERRORS	
TOTAL CORRECT	
TOTAL ITEMS	
% CORRECT	
TESTING TIME	

3. HERERO NON-WORD REPETITION.

SCORE 1 POINT FOR EACH COMPLETELY CORRECT LINE.

NON-WORD SEQUENCE	CHILD'S RESP.	X	✓
1. ngirahu			
2. puara			
3. ongatja kurahu			
4. nura tjarae			
5. rukapu utingo veratja			
6. voora naera randora			
7. rohako utingo torako kotako			
8. karakata vahisa hondisa vukura			
9. ngohori ndayekuo ndambako korine mbukue			
10. tjemuao ngatemuo vamemo ihimbako ndjuhue			
11. rorimumo reheuro ṉenguozo ukuṯuo ezeumoitako			
12. mbindjio owundjo mbeongo ongeso orevumo asamo			

STOP. END OF HERERO NON-WORD REPETITION SEQUENCE.

TOT. ERRORS	
TOT. CORRECT	
TOT. ITEMS	
% CORRECT	
TESTING TIME	

4. **HERERO BEGINNING PHONEME TEST:**

SCORE IS THE TOTAL OF CORRECT ANSWERS. IF THE WORDS ARE REPEATED, SCORE HALF A POINT FOR EACH SET.

WORDS	WORDS W/ SAME SOUND AT BEG.	WORD W/DIFF. SOUND AT BEG.	CHILD'S RESP.	X	✓	REPEAT SCORE
tuka tava reka	TUKA TAVA	REKA				
suva zuva sina	SUVA SINA	ZUVA				
viva rera rira	RERA RIRA	VIVA				
eta outa eha	ETA EHA	OUTA				
zira zera hinda	ZIRA ZERA	HINDA				
tura pera para	PERA PARA	TURA				
kanda konda randa	KANDA KONDA	RANDA				
ihi ehi indi	IHI INDI	EHI				
outa euva ouza	OUTA OUZA	EUVA				
ehiriro epuriro onduviro	EPURIRO EHIRIRO	ONDUVIRO				

STOP. END OF HERERO BEGINNING PHONEME TEST

TOT. ERRORS	
TOT. CORRECT	
TOT. ITEMS	
% CORRECT	
TESTING TIME	

5. **HERERO ENDING PHONEME TEST. SCORE IS TOTAL OF CORRECT ANSWERS. IF WORDS ARE REPEATED, SCORE HALF A POINT FOR EVERY SET.**

WORDS	WORDS W/ SAME SOUND AT END.	WORD W/DIFF. SOUND AT END	CHILD'S RESP.	X	✓	REPEAT SCORE
ohiva ohivi oheva	OHIVA OHEVA	OHIVI				
ohorongo ondombo onganda	OHORONGO ONDOMBO	ONGANDA				
eha ehi ohi	EHI OHI	EHA				
ekuva eyova eyovi	EKUVA EYOVA	EYOVI				
ozondi ozonda ongondivi	OZONDI ONGONDIVI	OZONDA				
onde ombatu ombotu	OMBATU OMBOTU	ONDE				
ohanga ohungu ondjima	OHANGA ONDJIMA	OHUNGU				
endindi ondundu ondjimbi	ENDINDI ONDJIMBI	ONDUNDU				
ombuta ombata ombatu	OMBUTA OZOMBATA	OMBATU				
omutiri omitiri omutire	OMUTIRI OMITIRI	OMUTIRE				

STOP. END OF HERERO ENDING PHONEME TEST.

TOT. ERRORS	
TOT. CORRECT	
TOT. ITEMS	
% CORRECT	
TESTING TIME	

6. SHORT-TERM MEMORY: HERERO FORWARD DIGIT SPAN. SCORE 1 POINT FOR EACH CORRECT RESPONSE (FIRST SCORE) AND A SECOND SCORE FOR THE LONGEST DIGIGT A CHILD ANSWERS CORRECTLY.

DIGITS	CHILD'S RESP.	X	✓
3 6			
9 4			
2 8 5			
9 1 7			
2 4 0 3			
4 0 2 3			
6 2 4 5 2			
2 4 6 2 5			
7 0 6 8 3 9			
8 3 9 6 0 7			
5 7 9 4 8 3 0			
8 3 4 0 9 7 5			

STOP. END OF STM: HERERO DIGIT SPAN TEST

TOT. ERRORS	
TOT. CORRECT	
TOT. ITEMS	
% CORRECT	
LONGEST SPAN SCORE	
TESTING TIME	

7. SHORT TERM MEMORY: HERERO REVERSE DIGIT SPAN. SCORE 1 POINT FOR EACH CORRECT RESPONSE (FIRST SCORE) AND A SECOND SCORE FOR THE LONGEST DIGIT A CHILD ANSWERS CORRECTLY.

DIGITS	CHILD'S RESP.	X	✓
6 7			
5 6			
9 2 9			
4 1 2			
1 9 6 4			
5 4 9 1			
0 0 0 2 9			
2 3 0 3 2			
7 3 1 2 0 4			
1 0 1 1 6 7			
8 4 0 2 1 0 3			
5 4 0 1 1 3 4			

STOP. END OF STM: HERERO REVERSE DIGIT SPAN.

TOT. ERRORS	
TOT. CORRECT	
TOT. ITEMS	
% CORRECT	
LONGEST SPAN SCORE	
TESTING TIME	

8 & 9. FOR BOTH THE FORWARD AND THE REVERSE SEQUENCES OF THE SPATIAL SPAN TASK, SEE THE ENGLISH VERSION TEST.

10. RAPID AUTOMATIC NAING (RAN)- HERERO LINE DRAWINGS

SCORE IS THE TOTAL TIME TAKEN, TO THE NEAREST SECOND, TO COMPLETE THE NAMING. ADD 2 SECONDS FOR EACH UNCORRECTED ERROR.

PRACTICE CARD: ________ secs.

TEST CARD : ________ secs

STOP. END OF LINE DRAWINGS TEST

---

11. RAPID AUTOMATIC NAMING (RAN)-HERERO RAPID COLOR NAMING

SCORE IS THE TOTAL TIME TAKEN, TO THE NEAREST SECOND, TO COMPLETE THE NAMING. ADD 2 SECONDS FOR UNCORRECTED ERRORS.

PARCTICE CARD: ________ secs.

TEST CARD : ________ secs.

STOP. END OF HERERO RAPID COLOR NAMING

---

12 HERERO STROOP INTERFERENCE TEST

SCORE IS THE TOTAL TIME TAKEN, TO THE NEAREST SECOND, TO NAME THE COLOR IN WHICH THE WORD IS WRITTEN.

PRACTICE CARD: __________ secs.

TEST CARD : __________ secs.

STOP. END OF HERERO STROOP INTERFERENCE TEST.

DERIVE AN INTERFERENCE LEVEL IN SECONDS. THE TIME DIFFERENCE BETWEEN RAN: COLOR NAMING AND THE STROOP TEST WILL GIVE THE INTERFERENCE LEVEL IN SECONDS.

TIME DIFFERENCE SCORE IN SECONDS: ___________ secs.

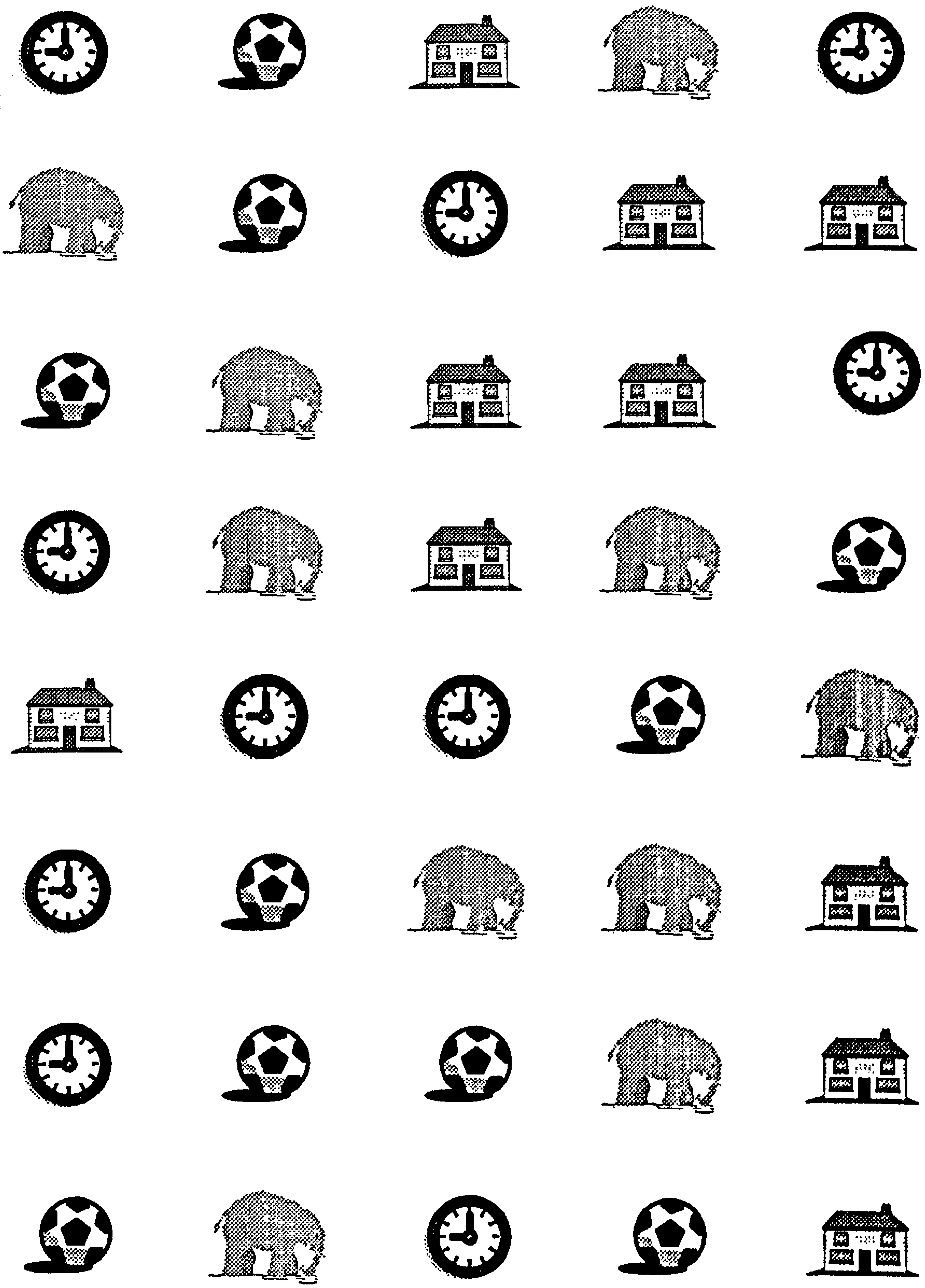
---

13. **PERCEPTUAL TASKS: HERERO SOUND DISCRIMINATION. SCORE IS THE TOTAL CORRECT ANSWERS.**

WORDS	S	D	X	✓	WORDS	S	D	X	✓
ONGANGA ONGANGA					ONDUNDU ONDUNDU				
ONDE ONDE					ONGARA ONGARA				
HINDA HINDA					ORUNDENDE ORUNDENDU				
EZE ESE					ERE ERE				
KONDA KONDA					ESURU ESUZU				
EZIRIRO ESIRIRO					RARA RARA				
HANDA HANDA					PIRURA PIZURA				
OSONA OSIONA					ZEZERA ZEZERA				
ONDJARA ONDJARA					ZIRA SIRA				
SESENGA ZEZENGA					PANGA PANGA				

