Exploring Health Literacy Assessment: The Relexicalisation of a Health Literacy Test from the U.S. for Application in a South African Population

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by

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STUDY OBJECTIVES

Introduction

The Rapid Estimate of Adult Literacy in Medicine (REALM) is a standardised health literacy test developed in the United States that has been previously administered and researched in South Africa and found to be largely inapplicable. This thesis explores the relexicalisation, or replacement of words used in the test, in an attempt to improve its applicability, and it compares the results of the original test with those of the modified test.

Objectives

The objectives of this thesis are:

1. To contextualise the REALM in terms of the fields of literacy, literacy assessment and health literacy, exploring the context from which the test originates, the ideological assumptions that inform it, and the view of language and communication that it holds.

2. To adapt the REALM for better use in a South African context, taking into account the influence of ideological assumptions on the modification of the REALM, the form the modification takes, and the criteria used to evaluate the test.

3. To compare the results of the modified test with the results of the original administration in South Africa in order to determine whether or not the modification makes the test more applicable.

4. To explore and critique the ideological assumptions that inform both the original REALM and the modification of the test, in light of recent advances in literacy theory and testing.

ABSTRACT

The Rapid Estimate of Adult Literacy in Medicine (REALM) is a standardised health literacy test developed in the United States that has been previously administered and researched in South Africa (Lecoko, 2000). It is an objective vocabulary test which uses item recognition of 66 health-related words where recognition is measured by pronunciation. It is designed as a screening instrument to identify the health literacy levels of patients in clinics.

Lecoko (2000) found the REALM to be largely inapplicable in a South African setting, in that only eight out of the 66 words could be deemed acceptable, in that they could be either both adequately pronounced and adequately comprehended or both inadequately pronounced and inadequately comprehended. This may have occurred for a number of reasons, including the administration of the test in a population for whom English is a second or other language, and inaccurate measurement of pronunciation and comprehension of words, with a key problem being that the choice of words in the original REALM may not accurately represent the range of conditions and issues in a South African healthcare setting.

This thesis was therefore premised on the principled relexicalisation of the REALM, that replacement of the words used in the test, using a sample gathered from health information and promotion texts in local clinics, would improve its applicability. In this regard, an exhaustive sample was gathered and analysed and 66 new words were chosen. The test was also modified to include a more principled approach to pronunciation and comprehension issues, and to account for language proficiency differences in administering an English language test in an English second language population.

This modified test, referred to as the REALM-M was administered to a group of respondents who were statistically similar to the group to whom the REALM had originally been administered, and the results were compared. It was found that relexicalisation increased the number of acceptable words on the test from eight to 38.

However, researching the key discourses surrounding health literacy and comparing these with current discourses about literacy beyond the field of healthcare revealed that despite improved content validity over the REALM, the REALM-M lacked construct validity. This

provided the opportunity to discuss the discourses of health literacy and to suggest the application of alternative paradigms in this field.

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CHAPTER 1: INTRODUCTION

1.1 Background to Research

Knowledge of health vocabulary and healthcare schemata, referred to as health literacy, is believed to be a major factor in promoting health and access to healthcare in public health settings such as clinics. Matching the level of health literacy of a patient and the literacy level of typical health information materials is also believed to be a key factor in providing healthcare, with a mismatch in levels likely to result in a variety of negative health outcomes. Thus, measuring a patient's health literacy and tailoring health information materials to the patient's level is one way of improving the provision of healthcare.

There are several tests developed in the United States to test health literacy, one of which is the Rapid Estimate of Adult Literacy in Medicine (REALM) test developed at Louisiana State University. This test was the focus of research for a Master of Pharmacy degree thesis entitled "Applicability of a Health Literacy Test from the U.S. in a South African Population", written in 2000 by M. L. E. Lecoko. Lecoko's research showed that the REALM test was not applicable and effective in a local population, and that only eight words out of the 66 that appear on the test could be considered applicable to a South African setting.

This may have occurred for a number of reasons. For instance, the REALM test may have had an inherent cultural slant that would have disadvantaged non-Western respondents. The REALM test may be founded on misconceptions about what constitutes 'literacy'. Similarly, testing health literacy or any form of literacy in South Africa with a standardised test may have disadvantaged individuals in a society where community literacy, in which people with differing levels of literacy assist each other in literacy tasks (Prinsloo and Breier, 1996), is a day-to-day reality. Additionally, the items chosen for the test may not have reflected typical health issues in South Africa, and the realities of the provision of health care in the South African public sector, including issues about language and the distribution of resources and personnel peculiar to South Africa, may have been ignored or obscured when a test developed for a U.S. setting was used here.

One response to this is to develop a literacy test that takes more cognisance of the multitude of factors that influence literacy in South Africa. This approach to developing a health literacy test also means incorporating a further group of factors that affect public health in this country, for instance disparities in the provision of healthcare to previously oppressed groups, or the dominance of English first-language healthcare professionals in settings where patients speak English as a second or other language. Depending on the view of literacy that one takes, this may be a lengthy and involved process and could involve extensive ethnographic research into literacy practices in clinics.

Another option was to adapt or modify the existing REALM test in an attempt to make it more applicable to the South African setting. This is the direction chosen for this thesis. While this approach to research may perpetuate some of the inherent problems with the REALM test, it may also provide insight into what constitutes health literacy in a South African setting. In addition, the results of such research could feed into later ethnographic research into health literacy and would also allow for comparison and contrast with previous research.

1.2 Field of Research

This thesis is intended to follow on from Lecoko's (2000) study, by modifying the REALM through relexicalisation, or simply put, choosing new, more appropriate words. It is based on an inter-disciplinary project between the Faculty of Pharmacy and the Department of English Language and Linguistics at Rhodes University, and attempts to integrate current advances in literacy research with the needs of healthcare professionals in assessing the literacy needs of individuals in healthcare settings. It also builds into other currently conducted research, which aims to develop materials such as patient information leaflets for patients with low literacy.

1.3 Overview of Chapters

The following chapters begin with a literature review that incorporates a discussion of the problems faced in defining literacy, and examines two major models of literacy, namely the autonomous and ideological models of literacy, including discussions of the challenges to each model. Next, the chapter delves into the assessment of literacy, looking at objective vocabulary tests, before discussing the historical context of literacy and education in South Africa. In the next section the discourse of health literacy is examined, including a discussion of various aspects of the testing of health literacy and common health literacy tests.

The methodology chapter begins with an in-depth look at the REALM test, listing the reasons for choosing to research this test. The rationale behind the modification process is then presented, outlining the various stages of modification, including the relexicalisation, as well as the addition of a comprehension aspect and a literacy practices questionnaire. The latter portion of the chapter deals with the administration of the modified test, discussing the methods used in administering the test.

The results chapter begins with a discussion of the general demographic characteristics of the sample population, before discussing the results of the administration of the modified test, comparing it with the results of the original test administered by Lecoko in 2000 (hereafter referred to as the REALM-L). Relationships between the results of the modified test and various factors based on data gathered by the literacy practices questionnaire are then discussed.

In the critique chapter, a number of implications are drawn from the results, with a discussion of the contribution the study makes to the field of health literacy. In addition, the limitations of the study and tensions that arose during the research project are explored, and suggestions are made to resolve these tensions and to further improve the assessment of health literacy.

Leading on from the discussion of limitations and measures to increase the applicability of health literacy tests in the critique chapter, the conclusion explores the application of a paradigm shift in assessing health literacy that may provide new insight into health literacy. The chapter concludes with a discussion of opportunities for further research.

CHAPTER 2: LITERATURE REVIEW

2.1 Overview

The literature review focuses on three major areas: examining definitions and models of literacy, looking at the history of literacy and education in South Africa, and then finally examining health literacy as a specific domain.

In Section 2.2, the development of a single unified definition of health literacy is discussed, sketching out the key issues that surround the concept, and examining various definitions and models of literacy. The two major models of literacy, the autonomous and ideological models, are presented, as well as problems with each model. This section concludes with a discussion of the assessment of literacy, focusing on formal assessment of literacy via objective vocabulary tests, as this is the sort of test used in the current study.

The historical, cultural, and socio-political context of the current study is examined in Section 2.3 on literacy, education and healthcare in South Africa. This section provides an account of how language, literacy and political struggle have interacted historically in South Africa, in order to give an insight into the role literacy has played for the sample population in the current study. Similarly, this section explores how the political history of South Africa has affected the provision of healthcare to its citizens.

In Section 2.4 the dominant discourses about a specific domain of literacy, health literacy, are discussed in the light of the models of literacy presented earlier in the chapter. This section also includes an examination of the assessment of health literacy, and the most commonly used instruments for testing health literacy.

2.2 Problems in Defining Literacy

Research into any aspect of literacy typically begins with an attempt to define the concept. Whether one is studying the acquisition of literacy, adult or child literacy, assessment of or attitudes towards literacy, the particular definition of literacy selected for a particular piece of research has important implications. This is true for literacy research conducted in a variety of disciplines, from anthropology to cognitive psychology, from socio-linguistics to politics. This is critically important as the chosen definition of literacy has implications for assessment as well as policy, objectives and literacy education (Lyster, 1992). With a multitude of experts and books published on the topic, one could assume that there would be a fair amount of agreement on how to define literacy. While most theorists agree the term connotes aspects of reading and writing, "major debates continue to revolve around such issues as what specific abilities and knowledge count as literacy, and what 'levels' can and should be defined for measurement" (Wagner, 1994, p. 474).

The search for a definition of literacy is problematic on a number of levels. Literacy "is not something that can be neatly and easily defined" (Baynham, 1995, p. 6) and any definition is likely to be contested. The definitions of literacy are not fixed (Street 1993) but remain fluid across disciplines and time. Issues, such as conflicting ideologies, the lack of linear progression between different conceptualisations, generalisation of the term, and the wide range of approaches to researching the area, all serve to complicate the definition of literacy. Cook-Gumperz (1986, p. 22) refers to "many contradictory views and hard-to-maintain dichotomies between forms of language, forms of historical development and the consequences of social changes" that surround the conceptualisation of literacy.

Defining literacy is clearly no easy task, and means stepping onto an ideological battleground upon which the war for conceptualisation of literacy is fought. Selecting a definition of literacy for a research project is not so much taking a sample of definitions showing a change in perception over time up until the current 'correct' definition, as it may be a case of choosing a side in a conflict (Bee, 1980). On an ideological level, literacy may be seen as emancipation, either in terms of a political revolution, economic development, or cognitively, through acquisition. It may also be seen as restrictive and oppressive, both economically and politically. Rassool (1999, p. 5) suggests that how "literacy is defined is significant in terms

of the framing and selection of particular meanings, emphasising some, whilst screening out others". Lyster focuses on the effect that various definitions of literacy have on a personal and interpersonal level, in that they "affect and reflect our perceptions of literate and illiterate individuals and societies" (1992, p. 12).

On another level, "definitions of literacy are highly problematic, for the present as well as the past" (Graff, 1987, p. 58), and although theories about literacy have developed over time, it seems that there is little historical progression from one perception of literacy to another. Different concepts of literacy can co-exist and influence research, policy and implementation concurrently. Hasan (1996, p. 377) expresses this well: "in the long history of education, [literacy] has not simply meant different things to different generations, but also different things to different persons in the same generation". Rassool also hints at this relativism. For her, the concept of a 'definition' of literacy necessarily involves the selection of criteria for what it means to be literate, criteria that will be situated within a given society at a specific point in history.

However, the failure to find a line of historical progression between definitions of literacy is only one aspect of the problem. Another aspect is the generalisation of the concept, what Hasan (1996) calls the semantic saturation of the word literacy. Halliday (1996, p. 339) feels the same way: "The term 'literacy' has come to be used in recent years in ways that are very different from its traditional sense of learning and knowing how to read and write". The term literacy has been dissociated from reading and writing, and is now generalised across not only different forms of discourse, spoken as well as written, but also mastery of a given task. "In this way," says Halliday (1996, p. 339), "it comes to refer to effective participation in any kind of social process". According to Lyster (1992, p. 11) "the term 'literacy' is increasingly used to refer to the basic education of adults rather than to the strictly technical skills of reading and writing".

Another factor is the "confusions of levels of, and perspectives on, literacy" which Cook-Gumperz (1986, p. 22) refers to, suggesting that the search for a definition of literacy is also compounded by the identification of multiple dimensions to literacy. There is a plethora of approaches to defining literacy, from anthropology, psychology, history, sociology, media theory, education and, of course, linguistics. The conceptualisation of literacy as a complex

of multiple literacies, a particularly broad view of literacy, may also complicate the issue. In addition, the term literacy can be used at both an individual level and a collective level, at a local, community level, and at a national and global level.

While the task of pinning literacy down to one definition may be difficult, looking at the definitions in terms of models can provide significant insight. According to Rassool (1999, p. 35), "Models of literacy refer to pedagogic frameworks in which theories about the literacy process are generated". They include the range of meanings produced in literacy practices as well as conceptions of how and what meanings can be obtained in texts and contexts. Rassool argues that models of literacy are useful because they are explicit about the range of literacies they frame and the process through which these literacies are accessed. Using models of literacy, the range of definitions of the concept can be split into two broad categories, distinguished by differing perceptions of the acquisition, consequences and uses of literacy. Street's (1984) division into autonomous and ideological models provides a helpful way of exploring these definitions, of examining the major paradigms at play.

2.2.1 The Autonomous Model and Functional Literacy

2.2.1.1 Key Issues of the Autonomous Model

A large number of predominantly Western theories define literacy "in terms of universal cognitive or technical skills that can be learned independently of specific contexts or cultural frameworks" (Verhoeven 1997, p. 128). These theories fall into the 'autonomous' model (Street, 1984), which holds that literacy and a particular set of supposed consequences of the acquisition of literacy are independent or 'autonomous' of the setting in which literacy is acquired. In addition to focusing on the consequences of literacy, the autonomous model also tends to be primarily skills-oriented, technicist and mechanical. Walsh (1991, p. 7) writes that the autonomous model emphasises "discrete, mechanical skills that are thought to be separately learnable and separately teachable". This model also represents a long-held and dominant perspective, within linguistic, psychological, anthropological and sociological fields, about the nature of literacy, characterised by a group of assumptions about the power of literacy. These assumptions are typically unchallenged, viewed as neutral, and link the acquisition of literacy with a specific set of positive consequences. The following sections discuss these consequences and the view of literacy solely as a skill.

2.2.1.1.1 Individual and Societal Consequences of Literacy

There is a multitude of consequences of the acquisition of literacy according to the autonomous model. According to this model, the acquisition of literacy has major implications for both individuals and societies, and is a prerequisite for both individual and societal economic empowerment. On an individual level, literacy is also seen as necessary for cognitive growth. The autonomous model suggests that "as individuals acquire literacy, so their worldviews expand: they are able to juxtapose different sets of ideas critically and so develop scientific and logical thinking" (Street, 1997, p. 133). Similarly, Cook-Gumperz (1986, p. 3) describes literacy as "a metacognitive process that makes other cognitive and social developments possible".

On a societal level, literacy is seen as the dividing line between 'primitive' and 'civilised' societies (Levy-Bruhl, 1910, cited in Goody, 1977, p 148) and as the key element for economic growth as a nation. Historical patterns of growth and the rise of 'civilisation' can

be linked with increases in the ratio of literate to illiterate individuals in a given society. The spread of literacy is believed to alter economic and political institutions for the better, replacing barter and exchange economies with capitalist democracy based on rational economic planning and individual entrepreneurship.

2.2.1.1.2 Literacy as a Skills-based Technology

The focus on skills and the 'literacy as technology' orientation of this model is evident in a number of definitions by both early theorists and more contemporary researchers. Goody (1977, p. 151) refers to literacy as "the technology of the intellect". Oxenham (1980, cited in Street, 1984, p. 186) also refers to literacy as a technology, calling it a "technical method of achieving a practical purpose". Approaches to literacy from the discipline of psychology describe it as "a multifaceted set of instrumental skills involving cognitive processes which operate in the production and comprehension of texts" (Cook-Gumperz, 1986, p. 3).

2.2.1.2 The Dominance of the Autonomous Model

The autonomous model also focuses on Western academic or schooled literacy and dominates Western education. Walsh (1991, p.7) refers to this model as the "dominant discourse at work in most U.S. schools and educational programs" and according to Lankshear (1997, p. 2), the view of reading and writing as specific cognitive abilities or sets of skills based on an identifiable technology (e.g. alphabetic script) dominated educational theory and practice until the 1970s.

2.2.1.3 Functional Literacy

An important aspect or offshoot of the autonomous model was the conceptualisation of functional literacy. Two key features characterised functional literacy. The first was the collocation of literacy with economic growth.

"The term 'functional literacy' was introduced in order to refer to the demands of literacy in the complex world," says Verhoeven (1994, p. 7), a leading current proponent of this approach. Originally used in the late 1950s by UNESCO researcher William Gray,

functional literacy orients the acquisition of literacy towards work and vocational training, as a means of increasing labour productivity.

This model was premised on the claim that the acquisition of literacy either by an individual or a society, as a nation or community, leads to economic growth. On one level, the acquisition of literacy empowered individuals to make their own choices and as a result, become economically empowered. On another level, it was believed that all that was required for the collective economy to 'take off' was for the ratio of literate to illiterate individuals in the society to reach a particular point, a critical mass.

This approach was to dominate UNESCO's policy on literacy for a number of years. For example, the UNESCO Revised Recommendation Concerning the International Standardisation of Educational Statistics (1978) describes the functional literacy : illiteracy divide in the following way:

> A person is functionally literate who can engage in all those activities in which literacy is required for effective functioning of his (sic) group and community and also for enabling him to continue to use reading, writing and calculation for his own and the community's development.
> A person is functionally illiterate who cannot engage in all those activities in which literacy is required for effective functioning of his group and community and also for enabling him to continue to use reading, writing and calculation for his own and the community's development.

During the late 1960's and 1970's, 'functional literacy' was associated with work-oriented programmes such the UNESCO Experimental World Literacy Programme (EWLP), which was a special programme for specific groups of adults in a number of developing countries. However, the subsequent popularity of the term meant that it was later generalised and applied to a number of contexts worldwide. With the rise in popularity of 'functional literacy', literacy became a socio-economic tool, designed to produce better workers and increase the productivity and GDP of a given nation.

Functional literacy was also focused on levels of literacy, and on the possible or minimum

level of individual literacy required to contribute to collective economic growth. Growing awareness that literacy versus illiteracy represented a continuum rather than a dichotomy suggested that there were different levels of literacy and that the literacy levels of an individual need only reach a certain functional level, an individual critical point, from which the individual could be regarded as sufficiently empowered to contribute to the greater societal literacy level, and thus to the growth of the collective economy.

In this paradigm, definitions of literacy focused on what was considered functional, or in another sense, identifying the minimum necessary level of literacy required of the individual to fulfil their function in society and thus contribute to the development and growth of the society.

According to Levine (1994, p. 121), "'functional literacy' has always asserted the existence of an intermediate standard of competence at reading and writing which is of fundamental individual and collective importance". For Levine, this intermediate standard represents the minimum level of competence necessary for 'social survival', which can include "a variety of different things such as the capacity to sustain independent, non-institutional living arrangements, an absence of dependency on state agencies, welfare benefits or charity but, above all, it invariably includes employment" (1994, p. 121).

Functional literacy seems to have been designed to refer to either a particular set of vocation-oriented literacy skills or a particular level of literacy, and was presented as a panacea to problems that had occurred in defining literacy prior to the 1960's when it was adopted.

2.2.1.4 Criticism of the Autonomous Model of Literacy and Functional Literacy

2.2.1.4.1 Criticism of the Autonomous View of Literacy

While "the uncritical affiliation of literacy with a range of social and economic effects – and of its 'other', illiteracy, with diametrically opposing effects – has retained a great deal of currency among policy makers, educators and the public" according to Luke, (1993, p. 2), both the autonomous model and functional literacy have come under criticism, and it is by way of this criticism that the ideological model was first proposed.

Street (1984) suggests that the autonomous theoretical framework is in fact embedded within a particular ideological and political context, and is designed to legitimise certain conventions of literacy practice within a Western setting. However, the autonomous model seeks to mask this ideological and political context and thus claims neutrality and universal application for its conventions and consequences. In this way it may be considered hegemonic.

2.2.1.4.1.1 Questioning Individual and Societal Consequences of Literacy

One way of exposing the hidden assumptions of the autonomous model is to challenge its premises and question the consequences of literacy it proposes. Graff (1987) has referred to this supposed link between the acquisition of literacy and its particular set of consequences as 'the literacy myth'.

According to Gee (1990, p. 32), 'the literacy myth' is seen to have produced claims that literacy leads to, or is correlated with, consequences such as logical and analytical modes of thought, general and abstract use of language, and critical and rational thought; as well as "a sceptical and questioning attitude, a distinction between myth and history, the recognition of the importance of time and space, complex and modern governments (with the separation of church and state), political democracy and greater social equity, economic development, wealth and productivity; political stability, urbanisation, and contraception (a lower birth rate)". On an individual level, the acquisition of literacy supposedly results in people who are more achievement oriented, more productive, more politically aware, more cosmopolitan, and more globally (nationally and internationally) and less locally oriented. Similarly, they are also supposedly more likely to have liberal and humane social attitudes, more likely to take the rights and duties of citizenship seriously, and are less likely to commit a crime (Gee, 1990).

Thus literacy is linked to 'civilisation', in terms of societal and economic empowerment, and also individual citizenship, cognition and logical or rational thought. In contrast, illiterate or non-literate societies were perceived to be primitive, or uncivilised, and to lack these supposedly positive features. Given that 'primitive' is a label that may be applied to other societies by a society which perceives itself as 'civilised', the terms may be seen as arbitrary and relative to each other, and thus the supposed features, and the values attached to those

features, of a civilised literate society may be questioned.

2.2.1.4.1.2 Questioning the Link Between Literacy and Societal and Economic Development

On a historical level, Cook-Gumperz suggests that the perceived cause-effect relationship of literacy and societal economic development, at the very least, has no factual basis: historical studies show that in the United Kingdom during the Industrial Revolution, though both literacy and development did improve, they did not necessarily do so at the same rate. Arguably, she says, "the literacy of a substantial portion of the population can be seen as having preceded industrial development, rather than the reverse" (1986, p. 23).

Indeed the 'civilising' power of literacy may also be questioned. Cook-Gumperz argues that historical studies of literacy have documented a variety of ways in which literacy has existed in Western society over the past five centuries, and that the great macro indicator of literacy levels, the national literacy rate, has only arisen as a phenomenon in the past 100 years. Thus, according to Cook-Gumperz, it is only in the twentieth century that literacy has been viewed as schooled literacy. Prior to this, "a pluralistic idea about literacy as a composite of different skills related to reading and writing for many different purposes and sections of a society's population" (Cook-Gumperz, 1986, p.22) was prevalent .

2.2.1.4.1.3 Questioning Links between Literacy and Individual Citizenship, Cognition and Logical Thought

In the same way as there is no historical basis for linking societal development to the acquisition of literacy, there is no causal relationship between literacy and citizenship. Although prevalent, it cannot be assumed that "an intimate and possibly even necessary association exists between literacy and the effective operation of democratic political systems" (Levine, 1994, p. 126).

Global political history provides a number of supporting examples. For instance, Graff (1987) has shown that even in patently democratic, literate societies (for instance nineteenth century Canada), restricting access to literacy was used to restrict access to socio-political and

economic power. Similarly, Wagner (1995, p. 354) suggests that although "democracy can hardly exist without an informed populace, and printed material remains the primary source of information about national and world events", in some developing countries broadcast media have supplanted traditional print media as the main source of external information. Thus, literacy is no longer seen as an essential component of democratic participation.

Apartheid South Africa provides a prime example of both of these: restricted literacy within supposed democracy, and later, democracy without literacy (or perhaps true democracy despite restricted literacy). Attempts by the apartheid government to regulate and restrict access to literacy, in order to retain oppressive socio-political and economic power, were rejected by revolutionary elements opposed to the apartheid regime. One aspect of this opposition was cross-border radio broadcasts whose content was counter-hegemonic, but whose medium was specifically chosen to reach an audience to whom the government restricted access to literacy. Even today, democracy in South Africa makes room for those with restricted literacy, for instance election ballots are designed to include voters with low literacy by displaying both symbols of the political parties and pictures of their candidates.

South Africa also provides an example of literacy adopted as revolutionary capital (Freire, 1970), in that another aspect of anti-apartheid opposition used the acquisition of literacy in informal contexts, for example informal literacy classes in mining hostels, to challenge the ideological dominance of the government of the day. While regime change in South Africa selected a more democratic model, this is not always the case. Elsewhere in the world, nations have selected (and continue to choose) non-democratic and even socialist governments. Even other nations whose political systems were similarly born of revolution have chosen alternative forms of government. Cuba, where literacy was also used as revolutionary capital, remains a socialist state, despite significant increases in societal literacy.

Thus the individual attainment of literacy cannot be seen as a necessary condition for citizenship, nor is there some critical mass or threshold level of societal literacy needed to assure the adoption of democracy.

Tackling the link between literacy and cognition at the most basic level, Baynham (1995, p.

3) suggests that even a 'technology'-oriented definition is problematic, as "we still don't know enough, despite decades of research, about the ways in which children and adults become literate". Thus, he suggests that research into literacy has not adequately explained the acquisition of this set of skills, nor the construction of meaning with the code.

Anthropological work by Scribner and Cole (1988, p.61-70) among the Vai people of Liberia also provides the opportunity to question a direct, causative link between literacy and cognition. Their study examined links between cognitive skills and literacy amongst a group that made use of three different scripts and literacies: Arabic, Latin and an indigenous Vai script, representing Arabic, English and Vai literacies. Scribner and Cole found that rather than literacy within any one or all languages giving rise to cognitive skills, specific cognitive skills were associated with the specific tasks and social uses associated with each script. Thus, for the Vai, cognitive skills such as reading and memorising texts were linked specifically to the Arabic script, which was used for reading and memorising religious passages, but not for writing. Thus the specific use of each language within the group and the designated social use of each script, and not the acquisition of literacy itself, could be linked with the development of cognitive skills. As Scribner and Cole (1988, p. 70) suggest, "The monolithic model of what writing is and leads to, ... appears in the light of comparative data to fail to give full justice to the multiplicity of values, uses and consequences which characterize as social practice".

Neither does a non-literate culture necessarily imply a lack of logical thought or sophistication. For example, Lienhardt (1961) shows that the culture of the non-literate Dinka tribe of the Sudan shares similar logical conceptualisations of 'self' with the writings of Gilbert Ryle, eighteenth century essayist and the Waynflete Professor of Metaphysical Philosophy at Oxford University. Similarly, research by Finnegan (1988) on the Limba, a non-literate group in Sierra Leone, demonstrates that despite the lack of writing and formal schooling, the Limba have a great deal of meta-linguistic and reflective sophistication in their talk about language, sophistication of the sort typically assumed to be the product of writing and formal schooling.

2.2.1.4.2 Criticism of Functional Literacy

There are similar challenges to the concept of functional literacy. Functional literacy has also been criticised in terms of its ideology and the supposed consequences of acquisition of literacy, and may also be criticised in terms of the levels it posits.

2.2.1.4.2.1 Questioning the Ideology of Functional Literacy

Functional literacy has been criticised on an ideological basis as being primarily concerned with producing better workers, and continuing to mask an oppressive discourse. Luke (1993, p. 2), for instance, points out the ideological implications of adopting functional literacy as follows "... the literacy/human capital rationale acts as a discourse technology for blaming victims, for shifting responsibility from systematically constituted inequality to already marginal individuals and groups".

As such, while literacy may be a pre-condition for employment or the ability to earn income, it cannot create or guarantee these. Solely focussing literacy programmes on employment or economic empowerment represents an impoverished view of individual and community development. Indeed, as Wagner (1995, p. 342) puts it, "there is little empirical research as yet to suggest that adult literacy programs are enabling the unemployed to obtain new jobs or to make major career changes".

There have been several attempts to assert a social dimension to functional literacy, for instance by Baynham (1995, p. 8) who acknowledges the effect of functional literacy as a "powerful construct in defining literacy in terms of its social purposes, the demands made on individuals within a given society, to function within that society, to participate and to achieve their own goals".

However, according to Lyster (1992), despite these attempts to relate literacy to its context, use and social relevance, functional definitions still obscure the ideological uses of literacy. Cook-Gumperz argues that this "new 'functional literacy' also contains certain social judgements about abilities specific to advanced technological societies" (1986, p. 20). Given a specific context, she argues, definitions of functional literacy are prone to cultural bias. While Wagner (1994, p. 474) says that the concept of functional literacy "has a great deal of

appeal because of its implied adaptability to a given cultural context", establishing norms upon which to base 'functionality' for a given society may be difficult. For instance, in a Third World country, asks Wagner, "does an illiterate woman need to learn to read and write in order to take her prescribed medicine correctly, or is it more functional (and cost-effective) to have her school-going son read the instructions to her?" (1994, p. 474). Applying the term or concept for research purposes in any cultural context would therefore be very awkward.

2.2.1.4.2.2 Questioning the Levels of Functional Literacy

The focus of functional literacy on the minimum necessary level of literacy for societal economic development represents a perception that higher and more complete levels of literacy for the entire society are unattainable. As Lyster (1992, p. 12) puts it, such "definitions of literacy are much more about what is regarded as possible, than what is regarded as ideal". The minimum level of literacy that a society requires of an individual for economic development may be far less than the individual could or may wish to attain. Accordingly, Wagner (1995, p. 344, his brackets) criticises 'minimum' literacy as a "level which allows an individual to have some access to the printed world (but not much)", but also comments on the tendency of literacy campaigns to produce no more than limited or minimal literacy.

Providing only the infrastructure for attaining functional literacy therefore represents a certain utilitarian willingness to restrict literacy acquisition and potentially disempower a large group of individuals within a society, in exchange for the economic development of the whole society. Certainly, the functional view of literacy as a commodity (Gee, 1990) that can be valued, measured and quantified, and therefore bought and sold, serves to reduce and restrict literacy's social and communicative role, and ultimately to hinder the acquisition of literacy.

Thus, the criticism of the autonomous model and functional literacy necessitated the development of an alternative model of literacy. This alternative approach became known as the ideological model.

2.2.2 The Ideological Model

A growing awareness of the influence of ideology on the acquisition and use of literacy lead to the development of the ideological model. While the autonomous model tended to separate the acquisition and use of literacy from the site in which it played out, and focused on the individual skills of literacy, the ideological model was driven by the realisation that "literacy is not first and foremost an individuated and individual competence or skill, but consists of socially constructed and locally negotiated practices" (Luke, 1997, p. 144).

Similarly, the ideological model also emphasizes the external context of literacy. According to Courts (1991), literacy enables the individual to draw on internal capabilities to act on and interact with external structures in defining self and negotiating meaning.

Uses of literacy are, say Prinsloo and Breier (1996, p. 22), "always the shaped products of interested social action, and not neutral, transparent or technical means of communication". They suggest that the notion of 'illiteracy', for example, is not an objective description of social fact, but rather serves to construct one group of people ('illiterates') in terms of the specific interests and ideology of another group (literate society).

Hasan (1996) suggests that each meaning assigned to literacy is significant for what these meanings imply about the process of acquiring literacy, using it and about those involved in the process. According to Baynham (1995, p. 8) "definitions of literacy are always ideological". This suggests that the ideological context of literacy influences the definition of literacy within that context. "From this point of view," says Halliday (1996, p. 366) "to be literate is not just to have mastered the written registers, but to be aware of their ideological force: to be aware of how society is constructed out of discourse".

The idea of discourse and ideology are intertwined. If we view discourse as a way of talking about a subject, then an examination of the words that describe the subject and the metaphors typically used to talk about the subject, can reveal hidden assumptions about that subject and how it fits into a particular culture or ideology. Gee (1990) has written extensively on the role of discourse in language. He refers to Discourse (with a capital D to differentiate from the use of 'discourse' to mean a stretch of language) as "ways of being in the world, or forms of life

which integrate words, acts, values, beliefs, attitudes, social identities..." (1990, p. 142). In Gee's conceptualization, a Discourse "is a socially accepted association among ways of using language, of thinking, feeling, believing, valuing and of acting that can be used to identify oneself as a member of a socially meaningful group or 'social network', or to signal (that one is playing) a socially meaningful 'role'" (1990, p. 143). However, it is in the interaction of two or more Discourses that the power of Gee's conceptualization is revealed. Any Discourse, according to Gee, "puts forward certain concepts, viewpoints and values at the expense of others [and] in doing so, it will marginalize viewpoints and values central to other Discourses" (1990, p. 144).

Two concepts arise from this clash of Discourses, primary versus secondary Discourses, and dominant versus non-dominant Discourses. Gee differentiates between a person's primary Discourse, which involves the primary socialization group defined within a given culture, for instance, the couple or the family, and secondary Discourses which involve social institutions beyond this group, such as schools, workplaces, stores, government offices and so forth. "Secondary Discourses can be local, community-based Discourses, or more globally oriented ('public sphere Discourses')" (Gee, 1990, p. 152).

Given Gee's position that "Discourses are intimately related to the distribution of social power and hierarchical structure in society" (1990, p 144), that they are always ideological, regardless of setting, this means that control over, or membership of, certain Discourses can lead to the acquisition of social goods or social capital in a society. Dominant Discourses are those which lead to acquisition of those goods. Individuals may also have access to different aspects of the same Discourse, based on the proximity of the Discourse to their primary Discourse. In this regard, when a given secondary Discourse is closer to an individual's primary Discourse, they typically occupy a more dominant position within that Discourse, than a person for whom this secondary Discourse is further away from their primary Discourse. For example, as a plaintiff defending his- or herself in court, an educated lawyer would have greater (and closer) access to the secondary Discourse of law than would a less educated mineworker acting in their own defence. Individuals with closer access to the secondary Discourse can also be referred to as having access to the 'elaborated' version of a code of communication, versus a marginal, 'restricted' code for those who have more distal access.

Gee defines 'literacy' in a broad sense, as "mastery of, or fluent control over, a secondary Discourse" (1990, p. 153). In this regard, what is more narrowly viewed as literacy (reading, writing and associated practices) may rather be thought of as 'print' literacy, or as a secondary Discourse specifically involving printed language. Thus, arguments for the positive consequences of literacy acquisition, which exemplify the autonomous model of literacy, originate in cultures in which print literacy has cultural or social capital, in which literacy is a dominant secondary Discourse.

In the same way that secondary Discourses may be 'community-based' or 'public sphere', literacy can also be community-based or public sphere. Similarly literacies can also be called 'dominant' and 'non-dominant' depending on whether they involve mastery of dominant or non-dominant secondary Discourses.

Thus literacy is also constructed by Discourse. This may be a Discourse driven by awareness of the influence of ideology or it may go further and be charged with challenging and transforming the dominant forces in society. This Discourse may also, on various levels, be characterised by different social, political or cultural aspects. The following sections examine the role that social, political and cultural contexts play in constructing literacy, and then discuss the concepts of multiliteracies, and literacy practices and literacy events.

2.2.2.1 Key Issues in the Ideological Model of Literacy

2.2.2.1.1 Literacy and Social Context

Street's (1984, p. 1) view of literacy as "a shorthand for the social practices and conceptions of reading and writing" portrays literacy as a social phenomenon. Verhoeven, who is typically a proponent of functional literacy, has also referred to this social aspect, stating that, "over time the emphasis has shifted from structural aspects of reading and writing to broader definitions which take into account the functions of written language in a range of social contexts" (1997, p. 128).

According to Street (1984, p. 97), literacy is "a social practice, in which particular socially constructed technologies are used within particular institutional frameworks for specific social purposes". These institutional frameworks, according to Prinsloo and Breier (1996),

include the family, the school, the workplace, the legal system, the church and various systems of governance, including local government and public administration structures.

2.2.2.1.2 Literacy and Cultural Context

The social context of literacy may be situated in a wider cultural context and this context also influences the meaning of literacy. According to Gee (1990), literacy's meaning and consequences are reliant on the particular cultural contexts in which it is used, with different consequences and meanings in each different context. Thus, the orientation of a given definition of literacy to its cultural context influences its applicability. As Dubbeldam (1994) suggests, literacy must be integrated into some part of a culture to be considered functional. If the ability to read and write does not fulfil a perceived need in a society, it will not be learnt or maintained in that society.

Prinsloo and Breier (1996, p.22) have referred to institutions that are sources of the key social discourses which shape identity or 'personhood' in society. Within these institutions, cultural capital is constructed and assigned only to selected cultural resources. This highlights the role of cultural as well as social context, and suggests that only certain forms of literacy are likely to be legitimised in a particular culture. As a result, as Wagner (1994, p. 475) puts it, "because literacy is a cultural phenomenon - adequately defined and understood only within each culture in which it exists - it is not surprising that definitions of literacy may not be permanently fixed".

2.2.2.1.3 Literacy and Political Context

While culture is an important element of conceptualizing literacy, in societies where different cultural groups interact in a variety of power structures, literacy takes on a political perspective. Thus, in societies where literacy has been used to marginalise one group and advance another, a common response associated with literacy is that it should challenge the hidden ideology, and transform the status quo. Thus, in this view, "literacy encourages the oppressed to speak and value language, as a tool for perceiving that society is not fixed and unchangeable; but that its structures and institutions can be challenged and transformed through concerted thought and action" (Bee, 1980, p. 55).

The work of Paulo Freire, a Brazilian educator, has been most influential in politicising literacy. Freire suggests that, "to acquire literacy is more than to psychologically and mechanically dominate reading and writing techniques. It is to dominate these techniques in terms of consciousness; to understand what one reads and to write what one understands; it is to "communicate" graphically. Acquiring literacy does not involve memorizing sentences, words or syllables - lifeless objects unconnected to an existential universe - but rather an attitude or creation and re-creation, a self-transformation producing a stance of intervention in one's context" (1973, p. 48).

The Freirian view posits literacy as a learner-centred process. Within this process individuals learn how to identify social, political and economic imbalances and how to combat the oppressive elements of society that perpetuate these imbalances. While the majority of Freire's work was written in the 1970's, this view has influenced a number of theorists in the field, and throughout the 'developing' world, adult literacy programs continue to be driven by these ideals.

For instance, Lankshear (1987, p. 216, cited in Agnihotri, 1997, p. 174) says that "proper literacy comprises practices of reading and writing which enhance people's control over their lives and their capacity for making rational judgements and decisions by enabling them to identify, understand and act to transform social relations and practices in which power is structured unequally".

Gee (1990) conceives the political role of literacy in terms of dominant and non-dominant Discourses. He suggests that when dominant Discourses conflict with an individual's secondary Discourse, "a given Discourse could (and often does) reserve a sort of 'colonised' role for you: a person internalized by the Discourse as a subordinate, whose very subordination is used as a validation for the prestige and power of the Discourse" (1990, p. 155). Literacy that assumes the liberating role assigned to it by Freire, sets itself in opposition to a dominant Discourse but, argues Gee, can only be termed 'liberating' if it can be used on a meta-level to critique other Discourses.

2.2.2.1.4 Multiliteracies

The identification of a wide range of different contexts has lead to the conceptualisation of a multitude of different literacies, also termed multiliteracies. Gee (1990), for instance, holds that a multitude of secondary Discourses means that literacy is pluralistic and can therefore be termed 'literacies'. His work is part of a body of research conducted in a number of independent disciplines, including anthropology, history, psychology, sociolinguistics and sociology, referred to as the New Literacy Studies, which has been most responsible for the shift towards multiliteracies.

Barton (1994, p. 189) suggests that there are groups of literacy practices associated with different aspects of life, including such as home, education, religion and work, which are best described as different literacies. According to Prinsloo and Breier (1996) the shift from the autonomous model to the ideological model allows for the existence of multiple literacies, domains and genres of literacy. In a similar vein, Rassool (1999) suggests that literacy is increasingly seen as organic and multidimensional, while Kress (2000) stresses the multimodal aspect of literacy, incorporating visual literacy and print literacy. Current research also focuses on digital literacies (for example, Kress 2003), which examine literacies in the domain of the Internet. Street (1997) talks about social literacies, while Rassool (1999, p.12) also suggests a number of other literacies, including cultural literacies, such as religious and ethnic-group-based cultural practices which may have high personal value for individuals who associate these literacies with issues of group or self identity.

Interestingly, the multiplicity of literacies may be a return to a historically prevalent model. Cook-Gumperz (1986, p. 22) suggests that the historical trend since the Renaissance has actually not been a shift from illiteracy to literacy, but from "a hard-to-estimate multiplicity of literacies ... to a twentieth-century notion of a single standardised schooled literacy".

The multitude of possible literacies may be realized in a variety of different ways. For instance Barton and Hamilton (1998, also Barton, 1994) describe local or community literacies, Gee (1990) refers to local, community-based versus more global, public sphere-based literacies, and Rassool (1999) discusses vernacular, local or community literacies as well as formal literacies. Vernacular, local or community literacies are "generally associated

with different subcultures, communities, age and gender groups" (Rassool, 1999, p. 11), while formal literacies may be likened to Gee's 'public-sphere' literacies in that they are "historically associated with the languages, knowledges, discourses and registers of, for example, education, law, medicine, politics and ... embedded in institutions associated with economic, cultural and political power" (1999, p.11). As such, these formal literacies may also be seen as dominant secondary Discourses, associated with social groups outside the primary Discourse (formal institutions) and involved in the acquisition and control of social capital or power.

2.2.2.1.5 Literacy Events and Literacy Practices

Barton's (1994, p. 187) concept of "literacy [as] a social activity [which] can be described in terms of people's literacy practices which they draw upon in literacy events" opens up two key tools in understanding literacy: literacy practices and the literacy event.

Heath (1982, p. 350) describes the Literacy Event as "a conceptual tool useful in examining within particular communities of modern society the actual forms and functions of oral and literate traditions and co-existing relationships between spoken and written language", stating that "a literacy event is any occasion in which a piece of writing is integral to the nature of participants' interactions and their interpretive processes".

In addition, Barton (1994) suggests that literacy events need not be focused only on reading and writing, but that people often participate in literacy events where multiple modes of communication are used in addition to reading and writing.

On a higher level of abstraction are 'literacy practices' which Barton (1994, p. 188) refers to as "general cultural ways of using literacy which people draw upon in a literacy event". Literacy practices may be viewed as the conventions that characterize a particular discourse or site. This may include a variety of practices, ranging from particular subject positions, to roles in reading and writing, and prescribed location and time of particular literacy events. These practices are ultimately socially oriented and are situated in broader social networks (Barton, 1994).

2.2.2.2 Criticism of the Ideological Model of Literacy

Challenging and criticising the ideological model of literacy is difficult. All commentary is likely to be couched within a particular ideology, and as such, may be subsumed by the relativism of the ideological model. Oppressive ideologies just represent conflicting discourses of literacy. It is possible, however, to comment on the importance placed on literacy in this model. Verhoeven argues that the ideological model must be placed in perspective, that literacy is one factor amongst many contributing to the social ills it is seen to relieve. Therefore, although literacy can, in the right circumstances, have beneficial consequences, it "cannot be seen as the ultimate mediator or arbiter of social problems" (1997, p.129). Similarly, Olson and Torrance (2001, p. 13) feel that "literacy is not the solution to a host of social ills including poverty, malnutrition and unemployment. It is not, in most cases, relevant to the solution of those problems, and to blame those problems on illiteracy deflects attention from the more basic social causes such as political oppression, injustice, political and economic disenfranchisement", although they do feel that literacy can play an important though indirect transformative role.

2.2.3 Assessing Literacy

The distinction between the autonomous and ideological views of literacy also impacts on the assessment of literacy. Literacy may be assessed using both formal and non-formal methods. The application of formal methods of assessment examines skills and competencies, and as such, is primarily situated within a functional and autonomous view of literacy, while the selection of informal assessment in a given setting is often directly linked to a dominant ideological view of literacy in that setting. Formal assessment includes early reading tests, standardised reading tests, domain-referenced or basal reading tests, while informal methods of assessment include self-assessment, anecdotal reports, teacher-student interactions, oral miscue analysis, reading inventories and portfolios (Taylor, 2003; McKenna and Stahl, 2003; Bailey, 1988).

2.2.3.1 Informal Assessment of Literacy

Informal or alternative methods of assessing literacy are often favoured in educational settings, where an impression of a respondent's literacy can be built up over time in a series of evaluations. These evaluations should include different formats and tend to focus on assessing writing as well as reading performance. For instance, portfolio assessment is reliant on the development of a body of written work (Bailey, 1998), while oral miscue analysis requires the reading of a pre-assigned passage with miscues in production recorded and subsequently analysed. In this regard, "errors are analysed in relation to the reader's use of the semantic, syntactic and graphic cues" (McKenna and Stahl, 2003, p. 51) which occur in the text.

Reading inventories (McKenna and Stahl, 2003) also utilise graded reading of texts, but call for the administrator of the test, typically a teacher, to make judgements about the respondent's ability, rating their reading according to a three-tiered scale of independent, instructional or frustration levels. According to this scale, at the independent level, the respondent can read without assistance, at the instructional level, they would benefit from instruction, but even instructional assistance may not be able to help if the respondent reads at the frustration level. Other forms of informal assessment include anecdotal reports, or collected written performance evaluations of a series of literacy events, and self-assessments,

which often utilise structured interviews to ask respondents to review their own literate behaviour.

2.2.3.1.1 Criticism of Informal Assessment

As can be seen, informal methods of literacy assessment focus on educational settings and place considerable responsibility on the teacher as assessor. As such, they are open to increasing degrees of subjectivity. While standardised techniques have been developed for informal assessment, such as the Qualitative Reading Inventory, developed by Leslie and Caldwell (2001, cited in McKenna and Stahl, 2003, p. 42) or the Reading Miscue Inventory (Goodman, Watson and Burke, 1987, cited in McKenna and Stahl, 2003, p. 59), these remain reliant on a certain level of assessor subjectivity. Rather than advancing the scope and range of these tests, educators are often encouraged to develop their own tests concentrating on assessing literacy in terms of its uses in the community they serve, and on assessing authentic or 'real-world' tasks.

Thus, informal assessment methods often acknowledge the ideological assumptions surrounding literacy. Such methods are beneficial in that they do measure productive as well as receptive literacy, and they are likely to reduce negative ideological effects, but they also require more knowledge on the part of the assessors (often specifically a pedagogic perspective) as well as more time, both from the assessors and the respondents. This time can be measured in weeks or months rather than in minutes. Thus, formal methods often supersede the informal assessment of literacy.

2.2.3.2 Formal Assessment of Literacy

There is a bias towards formal assessment of literacy, as the educational community is reluctant to privilege informal measures used to assess literacy level and reading ability as these rely heavily on teacher judgment, and are perceived as open to bias and subjectivity (Garcia and Pearson, 1991, p. 253).

The link between formal methods of assessment and a functional and autonomous view of literacy means that autonomy is a key factor in assessment. The autonomy of literacy in

assessment is perceived to include individual autonomy in testing situations, autonomy of settings, and assessing individual skills or competencies autonomously of both background knowledge and other skills. For instance, according to Verhoeven (1997, p. 130) in formal assessment, "not only can reading and writing be separately assessed but a distinction can be made between encoding skills and comprehension skills in reading and between transcription and composition skills in writing". The autonomous testing of literacy thus concentrates on individual skills, assessed separately and typically tested in silence, and attempts to exclude any assessment that draws on background knowledge. Assessing content that requires test-takers to use prior knowledge may benefit a particular group of test-takers at the expense of others, and thus reduce the test's validity. Similarly, tests are designed to be valid and applicable in a range of settings.

As a result, formal assessment of literacy is dominated by the use of standardised reading tests. According to Wagner (1994, p. 480), "current work in this area tends to be biased ... towards relatively expensive standardised techniques in industrial countries," referring to commercially developed tests commonly used for a variety of reasons, including the evaluation of the effectiveness of various educational programs. These tests have had a powerful influence on American education, according to Garcia and Pearson (1991), and have traditionally been viewed as objective and non-biased, due to the validity associated with autonomous testing situations and the wide range of settings in which they can be administered.

The formal focus on testing reading rather than writing occurs for a number of reasons. On one level, according to Hill and Parry (1994, p. 2), "The reliance on reading tests can ... be viewed as a practical matter; it is quite difficult to evaluate the extended samples of prose that are elicited in any large scale use of a writing test". However, the dominance of reading tests over writing tests means, "that greater weight is placed on non-native learners comprehending written English rather that producing it" (1994, p. 2).

On another level, the skill of reading may be used more in society than writing. According to Corbett (1981, p. 47, cited in Robinson, 1988, p. 248) "...writing will never be as crucial a skill for surviving or thriving in our society as reading is. ... Only a miniscule portion of the total population will regularly have to compose important, influential documents. The

majority of literate people have to do some writing occasionally - letters, notes, fill-in-the-blanks forms - but only a minority have to write regularly and seriously in connection to their jobs".

Reading skill is often presented in terms of a grade level equivalent, a practice prevalent in industrialised nations, which is based on equating a person's literacy with their completion of a given level of formal education. Grade level equivalency is often used to measure 'readability' of health information and promotion materials, with the eventual intention of producing materials at a literacy level appropriate for the average patient, but can also function as a broad indicator of literacy level in the interpretation of results of standardised reading tests. For example, in the United States, "completion of secondary school has become a kind of a benchmark definition of functional literacy" (Parker, 1976, p. 3, cited in Hunter and Harman, 1979, p. 381). This relationship is supported by the results of the 1992 U.S. National Adult Literacy Survey (Kirsch, Jungeblut, Jenkins and Kolstand, 1993) which rated the prose, document and quantitative literacy[1] proficiencies of American adults according to 5 different levels. The survey showed that 62% of those in the lowest level for prose literacy had not completed high school, corresponding to 23% of the total population or between 40 and 44 million adults.

2.2.3.2.1 Criticism of Formal Assessment

The perception of objectivity in formal assessment of literacy has been surprisingly resilient, despite criticism of this assessment paradigm. Standardised tests have been criticised because they ignore any social aspect of what is essentially a social practice. According to Hill and Parry (1994, p. 19), "the belief that literacy skills can be isolated from the personal and social characteristics of readers is basic to reading tests. The purpose of such tests is to assess reading as an autonomous skill". However, this negates the role of other qualities, including individuals' own factual knowledge, their ability to use this knowledge in obtaining new information from texts and their capacity for remembering and using such information for purposes other than immediate interpretation. Garcia and Pearson (1991, p. 253) also criticize

[1] Prose literacy refers to "the knowledge and skills needed to understand and use information from texts that include editorials, news stories, poems and fiction"(Kirsch et al, 1993, p.3), document literacy focuses on materials such as job applications, forms, maps, graphs, schedules and tables, and quantitative literacy is concerned with regular arithmetic operations needed to function in society, elsewhere referred to as numeracy.

autonomous literacy tests because "they obscure rather than confront the influence of students' prior knowledge, reading strategies or reasoning strategies".