STIMULUS CARDS FOR HERERO INDIVIDUALLY ADMINISTERED TESTS

- Rapid Automised Naming of familiar objects task
- Practice card for rapid colour naming and word interference
- Rapid colour naming of familiar colours task
- Congrous colour naming task
- Incongrous word interfernce (Stroop) task



Rapid naming task (Herero)

otjingirine

otjimblou

otjiserandu

otjingara

CB (H)

Otjiserandu	Otjingirine	Otjimblou	Otjimblou
Otjiserandu	Otjiserandu	Otjimblou	Otjingara
Otjimblou	Otjiserandu	Otjingirine	Otjimblou
Otjiserandu	Otjingara	Otjingirine	Otjingara
Otjiserandu	Otjimblou	Otjingirine	Otjingara
Otjingirine	Otjimblou	Otjiserandu	Otjiserandu
Otjingara	Otjingirine	Otjingirine	Otjiserandu
Otjimblou	Otjiserandu	Otjimblou	Otjingara
Otjingirine	Otjingirine	Otjingara	Otjingara
Otjimblou	Otjimblou	Otjiserandu	Otjingirine
Otjingara	Otjingara	Otjiserandu	Otjimblou
Otjingara	Otjingirine	Otjingara	Otjingirine

CT (H)(b&w)

Otjingara	Otjingara	Otjingirine	Otjimblou
Otjimblou	Otjiserandu	Otjingara	Otjiserandu
Otjingirine	Otjingara	Otjimblou	Otjingirine
Otjiserandu	Otjingara	Otjiserandu	Otjiserandu
Otjingara	Otjingara	Otjimblou	Otjingirine
Otjingirine	Otjingirine	Otjimblou	Otjingirine
Otjiserandu	Otjingara	Otjiserandu	Otjingirine
Otjingirine	Otjingara	Otjimblou	Otjiserandu
Otjimblou	Otjiserandu	Otjimblou	Otjingara
Otjingirine	Otjingara	Otjimblou	Otjingirine
Otjingirine	Otjiserandu	Otjingara	Otjimblou
Otjimblou	Otjiserandu	Otjiserandu	Otjimblou

CT (H)(nc)

ENGLISH INDIVIDUALLY ADMINISTERED TESTS

INDIVIDUAL TESTS

CASE NUMBER : ______________________

NAME OF CHILD : __________________________________

GRADE : _____________________

NAME OF SCHOOL : __________________________________

AGE OF CHILD : ____________ SEX ______

CHILD'S DATE OF BIRTH : _____________________

EXAMINER : _____________________

SPECIAL CASE : ____________ YES ___________ NO

English Individual Tests

	EWR	ENWR	ENWREP	EBEGPHON	EEPHON	EDSFOR
Total Errors						
Total Correct						
Total Items	**70**	**10**	**12**	**10**	**10**	**12**
% Correct						
Words Correct in 1 min.						
Testing Time						
Complete Row Points						
Longest Span						

	EDSREV	CORFOR (Forw. Spatial Span)	CORREV (Rev. Spatial Span)	ERNLD	ERNCOL
Total Errors					
Total Correct					
Total Items	**12**	**12**	**12**	**40**	**40**
% Correct					
Testing Time					
Longest Span					

English Individual Tests, cont.

	E-Semantic Fluency		Word Interference Task	ESODIS
	COL.	BP		
Total Errors				
Total Correct				
Total Items			**40**	**20**
% Correct				
Testing Time				
Interf. Level				

1. ENGLISH SINGLE WORD READING

SCORE 1 POINT FOR EACH COMPLETE ROW. INCLUDE ALL COMPLETE ROWA, EVEN IF THE CHILD MAKES AN EARLIER MISTAKE

X	✓	WORD
		1. TREE
		2. BOX
		3. MILK
		4. EGG
		5. BOOK
		6. AXE
		7. SIT
		8. DRESS
		9. CAR
		10. BUN
		11. DUCK
		12. ROAD
		13. COW
		14. TRAIN
		15. NAME
		16. DOGS
		17. RICE
		18. MEAL
		19. READ
		20. THIS
		21. BROTHER
		22. DOWNSTAIRS
		23. PARENT
		24. SHEPHERD
		25. BIRTHDAY
		26. BREAKFAST
		27.SANDWICH
		28.BEGIN

X	✓	WORD
		29. SMALL
		30. ISLAND
		31. STANDING
		32. ANGEL
		33. CEILING
		34. DENTIST
		35. HEAVY
		36. FIGHTING
		37. MORNING
		38. TABLE
		39. NEPHEW
		40. CUPBOARD
		41. SATURDAY
		42. OPPOSITE
		43. PINEAPPLES
		44. SOMETHING
		45. DISEASED
		46. UNIVERSITY

		47. ORCHESTRA
		48. KNOWLEDGE
		49. WINDOW

X	✓	WORD
		50. SITUATED
		51. PICTURE
		52. CAMPAIGN
		53. CHOIR
		54. INTERCEDE
		55. FASCINATE
		56. SADDLE
		57. SIEGE

		58. RECENT
		59. PLAUSIBLE
		60. PROPHECY
		61. COLONEL
		62. SOLOIST
		63. SYSTEMATIC
		64. SLOVENLY
		65. CLASSIFICATION
		66. GENUINE
		67. INSTITUTION
		68. PIVOT
		69. CONSCIENCE
		70. SENTENCES

STOP. END OF ENGLISH WORD READING LIST

TOTAL ERRORS	
TOTAL CORRECT	
TOTAL ITEMS	
% CORRECT	
WORDS READ CORRECTLY IN 1 MIN.	
TESTING TIME	
COMPLETE ROW POINTS	

2. ENGLISH NON-WORD READING TEST.

SCORE IS THE TOTAL CORRECT ANSWERS

X	✓	WORD	TARGET WORD	X	✓	WORD	TARGET WORD
		1. gat	fat			6. higure	figure
		2. rop	top			7. kibnick	
		3. shug	shut			8. pachine	machine
		4. hild	wild			9. clabnag	
		5. narge	large			10. tringdom	kingdom

STOP.

END OF ENGLISH NON-WORD READING TEST

TOTAL ERRORS	
TOTAL CORRECT	
TOTAL ITEMS	
% CORRECT	
TESTING TIME	

3. ENGLISH NON-WORD REPETITION:

SCORE 1 POINT FOR EACH COMPLETELY CORRECT LINE

NON-WORD REPETITION	CHILD'S RESP.	X	✓
1.ket			
2. lum			
3. mup hin			
4. ret spige			
5. trum frut nabe			
6. ronch tarp keld			
7. horp brid nate proog			
8. fode wike drup cren			
9. girf nurme grom snok worp			
10. delk prat chorn tane roog			
11. tek zate nome clorn fedo pachine			
12. narge shug higure hild dictin shug			

STOP. END OF ENGLISH NON-WORD REPETITION SEQUENCE

TOT. ERRORS	
TOT. CORRECT	
TOTAL ITEMS	
% CORRECT	
TESTING TIME	

4. ENGLISH BEGINNING PHONEME TEST:

SCORE TOTAL OF CORRECT ANSWERS. IF THE WORDS ARE REPEATED, SCORE HALF A POINT FOR EACH SET

WORDS	WORDS W/ SAME SOUND AT BEG.	WORD W/ DIFF. SOUND AT BEG.	CHILD'S RESP.	X	✓	REPEAT SCORE
1. cold bald cult	COLD CULT	BALD				
2. wet will vet	WET WILL	VET				
3. deal beat bell	BEAT BELL	DEAL				
4. kill bold king	KILL KING	BOLD				
5. bull put bill	BULL BILL	PUT				
6. union unit at	UNION UNIT	AT				
7. food boat full	FOOD FULL	BOAT				
8. hill high tight	HILL HIGH	TIGHT				
9. hit dead hold	HIT HOLD	DEAD				
10. tail dot day	DOT DAY	TAIL				

STOP. END OF BEGINNING PHONEME TEST

TOT. ERRORS	
TOT. CORRECT	
TOT. ITEMS	
% CORRECT	
TESTING TIME	

5. ENGLISH ENDING PHONEME TEST:

SCORE TOTAL OF CORRECT ANSWERS. IF WORDS ARE REPEATED, SCORE HALF A POINT FOR EVERY SET.

WORDS	WORDS W/ SAME SOUND AT END	WORD W/DIFF. SOUND AT END	CHILD'S RESPONSE	X	✓	REPEAT SCORE
1. dime ton dim	DIME DIM	**TON**				
2. wall debt wilt	DEBT WILT	**WALL**				
3. fog leg deck	FOG LEG	**DECK**				
4. show tow tone	SHOW TOW	**TONE**				
5. nap nil soap	NAP SOAP	**NIL**				
6. bat buck deck	BUCK DECK	**BAT**				
7. his flash fresh	FLASH FRESH	**HIS**				
8. tight real cut	TIGHT CUT	**REAL**				
9. nip toll nap	NIP NAP	**TOLL**				
10. ton him ham	HIM HAM	**TON**				

STOP. END OF ENDING PHONEME TEST

TOT. ERRORS	
TOT. CORRECT	
TOT. ITEMS	
% CORRECT	
TESTING TIME	

6. SHORT-TERM MEMORY: ENGLISH FORWARD DIGIT SPAN

SCORE 1 POINT FOR EACH CORRECT RESPONSE (FIRST SCORE) AND A SECOND SCORE FOR THE LONGEST DIGITS A CHILD ANSWERS

DIGITS	CHILD'S RESP.	X	✓
8 9			
7 3			
3 9 6			
8 5 0			
3 0 2 4			
2 3 4 0			
7 8 4 2 7			
4 9 1 4 9			
9 6 3 0 8 1			
0 7 5 3 9 7			
2 1 0 2 9 5 8			
7 1 0 2 9 5 8			

STOP. END OF STM: DIGIT SPAN TEST

TOT. ERRORS	
TOT. CORRECT	
TOT. ITEMS	
% CORRECT	
LONGEST SPAN SCORE	
TESTING TIME	

7. SHORT TERM MEMORY: ENGLISH REVERSE DIGIT SPAN

SCORE 1 POINT FOR EACH CORRECT RESPONSE (FIRST SCORE) AND A SECOND SCORE FOR THE LONGEST DIGITS A CHILD ANSWERS.