There are also problems with relying on grade level equivalency. Wagner (1994, p. 480) describes the bias "in developing countries, towards the far-too-simplistic methods of using school attendance or self-assessment questions as surrogates for direct assessment of literacy skill". Though statistical correlations such as those between literacy performance and grade completion are commonly used, they have been criticised as arbitrary and unreliable. Completion of a specific level of education does not guarantee formal acquisition of a particular level of competency for all individuals, and a wide variety of learning environments can mean a similar variation in individual literacy. However, practicality drives the continued use of this measure of literacy. According to Hunter and Harman (1979, p. 379), "we concentrate on those with less than a high school education primarily because more comparative figures are available (for this group). We do so, however, realising that our focus on this group is arbitrary. It is clear that the completion of high school is not a reliable indicator of functional literacy". They suggest however, that "the available statistics – however inaccurate, distorted, culturally biased and occasionally contradictory they may be – do have a kind of gross truth" (1979, p. 379). This suggestion may be less plausible when completion of formal education in the developing world can be affected by a variety of historical, political and socioeconomic factors not typically found in the developed world.

Though speaking about less formal social 'tests' designed to identify individuals as members or subjects of a Discourse, Gee (1990) sums up the ideological rationale for formal literacy assessment by saying that, "dominant groups in a society apply rather constant 'tests' of the fluency of the dominant Discourse in which their power is symbolized; these tests become both tests of 'natives' or, at least, 'fluent users' of the Discourse, and gates to exclude 'non-natives' (1990, p158). In this regard, non-natives may be understood to be less fluent users of a Discourse, those who have conflicts with a dominant Discourse, even when they can demonstrate full mastery of a Dominant discourse in almost every, but not all, situations. When applied to formal assessment of literacy, this may suggest that standardized reading tests are designed to affirm a 'literate' person's mastery and to close a gate to those identified (by the tests) as illiterate, irrespective of whether or not they have the skills and competencies to survive in society.

2.2.3.3 Objective Vocabulary Tests

One particular type of reading test is the so-called 'objective'[2] vocabulary test. Objective vocabulary tests are popular for a number of reasons, including the perception that, in addition to measuring vocabulary knowledge, objective tests can function as "valid indicators of language ability in the broadest sense", according to Read (2000, p. 76). In addition, because the test "material is divided into small units, each of which can be assessed by means of a test item with a single correct answer that can be specified in advance" (Read 2000, p. 81), objective tests are easy to apply.

Research by both Anderson and Freebody (1981, p. 78-80) and Pike (1979) shows a high correlation between tests of vocabulary and reading comprehension for both first-language (L1) and second-language (L2) speakers. According to Alderson (2000, p. 99), "tests of vocabulary are highly predictive of performance on tests of reading comprehension. In studies of readability, most indices of vocabulary difficulty account for about 80% of the predicted variance. In short, vocabulary plays an important role in reading tests".

However, this broad correlation of language ability with vocabulary knowledge should be treated carefully, with the same misgivings as correlations of language ability and highest level of education completed, as described above. On anything but a surface level, such correlations can be readily questioned. Knowledge of the meanings of a large number of individual words presented in isolation does not necessarily guarantee knowledge of how to put these words together or how to decode texts using these words to create further meaning. Despite this, it is obvious that researching vocabulary knowledge will give some insight into language ability and literacy level.

Objective vocabulary tests test either vocabulary size or quality of vocabulary knowledge, also referred to as depth of vocabulary knowledge. Depth of vocabulary knowledge typically

[2] The use of 'objective' to describe such tests is problematic in that it obscures the ideologies and frameworks that underpin the development and application of the tests. Consider the prior discussion on Discourses in Section 2.2.2 and 2.2.3.2.1

measures the individual's awareness of the multiple meanings and uses a word may have, while measurement of vocabulary size can provide some indication of literacy level and estimates the range of vocabulary knowledge. This is based on the premise that adequate vocabulary size "is a pre-requisite for effective language use". According to Read (2000, p. 83-84), "learners whose vocabulary is below a certain threshold level struggle to decode the basic elements of a text, to the extent that they find it hard to develop any higher level [of] understanding of the topic". As Alderson (2000, p. 35-36) suggests, "having to struggle with reading because of unknown words will obviously affect comprehension and take the pleasure out of reading". Research in this field has concentrated on measuring vocabulary range and on positing the minimum vocabulary size necessary for comprehension.

For example, research by Laufer (1989) shows that readers need to know 95% of the words in a text to gain adequate comprehension and to be able to guess unknown words from context. Hirsh and Nation (1992) estimate that in order to be familiar with 97% of the words in a typical text a reader needs a vocabulary of roughly 5000 words. Hirsh and Nation conducted research using vocabulary inventories, which represent the 2000 most frequent words of English as well as an additional 1000 academic words, and in their study of vocabulary size and reading for pleasure, suggest that readers familiar with the 2000 most frequent words of English only are like to understand only roughly 90% of the words in text.

Developing an instrument that measures vocabulary size such as an objective vocabulary test typically involves three key issues: deciding on criteria for inclusion and classification of words (usually a large number of words), selecting a specific subset of words for the test, and deciding on the criteria for 'knowledge' or comprehension of the selected words. Another issue that can affect the outcome of an objective vocabulary test is the manner in which the words are presented. The following sections examine these four issues.

2.2.3.3.1 Criteria for Inclusion and Classification of Items: What Counts as a Word?

In any corpus of language, there are a potentially large number of individual word forms that may in fact consist of a smaller number of word families, made up of a base word and its inflectional and derivational morphemes. While it may be possible to list only base words, there are a number of base words which have a range of meanings depending on context of

use, and whose derivational forms seem to fit into more than one word family. In this instance, Read suggests examining the extent of semantic separation between the base words and their derivational forms. According to Read (2000, p. 85) "the identification of the units to be counted is an important step in research on vocabulary size".

2.2.3.3.2 Selection of Test Items: How do we Choose Which Words to Include?

According to Read (2000, p. 159) "there is no standard approach to the choice of target word for vocabulary testing. For some specific kinds of test, notably those which measure vocabulary size, a random selection procedure from a word list is appropriate. For most tests, though, the test-writer must exercise judgement in choosing the lexical items, having regard to the teaching/learning objectives and the purpose of assessment" (2000, p. 159). Selection of items is in no way neutral, as according to Hill and Parry (1994, p. 21) "in selecting words, writers do not simply refer to the world they are writing about; they associate themselves with particular communities of language users". As this is an ideological aspect, this is not typically explicit in the autonomous application of formal literacy assessment.

Research by Nation (1990) suggests that vocabulary items within a corpus fall into three broad categories, namely high frequency, low frequency and specialized vocabulary groups. In terms of choosing which words to include in a vocabulary size test, Read (2000) suggests that the words second-language speakers know are likely to be common high frequency ones. Similarly, with second-language speakers "the issue may not be so much what their vocabulary size is in absolute terms but how much they know of the high frequency words that they are most likely to encounter and need in their use of the language" (2000, p. 87). However, knowledge of low frequency items, while less helpful to readers, "reflect[s] the influence of a variety of personal and social variables" (Read, 2000, p. 158). Selecting low frequency items for a test can reveal greater depth of information about individual test takers, including "how widely they've read and listened; what their personal interests are, how much time they have devoted to intensive vocabulary learning; what their educational and professional background is; what community or society they live in; what communicative purposes they use the language for, and so on" (Read, 2000, p. 158).

Specialised vocabulary on the other hand, includes technical terms and other lexical items

that occur relatively frequently in particular registers of language. The field of Language for Special Purposes, or LSP, also refers to 'special language' in contrast with the "existence of general language or languages and LGP (language for general purposes)" (Robinson, 1991, p. 20). Robinson refers to three levels of vocabulary: specialist vocabulary, an intermediate semi-technical level, and language for general purposes. The specialist vocabulary has also been called a 'technolect', while the second level is "semi-technical, sub-technical or general scientific/technical and comprises words which occur in a number of scientific or technical areas" (1991, p. 28). This level can be seen as language geared towards discussing research, ideas and language, or as a Discourse capable of critiquing other Discourses, and may thus be thought of as meta-linguistic.

Carter (1988, p 171) describes a similar distinction, between core versus subject-specific vocabulary, arguing that while "core vocabulary will not be neutral by not indicating degrees of intensity or formality, or by being neutral in the field of discourse; subject-specific vocabulary will be only expressive of a particular field; it will be [perceived as] neutral as far as the domain of the discourse is concerned".

According to Sager, Dungworth and McDonald (1980), the use of special vocabulary assumes special education and is typically restricted to communication among specialists in the same or closely related fields. This specialised vocabulary may cluster in a variety of domains, such as law, the workplace, government, and of course, medicine and healthcare, and as such is similar to Rassool's (1999) concept of formal literacies, and Gee's (1990) dominant public sphere Discourses.

2.2.3.3.3 Criteria for 'Knowledge' of Selected Test Items: How do we Measure if a Word is Known or Not?

In order to test whether items are known or not, a number of formats have commonly been used, including: "multiple choice items of various kinds; matching of words with synonyms or definitions; supplying an L1 equivalent for each L2 target word; the checklist (or yes-no) test, in which test takers simply indicate whether they know the word or not" (Read 2000, p. 87). While the checklist method is the simplest possible format and has appeal for large-scale research, it has been criticized because it does not differentiate between a test taker being

familiar with a word and actually 'knowing' and being able to define the word. Thus it is common to use definition matching as the criterion of 'knowing' a word.

2.2.3.3.4 The Role of Context

The format in which words are presented can affect the strategies test-takers use to define words and can aid them in defining words they do not actually know. Therefore, vocabulary test items are typically presented in isolation so that the use of the word in a sentence context does not give away its meaning. "In research on incidental vocabulary learning, the learners encounter the target words in context during reading or listening activities, but in the test afterwards the words are presented separately because the researcher is interested in whether the learners can show an understanding of the words when they occur without contextual support" (Read, 2000, p. 162). However, "one practical difficulty with testing vocabulary in isolation was recognized early on: a word can have different meanings and be used as more than one part of speech. When the word form is presented by itself, there is no indication as to which meaning or use of the word the test-writer intends to assess" (2000, p. 99).

Thus, another approach is to present the word in a short phrase or sentence in order to cue the intended usage, using a neutral context that does not actually give away the meaning. For instance 'hammer' may function as both a noun and a verb. The sentence 'Here is a hammer' cues the noun use neutrally, while a sentence 'he hits the nail with a hammer' may give away the meaning of 'hammer' to a reader who only knows the word 'nail'. However, when testing a large number of words, this approach may be somewhat impractical, and simpler measures are likely to be adopted.

2.3 THE SOUTH AFRICAN CONTEXT

2.3.1 Literacy and Education in South Africa

Investigating or researching any aspect of literacy must include an awareness of the social, cultural and political context in which that research is conducted. Conducting literacy research in South Africa, given that South Africa provides a particularly pertinent example of the range of various Discourses of literacy, requires some discussion of the history of education in South Africa.

Historically, the systematic restriction by the apartheid government of access to knowledge, education and by inference, literacy, for black people in South Africa competed with discourses of liberation and struggle, of empowerment and people's choices about education and language. One of the primary sites of literacy acquisition in South Africa, and thus a key site for competing Discourses of literacy, is the education system.

On one hand, the orientation of the apartheid education system towards the ideological domination of cultural groups through literacy, as well as its functional orientation towards the economic exploitation of these groups, provides an excellent real world example of the application of the autonomous model of literacy. On the other hand, both the contemporary challenges to apartheid domination by liberal and leftwing political groups, and the ongoing work aimed at redressing the effects of this domination by the current government through the provision of adult literacy and Adult Basic Education and Training programmes, are driven by ideological perspectives on literacy.

An examination of the historical domination of the education system by the Nationalist government from the 1950's until 1994 reveals the clash of the dominant and marginalised Discourses, and of autonomous and ideological models of literacy. It also reveals the role of oppressive language policy in a multilingual environment.

Prior to the Bantu Education Act of 1953, education for black children was primarily conducted in mission schools, but with the passing of the Act, the state made itself responsible for their education (Coutts, 1992). The missionary schools were generally forced

to hand over control to the state or face closure, and all educational appointments, syllabi, examinations and school buildings from that point onwards were controlled exclusively by the state.

The Act was founded on "the basic assumption ... that black children required a schooling which was different from that of white children" (Samuel, 1990, p. 18), an education that ensured that "in practice, white middle class children would derive the most benefit ... while working class, predominantly black, children would be shunted into narrow, non-formal work training" (Coutts, 1992, p. 11). Thus, according to Samuel, "whites were prepared for an almost complete monopoly of the dominant positions in society" (1990, p. 19).

This was achieved in a number of ways. As an example, the state expanded the number of primary schools, as Samuel (1990, p. 18) states: "a crucial facet of the state's education policy was its focus on developing a schooling system that would ensure the majority of black children had some contact with 'Bantu Education'".

However this resultant massive increase in the number of black pupils in the lower primary (Grades 1 to 3) and higher primary levels (Grades 4 to 6), was "confined to the lower standards. The deliberate lack of state funding for secondary schools, combined with pervasive poverty, ensured that a massive drop-out rate characterised black schooling" (1990, p. 18).

In addition, the concentration of funding and pedagogic effort on primary schools was also affected by the language policy of the state, which held that children should be initially educated in their first-language for the first three years of school, after which they were to be instructed in one of the two then official languages, either English or Afrikaans. Primary schools were allowed to select the language of learning and teaching between these two from the fourth year of schooling onwards. Often English was chosen, as Afrikaans was increasingly viewed as the language of the oppressor. This was, at the time, relatively sound educational policy in multilingual environments, supposedly enabling children to transpose literacy skills from one language to another. However, it may have been difficult to achieve, as the switch from first-language to official language was often very abrupt with little reference to the first-language. In addition, according to Webb (1999, p. 356) "the knowledge

which black teachers have of English is often also inadequate". He cites research by Odendaal (1984) showing that 69.4% of teachers in Kwazulu had obtained between 40% and 49% for English in their final school examinations. Thus, it seems that the State paid lip service to the policy of supporting the learning of English and Afrikaans with initial instruction in the learners' first-language, and in fact, the intention was to effectively deprive black learners (and hence black adults) of proficiency in either of the official languages.

Secondary schools were the site of targeted deprivation not only on a funding level, but were also the focus of state discrimination and interference in the realms of course content. Not only was the State seeking to paint a particular picture of the roles of white and black South Africans but also to restrict knowledge and access to knowledge (literacy) that could lead people to challenge the status quo. The events that lead up to the 1976 Soweto student uprising are well documented and reflect an attempt to control literate behaviour. Samuel (1990, p. 21) writes that, "until the end of 1974, secondary schools were able to select the medium of instruction. On 29th August 1974, a circular was issued by the Southern Transvaal Regional Director, which required that general science and practical subjects in Grades 7 to 9 be taught in English and mathematics/arithmetic and social studies in Afrikaans".

The remaining Grades 10 to 12 were also to be taught in both English and Afrikaans on a 50-50 basis. Despite a negative response from both students and teachers, the Department continued to prescribe that mathematics and social science for Grade 8 were taught in Afrikaans. An increase in the Grade 7 failure rate, from 8% to 39 %, attributed by pupils and teachers to this prescription, fuelled further dissatisfaction. Following failed negotiations, "pupils at Orlando West Junior School went on strike and at least seven schools followed suit during the ensuing weeks. The Department still did not respond and on 16 June, Sowetan pupils decided to show their hostility to the 50-50 ruling by marching to Orlando stadium" (Samuel, 1990, p. 21). The result was a dark day in the nation's history: police opened fire on the marching students, killing 23 and sparking off countrywide protests. By late 1977, an estimated 196 000 black pupils throughout the country were boycotting classes (Samuel, 1990, p. 22).

However it wasn't until 1980 that the State made any attempt to review its educational policy. "On 1 January 1980, a new statute, the Education and Training Act, replaced the Bantu

Education Act of 1953 and the Bantu Special Education Act of 1964. The Act sought to do away with some of the worst aspects of previous legislation. It removed the designation 'Bantu' and replaced it with 'black'. It declared that free and compulsory education would be a central aim of policy. It also pledged itself to 'the active involvement of the parents and communities in the education system'" (Samuel, 1990, p. 23). Whether or not these goals were achieved or achievable is questionable, but the Act was roundly criticised for not doing enough and not going far enough to distance itself from its predecessors. As such it continued to discriminate against black students and 1980 also witnessed large-scale student boycotts. Protest over a lack of educational reform and ongoing oppression continued from 1983 to1986, with education becoming a political battleground. "The student revolts of 1976 and the school boycotts of 1980 revealed and reinforced certain characteristics of student action that were to become an integral part of students' rejection of the educational system in the 1980's. Resolving the inadequacies of the education system was seen as a short-term demand, while the national struggle for liberation – and therefore the linkages with broader community and political issues – became an important part of the educational struggle" (Samuel, 1990, p. 25).

One aspect of the political opposition during the apartheid era was the provision of literacy classes by liberal elements in South African society. However, given that literacy classes were also provided for mine workers by the major South African mining houses in order to create better workers, the provision of, and participation in, literacy classes may also have served an oppressive rather than liberating function. The growth of the South African economy, built on majority black labour, also required a more literate workforce. Attempts by the state during the 1980's to raise the literacy levels of the workforce while restricting growth of political awareness and maintaining the unequal power imbalances in the country proved to be difficult and ultimately unsuccessful.

The political changes that have occurred in South Africa since the formal abolition of apartheid and the 1994 elections have reformed government education and language policy considerably, and in the past nine years the situation for learners has improved. Giving a total of eleven languages official status has supposedly brought about an end to institutional discrimination on the basis of language choice. However, this remains a largely political gesture and English has both assumed an economically dominant role and continues to

dominate even official government communication. Referring to a mismatch between policy and official practice, Webb (1999, p. 351) states that "whereas the country's institutional documents (the Constitution and the national policies being developed) proclaim linguistic pluralism to be the national objective the country seems to be regressing to its pre-apartheid situation of monolingual practice – a situation of 'English only'".

Another major consequence of the apartheid education system is that it continues to disenfranchise several generations of adults, both those who remained in the system and those who participated in school boycotts and protests to alter the system. While the former group suffers from the systematic deprivation of their education, with no alternative option for education during the past three decades, the latter group has lost out on years of schooling and whatever benefits may have been distilled from an apartheid education.

While adult literacy and Adult Basic Education and Training programmes abound in post-apartheid South Africa, their reach is limited, and they do little to mitigate the effect of unequal power relations in the past. Often, the nation building efforts of the new government and industry-based literacy programmes are driven by the functional perspective, and seem to be tasked with creating better workers for the new South Africa rather than true empowerment. The economic dominance of English over other languages in South Africa, though less suspect than political oppression, still represents a major practical and ideological hurdle for many black South Africans. What is needed is a stronger drive towards researching and validating local literacies, and towards building critical literacy and raising awareness (or 'conscientisation', as Freire (1970) calls it), so that ideological oppression and disempowerment on an economic basis does not replace political oppression.

2.3.2 The Healthcare Context in South Africa

The healthcare system in South Africa was also profoundly affected by the apartheid era. Prior to 1948, South Africa's National Health Service was concerned with providing free healthcare for all, via a system of primary health care centres providing care directly to the communities around them. However, "after 1948 the country's health system developed on a course of fragmentation and discrimination (segregated health services based on race); emphasis on *hospital-based* curative services; and the development of a strong and increasingly expensive private health care system" (de Villiers and de Villiers, 1999, p. 718, emphasis by de Villiers and de Villiers).

According to Abrahams, Jewkes and Mvo (2001, p. 242), the racial divisions inherent in the ethos of apartheid "created a complex set of racially separate residential areas [and] health service locations have followed this pattern". Arguably, allocation of resources and funding, and the provision of healthcare followed the same pattern. Gilbert and Gilbert (2003, p. 4) suggest that "before 1990, the National Party had dedicated most of its health care resources to tertiary, curative care catering primarily for the white minority, which held political and economic power". Thus, while white South Africans had access to health care comparable with Europe and the United States, black South Africans were dying of curable diseases like malaria and tuberculosis. Accordingly, they say that "it is likely that the gross inequality entrenched by apartheid laws and structures is largely responsible for the poor health status of many South Africans" (Gilbert and Gilbert, 2003, p. 6).

While the effects of a discriminatory health system cannot be underestimated, the emphases on hospital-based care and on an expensive private healthcare system both have an insidious and detrimental role. It is likely that an emphasis on hospital-based care deterred access to adequate healthcare rather than promoting it. Gilbert and Gilbert (2003, p. 8) say that "in much of the non-western world, allopathic medicine (or western medicine) is associated with the colonial state and linked to control and surveillance of local populations" (brackets, Gilbert and Gilbert). A similar view of the apartheid government's public health system may have influenced many South Africans to choose not to access the public healthcare system, as it may have been viewed as a government institution and therefore part of the oppressive regime. This is supported by research by Abrahams, Jewkes and Mvo (2001) in which

pregnant women's negative perceptions of obstetric care included fears about institutional bureaucracy and poor quality of care, stretching to abuse.

Similarly, "the development of a strong and increasingly expensive private health care system" (de Villiers and de Villiers, 1999, p. 718) may have made the cost of private healthcare for black South Africans, already economically disempowered, prohibitive.

Thus, the apartheid public health system "succeeded in maintaining the hegemony of allopathic medicine, while at the same time keeping it inaccessible for the majority of the African population" (Gilbert and Gilbert, 2003, p. 9). De Villiers and de Villiers (1999, p. 716) suggest that the legacy of South Africa's history "created a health system that in some respects can be compared to the best in the world, but one also characterised by inequality, discrimination and lack of access to even basic services for the rural and the poor".

As with the transformation of education, it was not until the political changes of the 1990's and the formal abolition of apartheid, that the national healthcare system was revised. According to Abrahams, Jewkes and Mvo (2001, p. 241), "in 1994, the National Health System adopted a primary health care approach to improve access of health services to disadvantaged communities". The ANC Health Plan in 1994 selected a primary health care approach as the basis for future health practice in South Africa and placed the burden of responsibility for provision of services at a district level, below national and provincial government. However, writing five years after the inception of the plan, de Villiers and de Villiers (1999, p.719) suggest that "the realities of cost and incomplete structures very soon dictated that a district health system will probably only be achieved over many years", implying that the plan had not yet been successfully implemented.

Thus, despite increased spending on healthcare since 1994 and "significant attempts to correct massive discrepancies in the distribution of resources" (Gilbert and Gilbert, 2003, p. 9), including the implementation of a one-year community service requirement for both doctors and pharmacists, the ANC Health Plan may not have made sufficient inroads into reforming the national healthcare system.

Certain disparities in the provision of healthcare still remain in place in South Africa.

Focussing on medical education for doctors, de Villiers and de Villiers (1999, p. 716) refer to "the inequity of distribution of medical practitioners between levels of care, between private and public sector and between rural and urban areas" as well as "a severe racial imbalance in medical school entrants with less than 15% students being African" (ibid). In addition, Abrahams, Jewkes and Mvo (2001, p. 241) suggest that the provision of education for nurses was also the site of racial discrimination, in that "the bodies that represented and regulated the profession were characterised by racial discriminatory practice with the disenfranchisement of African nurses".

As a result, the majority of medical graduates are thus White, Coloured or Indian South Africans, (and probably predominantly White given the high cost of medical education). Coupled with the fact that students predominantly receive instruction in English and Afrikaans, this often results in healthcare professionals who do not have access to any of the official languages other than English or Afrikaans, being assigned to rural healthcare centres which serve communities who have little access to these languages.

2.4 Health Literacy

A key domain in which literacy plays a role, and upon which this study focuses, is healthcare. Within this context, doctors routinely expect patients to read and understand labels on medicine containers, appointment slips, informed consent documents, and health education materials. The expectation that patients can and should be able to cope with the demands for literate behaviour in this setting forms the basis of definitions of literacy in healthcare settings, or rather, health literacy.

At a basic level, health literacy may be defined as, "the ability to read and comprehend prescription bottles, appointment slips and the other health-related materials required to successfully function as a patient", according to the American Medical Association's Council on Scientific Affairs Ad Hoc Committee on Health Literacy (JAMA 281:6, 1999, p.552). Similarly, according to Allen (2000, p.3), "Health literacy, simply defined, is the ability to read, comprehend and act on health care information ... it includes the capacity to apply reading and numeracy skills in ways that enhance health: reading consent forms and medicine labels, comprehending written and oral health care instructions and acting on health care directions such as measuring medication dosages."

At a more advanced level, definitions of health literacy have expanded to aspects such as self-management, health knowledge, vocabulary range, ability to assimilate new concepts, attitude and motivation. As such, health literate individuals are assumed to have enhanced decision-making, to be able to make best use of health services, to adopt healthy lifestyles, or to take an active role in addressing the social determinants of health, have better access to health information, more knowledge about health and more awareness of options for treatment (Nutbeam and Kickbusch, 2001). This conceptualisation of health literacy assumes that a population with adequate health literacy can make more appropriate decisions for improving health and well-being than a population with limited health literacy (Parker, 2000) and is associated with "such outcomes as improved knowledge and understanding of health determinants, and changed attitudes and motivations in relation to health behaviour, as well as improved self-efficacy in relation to defined tasks" (Nutbeam, 2000, p. 263).

Given the highly structured and technical nature of language about health, and the roles of healthcare providers and patients within this domain, it can be argued that the healthcare system constitutes a formal literacy (Rassool, 1999). Formal literacies, according to Rassool (1999, p. 11), "have traditionally had more social status and economic currency within a stratified labour market", and are associated with key economic, political and cultural power structures including medicine. In this regard, language about health can also be viewed as specialised vocabulary (Nation, 1990; Robinson, 1991; Carter, 1988; Sager, Dungworth and McDonald, 1980), or alternatively as a dominant public sphere Discourse (Gee, 1990). The view of health literacy or knowledge about health as a dominant Discourse is supported by MacDonald (2002, p. 448) who suggests that "medical discourse functions as a form of social control" and that "the discursive field of medicine operates (alongside other powerful discursive fields such as education, law, religion, finance and media) to create, maintain and reproduce certain social effects which ... have an ideological function" (2002, p. 449). MacDonald describes medical discourse as having hierarchical levels (or elaborated and restricted codes) to which certain professions and certain factions within professions have access.

An examination of various views of health literacy reveals a number of key discourses about this type of literacy. These include the view of illiteracy as a crisis, both in terms of the economic cost of inadequate health literacy, and in terms of impact on the individual; a concern with labelling levels of literacy; and the view of literacy as a skill separate from background knowledge. These discourses factor into the particular ways in which researchers choose to assess health literacy. In this regard, there is significant overlap of key elements of the discourse and definitions of health literacy and the autonomous model of literacy.

2.4.1 Key Discourses about Health Literacy

2.4.1.1 The Crisis of Illiteracy in Health

In various studies researching literacy and health, predominantly conducted in the United States, an individual's literacy level has been found to correlate with a wide variety of determinants of health, including risk of hospital admission (Baker, Parker, Williams and Clark, 1998), patient's knowledge of their chronic disease (Gazmararian, Williams, Peel and Baker, 2003), self care (Williams, Baker, Honig, Lee and Nowlan, 1998), use of birth control (Parker, Williams, Baker and Nurss, 1996) and adherence to appointments (Ahluwalia et al, 2002).

Literature on health literacy refers to both illiteracy, portrayed as the supposed binary opposite of literacy, and to low, limited or inadequate health literacy. Illiteracy is perceived as a crisis on a number of levels and has been correlated with a variety of negative societal and health outcomes. According to Foulk, Carroli and Wood (2001) illiterate individuals are more likely to live in poverty, to have fewer years of education, to have more health problems, to be older, or to be in prison.

Additionally, illiteracy in a healthcare context equates with less knowledge about health, for instance "of cancer control and more misunderstanding about susceptibility to cancer, the benefits of early detection, and its prognosis" (Davis, Williams, Marin, Parker and Glass, 2002, p. 138), and less access to health care, as "adults with limited literacy encounter many problems using the health care system [and] ... are less likely to use screening procedures, follow medical regimens, keep appointments, or seek help in the course of a disease" (Foulk et al, 2001, p. 9).

These individuals are "also significantly more likely to visit their doctors on a monthly basis and ... less likely to view their providers as involving them in their own treatment and explaining things to them in an understandable manner... suggest[ing] that persons with lower health literacy place a greater demand on their health care providers, and yet do not feel integrated with their health care" (Kalichman et al, 2000, p. 350). This statement reveals

one aspect of the perception of crisis, that treating individuals with lower health literacy takes more time and thus 'costs' more.

In contrast, according to Van Reusen (1996, p. 529), health literate adults are assumed to be more productive in the workplace and will require less service from the already stressed health care system.

While low health literacy affects a large number of people on an individual level, lack of knowledge about communicable diseases can have a wider, societal impact, and thus may be more devastating. In a study examining health literacy and HIV/AIDS, Kalichman et al found that "in addition to poorer knowledge and understanding of HIV illness status ... persons of lower health literacy ... [held] more misperceptions of how HIV treatments influence HIV-transmission risks" (2000, p. 350). Accordingly, this suggests "an alarming situation in which persons of lower health literacy living with HIV may be at increased risk for transmitting HIV/AIDS to others while under a false impression of reduced infectivity" (Kalichman et al, 2000, p. 350).

The role of parental health literacy also contributes to a perception of crisis. According to Davis et al (1994, p. 466), "little attention has been paid to parent literacy. Paediatricians rarely screen the parents of their patients for reading ability". Given that parents are responsible for accessing and providing health care for their children, who cannot access the healthcare system for themselves, parents who have limited health literacy unwittingly place their children in danger. Thus, parents "who are functionally illiterate may not understand how to get in touch with appropriate health care physicians and other health care professionals when a child is ill or malnourished" (Davis et al, 1994, p. 466).

Low health literacy is often difficult to identify especially via oral communication between healthcare professionals and their patients. One aspect of the problem lies in the fact that "physicians routinely take for granted patients' ability to read and understand all types of health-related materials" (Parker, 2000, p. 277), while a considerable amount of health promotion material may be inaccessible to the average patient. Alternatively, "shame (may)

actually inhibit low literate patients from admitting their reading difficulties,, seeking needed help to comprehend and complete medical forms, or asking questions regarding their healthcare" (Parikh, Parker, Nurss, Baker, and Williams, 1996). Many patients have difficulty communicating with their health care providers and following up with self-care instructions (Parker, 2000). Low health literacy, according to Schillinger, Bindman, Wang, Stewart and Piette (2003, p.1) "appears to be a marker for oral communication problems, particularly in the technical, explanatory domains of clinician–patient dialogue".

2.4.1.2 Levels of Health Literacy

In order to address the negative effect that low or limited health literacy has on individuals in society, research in this area has focused on assessment of health literacy level. For instance, the US Department of Health and Human Services' (HHS) definition of health literacy as the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions, is concerned with 'degree' and 'capacity'. This is deemed important according to Chez (1999, p. 72) because "the health care provider needs to know the literacy level of the patient in order to provide the appropriate format for education and instruction".

One of the ways in which this is realized is the positing of low or basic, functional and critical levels of health literacy. Basic health literacy, (Wang, 2000, p. 271) "implies a fundamental understanding of a health problem and the ability to comply with prescribed actions to remedy the problem", while "functional health literacy involves more advanced knowledge and skills to function in everyday society and the ability to seek out information in order to respond to changing needs". Wang (2000, p 271) also talks about critical health literacy as the most advanced level of health literacy, which "implies a significant level of knowledge, personal skills and confidence to manage one's health, and the ability to take action to change the determinants of health in the environment".

In contrast, Nutbeam (2000, p. 264) refers to functional, interactive and critical levels of health literacy, with 'functional health literacy' as the lowest level, reflecting "the outcome of traditional health education based on the communication of factual information on health

risks"; 'interactive health literacy' as the next level, "focused on the development of personal skills in a supportive environment ...improving personal capacity to act independently on knowledge, specifically to improving motivation and self-confidence to act on advice received" (Nutbeam, 2000, p. 264) and linked with contemporary health education; and 'critical health literacy' as the highest level, targeting health outcomes on a community or group level.

The following two sections provide more insight and exploration into the functional and critical levels of health literacy.

2.4.1.2.1 Functional Health Literacy

Functional health literacy is a key construct in health literacy assessment and research. While it is possible to criticise the labelling of this level of health literacy as functional (given concerns about functional literacy, discussed in Section 2.2.1.3), it remains a robust and repeatedly-used construct in the field. For example, the construct is integral in the development and continued use of the Test of Functional Health Literacy in Adults (TOFHLA), designed by Nurss, Parker, Williams, and Baker (1995).

'Functional' in this regard can refer to the applicability of the patients' knowledge and reading skills to the material at hand. Thus, functionality can be likened to situational authenticity, or "the extent to which the test tasks share features of the target language use situation" or matching what is required of patient reading ability in an assessment with materials typically used in a healthcare context, an assessment measure suggested by Douglas (2000, p. 116). Nurss et al (1995, p. 537) refer to 'adequate functional health literacy' as "being able to apply literacy skills to health related materials such as prescriptions, appointment cards, medicine labels, and directions for home health care".

Some researchers have also posited internal levels of competency within functional health literacy, referring to low, marginal and adequate functional health literacy. For instance, Baker, Parker, Williams, Clark and Nurss (1997, p.1027) talk about functional health literacy in their study on self-reported health and the use of health services, that "patients with

inadequate functional health literacy were consistently more likely to report poor health than patients with adequate reading skills".

2.4.1.2.2 Critical Health Literacy

Critical health literacy occupies the top position in both Nutbeam's (2000) and Wang's (2000) conceptualisation of levels. However, it may also be thought of as an orientation towards literacy that incorporates a broader social dimension. A number of statements Nutbeam makes about critical health literacy provide insight into what is (and increasingly will be) an important view of health literacy. Thus, "critical health literacy reflects the cognitive and skills development outcomes which are oriented towards supporting effective social and political action, as well as individual action [and] can be more obviously linked to population benefit, alongside benefits to the individual" (Nutbeam, 2000, p. 264). Critical health literacy may thus represent a more ideologically aware dimension of health literacy.

In contrast to the other levels of health literacy, critical health literacy may be intrinsically linked with the provision of appropriate health education. According to Miles and Davis (1995), in order to achieve health literacy, it is necessary to direct efforts to schools, families, and community settings. Health education seeking to attain critical health literacy, would "involve the communication of information, and development of skills which investigate the political feasibility and organizational possibilities of various forms of action to address social, economic and environmental determinants of health" (Nutbeam, 2000, p.265) and it would also "be directed towards improving individual and community capacity to act on these social and economic determinants of health" (ibid).

The U.S. National Health Education Standards also talk about empowering students to "analyse the influence of culture, media, and technology on health, [to] use goal-setting and decision-making to enhance health, [and] to advocate for personal, family and community health" (Van Reusen, 1996, p. 529) in addition to less critically-oriented skills such as the abilities to "comprehend concepts related to health promotion and disease prevention, [to] access valid health information, products, and services, [to] practise health-enhancing

behaviours and reduce health risks [and to] use interpersonal communication skills to enhance health" (1996, p. 529).

According to Van Reusen (1996, p. 529), "the Standards will serve as a foundation for health curriculum development, health instruction, and assessment of student performance". Thus, this link with health education could facilitate the future testing of critical health literacy.

2.4.1.3 Health Literacy: Skill or Knowledge?

A number of definitions of health literacy focus on skills. This skills-focus of health literacy is evidenced in definitions such as that provided by the World Health Organization (1998), which describes health literacy as, "the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health" (cited in Wang, 2000, p 11). Similarly, for Nutbeam and Kickbush (2002), 'health literacy' represents a specific set of cognitive and social skills related to health decision-making. Davis, Williams, Marin, Parker and Glass (2002, p. 136), refer to health literacy as "patients' literacy skills in accessing health care systems and bureaucracies".

However, this orientation towards discrete literacy skills may exclude the role of background knowledge. A number of definitions of health literacy acknowledge background knowledge as a key factor. Parker (2000, p.279-280) talks about patients with "poor background health knowledge and health vocabulary", who may have trouble assimilating new information and concepts, while Davis, Williams, Marin, Parker and Glass (2002, p. 137), refer to "limited knowledge of cancer control and its accompanying vocabulary" and suggest that "individuals with limited health literacy also tend to have less knowledge of anatomy and may not understand cancer control concepts such as screening and early detection" (ibid).

In addition, the U.S. National Health Education Standards refer to the essential knowledge and skills necessary for a student to be health literate. While the definition of the necessary skills may be criticised for their circularity: "Those skills include the ways of communicating, reasoning, and investigating which characterize a health-literate person" (Joint Committee on

National Health Education Standards, 1995, p9, cited in Van Reusen, 1996, p. 528), the knowledge referred to includes "the most important and enduring ideas, issues and concepts related to achieving good health". Thus, if health literacy is to be adequately assessed, knowledge as well as processing skills need to be measured.

2.4.2 Assessing Health Literacy

The discussion of dominant discourses about health literacy focuses attention on the assessment of health literacy. A perception of low health literacy as a crisis, and an awareness of literacy as a continuum, wherein basic/functional, functional/interactional and critical health literacy levels provide points on which to place individuals, argues for the necessity of assessment of an individual's level of health literacy as a screening issue. Similarly these discourses influence the ways in which researchers and healthcare professionals choose to assess health literacy.

As with general tests of literacy, there is a bias towards formal assessment methods such as standardized objective vocabulary tests. While there are a number of informal methods of health literacy assessment, they tend to focus on proxy measures in oral patient-provider communication, for instance presenting material to patients upside down to see if they can spot the error, or asking patients to 'teach' the healthcare professional about content or material they have recently been handed, these methods tend to be subjective and thus face the same challenges of reliability and validity as informal methods of general literacy assessment. Additionally, estimating levels of health literacy by proxy measures may be hampered by healthcare providers' assumptions about their patient's abilities and by patients' disguising of their low literacy levels due to shame. A prevailing belief is that formal, standardised tests measuring literacy ability for healthcare settings have emerged because there are few reliable informal indicators of literacy.

As a result, a considerable amount of research has been conducted on developing and applying standardized health literacy tests in a range of settings and examining the relationship of test score with various conditions and disease states. As with any standardized tests, reliability, validity and the ability to generalize results are key issues.

2.4.2.1 Commonly Used Health Literacy Tests

The three most commonly used standardised health literacy tests are the REALM (Rapid Estimate of Adult Literacy in Medicine), the TOFHLA (Test of Functional Health Literacy in Adults) and the MART (Medical Achievement Reading Test), although other more general

literacy tests such as the WRAT (Wide Range Achievement Test), the SORT (Slosson Reading Test) and the PIAT-R (Peabody Individual Achievement Test- Revised) are also used in clinical settings. The REALM and MART are objective vocabulary tests, while the TOFHLA requires some prose reading and is unique in that it also tests numeracy skills as part of health literacy.

The REALM, TOFHLA and MART are discussed briefly below. The methodology chapter includes a more in-depth examination of the REALM as it has been chosen as the focus of this research project.

2.4.2.1.1 The Rapid Estimate of Adult Literacy in Medicine (REALM)

The REALM (Davis, Long, Jackson, Mayeaux, George, Murphy and Crouch, 1993) is a reading recognition test designed for U.S. health care settings. It uses word-recognition to determine grade-level reading ability, using three lists of 22 words (66 in total) that increase in difficulty towards the end of the test. The difficulty rating is determined by word length and number of syllables. Respondents are asked to read the words out loud and are graded on pronunciation. Correctly pronounced items are scored and the raw scores are then converted to a grade-level equivalent. The REALM attempts to make the reading environment as comfortable as possible, using large print and good contrast of black print on a light background. According to Davis et al (1994) the REALM is useful in busy public health clinics where parents need to be screened for reading ability.

2.4.2.1.2 The Test of Functional Health Literacy in Adults (TOFHLA)

The TOFHLA (Nurss, Parker, Williams and Baker, 1995) measures both numeracy as well as reading ability, based on the premise that numeracy is part of literacy and thus should also be part of health literacy. When originally developed, it included 17 numeracy items and three prose passages, but was later reduced (S-TOFHLA) to four numeracy items and two prose passages. This reduced the administration time from 22 minutes to 12 minutes.

The prose passages sections use a modified Cloze procedure in which every fifth to seventh word in a prose passage is omitted, and respondents are given four possible word choices for

each omission. The prose passages in the TOFHLA were developed from a sample of over "30 examples of commonly used hospital texts, including patient education materials, instructions for diagnostic tests, prescription bottle labels and instructions, and patient registration forms" (Nurss et al, 1995, p. 538). Examples of these include a standard hospital informed consent form, or the patient rights and responsibilities form for government medical aid.

Similarly, the numeracy items use authentic materials found in a health care setting, including "actual hospital forms and labelled prescription vials" (Baker et al, 1995). Respondents are presented these on cue cards or bottles and asked oral questions about their contents.

2.4.2.1.3 The Medical Achievement Reading Test (MART)

The MART was designed for a U.S. context and is closely modelled on the Wide Range Achievement Test (WRAT), and follows the same format using a list of 42 words that increase in difficulty towards the end of the test. The difficulty rating is determined by word length and number of syllables, with the assumption that such phonemic/morphological features reflect semantic difficulty. Respondents are asked to read the words out loud and are graded on pronunciation. If there is a word they struggle with, they are asked to continue until either completing the list or until 10 consecutive words are either skipped or incorrectly pronounced.

This test specifically selected medical or health-related words from a sample of 500 words gathered from 119 prescription labels and a medical dictionary. The MART attempts to replicate specific literacy conditions encountered in health care settings, and uses a small type size, on a white background and covers the test with a gloss finish to replicate the text found on prescription labels. The test also uses these features, as well as concentrating on medical terminology, as possible built-in excuses to be used by respondents to account for any inability to read words, allowing respondents to attribute blame to the format of the test rather than themselves. This has been designed to make the MART less threatening.

2.4.2.2 Criticism of Formal Assessment of Health Literacy

Tests such as the TOFHLA, MART and REALM continue to be used in research and gain credibility, for a number of practical reasons. As standardised tests, they are often assumed to be objective, reliable, valid and non-biased, having endured the rigours of several years of research and application in a wide range of settings. However, as has been noted before, the nature of standardized tests means that their application across a range of settings often restricts the effect of prior knowledge.

Thus, there are a number of advantages and disadvantages associated with each test. For instance, while the TOFHLA provides a more holistic measurement of health literacy than other tests, the time taken to administer even the S-TOFHLA can be a detracting factor.

The TOFHLA may also be limited by the fact that functionality, so to speak, can be interpreted in different ways. For instance, 'functional' can be interpreted as an indication of situational authenticity, as described in Section 2.4.1.2.1. Alternatively, 'functional' can also be interpreted as a level of health literacy. There are two issues to address if this interpretation is selected. Firstly, application of the TOFHLA may be affected by a mismatch in labelling the levels of health literacy, as evidenced in the overlap between Nutbeam's (2000) functional, interactional and critical levels of health literacy versus Wang's (2000) basic, functional, and critical split. Thus, there is confusion over where to position the functional level. As has previously been noted (Section 2.4.1.2.1.) there is also a confounding subdivision of inadequate, marginal and adequate levels within functional health literacy.

Secondly, both Nutbeam's positioning of functional health literacy as the lowest, most basic or minimum level of health literacy and Wang's focus on the knowledge and skills needed "to function in everyday society" may be viewed as similar to the usage of the term 'functional literacy' (discussed in Section 2.2.1.3). In this regard, it may be argued that functional health literacy posits similar minimum levels of literacy as the ethically-suspect functional paradigm of literacy already criticized in Section 2.2.1.4.2. Despite alternative interpretations of 'functional', it may be difficult to distance the application of the TOFHLA from the criticisms of the functional literacy paradigm as disempowering and disenfranchising, without significant resolution of the term.

However, the TOFHLA focuses on actual materials used in healthcare settings, which Douglas (2000, p. 116) refers to as interactional authenticity, or "the extent to which a test taker's language knowledge, strategic knowledge and world knowledge are engaged by the test task". Similarly it uses prose passages to test comprehension via the Cloze method and numeracy, which the other tests do not measure.

In contrast, the REALM and MART have some benefits over the TOFHLA, though as objective vocabulary tests they also suffer from specific flaws. Vocabulary size has been identified as a key factor in health literacy by Schillinger, Bindman, Wang, Stewart and Piette (2003) for assessing background or prior knowledge. Objective vocabulary tests like the REALM and the MART can be used to assess this knowledge. They are quick and easy to apply, especially in busy public health clinics, and they require little additional training or knowledge from clinical healthcare providers.

However, the REALM and MART are limited because as objective vocabulary tests they are open to bias in terms of words selected for inclusion (discussed in Section 2.2.3.2.2) and the method they use to measure 'knowledge' of a word (Section 2.2.3.2.3), i.e. word pronunciation, may not be able to differentiate between a respondent's familiarity with a word or their comprehension of the word. Similarly, the REALM and MART may also be criticised because they present words in isolation, potentially hampering respondents' selection of appropriate meanings for words.

However, formal methods of literacy assessment are often used despite their flaws because they are quick and simple to apply for a large number of cases, making them valuable for both practice and research. While the benefits of informal methods of literacy assessment are noteworthy, they are difficult to study on a large scale.

It is important to understand that there is no one 'best method' for assessing literacy (Alderson, 2000) and no one method can accommodate all the purposes for which literacy might be tested. Indeed, according to Alderson (2000, pp. 203-204), one must always be aware that "certain methods are commonplace merely for reasons of convenience and efficiency, often at the expense of validity, and it would be naïve to assume that because a certain method is widely used it is therefore 'valid'. Where a method is widely advocated and researched, it is prudent to consider all the research on that method, whether supportive or

detractive". It is also important to examine the Discourse in which the method is situated and to question all the hidden assumptions of that method. Thus the flaws and biases of formal assessment of health literacy as described above must be taken into account when conducting research in this manner.

2.5 Opportunity for Research

The concerns with the current assessment of health literacy expressed above suggest that instruments such as the REALM, the TOFHLA and the MART require some sort of modification in order to make them more effective, and in order to apply them without bias in South Africa. This provides an opportunity not only to research the modification of a health literacy test, but also to examine the administration and results of the modified test and to explore dominant discourses within health literacy. In this case, the REALM has been selected for modification, in an attempt to make it more applicable to local conditions. The following chapter describes the reasons for selecting the REALM, the particular process of modification chosen and how the modified test was administered in a local setting.

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CHAPTER 3: METHODOLOGY

3.1 Overview

The chapter begins with an examination of the original REALM test, exploring its creation, validation and administration. This leads to a discussion of various modifications of the tests, including the relexicalisation of this test in an attempt to make it more applicable for a South African population.

The methodology for relexicalising the test is then discussed, detailing data collection, initial data analysis and selection of words for the modified REALM test. This includes a discussion of various problems that arose, and their resolution.

A brief discussion of additions to the test is presented, including an examination of the literacy practices and demographic questionnaire attached to the modified REALM test. In the final section of the chapter, the test sites, the sample population, and the procedure for administering the test are detailed.

3.2 Reasons for Selecting the REALM for Research

The REALM is a reading recognition test designed for U.S. health care settings. It was chosen as the focus for this study above other pre-existing health literacy tests, and above the creation of a new instrument for assessment of health literacy for a number of reasons.

Firstly, the REALM has been used to research health literacy in a wide variety of health fields and predates the TOFHLA. A recent literature search using Medline and Science Direct online journal databases yielded a variety of papers in which the REALM is cited or used to determine participants' health literacy. These included topics such as asthma self care (Williams, Baker, Honig, Lee and Nowlan, 1998), cancer research (Bennett et al, 1998; Lindau et al, 2002; Casarett, Karlawish and Hirschman, 2003), contraception (Parker, Williams, Baker and Nurss, 1996; Raymond, Dalebout and Camp, 2002), dentistry (Kubba, 2000), mammography (Davis et al, 1998), medical informatics (Sutherland, Campbell, Ornstein, Wildemuth and Lobach, 2001), paediatrics (Moon, Cheng, Patel, Baumhaft and Scheidt, 1998), pharmacology (Brass and Weintraub, 2003), psychiatry (Christensen and Grace, 1999), public health (Chez, 1999; Nath, Sylvester, Yasek and Gunel, 2001), smoking cessation (Arnold et al, 2001; Ahluwalia et al, 2002) and sexually transmitted diseases (Fortenberry et al, 2001), as well as a host of nursing studies (Brez and Taylor, 1997; Murphy, Chesson, Berman, Arnold, Galloway, 2001; Conlin and Schumann, 2002; Wilson, Racine, Tekieli and Williams, 2003; Skelly and Schmuck, 2003).

In comparison, the TOFHLA was cited or used in studies on chronic disease (Williams, Baker, Parker and Nurss, 1998; Gazmararian, Williams, Peel and Baker, 2003), diabetes (Schillinger et al, 2003), gerontology (Gazmararian et al, 1999; Baker, Gazmararian, Sudano and Patterson, 2000; Gausman-Benson and Forman, 2002; Baker et al, 2002), gynaecology (Gazmararian, Parker and Baker, 1999), HIV/AIDS (Kalichman et al, 2000) and medical informatics (Kalichman et al, 2002), as well as public health (Williams et al, 1995; Baker, Parker, Williams, Clark and Nurss, 1998; Nurss et al, 1997; Montalto and Spiegler, 2001).

In some cases, these two tests are cited in the same text, for instance in studies of gerontology (Kiefer, 2001) or polio literature (Davis et al, 1998) but also in articles on public health

geared towards extending the scope of health literacy assessment, for example on cancer communication (Davis, Williams, Marin, Parker, and Glass, 2002) and patient screening (Lasater and Mehler, 1998). In addition, the REALM was used in the development of the TOFHLA (Nurss et al, 1995) to measure relative validity, and Davis, one of the original investigators and developers of the REALM, collaborated with the developers of the TOHFLA to create a Spanish version of the TOFHLA. A casual glance at the literature cited above reveals the continued collaboration on health literacy assessment issues between REALM and TOFHLA researchers, but also reveals the dominance and precedence of the REALM.