DIGITS	**CHILD'S RESPONSE**	**X**	**✓**
6 4			
4 5			
7 2 7			
2 1 4			
2 0 4 6			
9 1 5 4			
8 6 9 8 4			
3 2 0 2 3			
4 0 7 1 2 3			
1 6 7 1 0 1			
2 1 0 3 0 4 8			
1 1 0 4 5 4 3			

STOP. END OF ENGLISH REVERSE DIGIT SPAN TEST

TOT. ERRORS	
TOT. CORRECT	
TOT. ITEMS	
% CORRECT	
LONGEST SPAN SCORE	
TESTING TIME	

8. VISUAL SPAN: SPATIAL SPAN FORWARD SEQUENCE

SCORE 1 POINT FOR EACH CORRECT RESPONSE (FIRST SCORE) AND A SECOND SCORE FOR THE LONGEST SEQUENCE A CHILD ANSWERS CORRECTLY

SEQUENCE	CHILD'S RESP.	X	✓
A C			
G B			
B D F			
D H I			
J H F G			
GE D J			
B D A C I			
C E A D B			
B D F E C A			
F D B E C A			
H F D E G E C			
G E C A H F D			

STOP. END OF FORWARD SPATIAL SPAN SEQUENCE

TOT. ERRORS	
TOT. CORRECT	
TOT. ITEMS	
% CORRECT	
LONGEST SPAN SCORE	
TESTING TIME	

9. VISUAL SPAN: CORSI BLOCKS- REVERSE SEQUENCE

SCORE 1 POINT FOR EACH CORRECT RESPONSE (FIRST SCORE) AND A SECOND SCORE FOR THE LONGEST SEQUENCE A CHILD ANSWERS CORRECTLY.

SEQUENCE	CHILD'S RESPONSE	X	✓
B D			
H A			
F D B			
J H F			
G E C A			
H F D B			
E C A F D			
B D F A C			
J H F E G E			
C A B D F H			
I G C A E D F			
B D F H J I E			

STOP. END OF CORSI BLOCKS-REVERSE SEQUENCE

TOT. ERRORS	
TOT. CORRECT	
TOT. ITEMS	
% CORRECT	
LONGEST SPAN SCORE	
TESTING TIME	

10. RAPID AUTOMATIC NAMING (RAN)- ENGLISH LINE DRAWINGS

SCORE IS TIME TAKEN, TO THE NEARES SECOND, TO COMPLETE THE NAMING. ADD 2 SECONDS FOR EACH UNCORRECTED ERROR.

Practice Card: _____secs.

Test Card : _____ secs.

STOP. END OF RAN: LINE DRAWINGS

11. RAPID AUTOMATIC NAMING (RAN)- ENGLISH RAPID COLOR NAMING

SCORE IS TIME TAKEN, TO THE NEAREST SECOND, TO COMPLETE THE NAMING. ADD 2 SECONDS FOR EACH UNCORRECTED ERROR

Practice Card: _____ secs.

Test Card : _____ secs.

STOP. END OF RAN: COLOR NAMING

12. ENGLISH STROOP INTERFERENCE TEST

Practice Card : ______ secs

Testing Card : ______ secs.

STOP. END OF STROOP TEST.

DERIVE AN INTERFERNCE LEVEL IN SECONDS. THE TIME DIFFERENCE BETWEEN RAN: COLOR NAMING AND THE STROOP TEST WILL GIVE THE INTERFERENCE LEVEL IN SECONDS.

INTERFERENCE LEVEL IN SECONDS: ____________ secs.

13. PERCEPTUAL TASKS: SOUND DISCRIMINATION

SCORE TOTAL CORRECT ANSWERS.

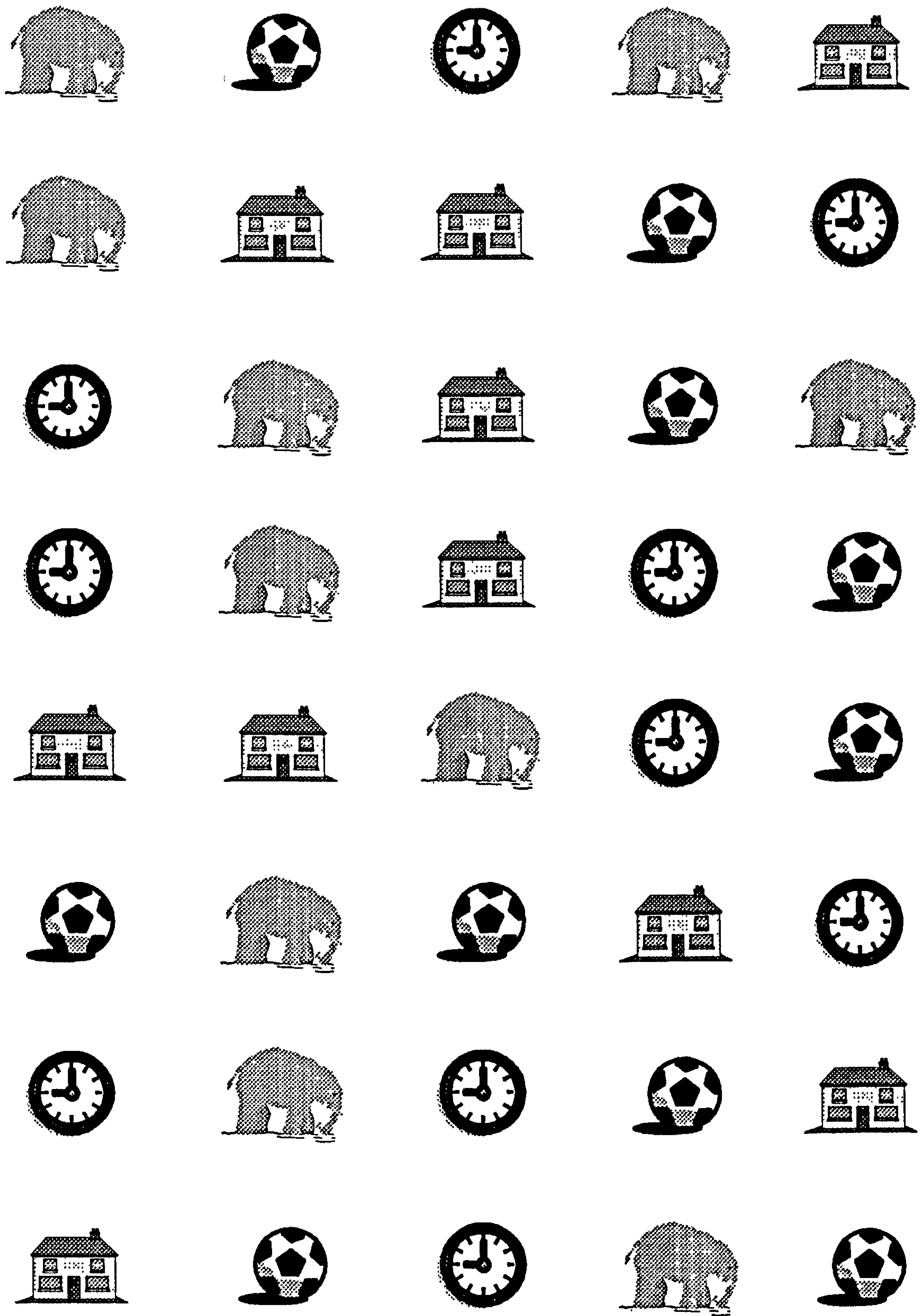
WORDS	S	D	X	✓	WORDS	S	D	X	✓
1. RIP TIP					11. FISH FISH				
2. SICK SACK					12. SHELLED SHIELD				
3. SIDE SIDE					13. HALT HALL				
4. PET BET					14. TRY TIE				
5. BIG BOG					15. TILT TILT				
6. SIT SIT					16. SHIP SHEEP				
7. BED BAD					17. RAW WAR				
8. DAM MAD					18.THROW THROW				
9. SLOW SNOW					19. RIP REAP				
10. END AND					20. NIB NIP				

STOP. END OF SOUND DISCRIMINATION TEST.

TOT. ERRORS	
TOT. CORRECT	
TOT. ITEMS	
% CORRECT	
TESTING TIME	

STIMULUS CARDS FOR ENGLISH INDIVIDUALLY ADMINISTERED TESTS

- Rapid Automised Naming of familiar objects task
- Practice card for rapid colour naming and word interference
- Rapid colour naming of familiar colours task
- Congrous colour naming task
- Incongrous word interfernce (Stroop) task



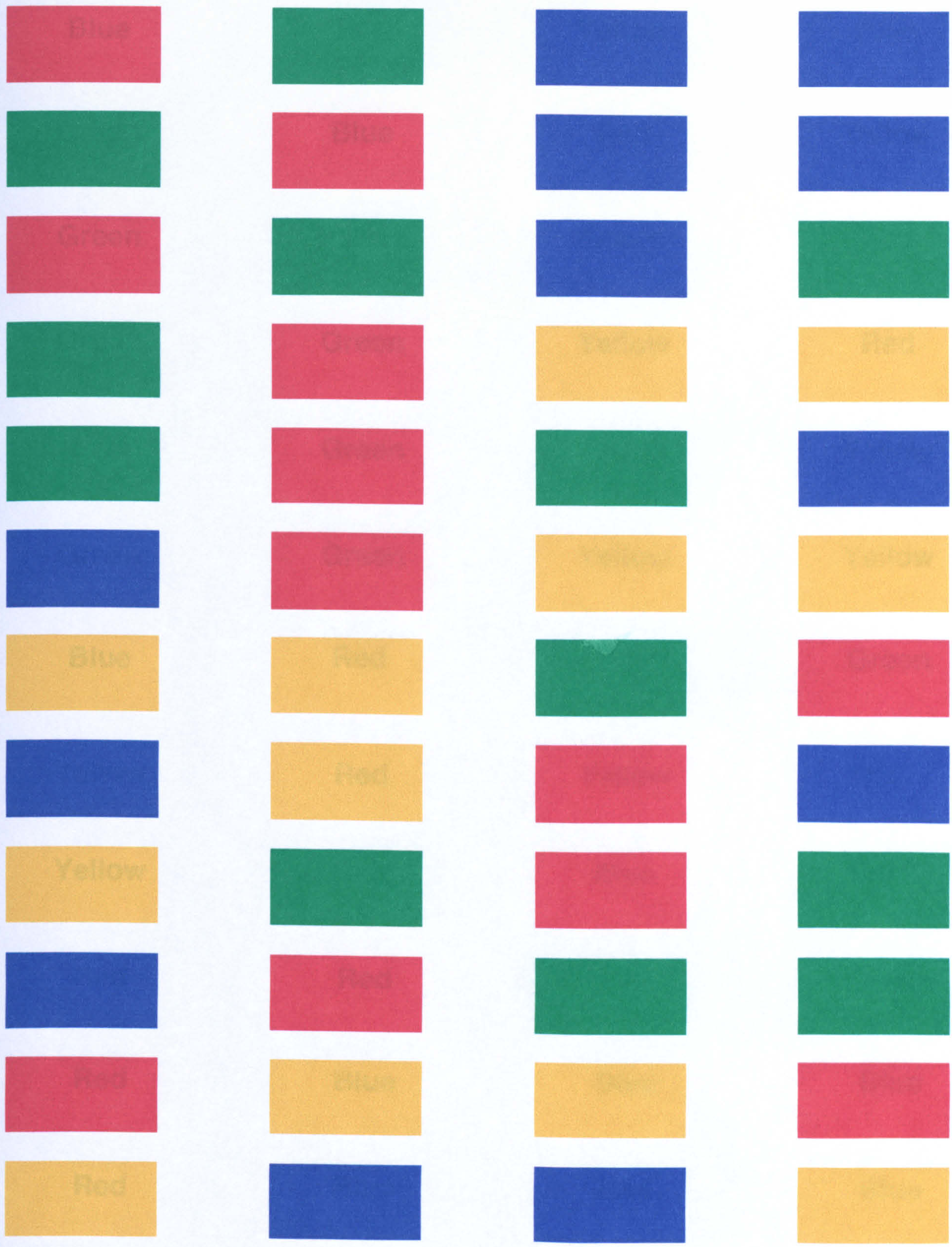
Rapid naming task (English)