A second reason for selecting the REALM is that as an objective vocabulary test, it provides concrete examples of key elements of the autonomous paradigm evident in the Discourse of health literacy. Consequently, researching the REALM provides an opportunity for comment and investigation of the ideological assumptions of this test and hence the dominant Discourse from a sociolinguistic perspective.

However, the most compelling justification is that relevant previous research on the REALM has been conducted in a local setting, which allowed for comparison with the results of the present study. This was probably the most important deciding factor. Having prior research with which to compare results was considered more valuable than attempting to administer an alternative instrument such as the TOFHLA or the MART in a local setting. As such, this thesis is heavily reliant on the work of Lecoko (2000), who previously researched the applicability of the REALM in Grahamstown, in the same setting that the research for this thesis was conducted.

3.3 Examination of the Original REALM Test

According to Davis, Long, Jackson, Mayeaux, George, Murphy, and Crouch, (1993, p. 392), "the REALM is a reading recognition test that measures a patient's ability to pronounce words in ascending order of difficulty". Given that it uses popular medical words, they suggest that it is "particularly useful in estimating literacy skills in medical settings" (1993, p. 392). It is intended to enable health care professionals to "identify patients who may have difficulty reading materials given to them in medical settings, provide a numerical estimate of how severe their reading difficulty is, and select or create materials written at the appropriate levels" (1993, p.393). The REALM can also be used to identify patients with extremely limited literacy, "allowing health professionals to focus special attention on patients who need help the most" (1993, p. 393).

The pilot version appeared in 1991 (created by Davis, Crouch, Long, Jackson, Bates, George and Bairnsfather), but was shortened from 125 words to 66 words in three columns of 22 each, arranged "by number of syllables and item difficulty" (1993, p. 392). The REALM is printed in 14 point Arial, a san-serif font larger than normal prescription label print, and is printed on a purple background, with both features intended to provide a non-threatening appearance. The shortened version of the REALM is also expected to be quick to administer and should take "only one to two minutes for completion" (Davis et al, 1993, p. 391).

The REALM is based on the premise that "reading recognition tests, in which subjects read aloud words in isolation, are accepted as useful predictors of general reading ability" (1993, p. 393). Respondents were required to read out loud as many words as they could. When encountering difficulties, respondents would be asked to either attempt the word to the best of their ability or to pass, by saying 'blank'. Examiners then scored the results on a separate sheet and could compute a raw reading score based on the total number of correctly pronounced words.

Assessment of pronunciation used 'dictionary pronunciation' as the benchmark, according to Davis et al (1993, p. 392), who state that "A dictionary is the recognized guide for people seeking help with unfamiliar words, regardless of their culture or the region of the country in which they reside."

Though the creators of the REALM test are careful to divest the literacy estimates of the test from any specific educational level correlations, suggesting that "patient scores on the REALM must be interpreted as estimates of literacy, not grade equivalents" (1993, p. 393), the test does list estimated scores according to specific educational grade ranges. The REALM groups respondents into four educational ranges, namely Grade 3 or lower, i.e. those with three or fewer years of education including respondents who have never attended school, Grades 4 to 6, Grades 7 to 8, and Grades 9 and above, including those with tertiary education. Respondents are expected to score in four groups of results according to the number of words they could pronounce, namely 0-18 words, 19-44 words, 45-60 words and 61-66 words. The Grade 3 or lower group is expected to have their largest number of respondents only able to pronounce up to 18 words, the Grade 4 to 6 group expected to pronounce up to 44 words, and so on.

3.3.1 Various Problems with the REALM Test and Resultant Modifications

The original REALM test may be criticised for a variety of reasons. In some cases these criticisms can be addressed by modification of the REALM, while in others, no modification is necessary. For instance, in development of the MART, the situational authenticity of the test was increased by using a smaller print size more typical of prescriptions, a glossy finish such as that found on tablet bottles, and a white background also typical of text materials found in such settings. Thus the use of a print size larger than normal prescription print on a purple background on the REALM has been criticised by Hanson-Divers (1997) as being uncharacteristic of text materials typically found in healthcare settings, with the suggestion that these features actually make the REALM test more threatening to respondents with low literacy.

However, the MART uses more technical terminology than the REALM, and allows for small print size, glossy finish, background and inaccessible terminology to be used as 'excuses' for inability to read words, in order to appear less threatening. Given that the authors of the REALM intended the print size and bright colour to act as non-threatening elements, its differences to the MART can be put down to a difference of priority between situational authenticity and readability, or a difference in selecting criteria for appearing less

threatening. Perhaps more research into what patients or respondents regard as threatening may be necessary to resolve this issue, but the REALM requires no modifications, in this regard, in order to be used for this study.

Another issue is the use of grade level equivalencies in scoring the REALM test. The suggestion by the developers of the REALM that patient scores can only be taken as broad estimates of literacy, may indicate that they are aware of the problems of grade level equivalency. Despite this, they provide a list of expected scores per educational grade group. This may represent either a general trend towards use of this measure in Western settings (as discussed in Section 2.2.3.1) in which Davis et al (1993) are complicit, or an awareness by the authors that although this is a problematic measure, the REALM test is likely to be administered by healthcare professionals for whom grade level equivalency is still valid. Indeed, the REALM has been criticised by Hanson-Divers (1997) for failing to place respondents into specific grade levels.

However, in whatever form, estimated or specific, grade level equivalencies are difficult to justify in any non-Western setting and likely to be very difficult to apply in a South African setting. Given the history of literacy and education in South Africa outlined in Section 2.3, it may be difficult to correlate literacy levels with completion of a specific level of education. Thus, using the same grade ranges or using the expected scores per grade range as the REALM may be problematic.

However, this aspect is retained and not modified in the current study for a number of reasons. Firstly, the selection of respondents for the REALM study conducted in South Africa (Lecoko, 2000) utilised the same grade ranges, so the current study remains unmodified in this regard to allow for comparison. Secondly, given that there is likely to be no trend or correlation between completion of a specific level of education and literacy level in South Africa, it is not possible to substitute a local grade equivalency that would alter the grouping of grades suggested by Davis et al (1993) in any manner that contributes to greater applicability or understanding. Thus, the rationale behind the REALM's broad grade equivalency estimates, based on the premise that the group with the lowest education should cluster in the lowest number of words, the next highest group in the next highest number of words, and so on, was applied in order to facilitate comparison.

The use of 'dictionary pronunciation' as a measure of adequate pronunciation for the REALM is highly problematic, and application of this benchmark in South Africa would be difficult, given the range of varieties of English used in this country, and especially given the high number of people who speak English as a second or additional language. Dictionaries are likely to only reflect one variety, for instance, the Oxford South African English Dictionary 2000, which uses Standard South African English, a typically first-language variety, as its benchmark. Thus, if this dictionary is used, any deviation from this, for instance by speakers of Black South African English (a well-researched and recognised variety) is likely to be viewed as sub-standard rather than equally valid. A more informed method of measuring pronunciation was therefore necessary. As explained in Section 3.5.5 'Scoring the Test' towards the end of this chapter, a pronunciation guide which caters for L1 and L2 pronunciations (specifically BSAE) was developed to aid in administering the test.

The creators of the REALM are also vague about the relationship that they perceive between pronunciation and comprehension. It would appear that Davis et al (1993, p. 393) perceive no relationship between pronunciation and comprehension, as evidenced in the statement that "the results of the test do not imply comprehension or interpretation but only agreement on the sound of the word".

However, there are a number of contradictory statements. Firstly, Davis et al (1993, p. 393) seem willing to suggest that a relationship exists between inadequate pronunciation and inadequate comprehension, that "if patients have trouble reading and pronouncing words, one is alerted to the possibility that reading comprehension is likely to be a problem". It seems curious that they do not validate the converse of this statement, that adequate pronunciation is related to adequate comprehension.

Secondly, the authors do say that "reading recognition tests, in which subjects read aloud words in isolation, are accepted as useful predictors of general reading ability" (1993, p. 393) and "are appropriate measures of reading skill for low-level readers" (1993, p. 393). However, the use of 'read' in these statements (i.e. 'read aloud', 'general reading ability', or 'reading skill') is problematic, because it makes no distinction between different aspects of reading, namely pronunciation and comprehension. 'Read aloud' may easily be understood as

pronunciation, but 'general reading ability' and 'reading skill' may refer, but are not so readily linked, to comprehension.

Despite this confusion, what is clear is that the REALM test does not examine comprehension directly and its indirect assessment of comprehension is vague and inadequately premised. While the importance of testing comprehension in addition to pronunciation in terms of objective vocabulary tests has already been discussed in Section 2.2.3.2 of the Literature Review, a number of studies on health literacy assessment (Baker, Nurss, Parker and Williams, 1993, Nurss, Baker, Davis, Parker and Williams, 1995, Baker, Williams, Parker, Gazmararian, Nurss, 1999, Lecoko 2000) have shown that adequate pronunciation does not imply comprehension. Thus, comprehension and pronunciation are equally important issues, and the REALM's failure to test comprehension may be a serious oversight.

For instance, when compared with the results from the S-TOFHLA, a number of respondents were able to read and correctly pronounce individual words on the REALM test, but scored poorly on reading comprehension as part of the S-TOFHLA (Baker et al, 1999). Similarly, research into the creation of a Spanish-language REALM (Nurss et al, 1995) has shown that adequate comprehension cannot be assumed from adequate pronunciation given the ease of adequate pronunciation of Spanish because of the strong grapheme-phoneme correlation in that language. The results of the REALM study (Lecoko, 2000) conducted in South Africa, which tested both reading and understanding, also showed a similar trend, in that 80% or more of the respondents could pronounce 25 words adequately, but could only comprehend 16 of these adequately. Thus the addition of a comprehension aspect to the test was necessary. This is also described in Section 3.5.5 'Scoring the Test'.

Read (2000) criticises the presentation of words in isolation because this format provides no cues from which respondents may select the required part of speech or meaning from a possible range of meanings that a word may have. As a result, the assessment of comprehension on the modified test may possibly have benefited from the presentation of words in appropriately neutral sentences, providing sufficient surrounding context to allow respondents to adequately select the appropriate health-related meanings without giving away their meanings. However, given that the technical nature of health Discourse means that

words within this specialised vocabulary would tend to be more specific (i.e. to have a restricted range of meanings), and include a lower number of associated non-healthcare meanings, this may be a moot point. Thus, retaining the presentation of words in isolation (as with the use of grade range estimate) to enable comparison of results with Lecoko's (2000) study may not be as problematic or as detractive as Read suggests. This issue could not be further addressed without significantly altering the format of the test, or even necessitating the development of a new test.

According to its developer, the REALM test's word recognition-only format is justified because it results in a test that is quick to administer and score. Rapid administration is an important consideration in public health care settings, given the volume of patients that a typical healthcare professional must deal with on a daily basis. Unlike the TOFHLA, which can take between 12 and 22 minutes to administer (Baker et al, 1999), the shortened REALM should only take one to two minutes to administer. However, the administration of the REALM in a local setting was considerably slower. Although 46.4 % of the respondents in Lecoko's (2000) study completed the REALM test in less than three minutes, the remaining 53.6 % took anything from 10 minutes to 22 minutes 18 seconds. This may suggest that the REALM is less applicable in a local setting than in typical Western settings.

Another key area that required modification was the words selected for the test. Lecoko's (2000) research showed that the majority of words used in the original REALM (58 out of 66) were not applicable for a local population. The selection of the words may also have been problematic. "The original REALM was ... selected in a fairly unscientific way - the principal investigator walked around jotting down words with medical meanings from educational materials she saw at the clinics of the LSU hospital" (E. Marin, personal correspondence, November 28, 2002). Thus modification of the test in terms of the method of word selection must begin by choosing different words, using a more principled and theoretically justifiable approach. This approach is described in the following section.

3.4 Relexicalisation of the REALM Test

3.4.1 Basis for the Chosen Method of Relexicalisation

In view of the selection of words for the pilot version of the REALM from educational materials found in clinics that Marin describes above, and the fact that words were selected on the basis of their frequency "in written materials material given to patients" (Davis et al, 1993, p. 392), a similar approach was used to relexicalise and modify the REALM test, gathering materials from clinics and examining the frequency of individual words. While the primary goal of this process was to provide data for this research project, a secondary goal was to develop a database of common popular English medical words used in local healthcare settings gathered from locally available health promotion materials.

The approach was similar to that used by a research project which created a 'Multilingual Glossary of Technical and Popular Medical Terms in Nine European Languages' (Multilingual Glossary of Technical and Popular Medical Terms in Nine European Languages Final Report, 1995[3]) intended for use by European health care professionals in 'translating' technical to popular words.

This project initially gathered a list of 45 000 Dutch words from a computerised compendium of medical words used in technical data sheets, available on a CD-ROM from the Belgian Pharmaceutical Association. This list was reduced to 11 000 headwords by exclusion of "irrelevant word forms (articles, prepositions, etc), of 'terms' with a frequency of occurrence of less than five," (MG Final Report 1995, Section 2.1) as well as words with a variety of possible spellings. A second reduction of the list yielded 2 200 words by excluding any words that fell outside of "the domain of medical information", as well as compounds, chemical structure terminology, and words that appeared less than 10 times. A further 170 words were eliminated by excluding synonyms and grouping related medical words, ending up with a list of 1 830 words. From this point the research project went on to translate these words into eight other European languages.

While this project was initially concerned with Dutch medical words, and while the outcomes involved defining the words and translating them into nine languages, the format of the initial

[3] Hereafter referred to as the MG Final Report

research gives some insight into the process that was used to gather and analyse data for relexicalising the REALM test. This process is described in the following sections.

3.4.2 Data Gathering

Texts were collected from 9 different health care sites around Grahamstown. These sites included the Day Hospital, (an outpatient centre associated with Settlers Hospital, which is the only public hospital in Grahamstown), the public primary health care clinics: Middle Terrace, Joza, Raglan Road, Tantyi, Anglo-African (Town), Victoria Shumane and Extension 7, as well as one private primary health clinic, Assumption Clinic. One copy of each English language health promotion text was collected, while administrative texts such as forms, medication information inserts and patient records were excluded, in keeping with the selection of words for the original REALM from educational materials. Copies were also collected when English appeared as one of two or more languages used in the text.

3.4.2.1 Brochures versus Posters

Initially, it was intended that both brochure or pamphlet texts and posters would be collected, but the gathering of information from posters proved problematic, as in most cases, the clinics only had one copy of each poster and these posters were in daily use. The majority of the posters were politically motivated or dealt with citizenship rather than health issues. In some cases, the posters could not be successfully removed from the walls to record the information on them without damaging them. An initial attempt to record the information on the posters by photographing them was difficult as the resolution was inadequate. Though a later attempt was made at reading off the information and recording it onto tape, the sheer volume of work was prohibitive.

Thus a decision was made to concentrate on brochures/pamphlets as they were deemed to be more effective than posters in communicating health information for the following reasons:

- There were multiple copies, therefore more opportunity for wider usage.
- Brochures/pamphlets could be removed from the clinic to be read, expanding their usage.
- They could be referred to repeatedly.

- The range of topics addressed in the brochures/pamphlets was more extensive than that covered by posters.
- The information on posters was often duplicated and expanded upon in brochures/pamphlets.
- Posters frequently contained less actual text than pamphlets, allowing for more vocabulary data to be gathered from pamphlets.

In addition, Mbananga and Becker (2002, p. 205) suggest that pamphlets outperform posters 'in conveying intended information'.

3.4.2.2 Topics

A total of 71 unique brochures/pamphlets were collected. In some cases, there were newer and older versions or designs of each brochure, but the text they contained had not changed. The content or topic of the brochures included the following:

- 11 on infant nutrition
- 5 on breast-feeding
- 4 on infant immunization
- 8 on child-rearing at the new born stage
- 3 on child-rearing, aimed at child-minders at the toddler/pre-school stage
- 4 on various forms of cancer
- 6 on family planning and contraception
- 3 on various aspects of menstruation
- 15 on HIV/AIDS, including a series of 12 produced by the Department of Health.

The remaining 12 brochures were on single topics, including pregnancy, abortion, influenza, vaccinations, malaria, dysentery, autism, lice, water usage, health rights and health promotion.

3.4.2.3 Sources

Of the 71 brochures, 44 brochures were produced by either the Department of Health at a national or provincial level, or by various organizations like the Planned Parenthood Association of South Africa, the Association for Voluntary Sterilization of South Africa or the National Cancer Association. Another 26 brochures were produced by pharmaceutical companies, including Glaxo-Wellcome (now Glaxo-Smith-Kline), Johnson and Johnson and Nestle, and either branded as community service initiatives, or served to advertise specific products. One brochure was produced by a Christian aid organization.

3.4.3 Data Analysis of Texts

Two different programs were used for data analysis, as this allowed for verification and because they also offered mutually exclusive functions. The Lexical Frequency Profile (LFP) program was written by Heatley, Nation and Coxhead (2002) and is a public domain computer program downloadable from Nation's website, while Wordsmith is an Oxford University Press product. The capabilities of the LFP program are somewhat limited in comparison to Wordsmith, which allows for a range of operations, and it lacks the more user-friendly interface of Wordsmith. However, in some cases and for some functions, the simplicity of the LFP program actually contributed to its use for data analysis. For example, it is easier to use the LFP program to compare multiple texts.

The text from each unique brochure was entered into a single MS Word file, with lines separating each brochure entry. The text was entered as it appeared in the brochures, with no corrections made to grammar, spelling or punctuation. This yielded a sample length of 51 921 words. This file was then analysed using the two programs described above.

The analysis yielded 5 083 individual words, rated from most frequent ('THE' appeared 2 713 times) to least frequent (2 143 words that appear only once). In cases where a given base word appeared in a variety of forms, for instance nouns appearing in multiples (DRUG versus DRUGS) or verbs inflected for tense or number, all inflectional and derivational lexemes of a base word were grouped together in a word family (i.e. lemmatised), with the base word

representing that word family and the frequencies for all the morphemes subsumed under that word added up and reflected as a total for that base word.

This frequency analysis data was compared with medical terminology lists from the U.S. National Library for Medicine (Medline Plus Encyclopedia, 2000) and the U.K. National Electronic Libraries for Health (NHS Direct Online Encyclopaedia, 2003), as well as the 'Multilingual Glossary of Technical and Popular Medical Terms in Nine European Languages' (MG Final Report, 1995) previously described. These medical word lists were created by accessing the online encyclopaedias of these sites and downloading the entries listings, excluding the definitions, into three separate files.

Comparisons with these three medical word lists were intended to extract the medical words from the 5 083 word sample. However, these comparisons proved inconclusive as they excluded words that, at face value, seemed significant, including words like 'AFFECT', 'PROCEDURES', and 'COUNSELLING'.

3.4.4 Selection of Lexical Items

3.4.4.1 Exclusions

Initially, 3 740 words that appeared less than five times (or less than 0.01 % of the sample) were deemed to be statistically insignificant because of their low incidence of appearance. They were excluded and saved separately for later analysis.

Thereafter, a manual method of paring down the list was chosen. It was deemed necessary to separate and parse the remaining 1 343 words into lexical sets that were defined as medical or health-related, versus more mainstream or non-medical words. The 1 343 words were qualitatively analysed and initially certain groups of grammatical functions were excluded as non-medical. These included the following groups of words:

- Articles
- Determiners
- Conjunctions
- Subjunctives
- Pronouns

- Auxiliary Verbs
- Prepositions
- Numbers
- Question Words
- Negatives.

In addition, the following lexical sets were also excluded: place names, brand names/proper names, religious words/names, words relating to organisational structures, nationalities, words of time and ages, inflections (suffixes and prefixes), common non-medical abbreviations, words describing relationships of commodities and exchange and part versus whole, human social relationships, senses, colours, words describing communication/ understanding/knowledge and communicative tools, the physical world and equipment, including object qualities, like size and temperature, as well as words relating to the realms of teaching education or emotions and psychology, and intensifiers or qualifiers that were in some way tentative, contributive or detractive. Also excluded were words which represented adverbials of time, adverbials of manner, roles and the relationship of all versus some, as well as words which were regularly used in a healthcare context but did not actually have any direct connection to health, did not have a medical or health component to their meaning, or were equally likely to be used elsewhere. These words included, for example, 'COMPLEMENTARY', 'CUT', 'BREAK', 'ATTENTION' and 'LIQUID'.

3.4.4.2 Intermediate Selection of Lexical Items

At this stage, 1069 words had been rationally excluded from the 1343 statistically significant words, with 274 words remaining. These 274 words were parsed into a variety of health-related lexical sets. These included:

- Body Parts, processes and substances produced by the body
- Health and family roles
- Health administration and factors
- Sex, pregnancy/birth, and nutrition
- Disease states/symptoms, health states, diseases/conditions and death versus life
- Transmission, treatment and diagnosis

- Hygiene
- Pathogens
- Drugs.

Where there was a range of meanings for a given base word, reflecting both health-related and non-health-related meanings, the base words were checked against the sentences in which they appeared and only instances where health-related meanings were selected were included in the frequency listing.

3.4.4.3 Final Selection of Lexical Items

It was then necessary to pare the remaining 274 medical or health-related words down to 66 to match the sample in the REALM test. The remaining 274 words were grouped in order from highest to lowest frequency. In cases where a number of words shared the same frequency, they were listed alphabetically. This list was used for various attempts at quantitative analysis in order to select a final list of 66.

3.4.4.3.1 Various Attempts at Quantitative Selection

3.4.4.3.1.1 Quantitative Selection using LFP Baseword Lists

The LFP program contains three word lists that the creators of the program (Laufer and Nation, 1995) believe to represent the first 1000 most frequent words of English, the next or second 1000 most frequent words, and another 1000 words not included in the other two lists, which represent frequent words in upper secondary school and university texts. The first two lists are based on A General Service List of English Words, developed by West (1953), and the third list on The Academic Word List developed by Coxhead (1998, 2000). Each list contains both the base forms of words and derived forms, thus including a large number of word families. Using the capability of the LFP program to cross-reference words with these lists, the 274 words were compared which yielded the following results:

- 79 appeared on baseword List 1, first 1000 most frequent words
- 67 appeared on baseword List 2, second 1000 most frequent words
- 29 appeared on baseword List 3, 1000 upper secondary and tertiary education level words
- A further 100 words did not appear on any of these baseword lists.

In order to replicate the format of the REALM test, three lists of increasing difficulty were created with 22 words in each list. The first selection process meant initially excluding the 100 words that did not appear on any LFP baseword list, and including every fourth word from List 1, every third word from List 2 and almost every word from List 3. This generated a total of 66 words, and is referred to as the LFP-exclusive Selection.

In a second selection process, the 100 words that did not appear on any LFP baseword list were included and 16 words were selected from this list and each of the LFP baseword lists. Thus every fifth word on List 1, every fourth word on List 2, every alternate word on List 3 and every sixth word on the list of 100 excluded words was selected. This generated a total of 64 words and is referred to as the LFP-inclusive Selection.

3.4.4.3.1.2 Other Quantitative Selections

Two selections based on analysis of frequency only were made. The first listed each unique frequency that appeared in the final sample of 274, for instance frequency 525 which only applied to one word, BABY, versus frequency 5 which applied to 30 words. There were 68 unique frequencies in total. The words that represented each unique frequency were listed alongside that frequency. This was called the Unique Frequency Selection. In the second selection, the first 66 words that appeared in order of frequency were chosen, called the First 66 Selection. In addition, a third completely random selection from the final sample of 274, which selected every fourth word, was made, which generated 66 words. This selection initially ignored frequency as a consideration, but where the selected word shared the same frequency as any of the following three words, all of these were listed. This is referred to as the Random Selection. There were however, a number of problems with each of these selections, and not one selection could be completely free of some degree of subjectivity.

3.4.4.3.1.3 Problems with Quantitative Selection

It was at this point that it was necessary to replace randomized statistical analysis with a further level of qualitative analysis. The reasons for this included the following:

1. While comparing the 274 words with the LFP baseword lists did categorise the words into different levels of lexical sophistication, this analysis did not provide any insight

in selecting words for the test. For instance, on the LFP-exclusive selection, not including the 100 words that did not appear on any of the LFP baseword lists meant excluding a number of significant health-related words, examples of which include 'TUBERCULOSIS', 'PREGNANCY', 'EPIDEMIC' and 'NUTRITION'.

2. The LFP baseword lists are assumed to represent typical mainstream vocabularies at these levels, whereas it may not be possible to categorise the specific subset of health or medical words into similar levels.
3. As stated before, words which shared the same frequency were grouped together and ordered alphabetically. This meant that random statistical selection of words was flawed. Thus, attempting to choose the final list using LFP-inclusive Selections 1 and 2, First 66 Selection, or even the Random Selection meant that occasionally words shared the same frequency. For instance 'ANTIBODIES', 'AUTISM', 'ARMS', and 'FAT' all shared the same frequency (8), and thus shared equal statistical significance. With no way to quantitatively differentiate between them, some sort of qualitative distinction was necessary.
4. If the Unique Frequency Selection was used, a given unique frequency could be represented by up to 30 words. As above, these words shared statistical significance and could only be qualitatively distinguished.
5. There were 68 unique frequencies, and selecting words that represented the top 66 meant that 58 words which represented the two lowest frequencies were excluded.

As a result, none of these methods produced a final list that was representative of local health care conditions.