Green

Blue

Red

Yellow



Blue	Red	Yellow	Blue
Green	Blue	Red	Yellow
Green	Yellow	Green	Red
Green	Green	Yellow	Red
Blue	Green	Yellow	Yellow
Green	Green	Yellow	Yellow
Blue	Red	Green	Green
Yellow	Red	Yellow	Red
Yellow	Blue	Blue	Yellow
Red	Red	Green	Green
Red	Blue	Blue	Blue
Red	Blue	Red	Blue

CT (E)(b&w)

Yellow	Green	Red	Red
Blue	Yellow	Red	Blue
Blue	Red	Yellow	Yellow
Blue	Red	Green	Blue
Red	Green	Yellow	Yellow
Green	Green	Blue	Green
Yellow	Green	Yellow	Yellow
Red	Yellow	Green	Green
Red	Yellow	Blue	Red
Green	Red	Yellow	Blue
Green	Red	Blue	Blue
Blue	Red	Blue	Green

CT (E)(nc)

HERERO GROUP ADMINISTERED TESTS

Appendix A-3

HERERO GROUP TESTS

CASE NUMBER : ____________

NAME OF CHILD : ____________________

GRADE : ____________

NAME OF SCHOOL : ____________________

AGE OF CHILD : ________ **SEX** ________

CHILD'S BIRTHDAY : ____________________

EXAMINER : ____________

SPECIAL CASE : ________ **YES** ________ **NO**

HERERO GROUP TESTS

	HERERO WORD SPELLING	OSCAT	HLISTCOM	RAV
TOT. ERRORS				
TOT. CORRECT				
TOT. ITEMS	40	32	25	36
% CORRECT				
TESTING TIME				
NO. OF FIRST LETTERS OF WORD CORRECT				

SPELLING TEST (Herero Version)

Below is a list of 40 words that the children are going to spell. Ask the children to listen carefully to the words you are going to read. Read the words in a sentence, and when you say the word again, the children must then spell it. Ensure that each word is not emphasized nor pronounced differently from normal. Note that the list includes some non-words. If a child makes more than ten consecutive errors, do not allow to continue any further. Stop at question 35 when administering the test to Grade 2 children. Tell the children not to worry if they do not know how to spell a word and that they should try the best they can to spell the word.

1. **Kurama**	Ami mba kurama pendje	**Kurama**
2. **Pose**	Maku pose ozondiwo	**Pose**
3. **Otjina**	Otjina hi otjikwaye	**Otjina**
4. **Oviaha**	Kaete oviaha tu wote ovikurya.	**Oviaha**
5. **Nokuzuva**	Ami hi nokuzuva	**Nokuzuva**
6. **Penduka**	Penduka tu yende.	**Penduka**
7. **Pitisa**	Pitisa ozondana	**Pitisa**
8. **Ezuko**	Onyungu iri pezuko	**Ezuko**
9. **Osengo**	Ombo ina osengo onde	**Osengo**
10. **Metameta**	Omutaare ma metameta uriri.	**Metameta**
11. **Takamisa**	Takamisa oku wira momeva	**Takamisa**
12. **Oruveze**	Oruveze rwa yenene	**Oruveze**
13. **Ozoseu**	Mama wa katjeza ozoseu	**Ozoseu**
14. **Ovivarero**	Ovivarero ovipupu	**Ovivarero**
15. **Orundundura**	Karande oheva ndji orundundura.	**Orundundura**
16. **Yezurura**	Koto ma yezurura orwiho	**Yezurura**
17. **Kongotwe**	Zako kongotwe yandje	**Kongotwe**
18. **Randerwa**	Ami mba nderwara ozongaku	**Randerwa**
19. **Tendama**	Omueze wa tendama	**Tendama**
20. **Tjiwasana**	Ovanatje vetu kave tjiwasana	**Tjiwasana**
21. **Ovinyandisiwa**	Ami hina ovinyandisiwa	**Ovinyandisiwa**
22. **Omatarazu**	Omeva o matarazu	**Omatarazu**
23. **Rihwikika**	Rihwikika tu yende	**Rihwikika**
24. **Sokuisako**	Tu sokuisako okurama	**Sokuisako**
25. **Tjaterwa**	Ovanatje mave tjaterwa	**Tjaterwa**
26. **Mondivitivi**	Turi mondivitivi yomeva	**Mondivitivi**
27. **Yondondu**	Ohima yarara mene yondondu	**Yondondu**
28. **Tikatikisa**	Tate ma tikatikisa okanatje	**Tikatikisa**
29. **Otjokukwatwa**	Otjikuki hi otjokukwatwa kwandje.	**Otjokukwatwa**
30. **Ovivava**	Ovivava vyo hunguriva vya teka	**Ovivava**
31. **Ondandjara**	Ombungu ndji ondandjara	**Ondandjara**
32. **Korimwerimwe**	Omawe toora korimwerimwe	**Korimwerimwe**
33. **Nokuhinakumunika**	Ami hi meekara nokuhinakumunika	**Nokuhinakumunika**
34. **Otjikondambunda**	Ongombe ya remana otjikondambunda	**Otjikondambunda**

35. **Okanavineya**	Kauru okanatje okanavineya	**Okanavineya**
36. **Yomapwikiro**	Oruhere ruri mondjuwo yomapwikiro	**Yomapwikiro**
37. **Nokukorisasana**	Ovandu kave nokukorisasana	**Nokukorisasana**
38. **Tjotjihunamavere**	Otjinyo tjotjihunamavere katjiri nao	**Tjotjihanamavere**
39. **Usokukondoroka**	Ove usokukondoroka ondjuwo	**Usokukondoroka**
40. **Ozongangane**	Ozongangane zetu ka zeungura nawa	**Ozongangane**

LISTENING COMPREHENSION-SHORT STORIES (Herero Version)

Read the following stories very clearly to the children and give them the following instructions:

1. listen very carefully to the four short stories I will read to you in Herero
2. after I have read the four short stories to you, I will ask you questions about each of the four short stories I have read to you
3. when you answer the questions, write down "YES" if the answer is yes or write down "NO" if the answer is no
4. when you are finished, remain quite and raise your hands to signal that your are finished
5. are you ready now to hear the first story ?

STORY 1.

Koto wa ungura otjihauto tjo zondarata. Nu Toto wina aa vanga oku ungura otjihauto tjo zondarata. Koto wa raisira Toto oku ungura otjihauto tjo zondarata. Tjiva mana; owo vaya mo kuti oku kahinga ovihauto vyao.

QUESTIONS ABOUT STORY 1:

1. Toto wa ungura otjihauto tjo zondarata ?
2. Koto wa raisira Toto kutja otjihauto tjo zondarata tji ungurwa vi ?
3. Va hingira ovihauto vyao vyo zondarata monganda ?

STORY 2.

Rukuru otji pari omuhona nguwaa hasora oku rara utuku. Kangamwa okarurokoho okatiti aake mupendura. Nu eye wa raerere ovasorondate ve kutja ve tjaere imba mbaa vetjiti orurokoho. Kombunda ya nao omuhona otjaa sora okurara utuku.

Outuku umue otji kwatona orutjeno rwo mbura. Omuhona wa zuva indwi orutjeno rwo mbura. Nu eye wa raera ovasorondate ve kujta ve tjaere indwi orutjeno rwo mbura.

QUESTIONS ABOUT STORY 2

4. Omuhona aa sora oku rara utuku ?
5. Omuhona aa sora oku rara ngunda apena kangamwa okarurokoho okatiti ?
6. Kombunda jaindi omuhona tjaza no kuraera ovasorondate ve kutja vetjaere orurokoho eye aa sora oku rara ?
7. Outuku umwe kwa tona orutjeno rwo mbura ?
8. Orutjeno rwo mbura tji rwatona omuhona wa raera ovasorondate ve kutja ve tjaere orutjeno rwo mbura ?
9. Orutjeno rwo mbura tji rwatona omuhona we ruzuva ?

STORY 3

Skorokoro ohauto ya tate. Nu oyo kaingara mai tupuka nomasa momivanda vyo tjihuro. Mo mivanda vyo tjihuro muna oviahauto vyarwe ovingi. Ouzeu tjinene kovihauto no zombesi oku ngara mavi nyinganyinga mo mivanda vyo tjihuro. Skorokoro ya tona ohiva yayo nungwari kakuna ihi otji̲na tji tjanyinganyinga. Nangarire otjihauto tjimwe kanaa tja rora okunyinganyinga. Skorokoro ya tona ohiva yayo rukwao. Wina kakuna ihi otjihauto tjarora okunyinganyinga.

Skorokoro yerihonga kutja nangarire kutja yatona ohiva yayo ovikando ovingi ovihauto imbi oyarwe kaa viroro okunyinganyinga kaparukaze. Oyo ya t̲oku kuyakisa oradiyo yayo ayi utu oku puratena ko mizumbi.

QUESTIONS ABOUT STORY 3

10. Skorokoro ya tona ohiva yayo ?
11. Skorokoro tji ya tona ohiva yayo ovihauto imbi ovyarwe vina puvya nyinganyinga?
12. Skorokoro ina pu yatona ohiva yayo po vikando vitatu ?
13. Oupupu ko vihauto no zombesi oku nyinganyinga mo mivanda vyo tjihuro?
14. Skorokoro ingara mai tupuka mo mivanda vyo tjihuro ?
15. Skorokoro ina pu yaakisa oradiyo yayo ?
16. Skorokoro ya uta oku puratena ko mizumbi ?

STORY 4

Koto wa tara mo kaat̲u ke ko zopena. Opena ye indji ombe kayari mo kaat̲u ke ko zopena. Eye wa raera omit̲iri ye nu oyo aimu raere kutja ngataré kutja iri mondjatu ye indji onene. Nungwri opena ye kamuyari.

Kombunda yanao eye wa muna Kauru nopena ndja sana ku indji oye. Nu eye wa raera omit̲iri ye kutja opena ye ina Kauru. Posya Kauru watja opena ndjo oye. Koto kari nongamburiro kutja opena ndjo tjiri oya Kauru. Mena ra nao Koto watja Kauru erunga.

Kombunda ya nao Koto kaa hungirisa Kauru rukwao. Eye wina kaa nyanda puna Kauru rukwao.

Koto tjeya ponganda eye wa raera ina kutja pa kaenda tjike. Nu ina watja Koto apindike kuna Kauru. Ina wina we muraera kutja nga pahe opena ye mo mbaanga ye.

Koto wari atemwa tja paha opena mo mbaanga ye. Eye wina ka karere no mutima omuwa ohunga no mambo nga hungira mu Kauru. Eye wina wa yanisa kutja ma kaningira ondjesiro ku Kauru eyuva indi ependukirwa. Eye wa hihamwa omutima ohunga nonavi ndja tjita.

QUESTIONS ABOUT STORY 4.

17. Kauru una paa paha opena ye ?
18. Koto una paa paha opena ye ?
19. Koto una pa nandarasi Kauru wa vaka opena ye ?
20. Opena yari mondjat̲u ya Koto ?
21. Omit̲iri ya Koto ya raera Koto oku paha opena ye mombaanga ?
22. Ina ya Koto wa raera Koto okupaha opena ye mo mbaanga?
23. Koto wari posyo okuruka omukwao ourunga ?
24. Koto wa yanisa kutja ma kaningira ondjesiro ku Kauru ?
25. Koto wa hihamwa omutima ohunga no navi ndja tjita ku Kauru?

NAME: ________________ GRADE: _________ SCHOOL: ________________

HERERO LISTENING COMPREHENSION.

PURATENEE KOZOSTORY NDU MAMU LESERWA MBA TJAZUMBA MU ZIRE OMAPURIRO NGU MAE KONGORERE MBO. ZIREE KUJTA II POO KAKO. EZIRIRO TJIRI RI II, NANEE OKAKOROISE PO "II" NUNGWARI TJIRI RI KAKO NANEE OKAKOROISE PO "KAKO".

OSTORY ONDENGA (1)

1. ---------------------------- II _____________ KAKO _____________
2. ---------------------------- II _____________ KAKO _____________
3. ---------------------------- II _____________ KAKO _____________

NAMBANO TWEE OVITJANGE VYENU PEHI MU PURATENE KOSTORY INDJI OITJAVARI.

OSTORY OITJAVARI (2)

4. ----------------------------II _________________ KAKO ______________
5. ----------------------------II _________________ KAKO ______________
6. ----------------------------II _________________ KAKO ______________
7. ----------------------------II _________________ KAKO ______________
8. ---------------------------- II _________________ KAKO ______________
9. ---------------------------- II _________________ KAKO ______________

NAMBABO TWEE IVITJANGE PEHI MU PURATENE KO STORY INDJI OITJATATU.

OSTORY OITJATATU (3)

10. -------------------------- II ____________________ KAKO ________________
11. -------------------------- II ____________________ KAK0 ________________
12. --------------------------II ____________________ KAKO ________________
13. --------------------------II ____________________ KAKO ________________
14. --------------------------II ____________________ KAKO ________________
15. --------------------------II ____________________ KAKO ________________
16. --------------------------II ____________________ KAKO ________________

NAMBANO TWEE OVUTJANGE VYENU PEHI MU PAURATENE KO STORY INDJI ITJAINE.

OSTORY OITJAINE (4)

17.-------------------------- II ____________________ KAKO ________________
18. -------------------------- II ____________________ KAKO ________________
19. -------------------------- II ____________________ KAKO ________________
20. -------------------------- II ____________________ KAKO ________________
21. -------------------------- II ____________________ KAKO ________________
22. -------------------------- II ____________________ KAKO ________________
23. -------------------------- II ____________________ KAKO ________________
24. -------------------------- II ____________________ KAKO ________________
25. -------------------------- II ____________________ KAKO ________________

ENGLISH GROUP ADMINISTERED TESTS

Appendix A-4

ENGLISH GROUP TESTS

CASE NUMBER : ____________________

NAME OF CHILD : ____________________________________

GRADE : ____________________

NAME OF SCHOOL : ____________________________________

AGE OF CHILD : __________ **SEX** __________

CHILD'S DATE OF BIRTH : ____________________

EXAMINER : ____________________

SPECIAL CASE : ____________ **YES** ____________ **NO**

English Group Tests

	ENGLISH WORD SPELLING	OBSCAT	ELISTCOM	RAV
TOT. ERRORS				
TOT.CORRECT				
TOT. ITEMS	**40**	**32**	**25**	**36**
% CORRECT				
TESTING TIME				
NO. OF FIRST LETTERS OF WORD CORRECT				
LDT CORRECT AFTER 1 MIN.				

SPELLING TEST (English Version)

Below is a list of 40 words that the children are going to spell. Ask the children to listen carefully to the words that you are going to read. Read the words in a sentence, and when you say the word again, the children must then spell it. Ensure that each word is not emphasized nor pronounced differently from normal. If a child makes more than ten consecutive errors, do not allow him/her to continue any further. Stop at question 20 when administering the test to Grade 2 children. Tell the children not to worry if they do not know how to spell a word and that they should try the best they can to spell the word.

1. **To**	Go to sleep	**To**
2. **Run**	Cats run fast	**Run**
3. **Legs**	People have two legs	**Legs**
4. **Tell**	Tell me a story	**Tell**
5. **Doll**	She did not want the doll	**Doll**
6. **At**	We will meet at her house	**At**
7. **The**	The man is fat	**The**
8. **Did**	Did you like the cake	**Did**
9. **Can**	Can you do me a favor	**Can**
10. **Like**	Do you like to swim	**Like**
11. **Pin**	Give me a pi, please	**Pin**
12. **Out**	Let us go out tonight	**Out**
13. **Not**	It is not true	**Not**
14. **Then**	He drank and then he ate	**Then**
15. **What**	What is your name	**What**
16. **Play**	Children like to play outside	**Play**
17. **Look**	Look at me	**Look**
18. **House**	My house is on fire	**House**
19. **Read**	Read this letter to me	**Read**
20. **Angry**	Angry people sometimes shout	**Angry**
21. **Cattle**	My father sold his cattle	**Cattle**
22. **Hilt**	They could see the hilt clearly	**Hilt**
23. **Promise**	You must keeo your promise	**Promise**
24. **Country**	Namibia is a beautiful country	**Country**
25. **Hospital**	My sister is in the hospital	**Hospital**
26. **Adventure**	Sara likes adventure	**Adventure**
27. **Wriggle**	She wriggled herself out of trouble	**Wriggle**
28. **Trousers**	We wear trousers in the winter	**Trousers**
29. **Thread**	Mother sent me to buy a thread	**Thread**
30. **Sword**	The soldier carried a sword	**Sword**
31. **Passage**	The passage is very long	**Passage**
32. **Quarter**	One quarter is not enough	**Quarter**
33. **Heart**	His heart was beating very fast	**Heart**
34. **Tradition**	Dancing is our tradition	**Tradition**

35. **Biscuit**	The biscuit was very sweet	**Biscuit**
36. **Parcel**	The parcel arrived yesterday	**Parcel**
37. **Beautiful**	That girl is beautiful	**Beautiful**
38. **Village**	Our village is far from here	**Village**
39. **Difficult**	Swimming is difficult to learn	**Difficult**
40. **Mother**	His mother is very sick	**Mother**

LISTENING COMPREHENSION-SHORT STORIES (English Version)

Read the following stories very clearly to the children and give them the following instructions:

1. listen very carefully to the four short stories I will read to you in English
2. I have read the short four stories to you, I willa sk you questions about each of the four stories I have read to you
3. when you answer the questions, write down "YES" if the answer is yes or write down "NO" if the answer is no
4. when you are finished, remain quite and raise your hand to signal that you are finished
5. are you ready to hear the first story ?

STORY 1

Koto decided to go to Windhoek. Kauru also wanted to go to Windhoek, but did not know how to get there. So, Koto showed Kauru where to catch the bus that goes to Windhoek. They later met in Windhoek.

QUESTIONS ABOUT STORY 1

1. Did Koto decide to go to Windhoek ?
2. Did Kauru show Koto where to catch the bus that goes to Windhoek ?
3. Did they later meet in Walvis Bay ?

STORY 2

Long ago, there was a boy who would not listen to his parents. He always went and smoked dagga with his friends. His parents told him to stop smoking dagga. For a little while, he listened to his parents and stopped smoking dagga.

Then one day, he met his friends at school. They gave him a lot of dagga. His parents told the teachers that he smokes dagga.

QUESTIONS ABOUT STORY 2

4. Would the boy listen to his parents ?
5. Did he ever listen to his parents for a while ?
6. Did the boy stop smoking dagga for a while
7. Did the boy meet his friends at church ?
8. Did the teachers stop the boy from smoking dagga ?
9. Did his friends give him a lot of dagga ?

STORY 3

Kambwapehuri is my father's cow. It cannot get a chance to drink water at the dam. There are so many cows at the dam. It is difficult for the goats, sheep, and cattle to drink water at the dam. Kambwapehuri mooed to tell the other animals to get out of the way but nothing happened. Not one goat or sheep or cow moved. Kambwapehuri mooed again. Still nothing happened.

Kambwapehuri learned her lesson. She learned that no matter how much she mood, the other animals would not get out of the way. So, she started to eat the grass near the dam.

QUESTIONS ABOUT STORY 3

10. Is Kambwapehuri my mother's cow ?
11. Did Kambwapehuri try to make the other animals get out of the way ?
12. Did she moo three times
13. Did the goats, sheep, and cattle get out of the way when she mooed ?
14. Is it easy for the goats, sheep, and goats to drink water at the dam ?
15. Did Kambwapehuri eat the grass near the dam ?
16. Did Kambwapehuri learn a lesson ?

STORY 4

Mbahee is Kamuzandu's donkey. Kamuzandu went to the veld to look for his donkey. He could not find it in the veld. He told his father about Mbahee and his father told him to look for Mbahee in Inyangu's kraal. But Mbahee was not there.

Then he saw Ukuna riding a donkey. It looked just like mbahee. He told his father that Ukuna has his donkey. But Ukuna said that the donkey was his. Kamuzandu did not believe what Ukuna said. He said Ukuna stole his donkey.

Kamuzandu stopped talking to, and playing with, Ukuna.

Kamuzandu went back home and told his uncle about Mbahee. He said Ukuna was riding a donkey looking like his. His uncle told him to look for his donkey in his own kraal.

Kamuzandu was surprised when he looked in his own kraal. He also felt very bad about what he said to Ukuna. He decided to apologize to Ukuna the next day. He felt very bad for saying Ukuna stole his donkey.

QUESTIONS ABOUT STORY 4

17. Was a donkey missing ?
18. Was Ukuna looking for his donkey ?
19. Did the donkey that was missing belong to Kamuzandu ?
20. Was the donkey in the veld ?
21. Did the donkey that Ukuna was riding look like Mbahee
22. Was Ukuna riding Kamuzandu's donkey
23. Did Kamuzandu call Ukuna a thief ?
24. Did Ukuna steal Kamuzandu's donkey ?
25. Did Kamuzandu find Mbahee in his own kraal ?

NAME: ________________ GRADE __________ SCHOOL ________________

ENGLISH LISTENING COMPREHENSION.

LISTEN TO THE STORIES THAT I WILL READ TO YOU AND THEN ANSWER THE QUESTIONS THAT FOLLOW. TICK "YES" IF THE ANSWER IS YES AND TICK "NO" IF THE ANSWER IS NO. NOW, LISTEN TO SORY 1.

STORY 1.