3.4.4.3.2 Qualitative Selection

Given the fact that quantitative methods of selection could not produce a statistically random list without introducing significant flaws, or a list that was representative of local health care conditions, it was necessary to use a more qualitative method of selection. Out of the list of 274 words, 66 words were chosen to reflect primary health concerns and issues that are locally prevalent. While this method was subjective, every effort was made to ensure that the choice of each word was justified and rational.

The final list of 66 words was developed in consultation with a pharmacist and a medical doctor, both with considerable experience in the South African primary health field. The choices were triangulated by comparison with similar choices from four healthcare providers, including other community pharmacists and clinic supervisors, and by comparison with the Random Selection list.

The screened choices of the four healthcare providers accounted for 64 of the final 66 words chosen, with the remaining two words, IRON and SLEEPY appearing on the Random Selection list. Interestingly, when compared with the medical terminology lists described in Section 3.3.3, 'Data Analysis of Texts', all of the 66 words appeared on all three of these lists, which suggests that they may be more widely applicable than previously assumed.

3.4.5 Formatting the REALM-M Test

The final 66 words were then entered into a form replicating the format of the original REALM test, and this was labelled as REALM-M, or Rapid Estimate of Adult Literacy in Medicine-Modified. This form differs from the original in a few other areas, aside from its relexicalisation. The REALM-M has two boxes to be checked for each word, one to indicate the respondent's ability to read the word, and the second to record their ability/inability to explain the meaning of the word. This is intended as a comprehension tool to test their understanding of a given word. The words on the list were grouped according to the broad education levels suggested by the LFP program and listed in three columns of 22 words of increasing difficulty, using word length as a measure of complexity.

3.5 Additional Questionnaire

A questionnaire comprising two parts was designed. The first part was designed to explore health literacy practices, looking at literacy in or with relation to clinics, health care professionals, sources of health literacy, texts in clinical settings, and assessing the communicative effectiveness of posters versus brochures.

The second part of the questionnaire covered demographic issues such as age, sex, residential status, educational level and employment. Two questions covered language and language proficiency, asking the respondent to state their first-language and to rate their ability to listen, speak, or read in their home language, and in English and Afrikaans, given the former political entrenched dominance of these two languages.

3.6 Administration of the Test

3.6.1 Test Sites

The test was administered at 9 different sites around Grahamstown, namely the following public health system clinics: Joza, Middle Terrace, Extension 7, Tantyi, Raglan Road, Anglo-African, Victoria Shumane, and the Day Hospital, and the private Assumption health clinic.

3.6.2 Test Population

To gain a sufficient cross-section of the population equal numbers of respondents from each clinic were selected. Respondents were selected from patients waiting for care at clinics or regular patients of local clinics. Respondents were all lower income bracket, South African adults, predominantly first-language speakers of isiXhosa and Afrikaans, all of whom spoke English as an additional language with varying degrees of competence.

The inclusion of non-white, Afrikaans first-language speakers reflects one facet of the socio-economic stratification of South African society, namely the endurance of townships differentiated by racial groups, a cornerstone of the apartheid era[4]. Including all of the public health system clinics meant that lower income population groups were included. The results of the apartheid era's socio-economic oppression meant that these lower income bracket population groups are almost exclusively non-white, and speak English as an additional language. As a result, the ratio of Afrikaans first-language speakers to isiXhosa first-language speakers in this study provides a sample that is reflective of public health system patients in South Africa.

3.6.3 Interpreting

Given that the researcher's first-language is English and that he can speak none of the indigenous languages with any degree of fluency, it was necessary to use an interpreter. An interpreter was selected, a 24 year old black male, who spoke isiXhosa, isiZulu and Afrikaans, as well as English. The interpreter was a 3rd year university student majoring in

[4] In this regard, it is important to note that Afrikaans is spoken as a first-language both by White people, representing an Afrikaner ethnic group, and by non-White "coloured" people.

linguistics, a feature that was deemed to provide special insight into this particular project. He also shared a similar background to the respondents.

The interpreter was expected to explain in isiXhosa and Afrikaans the reason for the research and process of administration in order to inform potential respondents and to obtain their informed consent. Thereafter, during the administration process, his role was to advise in explanation of the process, when and where respondents had difficulties, and to interpret definitions of words when these were given in isiXhosa or Afrikaans. Given that the interpreter would be relied upon for checking the definitions offered by respondents when these were not offered in English, it was important that the interpreter was capable of defining the words himself. Thus, the test was administered to both the interpreter and the researcher. In addition, a sample definition guide was provided against which definitions were checked.

The interpreter was specifically instructed not to be critical or judgemental in his communication with the respondents, and to provide space for the respondents to answer the questions without helping them and thus skewing the results. He was instructed to elicit pronunciations and definitions of words without assisting the respondents to complete these tasks.

The interpreter was also instructed to faithfully and accurately translate communication between the primary researcher and the respondents, not to paraphrase, and to make sure that the respondents felt comfortable and sufficiently informed about the test, so that any reservations about the test would not negatively influence their responses.

3.6.4 The Interview Process

In each case, the same interview process was followed. The interpreter introduced himself and the researcher and explained the research project to a potential respondent. He explained that the project examined both people's knowledge of health-related words and tested the relevance of words used in health promotion materials. Potential respondents were then offered an opportunity to participate in the study, and were given the time frame for

administration of the test and the range of questions in the literacy and demographic questionnaires. They were also offered a gratuity for taking part in the study.

If they consented to participate, the interpreter went on to explain the format of the test. It would begin with questions about their literacy practices while waiting in clinics, and about sources of health information, and be followed by confidential demographic details. When asking the questions in isiXhosa or in Afrikaans, the interpreter would repeat the answers in English so that they could be written down by the researcher. Initially audio tape recordings were made of the interviews, but given noise problems in the public settings in which interviews were conducted, this was discontinued.

After administering the literacy practices and demographic questionnaires, the respondents were then instructed to read aloud each column of the REALM-M test. They were given a laminated copy of the first page of the REALM-M with a short explanation in English at the top and the 66 relexicalised words in 3 columns, in 14 point Arial.

They were asked to read out each list and then timed, with the time recorded per column. Adequately pronounced words were ticked off on a separate scoring sheet per column. All three columns were timed and scored. The interpreter was careful to tell respondents that although they were being timed, clear pronunciation and not speed was the measure of the test.

Respondents were then asked to explain the words in each column, either by way of a definition, translating the English word into isiXhosa or Afrikaans, or using the word in a sentence to demonstrate the meaning. In some cases, respondents were able to point to and describe the relevant body part. This definition of a word was designed to be used as a measure of comprehension. Respondents were under no time constraints for this portion of the test. In addition, it was explained to them that inability to define a word was not taken as a reflection of their level of intelligence, but could rather be explained by the complexity of a given word or by an inability to remember the definition. This was designed to reduce the respondents' feelings of shame about their levels of literacy by acting as a face-saving option should they encounter a difficult word. Research by Parikh et al (1996) suggests that a patient's shame about their level of literacy may inhibit them from admitting reading

difficulties, seeking help, or asking questions regarding their healthcare. By extrapolation this may affect their responses in a health literacy test. However, this is likely to be less of an issue in developing countries where a low level of literacy is likely to be a community norm, as opposed to developed nations where there is more stigma attached.

Upon completion of the test, respondents were thanked for their participation and given a gratuity.

3.6.5 Scoring the Test

Two key measures were used to aid in the scoring of the test. Firstly, a pronunciation guide was developed prior to the administration of the test. This guide took into account realisations of Afrikaans South African English (AfkSAE), Black South African English (BSAE) and Xhosa-English (XE) that differ from Standard South African English (SSAE), the variety with which the researcher is most familiar. In terms of vowels, two key issues had to be accounted for. Research by Hundleby (1964, p. 48) showed that Xhosa has a smaller range of vowels than SSAE, and that a range of SSAE vowels could be realised as a single vowel by XE speakers or not realised at all, if Xhosa does not have a similarly placed vowel. For instance, /u:/ may be realised as [ʌu], [ʌ:], or as [ʉ:] in SSAE, but only as [u:] in XE. Additionally, Xhosa speakers typically conflate SSAE vowels [ɛ], [ɜ:] and [□] to [ɛ] in XE and [ɪ] and [ɪ:] to [ɪ:]. Thus, the words 'bed' and 'bird' would typically sound the same in XE, as would 'ship' and 'sheep'. Similarly, in SSAE vowel length has phonemic value but not so in XE. XE vowels are not distinguished based on length, and tend to be neither long nor short phonemically but rather differ depending on context.

In addition, SSAE diphthongs are also likely to be differently realised. According to Van Rooy and Huyssteen (2000: 24) SSAE diphthongs are typically either realised by BSAE speakers as monophthongs, losing their second element or produced as separate vowel sounds often aided by the insertion of a glide.

Another key issue is that of phonemic stress. According to Hundleby (1964: 41) "in the linguistic structure of Xhosa, stress is of no basic significance" and "stress would therefore

appear to be non-phonemic in Xhosa". Thus, the pronunciation guide allowed for a range of stress patterns not typically found in the production of individual words by mother-tongue speakers of SSAE, as well as a specific range of vowels to be substituted.

As Xhosa has most English consonants, save for key exceptions like dental fricatives, these did not present too much of a problem and only one word required a possible variation ('THROAT', which could alternatively be realised as [ɪɔɑt]).

Similarly, assessment of pronunciation of English by Afrikaans speakers allowed for typical variations. These included the tendency of Afrikaans speakers of English to pronounce an underlying /d/ or /t/ sound as [t] at the end of words or syllables (De Stadtler and Combrink, 1987, cited in Wissing and Dreyer, 1992), a tendency towards unaspirated /p t k/ in word initial position, as well as a non-approximant /r/ feature of AfkSAE (Lass and Wright, 1986). Lass and Wright (1986) also refer to a 'semi-rhotic' tendency in SAE, a "variable occurrence of post-vocalic /r/ in environments where non-rhotic dialects have none" (1986, p. 204), which may not be the result of transfer from Afrikaans to English, but which is common in the speech of Afrikaans speakers of English.

A few examples of permissible and adequate pronunciations for Xhosa first-language speakers may be helpful here. For example, 'HEART' could be realised as [hɑ:t] but not as [hɪ:t], 'REACTION' as both [ɹɪ:kʃ□n] and [ɹɪ:ækʃ□n], 'LUNG' as [ɪʌŋ] or [ɪʉŋ]as but not as [ɪɔŋ] or [ɪʊŋ].

If respondents could adequately pronounce a word within the given range, they were given a tick and scored 1 point per word. If however, they could not adequately pronounce a word, i.e. if their pronunciation fell outside of the range suggested by the Xhosa-English pronunciation guide or with incorrect sequencing of consonants, they received a zero score for that word. In addition, if they took longer than 10 seconds to attempt and to complete the word, they also received a zero score for that word.

The second measure was the sample English definition guide compiled from the 10th Edition of the Oxford Concise Dictionary of South African English (2002). If respondents could

define a test word such that their definition shared some sense of the sample definition and could be sufficiently differentiated from a similar word on the test, they were awarded a point per word. In cases where a word had two or more meanings, both peripheral and core meanings were allowed if there was some relationship with health. The sample definition guide was constructed to allow for such distinctions in meaning. If the respondent's attempts at definition were inadequate, as validated against the sample definition guide, they also scored a zero for that word. In cases where the respondent defined the word in isiXhosa or Afrikaans, or translated the word, it was necessary to rely on the interpreter's ability to translate adequately for a definition.

When respondents defined words in isiXhosa or Afrikaans, a simple system was used to communicate an adequate or inadequate answer between the interpreter and the primary researcher. If the respondent answered within acceptable semantic parameters, the interpreter would say 'OK' and nod, the phrase being perfectly acceptable as codeswitching between isiXhosa, Afrikaans and English. However, if their definition was off the mark, the interpreter would nod and make another affirmative and encouraging comment or gesture. This was deemed necessary to ensure that failure to adequately define a word was not communicated to the respondent, to deal with the possibility that that failure would impede attempts to define following words.

3.6.6 Statistical Analysis

These results were entered into a statistical analysis software package (Statistica) which was used to analyse the data and suggest trends and relationships between key demographic data such as educational level and literacy practices from the REALM-M test. A number of statistical tests, including chi-squared, two-sided t-tests, Analysis of Variance (ANOVA) and Scheffe tests were run on the data to determine any significant relationships between variables such as education level and REALM-M scores. Significance for these tests was set at a level of 5%.

CHAPTER 4: RESULTS

4.1 Overview

The chapter begins by reviewing the demographics of the sample population, looking at general demographic characteristics, such as age, gender, occupation and place of residence, before focussing on key issues like language and educational range. It also compares the population for this study, referred to hereafter as the REALM-M study, with that of Lecoko's (2000) study, referred to hereafter as the REALM-L study.

In the next section, the results of the REALM-M are compared with the REALM-L in terms of the statistics that Lecoko presents in her thesis, namely, pronunciation and comprehension for individual lists, followed by overall comparison of pronunciation and comprehension, and time taken to complete the test.

The presentation of results from the REALM-M study in this chapter commonly refers to adequate and inadequate pronunciation and comprehension, whereas the REALM-L study has referred to correct and incorrect reading and understanding. The change in terminology from reading and understanding to pronunciation and comprehension is intended to resolve the indistinct use of the term 'reading'. As a key element of literacy, reading may refer to processing written information, which may involve comprehending the meaning of an individual word, sentence, or text, all of which require subtly different competencies. The term may also apply to processing of other forms of information in a particular setting, i.e. a strategic competency. There is also a distinction between reading aloud and reading for understanding. While it seems fairly obvious that Lecoko's terminology, 'reading' and 'understanding', in a broad sense, refer to pronunciation and comprehension, using these terms is designed to be more specific. Similarly, the use of 'adequate' versus 'inadequate' as markers for performance in the REALM-M study, as opposed to the terms correct and incorrect used in the REALM-L study, represents a different focus on the criteria for pronunciation, given that a range of phonetic realizations has been allowed for, and the criteria for 'knowing' a word. This change means that the studies are focusing on subtly different criteria, namely correct or incorrect reading and understanding (as used in the REALM-L study) and adequate or inadequate pronunciation and comprehension (as used in the REALM-M study). However, these criteria may be compared in a broad sense. In the

presentation of results in this chapter, where the results of the REALM-L and REALM-M studies are compared, the REALM-L figures retain their original terminology.

Thereafter the applicability of the REALM-M test according to a pronunciation and comprehension matrix is assessed, before examining the applicability of individual items. Applicable items on the REALM-L and REALM-M tests are compared separately and the results of words shared by the tests are examined. The next section examines relationships between educational ranges and performance on the REALM-M test, looking at both pronunciation and comprehension performance separately and cross-referencing the educational ranges with the pronunciation and comprehension matrix. Various literacy practices and sources of health literacy are compared with REALM-M scores, with Analysis of Variance and Scheffe tests run on the data to determine any significant relationships.

4.2 Results of the Demographics Characteristics

4.2.1 General Demographic Characteristics

The general demographic characteristics are presented in Table 4.1. A total of 114 respondents were interviewed, with two questionnaires being discarded because respondents were unwilling to even attempt to read the REALM-M lists. Of these respondents, 88% were female, reflecting a predominance of women amongst regular public health clinic patients. The ratio of males to females in the REALM-L study was different, although women were still in the majority in the REALM-L sample.

The majority of respondents were between the ages of 21 and 40 (52.7%) with an additional 35.7% being between 40 and 65 years old. This distribution parallels the sample from the REALM-L study, as does the distribution of occupations, in cases where the two lists of occupations overlap. Respondents were predominantly unemployed (87.5%) with the majority of those who were employed working as domestic workers in Grahamstown (4.5%). Similarly, for those who were unemployed, a high percentage (25.9%) had also worked as domestic workers. One hundred and one (90.2%), respondents self-identified as 'black' or Xhosa, with the remaining 11 identifying as 'coloured'. The sample population was predominantly urban, with 96.3% coming from townships in Grahamstown East, or from suburbs closer to Grahamstown, and the remainder from farms very near Grahamstown.

Table 4. 1 General Demographic Characteristics, N (%)			
Characteristic	**REALM-M (N=112)**	**REALM-L (N=125)**	**p-value**
Gender			0.000
Male	13 (11.6)	50 (40.0)	
Female	99 (88.4)	75 (60.0)	
Age (years)			0.575
<21	7 (6.3)	6 (4.8)	
21-40	59 (52.7)	65 (52.0)	
40-65	40 (35.7)	51 (40.8)	
>65	6 (5.4)	3 (2.4)	
Occupation			0.181
Unemployed	98 (87.6)	89 (71.2)	
Clerical	1 (0.9)	No data available	
Farm	1 (0.9)	No data available	
Labourer	2 (1.8)	12 (9.6)	
Domestic	5 (4.5)	5 (4.0)	
Education	1 (0.9)	1 (0.8)	
Hospital Worker	2 (1.8)	No data available	
Self-employed	1 (0.9)	13 (10.4)	
Other	1 (0.9)	5 (4.0)	
Race			
Black	101 (90.2)		
"Coloured"	11 (9.8)		
Suburbs	2 (1.8)		
Township	106 (94.5)		
Farm	4 (3.8)		
Previous employment if unemployed			
Clerical	4 (3.8)		
Farm	14 (12.3)		
Labourer	11 (9.8)		
Domestic	29 (25.9)		
Education	1 (0.9)		
Shop assistant	10 (8.9)		
Hospital Worker	2 (1.8)		
Self-employed	3 (2.7)		
Never worked	14 (12.3)		
Other	24 (21.6)		

4.2.2 Language Characteristics

With reference to the results presented in Table 4.2 below, the majority of respondents were first language isiXhosa speakers (92.9%) with only one person also speaking English as an additional language at home, and seven people (6.3%) speaking Afrikaans as a first-language. This was different to the REALM-L sample population, which only had respondents who spoke isiXhosa as a first-language.

Table 4.2 Language Characteristics, N (%)

Characteristic	REALM-M (N=112)	REALM-L (N=125)	p-value
Home Language			
Xhosa	104 (92.9)	125 (100.0)	
English	1 (0.9)		
Afrikaans	7 (6.3)		
Language proficiency			
Home Language			0.609
Listen and speak	0 (0.00)	1 (0.8)	
Listen, speak and read	112 (100.0)	124(99.2)	
English			0.000
No proficiency	4 (3.8)	No data available[1]	
Listen only	1(0.9)	4 (3.2)	
Listen and speak	2 (1.8)	1 (0.8)	
Listen, speak and read	90 (80.4)	120 (96.0)	
Read only	1 (0.9)	No data available[1]	
Listen and read	14 (12.3)	No data available[1]	
Afrikaans			
No proficiency	53 (47.3)		
Listen only	7 (6.3)		
Listen and speak	9 (8.1)		
Listen, speak and read	23 (20.5)		
Read only	7 (6.3)		
Listen and read	13 (11.6)		
Other			
No proficiency	85 (75.9)		
Listen only	9 (8.0)		
Listen and speak	8 (7.2)		
Listen, speak and read	9 (8.0)		
Listen and read	1 (0.9)		

1 No data available refers to instances where the REALM-L did not ask the same questions as the REALM-M

As may be seen in Table 4.2, all respondents reported being able to listen to and understand, respond and read in their home language (either isiXhosa or Afrikaans). Ninety respondents (80.4 %) claimed to be able to listen to, speak, and read English, to some degree, and an additional 12.3% claimed they could listen to, understand, and read, but not speak English, which was significantly different from the REALM-L sample population.

One hundred and twenty (96%) of the REALM-L respondents reported being able to listen to, speak and read English, as opposed to the 80.4% of the REALM-M population. The REALM-L did not gather data on respondents who reported no proficiency, or who reported only being able to read, or listen and read English.

Just under half (47.3%) of the sample population had no proficiency whatsoever in Afrikaans, while 20.5% could listen and understand, speak and read Afrikaans. Additionally, 24.1% of respondents could also speak another language, primarily isiZulu, which is an Nguni language related to isiXhosa.

4.2.3 Educational Characteristics

Table 4.3 Educational Characteristics, N (%)

Characteristic	REALM-M (N=112)	REALM-L (N=125)	p-value
Education level			1.000
Grade 3 and below	26 (23.2)	30 (24.0)	
Grades 4-6	27 (24.1)	30 (24.0)	
Grades 7-8	28 (25)	30 (24.0)	
Grade 9 and above	31 (27.7)	35 (28.0)	

As grade-level equivalency is the major indicator for the original REALM test, education was used as the key category for selecting respondents to be interviewed. As presented in Table 4.3 above, similar numbers of respondents were interviewed from each of the educational ranges stipulated in the original REALM, with the four educational groups in the REALM-M test never varying more than 1% from that of the groups in the REALM-L test.

4.2.4 Clinic Attendance and Service

Table 4.4 Clinic Attendance and Service, N (%)	
Characteristic	**REALM-M (N=112)**
Frequency of visit	
Once a month	44 (39.3)
Twice a month	28 (25.0)
Every 2 months	4 (3.6)
Every 6 months	5 (4.5)
Once a year	3 (2.7)
Other: 3-4 times a month	28 (25.0)
Waiting period	
Within 15 min	35 (31.3)
15-30 min	34 (30.4)
30 min-1 hr	25 (22.3)
1-2 hrs	15 (13.4)
Other: > 2hrs	3 (2.7)

Most respondents (89.3%) were likely to visit the clinic one or more times a month, and were typically seen by a healthcare provider within an hour of arrival.

4.3 Comparison of Pronunciation and Comprehension Results

Given that the REALM and the REALM-M share only a few words or word families, it may be difficult to compare the original and modified tests except on a broad basis. On one level it is possible to compare the average scores for pronunciation and comprehension for each of the three lists without cross-referencing each of these variables. The average scores for all three lists may also be compared.

4.3.1 Pronunciation for Individual Lists

Table 4.5 Adequate Pronunciation for Individual Lists, N (%)

Number of words	REALM-M (N=112)	REALM-L (N=125)
List 1		
0	0 (0.00)	
1 to 6	3 (2.7)	9 (7.2)
7 to 14	10 (8.9)	32 (25.6)
15 to 20	49 (43.8)	36 (28.8)
21 to 22	50 (44.6)	48 (38.4)
List 2		
0	0 (0.0)	
1 to 6	4 (3.8)	22 (17.6)
7 to 14	18 (16.1)	39 (31.2)
15 to 20	43 (38.4)	37 (29.6)
21 to 22	65 (41.8)	27 (21.6)
List 3		
0	5 (4.5)	
1 to 6	10 (8.9)	22 (17.6)
7 to 14	39 (34.8)	31 (24.8)
15 to 20	35 (31.3)	34 (27.2)
21 to 22	23 (20.5)	38 (30.4)

According to the results presented in the REALM-M section of Table 4.5, the majority of respondents could adequately pronounce 15 or more words from List 1 (88.4%), as well as from List 2 (80.2%). This percentage dropped to 51.8% in List 3, but here the largest group could only adequately pronounce up to 14 words. Five respondents (4.5%) were unable to pronounce adequately any words at all in List 3.

Table 4.5 makes a distinction between being unable to pronounce adequately any words and being able to pronounce adequately 1 to 6 words, a distinction which Lecoko does not make. This distinction was considered significant because six respondents could not pronounce adequately any words in List 3. However, in order to compare the results for adequate pronunciation for the REALM-M study with similar results from the REALM-L study, it is necessary to combine these two groups. A comparison of results revealed that even when combining these groups for the REALM-M study, the distribution of results was not the same as the REALM-L study. For REALM-M Lists 1 and 2, the largest group of respondents pronounced adequately 21 to 22 words, while in List 3 the largest group pronounced adequately 7 to 14 words. In the REALM-L results, the largest group of respondents pronounced adequately 21 to 22 words for Lists 1 and 3 but only 7 to 14 words for List 2. In addition, the percentages for each largest group, per list, were higher in the REALM-M than for the largest group in the same list in the REALM-L.

4.3.2 Comprehension for Individual Lists

Table 4.6 Adequate Comprehension for Individual Lists N (%)

Number of words	REALM-M (N=112)	REALM-L (N=125)
List 1		
0	0 (0.0)	
1 to 6	7 (6.3)	39 (31.2)
7 to 14	18 (16.1)	68 (54.4)
15 to 20	66 (58.9)	16 (12.8)
21 to 22	21 (18.8)	2 (1.6)
List 2		
0	0 (0.0)	
1 to 6	10 (8.9)	70 (56.0)
7 to 14	32 (28.6)	43 (34.4)
15 to 20	55 (49.1)	11 (8.8)
21 to 22	15 (13.4)	1 (0.8)
List 3		
0	6 (5.4)	
1 to 6	30 (26.8)	91 (72.8)
7 to 14	46 (41.1)	29 (23.2)
15 to 20	25 (22.3)	5 (4.0)
21 to 22	5 (4.5)	0 (0.0)

As may be seen in Table 4.6, the largest grouping of respondents in the REALM-M study could adequately comprehend 15 to 20 words in Lists 1 (58.9%) and 2 (49.11%), but only 7 to 14 words in List 3 (41.1%). In the REALM-L study, the majority of respondents clustered in 0 to 14 words across all three lists, while in the REALM-M study, the clustering fluctuated.