1.---------------------YES __________ NO ______________

2.---------------------YES __________ NO ______________

3.---------------------YES __________ NO______________

STOP WRITING AND LISTEN TO STORY 2 NOW

STORY 2

4.---------------------YES __________ NO______________

5.---------------------YES __________ NO ______________

6.---------------------YES __________ NO ______________

7.---------------------YES __________ NO ______________

8.---------------------YES __________ N0 ______________

9.---------------------YES __________ NO ______________

STOP WRITIG AND LISTEN TO STORY 3 NOW

STORY 3

10.--------------------YES __________ NO ______________

11.--------------------YES __________ NO ______________

12.--------------------YES __________ NO ______________

13.--------------------YES __________ NO ______________

14.--------------------YES __________ NO ______________

15.--------------------YES __________ NO ______________

16.--------------------YES __________ NO ______________

STOP WRIRING AND LISTEN TO STORY 4 NOW.

NOW, TURN THE PAGE AND ANSWER THE QUESTIONS.

STORY 4

17.--------------------YES __________ NO ________________

18.--------------------YES __________ NO ________________

19.--------------------YES __________ NO ________________

20.--------------------YES __________ NO ________________

21.--------------------YES __________ NO ________________

22.--------------------YES __________ NO ________________

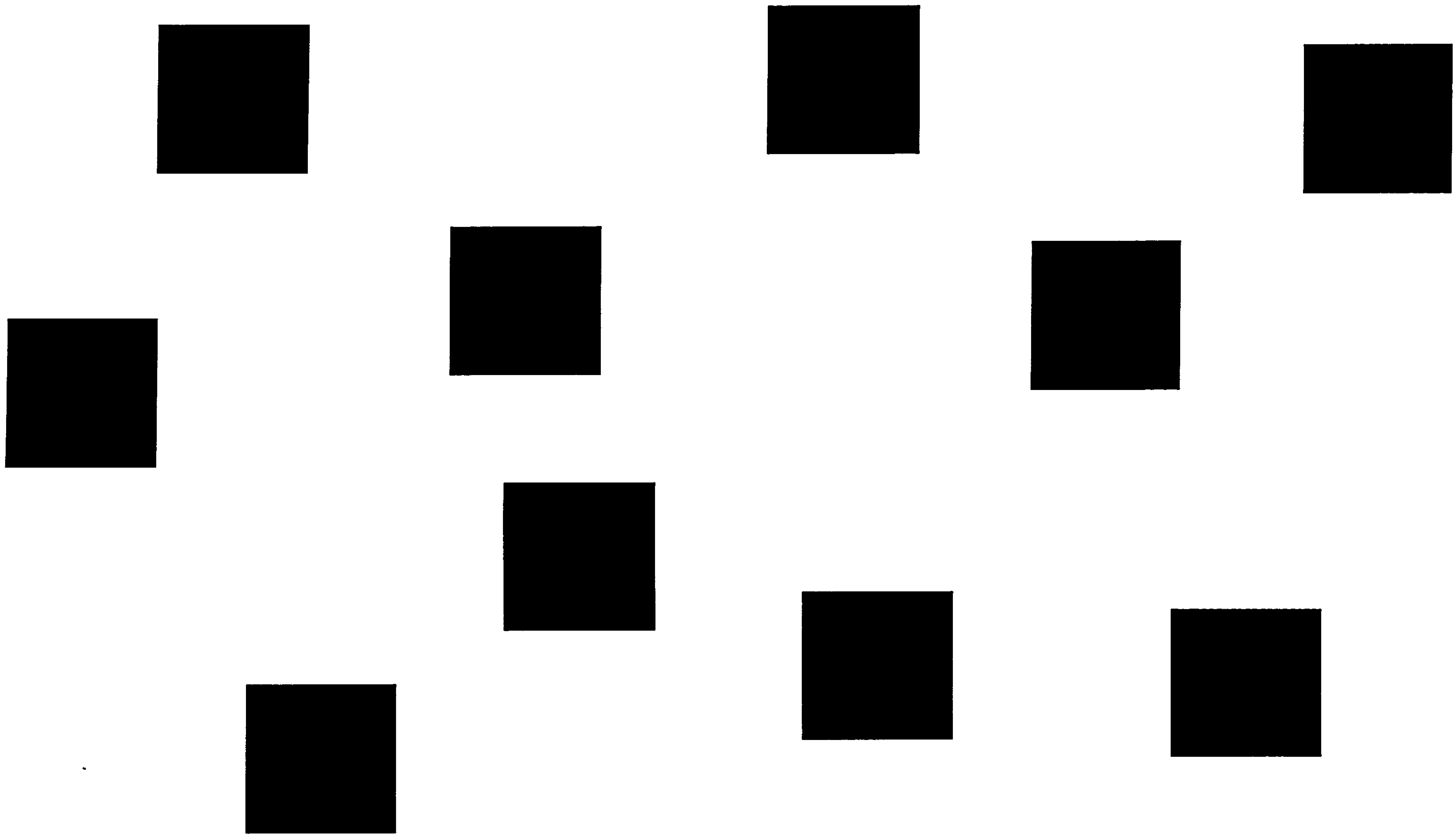
23.--------------------YES __________ NO ________________

24.--------------------YES __________ NO ________________

25.--------------------YES __________ NO ________________

STIMULUS CARD FOR THE NON-LANGUAGE BASED TASKS

- Spatial Span task (CORSI Blocks)



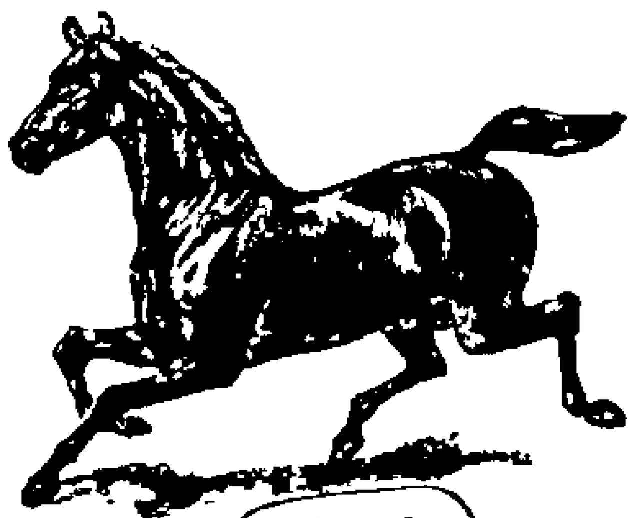
Corsi Blocks task

STIMULUS CARD FOR THE NON-LANGUAGE BASED TASKS

- Object Semantic Categorisation task

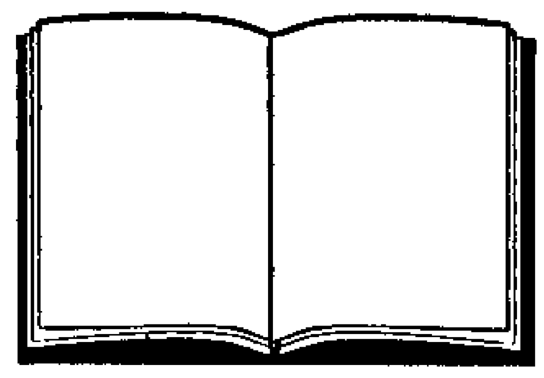
are the following items living or non-living?
oviṋa mbi mbia raisiwa kehi ovinamuinjo poo kavinamuinjo?

practice items
ovisanekero



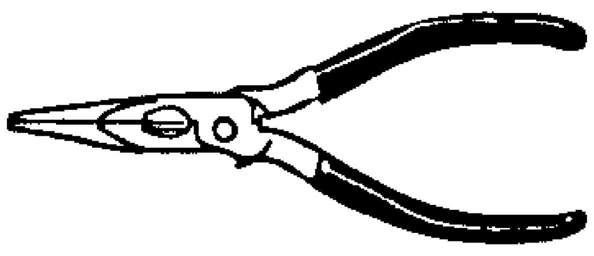
yes/ii

no/kako



yes/ii

no/kako



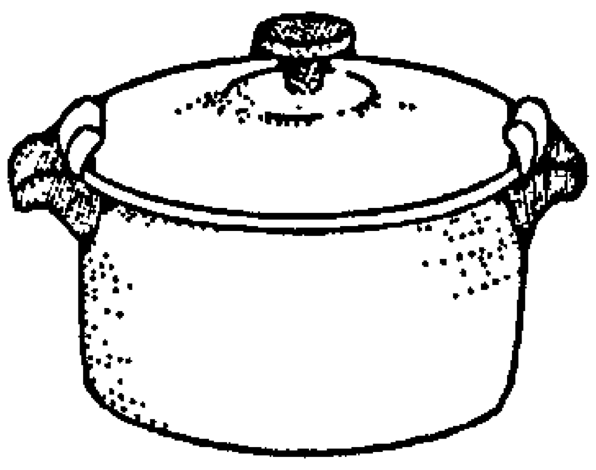
yes/ii

no/kako

yes/ii

no/kako

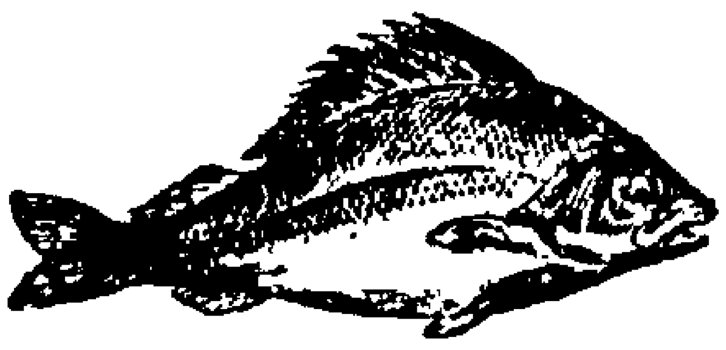
1



yes/ii

no/kako

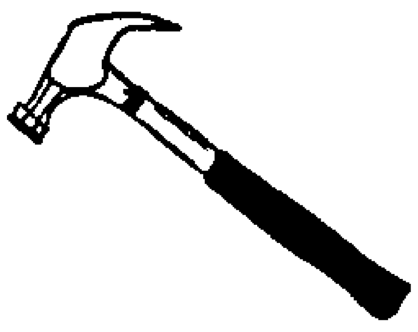
2



yes/ii

no/kako

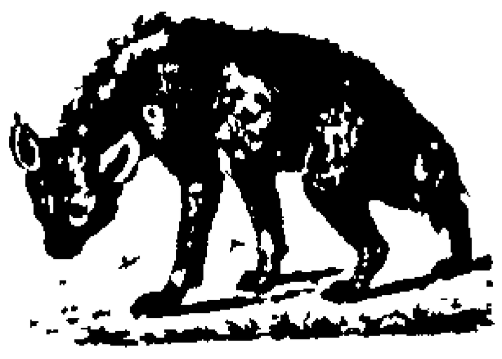
3



yes/ii

no/kako

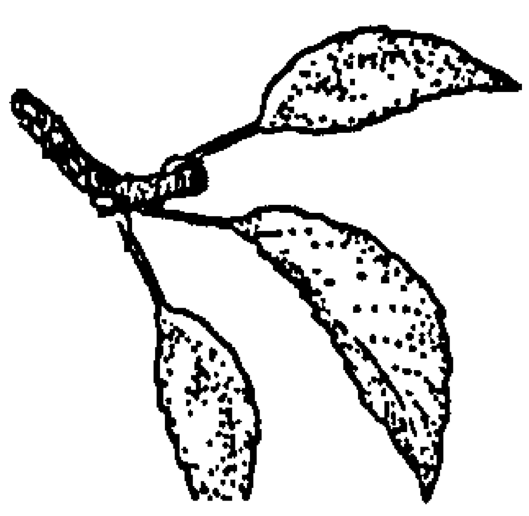
4



yes/ii

no/kako

5



yes/ii

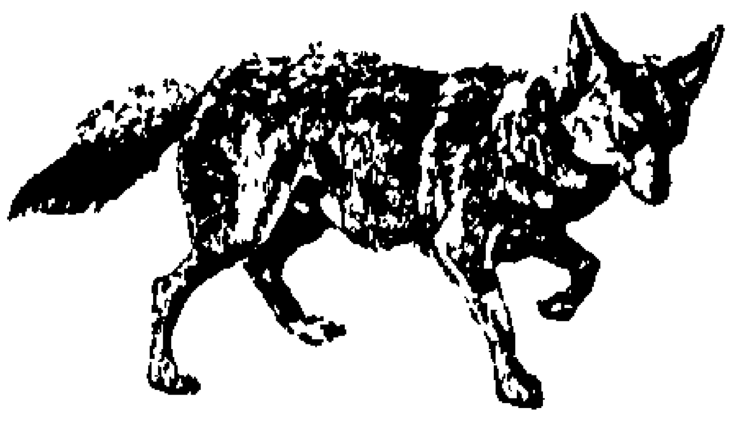
no/kako

6

yes/ii

no/kako

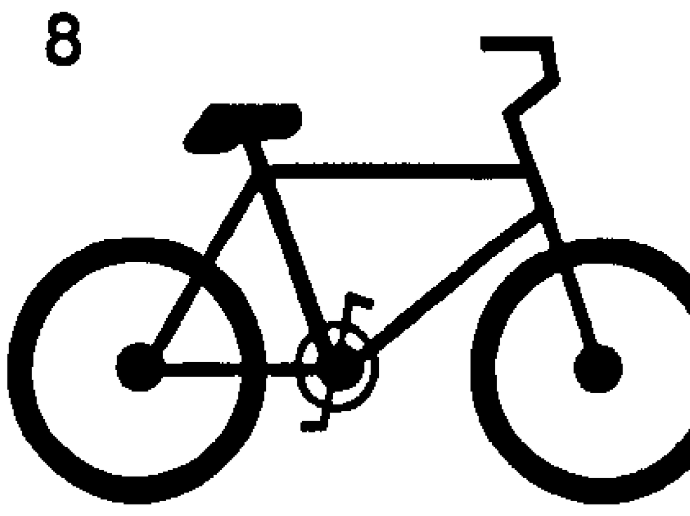
7



yes/ii

no/kako

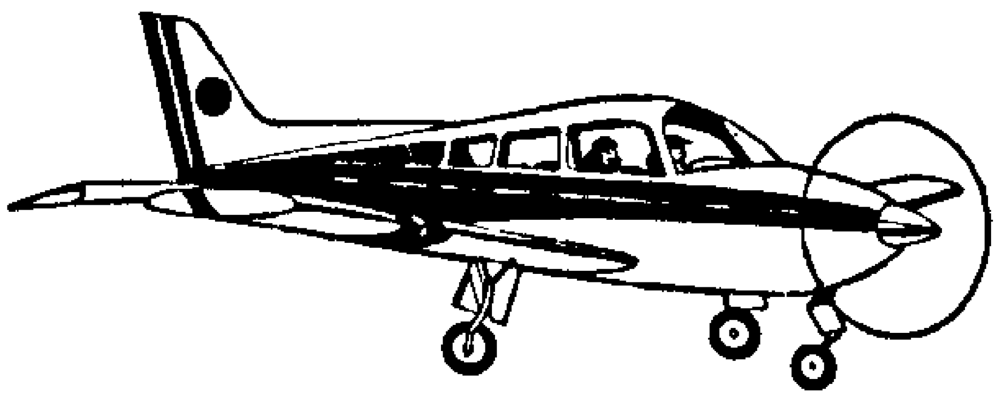
8



yes/ii

no/kako

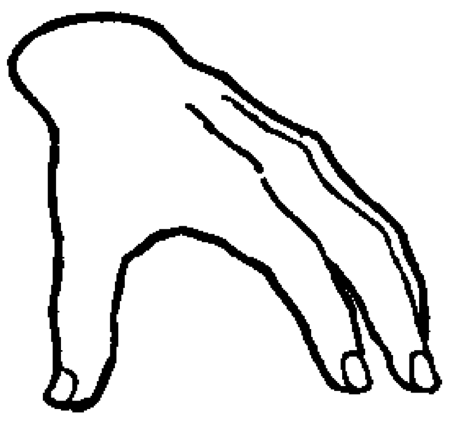
9



yes/ii

no/kako

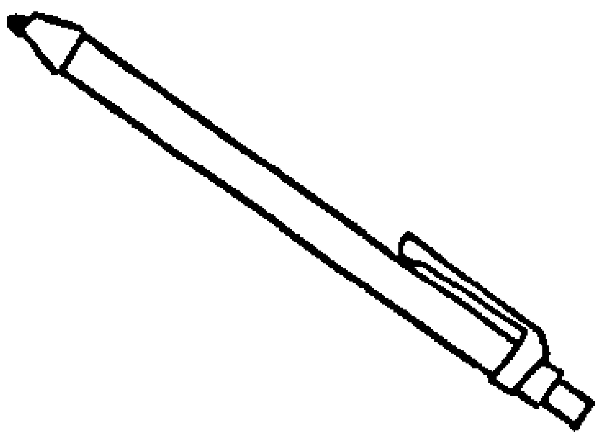
10



yes/ii

no/kako

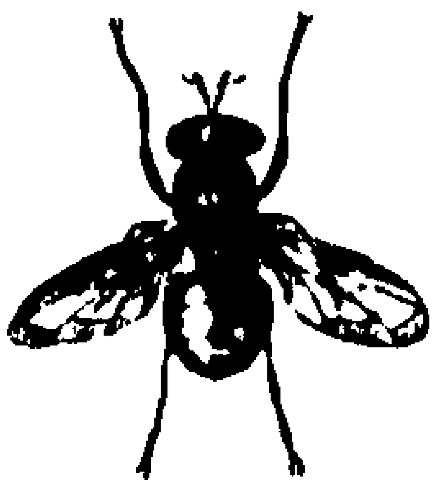
11



yes/ii

no/kako

12



yes/ii

no/kako

13

yes/ii

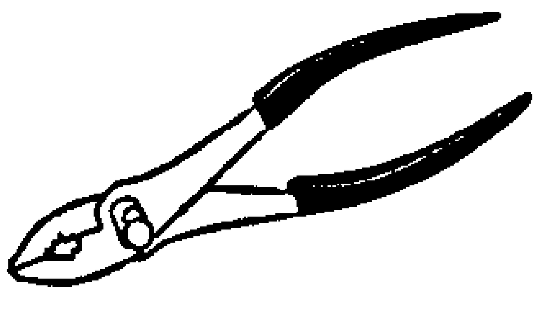
no/kako

14

yes/ii

no/kako

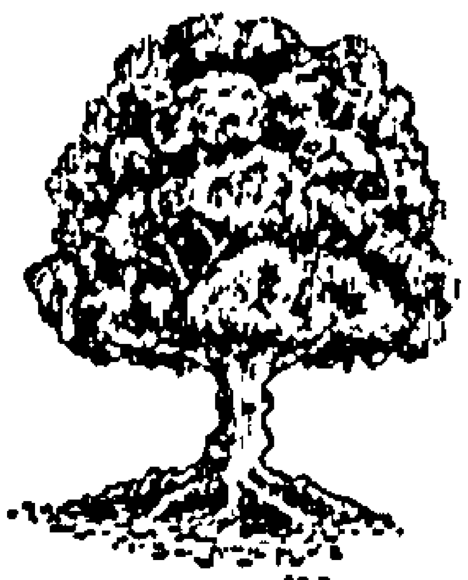
15



yes/ii

no/kako

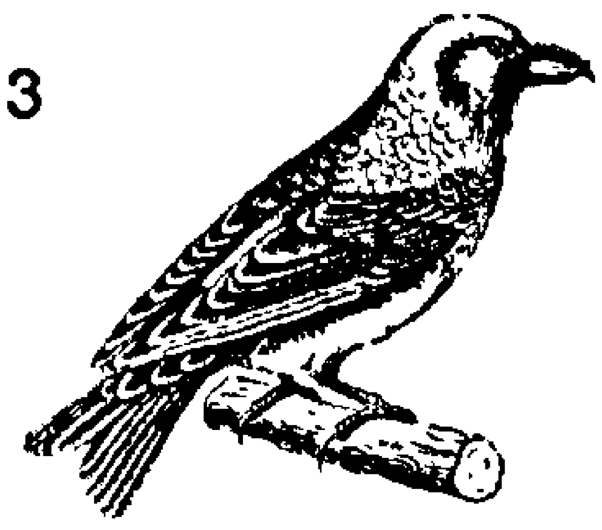
16



yes/ii

no/kako

13



yes/ii

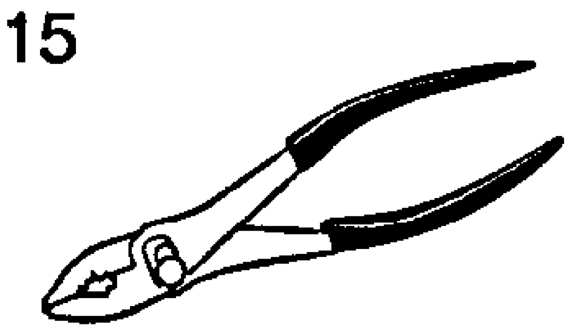
no/kako

14

yes/ii

no/kako

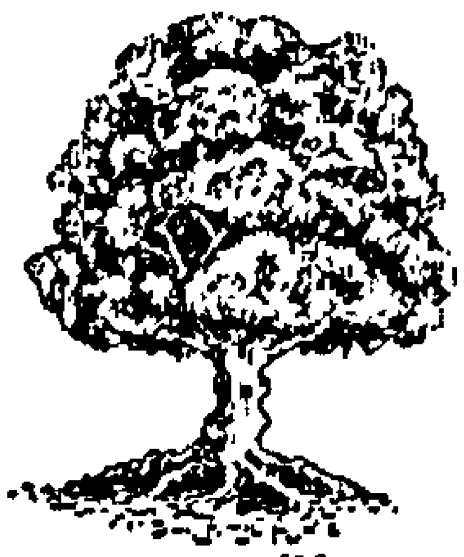
15



yes/ii

no/kako

16



yes/ii

no/kako

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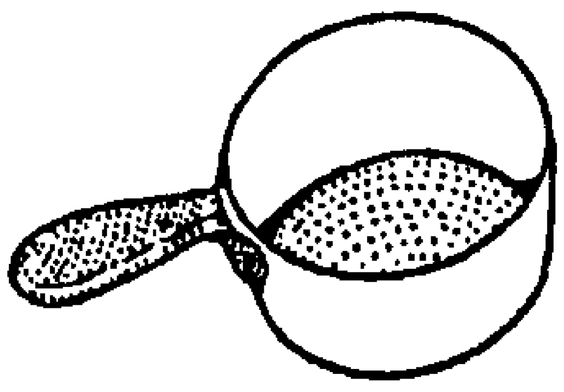
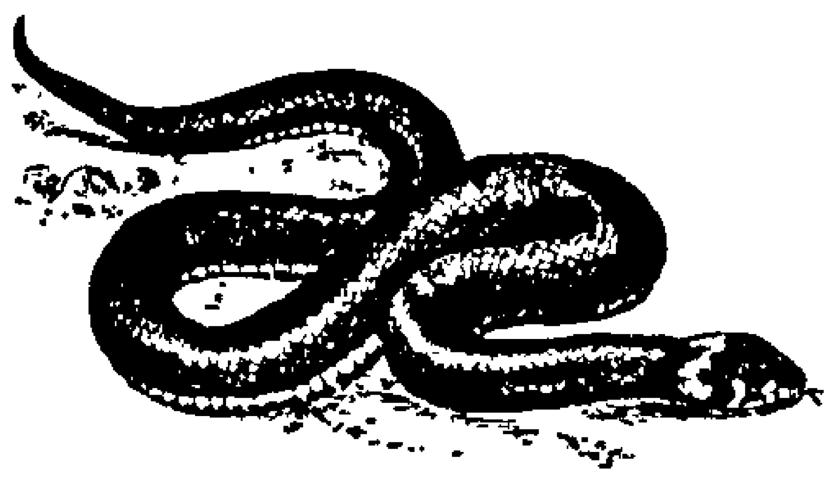