4.3.3 Overall Comparison of Pronunciation and Comprehension

Table 4.7 Overall Pronunciation and Comprehension N (%)

	REALM-M (N=112)	REALM-L (N=125)
Number of words	**Adequate pronunciation**	**Correct pronunciation**
1 to 18	5 (4.5)	15 (12.0)
19 to 44	23 (20.6)	39 (31.2)
45 to 60	49 (43.8)	31 (24.8)
61 to 66	35 (31.3)	40 (32.0)
	Adequate comprehension	**Correct understanding**
1 to 18	14 (12.5)	67 (53.6)
19 to 44	44 (39.3)	48 (38.4)
45 to 60	41 (36.6)	10 (8.0)
61 to 66	13 (11.6)	0 (0.0)

The REALM-M and REALM-L overall pronunciation and comprehension results for all 66 words (Table 4.7) were compared in terms of individual criteria, i.e. without cross-referencing adequate or inadequate pronunciation and correct or incorrect reading with adequate or inadequate comprehension and correct or incorrect understanding. However, the distribution of words on each test according to pronunciation only was found to be different, as was the distribution of words on each test according to comprehension only. The overall comparison seemed to hide any distinctions that may occur between lists, and also obscured any possible relationship between pronunciation and comprehension. Thus, a deeper analysis by cross-referencing pronunciation and comprehension results in a matrix was necessary. This will be discussed in section 4.4, Applicability of the REALM-M.

4.3.4 Time Taken to Complete the Test

Table 4.8 Time Taken to Read All 66 Words, N (%)			
	REALM-M (N=112)	**REALM-L (N=125)**	**p-value**
Time (minutes)			0.000
<3	92 (82.1)	58 (46.4)	
3 to 5	12 (10.7)	23 (18.4)	
5 to 10	8 (7.2)	33 (26.4)	
>10	0 (0.0)	11 (8.8)	

The REALM-M was significantly quicker to administer in a local population than the REALM-L, with the vast majority of respondents (82.1%) completing the modified test in less than three minutes. This is similar to the claims for rapidity of administration of the original REALM test in a U.S.-based sample population.

4.4 Applicability of the REALM-M Test

The applicability of the REALM-M test relies on two key aspects, firstly the applicability of the individual words selected for the test for the population of respondents, which Lecoko (2000) terms 'acceptability', and secondly the applicability of the test design to that population. The current section deals with the applicability of the words selected, examining whether or not they are relevant within the setting in which the REALM-M was administered. According to Lecoko's criteria for acceptability, in which a word "should 'work' ...for at least 80% of the respondent population" (2000, p.66, quotation marks Lecoko's), 'acceptability' implies that the word is relevant to the typical healthcare issues in a local setting, stylistically appropriate, and is meaningful to the population being surveyed.

To a certain extent, this may also be seen as the situational authenticity of individual words on the test, i.e. whether or not the test covers vocabulary that the respondents were likely to encounter in a clinical setting. Applicability of the test design is discussed in the Critique chapter. This section examines the applicability of words by looking at each of the three lists into which the REALM-M separates them, and also examining each word individually.

A further tool used to assess the applicability of individual words was to cross-reference words which were adequately or inadequately comprehended with words which were adequately or inadequately pronounced. This set up a four-way matrix wherein words could be inadequately pronounced and inadequately comprehended (referred to as Category 1), adequately pronounced and adequately comprehended (referred to as Category 2), inadequately pronounced and adequately comprehended (referred to as Category 3), and adequately pronounced and inadequately comprehended (referred to as Category 4).

In the original REALM-L study, Category 1 was labelled as worked 2, Category 2 as worked 1, with Category 3 as failed 1, and Category 4 as failed 2. The suggestion from Lecoko (2000) is that words that fell into Categories 1 and 2 were acceptable and words that fell into Categories 3 and 4 were not. This argument is based on the relationship between inadequate pronunciation and inadequate comprehension (which selects words that fall into Category 1 as acceptable) posited by the developers of the original REALM. While Davis et al (1993) do not explicitly validate the converse aspect of this relationship, that adequate pronunciation

is be linked to adequate comprehension, it is necessary to assume that this relationship must also logically exist, and thus this study also views words which fall into Category 2 as acceptable. Therefore, words which fall into Categories 3 and 4 are unacceptable because the existence of words whose adequate pronunciation does not imply adequate comprehension (Category 3), or words which cannot pronounced adequately but can be comprehended adequately (Category 4), runs counter to this argument. This rationale for acceptability makes a potentially problematic value judgment that has a number of implications about what it means to 'know' a word. For instance, both first-language and second-language speakers may be able to process and comprehend a word they have regularly encountered in texts, to the extent that they can define the word, without necessarily being able to adequately pronounce it. Thus it is possible that Category 4, wherein words can be comprehended adequately but not pronounced adequately, may also be as valid as Categories 1 and 2.

On the other hand, even first-language speakers may regularly use a word in conversation that they pronounce adequately and use appropriately but are not able to completely define. However, given that criteria for comprehending a word on the REALM-M did not focus on complete definition, but rather sought a demonstration of knowledge of some aspect of meaning or use of the word in a healthcare context, including using the word appropriately in a sentence, this is likely to be less of an issue in the analysis of data. However, while words that fell into Category 3 could be considered unacceptable in this regard, no value judgements were made about any of the categories. Instead, it was left up to analysis of the data to reveal which categories may or may not be used to justify the inclusion of an item in the modified REALM test.

The three lists of words for the REALM-M were compared within this matrix in terms of respondents' education ranges and grouped by number of words, and thereafter, individual items were examined in the same fashion according to this matrix.

4.4.1 Applicability of the REALM-M according to the Matrix

Table 4.9 Words that were Inadequately Comprehended and Inadequately Pronounced (Category 1), N (%)			
	(N=112)		
Number of words	List 1	List 2	List 3
0	40 (35.7)	39 (34.8)	19 (17.0)
1 to 6	59 (52.4)	49 (43.8)	40 (35.7)
7 to 14	11 (9.8)	20 (17.9)	38 (32.2)
15 to 20	2 (1.8)	3 (2.7)	8 (7.1)
21 to 22	0 (0.00)	1 (0.9)	9 (8.0)

Examining the number of words that fell into Category 1 as presented in Table 4.9, the results were highest for 1 to 6 words for all three lists. This means that most respondents struggled to adequately pronounce and adequately comprehend only six or fewer words. The results also suggested that a roughly equal number of respondents (35.7%) who struggled with six or fewer words in List 3 also struggled with 7 to 14 words (32.2%).

Table 4.10 Words that were Adequately Comprehended and Adequately Pronounced (Category 2), N (%)			
	(N=112)		
Number of words	List 1	List 2	List 3
0	0 (0.00)	1 (0.9)	7 (6.3)
1 to 6	7 (6.3)	12 (10.7)	37 (32.9)
7 to 14	22 (19.6)	41 (36.6)	43 (38.4)
15 to 20	63 (56.3)	46 (41.1)	21 (18.8)
21 to 22	20 (17.9)	12 (10.7)	4 (3.8)

The occurrence of Category 2 words was highest for 15 to 20 words (56.3%) in List 1, and in List 2 (41.1%), but dropped to 7 to 14 words (38.4%) in List 3.

Table 4.11 Words that were Inadequately Comprehended and Adequately Pronounced (Category 3), N (%)			
	(N=112)		
Number of words	List 1	List 2	List 3
0	13 (11.61)	11 (9.84)	13 (11.61)
1 to 6	90 (80.36)	81 (72.32)	67 (59.82)
7 to 14	9 (8.03)	19 (16.96)	32 (28.57)
15 to 20	0 (0.00)	1 (0.88)	0 (0.00)
21 to 22	0 (0.00)	0 (0.00)	0 (0.00)

As is evident in the data represented in Table 4.11, respondents tended to adequately pronounce but not comprehend less than 14 words. This pattern held for Lists 2 and 3, though the percentage of respondents capable of adequately pronouncing seven to 14 words without comprehending them did increase across the lists. This finding supports the conclusion reached in Lecoko's research (2000) that adequate pronunciation is not representative of adequate comprehension for a local population.

Table 4.12 Words that were Adequately Comprehended and Inadequately Pronounced (Category 4), N (%)

	(N=112)		
Number of words	**List 1**	**List 2**	**List 3**
0	84 (75.00)	74 (66.07)	74 (66.07)
1 to 6	27 (24.12)	38 (33.93)	37 (33.05)
7 to 14	1 (0.88)	0 (0.00)	1 (0.88)
15 to 20	0 (0.00)	0 (0.00)	0 (0.00)
21 to 22	0 (0.00)	0 (0.00)	0 (0.00)

Table 4.12 revealed that, apart from two instances, most of the sample population found no words they could comprehend but not pronounce. The next largest grouping of respondents could comprehend without being able to pronounce adequately one to six words. The high figures in this range for this category discounted the possibility that adequate comprehension without adequate pronunciation was a significant factor and may support Lecoko's value judgement of 'failed 2' for Category 4. The broader criteria for adequate pronunciation used in this study make this point more strongly.

4.4.2 Applicability of Individual Items

An examination of individual words revealed into which of the categories examined above they fell, and also which educational ranges could understand which words. This revealed more crucial data. In the REALM-L study, words which fell in a category for 50% or more of respondents were deemed to be most relevant and were highlighted. In order to compare with the REALM results, the same criteria were applied to the words in the REALM-M study, and these words are highlighted below. However, the largest grouping of respondents for a given word was also deemed to be relevant and in instances where the largest grouping is less than 50% of the population, the number and percentage are emboldened below.

Table 4.13 Applicability of REALM-M Test Items on List 1, N (%)				
	Category 1[1]	Category 2[2]	Category 3[3]	Category 4[4]
EAT	2 (1.8)	107 (95.5)	2 (1.8)	1 (0.9)
FAT	5 (4.5)	102 (91.1)	5 (4.5)	0 (0.0)
FLU	6 (5.3)	96 (85.7)	9 (8.0)	1 (0.9)
BABY	1 (0.9)	111 (99.1)	0 (0.00)	0 (0.0)
BODY	3 (2.7)	99 (88.4)	6 (5.4)	4 (3.6)
CURE	63 (56.2)	23 (20.5)	23 (20.5)	3 (2.7)
DOSE	21 (18.8)	**48 (42.9)**	42 (37.5)	1 (0.9)
FOOD	1 (0.9)	106 (94.7)	4 (3.6)	1 (0.9)
IRON	18 (16.1)	**49 (43.8)**	45 (40.2)	0 (0.0)
LUMP	18 (16.1)	12 (10.7)	82 (73.2)	0 (0.0)
LUNG	17 (15.2)	56 (50.0)	38 (33.9)	1 (0.9)
PAIN	4 (3.6)	101 (90.2)	4 (3.6)	3 (2.7)
PILLS	5 (4.5)	89 (79.5)	13 (11.6)	5 (4.5)
RASH	7 (6.3)	89 (79.5)	14 (12.5)	2 (1.8)
SICK	4 (3.6)	99 (88.4)	6 (5.4)	3 (2.7)
SKIN	6 (5.4)	92 (82.1)	10 (8.9)	4 (3.6)
SORE	36 (32.1)	**44 (39.3)**	29 (25.9)	3 (2.7)
TEST	5 (4.5)	94 (83.9)	10 (8.9)	3 (2.7)
BLOOD	4 (3.6)	99 (88.4)	8 (7.2)	1 (0.9)
CLEAN	6 (5.4)	100 (89.3)	4 (3.6)	2 (1.8)
COUGH	27 (24.1)	69 (61.6)	5 (4.5)	11 (9.8)
CLINIC	5 (4.5)	101 (90.2)	5 (4.5)	1 (0.9)

1 **Category 1** Inadequately pronounced and inadequately comprehended
2 **Category 2** Adequately pronounced and adequately comprehended
3 **Category 3** Adequately pronounced but inadequately comprehended
4 **Category 4** Inadequately pronounced but adequately comprehended
Highlighted words above indicate the largest grouping of respondents of 50% or higher
Emboldened words above indicate the largest grouping of respondents of lower than 50%

Given that words in List 1 are expected to be the easiest to read, the presence of 20 words (according to REALM-M criteria) which fall into in Category 2 for the largest group of respondents was hardly surprising. Words such as 'EAT', 'BABY' and 'FOOD' had the highest results, with 'CLINIC', 'PAIN' and 'FAT' also featuring strongly.

'CURE' proved most problematic for respondents in terms of Category 1 words. Most respondents could not pronounce 'CURE' adequately, which was often phonetically realised as /kəɪɹ/. In terms of Category 4 words, 'COUGH' had the highest results, perhaps reflecting problems English second-language speakers have with irregular spelling. This was regularly realised as /kɔʕ/.

Table 4.14 Applicability of REALM-M Test Items on List 2, N (%)				
	Category 1[1]	Category 2[2]	Category 3[3]	Category 4[4]
DROPS	5 (4.5)	82 (73.2)	25 (22.3)	0 (0.0)
FEVER	14 (12.5)	90 (80.3)	8 (7.2)	0 (0.0)
HEART	31 (27.7)	**54 (48.2)**	14 (12.5)	13 (11.6)
LIVER	12 (10.7)	62 (55.4)	35 (31.3)	3 (2.7)
VOMIT	12 (10.7)	87 (77.7)	6 (5.4)	7 (6.3)
WATER	3 (2.7)	109 (97.3)	0 (0.0)	0 (0.0)
CONDOM	2 (1.8)	109 (97.3)	1 (0.9)	0 (0.0)
CONTACT	15 (13.4)	62 (55.4)	31 (27.7)	4 (3.6)
DOCTOR	6 (5.4)	103 (92.0)	2 (1.8)	1 (0.9)
HEALTH	11 (9.8)	79 (70.6)	21 (18.8)	1 (0.9)
HIV/AIDS	13 (11.6)	85 (75.9)	7 (6.3)	7 (6.3)
IMMUNE	61 (54.5)	8 (7.2)	43 (38.4)	0 (0.0)
SEXUAL	29 (25.9)	**53 (47.3)**	25 (22.3)	5 (4.5)
SLEEPY	8 (7.2)	82 (73.2)	16 (14.3)	6 (5.4)
THROAT	16 (14.3)	**54 (48.2)**	39 (34.8)	3 (2.7)
WEIGHT	10 (8.9)	84 (75.0)	16 (14.3)	2 (1.8)
ALCOHOL	17 (15.2)	80 (71.4)	10 (8.9)	5 (4.5)
ALLERGY	37 (33.0)	24 (21.4)	**51 (45.5)**	0 (0.0)
DISEASE	17 (15.2)	65 (58.0)	29 (25.9)	1 (0.9)
PATIENT	43 (38.4)	60 (53.6)	4 (3.6)	5 (4.5)
PREVENT	20 (17.9)	**47 (42.0)**	45 (40.2)	0 (0.0)
SMOKING	1 (0.9)	108 (96.5)	2 (1.8)	1 (0.9)

1 **Category 1** Inadequately pronounced and inadequately comprehended

2 **Category 2** Adequately pronounced and adequately comprehended

3 **Category 3** Adequately pronounced but inadequately comprehended

4 **Category 4** Inadequately pronounced but adequately comprehended

Highlighted words above indicate the largest grouping of respondents of 50% or higher

Emboldened words above indicate the largest grouping of respondents of lower than 50%

As with List 1, the majority of words (20) on List 2 were also Category 2 words, or words which were both adequately pronounced and adequately comprehended. Words like 'WATER', 'CONDOM', 'DOCTOR' and 'SMOKING' had the highest results for Category 2. 'IMMUNE' proved to be the most challenging Category 1 word, with only 7.2% of respondents being able to adequately pronounce and comprehend it. 'IMMUNE' was often realized as /ɪmunəɪ/, and while a larger group of respondents (76.9%) could pronounce 'ALLERGY' adequately, only 21.4% of respondents could adequately comprehend it.

Table 4.15 Applicability of REALM-M Test Items on List 3, N (%)				
	Category 1[1]	Category 2[2]	Category 3[3]	Category 4[4]
STOMACH	31 (27.7)	75 (67.0)	3 (2.7)	3 (2.7)
SWOLLEN	**41 (36.6)**	25 (22.3)	40 (35.7)	6 (5.4)
BACTERIA	**45 (40.2)**	28 (25.0)	36 (32.1)	3 (2.7)
BREATHING	19 (17.0)	60 (53.6)	30 (26.8)	3 (2.7)
EXERCISE	24 (21.4)	74 (66.1)	9 (8.0)	5 (4.5)
MEDICINE	7 (6.3)	94 (83.9)	9 (8.0)	2 (1.8)
REACTION	56 (50.0)	22 (19.64)	33 (29.5)	1 (0.9)
DANGEROUS	13 (11.6)	88 (78.6)	6 (5.4)	5 (4.5)
INFECTION	19 (17.0)	**51 (45.5)**	42 (37.5)	0 (0.0)
SYMPTOMS	**44 (39.3)**	35 (31.3)	32 (28.6)	1 (0.9)
PROTECTION	17 (15.2)	46 (41.1)	**47 (42.0)**	2 (1.8)
TRANSMITTED	26 (23.2)	22 (19.6)	63 (56.3)	1 (0.9)
ANTIBIOTICS	60 (53.6)	16 (14.3)	34 (30.3)	2 (1.8)
HEADACHES	37 (33.0)	67 (59.8)	1 (0.9)	7 (6.3)
EMERGENCY	26 (23.2)	**46 (41.1)**	38 (33.9)	2 (1.8)
PREGNANCY	22 (19.6)	80 (71.4)	6 (5.4)	4 (3.6)
VACCINATION	70 (62.5)	9 (8.0)	30 (26.8)	3 (2.7)
MALNUTRITION	58 (51.8)	14 (12.5)	37 (33.0)	3 (2.7)
TUBERCULOSIS	42 (37.5)	**47 (42.0)**	15 (13.4)	8 (7.2)
MENSTRUATION	**47 (42.0)**	46 (41.1)	12 (10.7)	7 (6.3)
BREASTFEEDING	29 (25.9)	70 (62.5)	9 (8.0)	4 (3.6)
CONTRACEPTION	63 (56.3)	14 (12.5)	33 (29.5)	2 (1.8)

1 **Category 1** Inadequately pronounced and inadequately comprehended
2 **Category 2** Adequately pronounced and adequately comprehended
3 **Category 3** Adequately pronounced but inadequately comprehended
4 **Category 4** Inadequately pronounced but adequately comprehended
Highlighted words above indicate the largest grouping of respondents of 50% or higher
Emboldened words above indicate the largest grouping of respondents of lower than 50%

In List 3, the number of Category 1 words increased to nine, with 'VACCINATION' being the most difficult. Given that this was often realized as either /vɑsənəɪʃən/ or /vɑkənəɪʃən/, this may in part be the result of difficulty in identifying that adequate pronunciation of 'VACCINATION' required two phonemic realizations, i.e. both /k/ and /s/, of the <c> grapheme.

Also problematic on List 3 was 'TRANSMITTED' which could often be pronounced adequately but not comprehended adequately. On this list the number of Category 2 words drops to eleven with the highest results for 'MEDICINE' and 'DANGEROUS'.

'PROTECTION' was almost as likely to be pronounced adequately and comprehended adequately as it was to be pronounced adequately but not comprehended adequately. Thus comprehension is a major issue for this word. 'MENSTRUATION' however, was almost as likely to be pronounced inadequately and comprehended inadequately as it was to be pronounced adequately and comprehended adequately and the lack of any clear tendency towards one category may suggest that it is not an appropriate word to use.

Table 4.16 presents composite results for all 66 words, divided into the three lists.

Table 4.16 Composite Table of All 66 REALM-M Words and Their Scores for Each Category, N (%)														
	Category					Category					Category			
List 1	1[1]	2[2]	3[3]	4[4]	List 2	1[1]	2[2]	3[3]	4[4]	List 3	1[1]	2[2]	3[3]	4[4]
EAT	2 (1.8)	107 (95.5)	2 (1.8)	1 (0.9)	DROPS	5 (4.5)	82 (73.2)	25 (22.3)	0 (0.0)	STOMACH	31 (27.7)	75 (67.0)	3 (2.7)	3 (2.7)
FAT	5 (4.5)	102 (91.1)	5 (4.5)	0 (0.0)	FEVER	14 (12.5)	90 (80.3)	8 (7.2)	0 (0.0)	SWOLLEN	**41 (36.6)**	25 (22.3)	40 (35.7)	6 (5.4)
FLU	6 (5.3)	96 (85.7)	9 (8.0)	1 (0.9)	HEART	31 (27.7)	**54 (48.2)**	14 (12.5)	13 (11.6)	BACTERIA	**45 (40.2)**	28 (25.0)	36 (32.1)	3 (2.7)
BABY	1 (0.9)	111 (99.1)	0 (0.00)	0 (0.0)	LIVER	12 (10.7)	62 (55.4)	35 (31.3)	3 (2.7)	BREATHING	19 (17.0)	60 (53.6)	30 (26.8)	3 (2.7)
BODY	3 (2.7)	99 (88.4)	6 (5.4)	4 (3.6)	VOMIT	12 (10.7)	87 (77.7)	6 (5.4)	7 (6.3)	EXERCISE	24 (21.4)	74 (66.1)	9 (8.0)	5 (4.5)
CURE	63 (56.2)	23 (20.5)	23 (20.5)	3 (2.7)	WATER	3 (2.7)	109 (97.3)	0 (0.0)	0 (0.0)	MEDICINE	7 (6.3)	94 (83.9)	9 (8.0)	2 (1.8)
DOSE	21 (18.8)	**48 (42.9)**	42 (37.5)	1 (0.9)	CONDOM	2 (1.8)	109 (97.3)	1 (0.9)	0 (0.0)	REACTION	56 (50.0)	22 (19.64)	33 (29.5)	1 (0.9)
FOOD	1 (0.9)	106 (94.7)	4 (3.6)	1 (0.9)	CONTACT	15 (13.4)	62 (55.4)	31 (27.7)	4 (3.6)	DANGEROUS	13 (11.6)	88 (78.6)	6 (5.4)	5 (4.5)
IRON	18 (16.1)	**49 (43.8)**	45 (40.2)	0 (0.0)	DOCTOR	6 (5.4)	103 (92.0)	2 (1.8)	1 (0.9)	INFECTION	19 (17.0)	**51 (45.5)**	42 (37.5)	0 (0.0)
LUMP	18 (16.1)	12 (10.7)	82 (73.2)	0 (0.0)	HEALTH	11 (9.8)	79 (70.6)	21 (18.8)	1 (0.9)	SYMPTOMS	**44 (39.3)**	35 (31.3)	32 (28.6)	1 (0.9)
LUNG	17 (15.2)	56 (50.0)	38 (33.9)	1 (0.9)	HIV/AIDS	13 (11.6)	85 (75.9)	7 (6.3)	7 (6.3)	PROTECTION	17 (15.2)	46 (41.1)	**47 (42.0)**	2 (1.8)
PAIN	4 (3.6)	101 (90.2)	4 (3.6)	3 (2.7)	IMMUNE	61 (54.5)	8 (7.2)	43 (38.4)	0 (0.0)	TRANSMITTED	26 (23.2)	22 (19.6)	63 (56.3)	1 (0.9)
PILLS	5 (4.5)	89 (79.5)	13 (11.6)	5 (4.5)	SEXUAL	29 (25.9)	**53 (47.3)**	25 (22.3)	5 (4.5)	ANTIBIOTICS	60 (53.6)	16 (14.3)	34 (30.3)	2 (1.8)
RASH	7 (6.3)	89 (79.5)	14 (12.5)	2 (1.8)	SLEEPY	8 (7.2)	82 (73.2)	16 (14.3)	6 (5.4)	HEADACHES	37 (33.0)	67 (59.8)	1 (0.9)	7 (6.3)
SICK	4 (3.6)	99 (88.4)	6 (5.4)	3 (2.7)	THROAT	16 (14.3)	**54 (48.2)**	39 (34.8)	3 (2.7)	EMERGENCY	26 (23.2)	**46 (41.1)**	38 (33.9)	2 (1.8)
SKIN	6 (5.4)	92 (82.1)	10 (8.9)	4 (3.6)	WEIGHT	10 (8.9)	84 (75.0)	16 (14.3)	2 (1.8)	PREGNANCY	22 (19.6)	80 (71.4)	6 (5.4)	4 (3.6)
SORE	36 (32.1)	**44 (39.3)**	29 (25.9)	3 (2.7)	ALCOHOL	17 (15.2)	80 (71.4)	10 (8.9)	5 (4.5)	VACCINATION	70 (62.5)	9 (8.0)	30 (26.8)	3 (2.7)
TEST	5 (4.5)	94 (83.9)	10 (8.9)	3 (2.7)	ALLERGY	37 (33.0)	24 (21.4)	**51 (45.5)**	0 (0.0)	MALNUTRITION	58 (51.8)	14 (12.5)	37 (33.0)	3 (2.7)
BLOOD	4 (3.6)	99 (88.4)	8 (7.2)	1 (0.9)	DISEASE	17 (15.2)	65 (58.0)	29 (25.9)	1 (0.9)	TUBERCULOSIS	42 (37.5)	**47 (42.0)**	15 (13.4)	8 (7.2)
CLEAN	6 (5.4)	100 (89.3)	4 (3.6)	2 (1.8)	PATIENT	43 (38.4)	60 (53.6)	4 (3.6)	5 (4.5)	MENSTRUATION	**47 (42.0)**	46 (41.1)	12 (10.7)	7 (6.3)
COUGH	27 (24.1)	69 (61.6)	5 (4.5)	11 (9.8)	PREVENT	20 (17.9)	**47 (42.0)**	45 (40.2)	0 (0.0)	BREASTFEEDING	29 (25.9)	70 (62.5)	9 (8.0)	4 (3.6)
CLINIC	5 (4.5)	101 (90.2)	5 (4.5)	1 (0.9)	SMOKING	1 (0.9)	108 (96.5)	2 (1.8)	1 (0.9)	CONTRACEPTION	63 (56.3)	14 (12.5)	33 (29.5)	2 (1.8)

1 Category 1 Inadequately pronounced and inadequately comprehended

2 Category 2 Adequately pronounced and adequately comprehended

3 Category 3 Adequately pronounced but inadequately comprehended

4 Category 4 Inadequately pronounced but adequately comprehended

Highlighted words above indicate the largest grouping of respondents of 50% or higher

Emboldened words above indicate the largest grouping of respondents of lower than 50%

4.4.3 Comparison of REALM-L and REALM-M Category Results

Table 4.17 Comparison of REALM-L and REALM-M Category Results (According to REALM-L Criteria, i.e. 50% or More of Respondents)		
Category	REALM-M	REALM-L
1[1]	7	7
2[2]	41	16
3[3]	2	19
4[4]	0	0

1 Category 1 Inadequately pronounced and inadequately comprehended
2 Category 2 Adequately pronounced and adequately comprehended
3 Category 3 Adequately pronounced but inadequately comprehended
4 Category 4 Inadequately pronounced but adequately comprehended

In Table 4.17, the number of words deemed to be relevant (according to REALM-L criteria, i.e. with results of 50% or higher) that fell into each category in the REALM-M was compared with numbers of words in the same categories in the REALM-L test. This revealed that the REALM-M had seven Category 1 words (equal to the REALM-L), 41 Category 2 words versus 16 similar words on the REALM-L, and only two Category 3 words in contrast to the REALM-L's 19 words.