yes/ii

no/kako

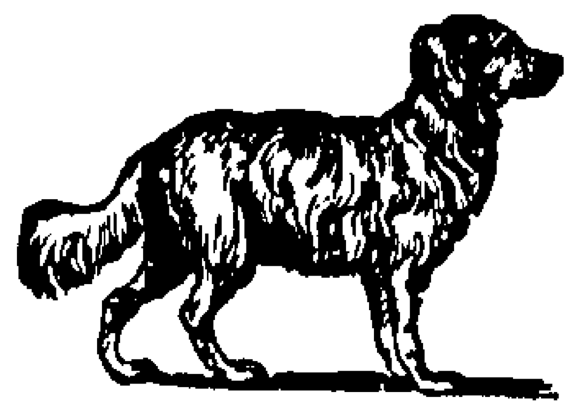
18



yes/ii

no/kako

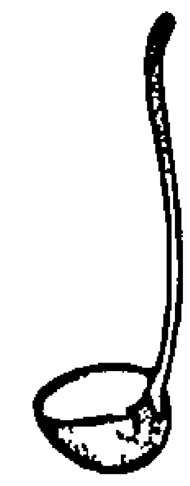
19



yes/ii

no/kako

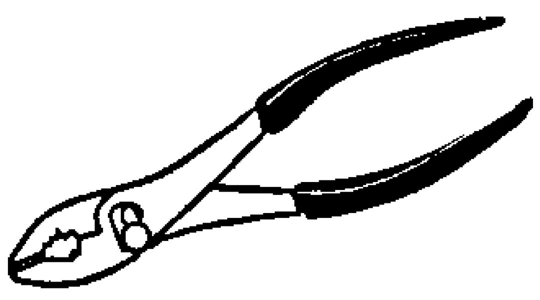
20



yes/ii

no/kako

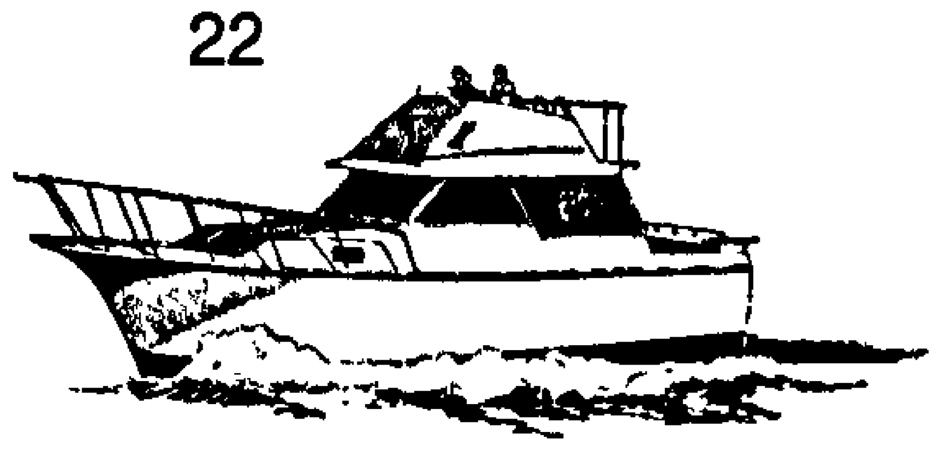
21



yes/ii

no/kako

22



yes/ii

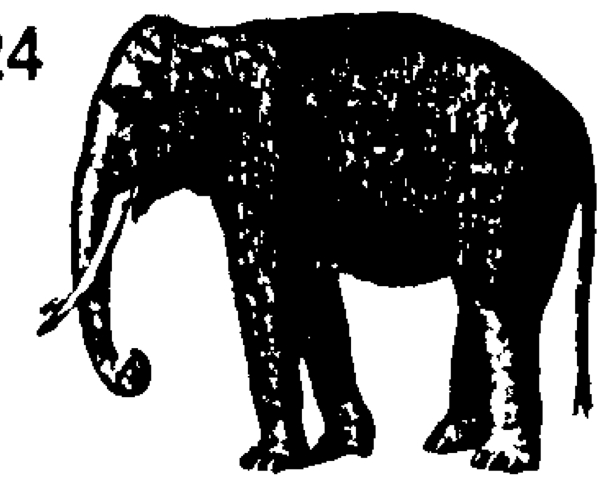
no/kako

23

yes/ii

no/kako

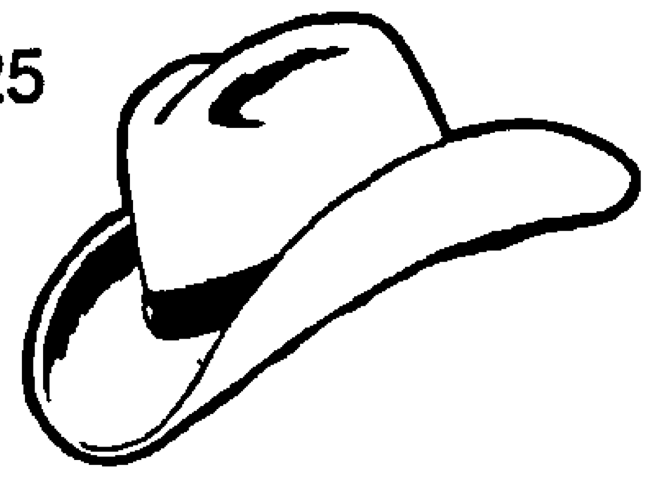
24



yes/ii

no/kako

25



yes/ii

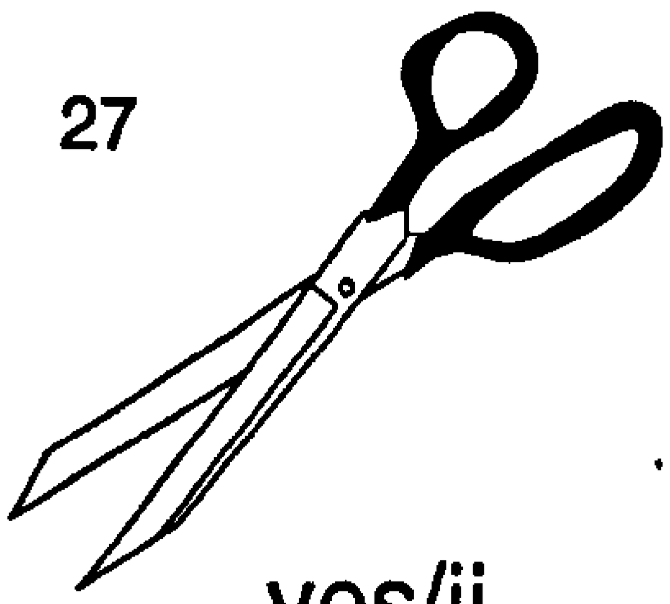
no/kako

26

yes/ii

no/kako

27



yes/ii

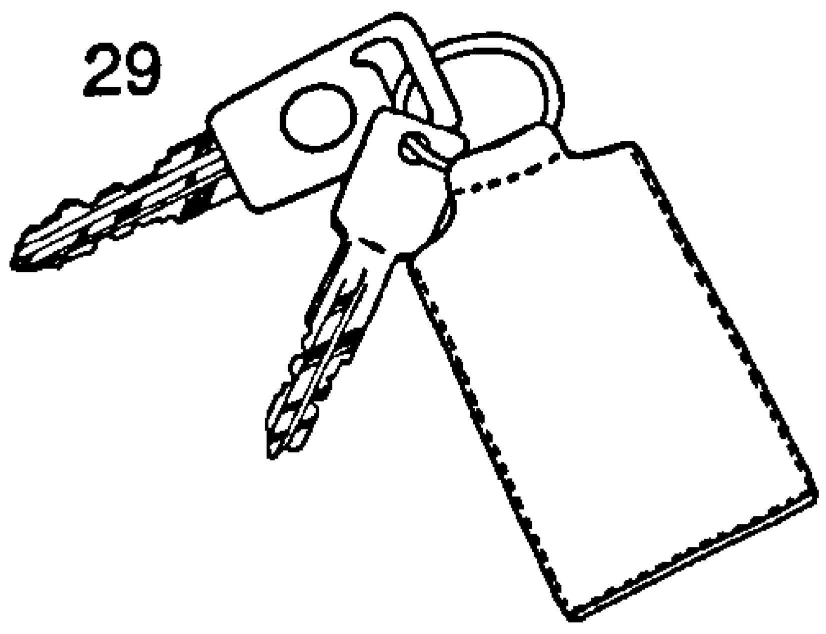
no/kako

28

yes/ii

no/kako

29



yes/ii

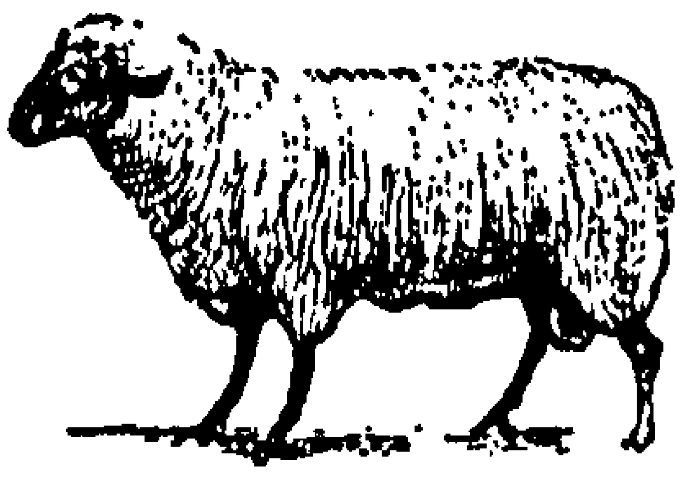
no/kako

30

yes/ii

no/kako

31



yes/ii

no/kako

32

yes/ii

no/kako