Table 4.18 Comparison of REALM-L and REALM-M Category Results (According to REALM-M Criteria, i.e. Largest Group of Respondents)		
Category	REALM-M	REALM-L
1[1]	11	12
2[2]	51	24
3[3]	4	30
4[4]	0	0

1 Category 1 Inadequately pronounced and inadequately comprehended
2 Category 2 Adequately pronounced and adequately comprehended
3 Category 3 Adequately pronounced but inadequately comprehended
4 Category 4 Inadequately pronounced but adequately comprehended

If REALM-M criteria are applied (Table 4.18), selecting the single largest group in each category, the REALM-M has 11 Category 1 words versus the REALM-L's 12, 51 Category 2 words versus 24 on the REALM-L, and only 4 Category 3 words, where the REALM-L has 30 such words that can be pronounced adequately but not comprehended.

While Lecoko uses 50% as an indication of relevance of an individual word for at least half of the sample population, the criteria for acceptance or applicability are different and hold

that a word " should 'work' ...for at least 80% of the respondent population" (2000, p.66, quotation marks, Lecoko's). This refers to categories used in Lecoko's study which refer to 'Worked 1' and 'Worked 2' similar to this study's Category 2 and 1 respectively. Thus when applied to the REALM-M, this criterion selects words for which Category 1 and 2 results are 80% or greater. Whereas Lecoko only found that "the test 'worked' for 8 out of the 66 words" (2000, p. 75), the REALM-L has 38 words that match this criteria. Thus, the REALM-M may be seen as more applicable than its predecessor in terms of selection of a greater number of acceptable individual words.

The acceptable words on the REALM-M include 16 words from List 1, 13 from List 2 and 9 from List 3. Of these 38 words, 20 fell securely into Category 2 (in other words had results ≥ 80% in this category), with none in Category 1. These words are presented in Table 4.19.

Table 4.19 List of Acceptable REALM-M Words on List 1, N (%)

List 1	Category 1[1]	Category 2[2]	List 2	Category 1[1]	Category 2[2]	List 2	Category 1[1]	Category 2[2]
EAT	2 (1.8)	107 (95.5)	DROPS	5 (4.5)	82 (73.2)	STOMACH	31 (27.7)	75 (67.0)
FAT	5 (4.5)	102 (91.1)	FEVER	14 (12.5)	90 (80.3)	EXERCISE	24 (21.4)	74 (66.1)
FLU	6 (5.3)	96 (85.7)	VOMIT	12 (10.7)	87 (77.7)	MEDICINE	7 (6.3)	94 (83.9)
BABY	1 (0.9)	111 (99.1)	WATER	3 (2.7)	109 (97.3)	DANGEROUS	13 (11.6)	88 (78.6)
BODY	3 (2.7)	99 (88.4)	CONDOM	2 (1.8)	109 (97.3)	HEADACHES	37 (33.0)	67 (59.8)
FOOD	1 (0.9)	106 (94.7)	DOCTOR	6 (5.4)	103 (92.0)	PREGNANCY	22 (19.6)	80 (71.4)
PAIN	4 (3.6)	101 (90.2)	HEALTH	11 (9.8)	79 (70.6)	TUBERCULOSIS	42 (37.5)	**47 (42.0)**
PILLS	5 (4.5)	89 (79.5)	HIV/AIDS	13 (11.6)	85 (75.9)	MENSTRUATION	**47 (42.0)**	46 (41.1)
RASH	7 (6.3)	89 (79.5)	SLEEPY	8 (7.2)	82 (73.2)	BREASTFEEDING	29 (25.9)	70 (62.5)
SICK	4 (3.6)	99 (88.4)	WEIGHT	10 (8.9)	84 (75.0)			
SKIN	6 (5.4)	92 (82.1)	ALCOHOL	17 (15.2)	80 (71.4)			
TEST	5 (4.5)	94 (83.9)	PATIENT	43 (38.4)	60 (53.6)			
BLOOD	4 (3.6)	99 (88.4)	SMOKING	1 (0.9)	108 (96.5)			
CLEAN	6 (5.4)	100 (89.3)						
COUGH	27 (24.1)	69 (61.6)						
CLINIC	5 (4.5)	101 (90.2)						

1 Category 1 Inadequately pronounced and inadequately comprehended

2 Category 2 Adequately pronounced and adequately comprehended

Highlighted words above indicate the largest grouping of respondents in a given category of 80% or higher

The tests share four of these words, 'FAT', 'FLU', 'EXERCISE' and 'PREGNANCY', with a fifth representing the same word family, namely 'SEXUAL' (on the REALM-M) and 'SEXUALLY' (on the original REALM) and the results for these words are distributed similarly across all four categories of pronunciation and comprehension.

The tests also share another four words deemed relevant using the REALM-M criteria, which have similar distributions, including 'INFECTION', 'DISEASE' and 'EMERGENCY', with the alternate forms 'ALLERGY' used on the REALM-M and 'ALLERGIC' appearing on the REALM.

Other acceptable words which appear on both tests are not distributed in the same manner, namely 'PILLS', 'MENSTRUATION', 'ALCOHOL' and 'MEDICINE' (which appears as 'MEDICATION' on the REALM), with another three 'relevant' words also not similarly distributed. These are 'ANTIBIOTICS', 'DOSE' and 'MALNUTRITION'.

These words are presented in Table 4.20. Presentation of Category 4 results have been excluded from Table 4.20 as these results do not have any bearing on the relevance or acceptability of the words under discussion.

Table 4.20 Words That appeared on Both the REALM-L and the REALM-M Tests, N (%)								
		REALM-M Categories			REALM-L Categories			p-value
		1[1]	2[2]	3[3]	1[1]	2[2]	3[3]	
CLASS 1 Words [6]								
A[4]	FAT	5 (4.5)	102 (91.1)	5 (4.5)	3 (2.4)	116 (92.8)	6 (4.8)	0.673
A[4]	FLU	6 (5.3)	96 (85.7)	9 (8.0)	11 (6.6)	109 (87.2)	5 (3.0)	0.291
A[4]	DISEASE	17 (15.2)	65 (58.0)	29 (25.9)	30 (24.0)	66 (52.8)	29 (23.2)	0.272
A[4]	PREGNANCY	22 (19.6)	80 (71.4)	6 (5.4)	20 (16.0)	95 (76.0)	2 (1.6)	0.260
A[4]	SEXUAL	29 (25.9)	**53 (47.3)**	25 (22.3)	38 (30.4)	67 (53.6)	19 (25.2)	0.130
R[5]	EMERGENCY	26 (23.2)	**46 (41.1)**	38 (33.9)	28 (22.4)	65 (52.0)	31 (24.8)	0.300
R[5]	ALLERGY	37 (33.0)	24 (21.4)	**51 (45.5)**	31 (24.8)	39 (31.2)	**55 (44.0)**	0.170
R[5]	INFECTION	19 (17.0)	**51 (45.5)**	42 (37.5)	15 (12.0)	58 (46.4)	52 (41.6)	0.530
R[5]	EXERCISE	24 (21.4)	74 (66.1)	9 (8.02)	25 (20)	88 (70.4)	10 (6.0)	0.602
CLASS 2 Words [7]								
A[4]	MEDICINE	7 (6.3)	94 (83.9)	9 (8.02)	18 (14.4)	47 (37.6)	**60 (48.0)**	0.000
A[4]	PILLS	5 (4.5)	89 (79.5)	13 (11.6)	4 (4.8)	**62 (49.6)**	59 (47.2)	0.000
A[4]	ALCOHOL	17 (15.2)	80 (71.4)	10 (8.9)	40 (32.0)	**53 (42.4)**	29(23.2)	0.000
A[4]	MENSTRUATION	**47 (42.0)**	46 (41.1)	12 (10.7)	37 (29.6)	**52 (41.6)**	34 (27.2)	0.003
R[5]	ANTIBIOTICS	60 (53.6)	16 (14.3)	34 (30.3)	47 (37.6)	20 (16.0)	**58 (46.4)**	0.022
R[5]	DOSE	21 (18.8)	**48 (42.9)**	42 (37.5)	24 (19.2)	28 (22.4)	73 (58.4)	0.003
R[5]	MALNUTRITION	58 (51.8)	14 (12.5)	37 (33.0)	34 (27.2)	31 (24.8)	**60 (48.0)**	0.000

1 **Category 1** Inadequately pronounced and inadequately comprehended
2 **Category 2** Adequately pronounced and adequately comprehended
3 **Category 3** Adequately pronounced but inadequately comprehended
4 **A** Acceptable according to REALM-L criteria, i.e. Category 1 and 2 values add up to ≥ 80%
5 **R** Relevant according to REALM-M criteria, i.e. largest grouping of results
6 **CLASS 1** Words which share similar statistical distributions on both REALM-L and REALM-M tests
7 **CLASS 2** Words which do not have similar statistical distributions on both REALM-L and REALM-M tests
Highlighted words above indicate the largest grouping of respondents of 50% or higher (REALM-L relevancy criteria)
Emboldened words above indicate the largest grouping of respondents of lower than 50% (REALM-M relevancy criteria)

While the distribution of results for these words was statistically different, there are some similarities. For instance, the largest group of results for 'PILLS', and 'ALCOHOL' appeared in Category 2 on both tests. Though REALM-L Category 2 results for 'MENSTRUATION' are not the largest out of the four categories, the difference between the REALM-M and REALM-L Category 2 results is less than 1%.

Additionally, though 'MEDICINE' and 'MEDICATION' fall into the same word family and are near-synonyms, they differ in terms of formality and 'MEDICATION' is more likely to be used in a jargonic fashion by healthcare professionals. This difference in formality may have affected the comprehension of this word as can be seen by the clustering of results for

'MEDICATION' in Category 3 on the REALM-L versus the clustering of results for 'MEDICINE' in Category 2 on the REALM-M.

The results for 'ANTIBIOTICS' and 'MALNUTRITION' were highest either for Category 1 (REALM-M) or Category 3 (REALM-L), which suggested that comprehension of these two words was the primary problem for the respondents in both studies.

4.4.4 Frequency Analysis

Given that frequency of appearance in health promotions text was a feature used to categorise the original data, with the intention of selecting words based purely on random sampling by frequency, a series of analyses looking for correlations between the results of the REALM-M and the frequency of the words was conducted.

The frequencies of words used in the REALM-M were divided into four categories, based on number of appearances in the sample data, using the median of 32 appearances. These categories included Very Low Frequency (a frequency of less than 16, or $F \leq 16$), Low Frequency ($16 < F \leq 32$), High Frequency ($32 < F \leq 64$) and Very High Frequency ($F > 64$). The last category does contain a number of extreme outliers, including 'SICK' (F: 204) and 'BABY' (F: 525).

Similarly, REALM-M scores were also divided into four categories, based on their largest group of results. Very Low REALM-M scores are those that fall into the lower quartile of results, i.e. any scores below 25%. Thus, Low REALM-M scores are those between 25% and 50%, High REALM-M between 50% and 75% and Very High REALM-M scores fall into the upper quartile.

In these analyses, the categorized frequencies of words on the test were cross-referenced with their results, initially examining all 66 words, and subsequently, the 38 acceptable words, and the 28 words not accepted by Lecoko's (2000) criteria. However, these analyses proved to be inconclusive and no statistically significant relationship could be determined between frequency and REALM-M score.

4.5 Relationships between Educational Variables and Performance on the REALM-M Test

While the authors of the REALM test are careful to divest the literacy estimates of the test from any specific educational level Relationships, stating that "patient scores on the REALM must be interpreted as estimates of literacy, not grade equivalents" (1993), they do however give suggested grade ranges for the estimates. They grouped educational variables in terms of Grade 3 and less (0-18 words), Grades 4 to 6 (19-44 words), Grades 7and 8 (45-60 words), and Grade 9 and above (61-66 words). The following sections examine the relationship between educational variables and pronunciation, and educational variables and comprehension as single criteria, before examining the relationship of educational variables with pronunciation and comprehension as cross-referenced criteria.

4.5.1 Education Variables and Pronunciation Performance

Table 4.21 Relationship between Stated Educational Level and REALM Grade Range Estimate Obtained from Pronunciation/Reading Score, N (%)

Stated education level	REALM-M (N=112)	REALM-L (N=125)
	0-18 words	
Grade 3 and below	5 (19.23)	11(36.7)
Grades 4-6	0 (0.00)	0 (0.0)
Grades 7-8	0 (0.00)	4 (13.3)
Grade 9 and above	0 (0.00)	0 (0.0)
	19-44 words	
Grade 3 and below	13 (50.00)	18 (60.00)
Grades 4-6	8 (29.63)	13 (43.3)
Grades 7-8	1 (3.57)	3 (10.0)
Grade 9 and above	1 (3.23)	5 (14.3)
	45-60 words	
Grade 3 and below	7 (26.92)	1 (3.3)
Grades 4-6	14 (51.85)	9 (30.0)
Grades 7-8	17 (60.71)	12 (40.0)
Grade 9 and above	11 (35.48)	9 (25.7)
	61-66 words	
Grade 3 and below	1 (3.85)	0 (0.0)
Grades 4-6	5 (18.52)	8 (26.7)
Grades 7-8	10 (35.72)	11 (36.7)
Grade 9 and above	19 (61.29)	21 (60.0)

Highlighted areas indicate the predicted REALM-M and REALM grade range estimate for the majority of respondents at each stated educational level

When the scores for these four groups for both the REALM-M and REALM-L studies were compared and examined in terms of number of words respondents in these groups could adequately pronounce, they followed a similar trend.

The highlighted areas on Table 4.21 indicate the predicted REALM grade range estimate for the majority of respondents at each stated educational level. On the REALM-M, 50.0% of respondents in the lowest grade range actually scored higher than expected, and could adequately pronounce up to 44 words. This also occurred in the REALM-L study. Similarly, 51.9% of respondents in Grades 4 to 6 in the REALM-M study also adequately pronounced more words than expected, suggesting that the words chosen may be too easy to pronounce for the test to function properly. In contrast, the pronunciation scores for the majority of respondents in Grades 7 to 8 (60.7%) and Grades 9 and above (61.3%) are within the expected ranges.

4.5.2 Education Variables and Comprehension Performance

Table 4.22 Relationship between Stated Educational Level and REALM Grade Range Estimate Obtained from Comprehension/Understanding Score, N (%)

Stated education level	REALM-M (N=112)	REALM-L (N=125)
	0-18 words	
Grade 3 and below	10 (38.46)	29 (96.7)
Grades 4-6	3 (11.11)	16 (53.3)
Grades 7-8	1 (3.57)	10 (33.3)
Grade 9 and above	0 (0.00)	11 (31.4)
	19-44 words	
Grade 3 and below	12 (46.15)	1 (3.3)
Grades 4-6	16 (59.26)	14 (46.7)
Grades 7-8	9 (32.14)	18 (60.0)
Grade 9 and above	7 (22.58)	16 (45.7)
	45-60 words	
Grade 3 and below	4 (15.39)	0 (0.0)
Grades 4-6	8 (29.63)	0 (0.0)
Grades 7-8	13 (46.43)	2 (6.7)
Grade 9 and above	16 (51.61)	8 (22.9)
	61-66 words	
Grade 3 and below	0 (0.00)	0 (0.0)
Grades 4-6	0 (0.00)	0 (0.0)
Grades 7-8	5 (17.86)	0 (0.0)
Grade 9 and above	8 (25.81)	0 (0.0)

Highlighted areas indicate the predicted REALM-M grade range estimate for the majority of respondents at each stated educational level

From Table 4.22, it can be noted that the scores for the REALM-L study, save for the lowest educational range, fell below the expected ranges. Thus, the majority of respondents with Grade 3 or less education could not comprehend more than 18 words, whereas the majority of respondents in Grades 7 to 8 comprehended fewer than the 45-60 words they were expected to. Similarly, only 22.9% of respondents with Grade 9 or higher education could comprehend up to 60 words, but no respondents could comprehend the 60 plus words they were expected to. The percentages of respondents in the Grade 4 to 6 category were split between 0-18 (53.3%) and 19-44 (46.7%) words.

The scores for the REALM-M study suggested that the words chosen were a little easier to comprehend for respondents with a Grade 3 or less education, with 46.2 % of these respondents able to comprehend more than the 18 words expected of them. While the majority of respondents with a Grade 9 or higher education could comprehend fewer than 60 plus words expected of them, the fact that 25.8% of that group can comprehend all the selected words, suggested that the words chosen were somewhat more appropriate. The majority of respondents in Grades 4 to 6 and Grades 7 and 8 could comprehend the amount of words they were expected to, which also suggested that the selection was more applicable.

4.5.3 Education Variables Cross-referenced with the Pronunciation and Comprehension Matrix

The analyses of pronunciation/reading and comprehension/understanding results in the two previous sections were likely to obscure key relationships between these two aspects of literacy scores on the REALM-M. Therefore a more in-depth analysis, cross-referencing the number of words in each of the four categories of adequate and inadequate pronunciation and comprehension with the different educational groups, was necessary. Table 4.22 below presents the results for this analysis. In these results, the largest group of respondents in Grade 3 and below clustered in low numbers (0-18 words) for Category 3 (76.9%) and Category 4 (96.2%) but had higher results (19-44 words) in Category 1 (42.3%) and 2 (50%). In terms of Category 2, respondents in Grade 3 and below actually scored higher than expected by the original REALM criteria.

Grade 4-6 respondents had the highest results in Categories 1 (66.7%), 3 (81.5%) and 4 (100.0%), for 0-18 words, while the majority of results for Category 2 (55.6%) were in the 19-44 word range. According to the REALM criteria, this is in line with the expected results for this education range, for Category 2 but not for Category 1.

Table 4.23 Relationship between Stated Educational Level and REALM Grade Range Estimate by Category, N (%), N=112

Stated education level	Category 1	Category 2	Category 3	Category 4
	0-18 words			
Grade 3 and below	9 (34.6)	11 (42.3)	20 (76.9)	25 (96.2)
Grades 4-6	18 (66.7)	5 (18.5)	22 (81.5)	27 (100.0)
Grades 7-8	27 (96.4)	1 (3.7)	22 (78.6)	28 (100.0)
Grade 9 and above	30 (96.8)	0 (0.0)	27 (87.1)	31 (100.0)
	19-44 words			
Grade 3 and below	11 (42.3)	13 (50.0)	6 (23.1)	1 (3.8)
Grades 4-6	9 (33.3)	15 (55.6)	5 (18.5)	0 (0.0)
Grades 7-8	1 (3.7)	11 (39.2)	6 (21.4)	0 (0.0)
Grade 9 and above	1 (3.2)	8 (25.8)	4 (12.9)	0 (0.0)
	45-60 words			
Grade 3 and below	5 (19.2)	2 (7.7)	0 (0.0)	0 (0.0)
Grades 4-6	0 (0.0)	7 (25.9)	0 (0.0)	0 (0.0)
Grades 7-8	0 (0.0)	12 (48.8)	0 (0.0)	0 (0.0)
Grade 9 and above	0 (0.0)	16 (51.6)	0 (0.0)	0 (0.0)
	61-66 words			
Grade 3 and below	1 (3.8)	0 (0.0)	0 (0.0)	0 (0.0)
Grades 4-6	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Grades 7-8	0 (0.0)	4 (14.3)	0 (0.0)	0 (0.0)
Grade 9 and above	0 (0.0)	7 (22.6)	0 (0.0)	0 (0.0)

1 **Category 1** Inadequately pronounced and inadequately comprehended
2 **Category 2** Adequately pronounced and adequately comprehended
3 **Category 3** Adequately pronounced but inadequately comprehended
4 **Category 4** Inadequately pronounced but adequately comprehended
Highlighted areas indicate the predicted REALM-M grade range estimate for the majority of respondents at each stated educational level

A similar trend occurred in the Grades 7 and 8 group, with the largest grouping for Category 2 (48.8%) occurring in the 45-60 word range, and the largest groupings for all other categories in the 0-18 word range. This also fell in line with the REALM criteria, as the largest Category 2 results were expected to fall in the 45-60 word range.

Although the majority of results in Categories 1 (96.8%), 3 (87.1%), and 4 (100.0%) for those respondents with a Grade 9 or higher education fall within the 0-18 word range, the majority

of results for Category 2 fall into the 45-60 word range rather than, as expected, the 61-66 word range.

To interpret these results the premise of the original REALM test, that respondents were assumed to be able to comprehend words they could pronounce (and vice versa), was applied. This selected Categories 1 and 2 as the most relevant with the majority of results in Category 1 expected to fall in the 0-18 word range and Category 2 results expected to fall into the highlighted area as above, as per the grade range capability estimates on the original REALM. Using these criteria it appeared overall that the words selected were not appropriate for the Grade 3 and below respondents, as the results for Categories 1 and 2 were both above the expected majorities. The word selection was on par for the Grade 4-6 and Grade 7-8 groups, but not appropriate for the Grade 9 and above group as the results fell below the expected range for Category 2.

4.6 Results of the Literacy Practices Questionnaire

Table 4.24 Literacy Practices: Posters versus Pamphlets		
Characteristic	**Posters**	**Pamphlets**
Read		
Yes	99 (88.39)	87 (77.69)
No	13 (11.61)	25 (22.31)
Helpfulness of Material		
Not Read	11 (9.82)	19 (16.96)
Very Helpful	87 (77.69)	79 (70.54)
Sometimes Helpful	1 (0.88)	11 (9.82)
Not Helpful	13(11.61)	3 (2.68)
Language difficulty		
Not Read	8 (7.14)	18 (16.07)
Very Easy	30 (26.79)	23 (20.54)
Sometimes Difficult	55 (49.11)	47 (41.96)
Very Difficult	19 (16.96)	24 (21.43)
Materials taken home?		
Does not read pamphlets	No data available [1]	8 (7.14)
Yes	No data available [1]	77 (68.75)
No	No data available [1]	27 (24.11)

[1] No data available refers to an instance where the REALM-M did not ask the same questions about the reading of pamphlets and posters

The Literacy Practices section of the questionnaire examined the reading of posters and pamphlets as the major print-based communicators of health information in clinical settings.

As reflected in Table 4.24, respondents were more likely to read posters than pamphlets while waiting for care in a clinic perhaps because pamphlets are perceived to be slightly more difficult to read than posters. Seventeen percent of the sample population considered the English on posters to be very difficult versus 21.4 % for pamphlets. The majority of respondents perceived the posters and pamphlets to be very helpful (77.7% for posters and 70.6% for pamphlets), and also took pamphlets from the clinics to read at home (68.8%).

Table 4.25 Information Choice	
Read about Nutrition	
Yes	36 (32.14)
No	76 (67.86)
Read about pregnancy and childrearing	
Yes	58 (51.79)
No	54 (48.21)
Read about STD's	
Yes	68 (60.71)
No	44 (39.29)

As represented in Table 4.25, 60.7 % of respondents were likely to read about sexually transmitted diseases, while nutrition seemed to be less of an issue as 67.9% were likely not to read about nutrition. The respondents were equally likely to read or not read about pregnancy and childrearing (51.8% likely to read versus 48.2% likely not to read about this topic).

Table 4.26 Role of Healthcare Professionals	
Reading Encouraged	
Yes	102 (91.07)
No	10 (8.93)
Reading Assisted	
Yes	91 (81.25)
No	21 (18.75)

The majority of respondents (91.1%) reported that healthcare professionals were likely to encourage them to read the health promotions materials, though there was a 10% drop in terms of whether the same healthcare professionals took the time to help them read (81.3%).

4.6.1 Literacy Practices Cross-referenced with REALM-M Scores

To examine the influence of various literacy practices on the results of the REALM-M, results were cross-referenced with six specific sets of practices. These practices were:

Literacy Practice 1: respondents only read posters.

Literacy Practice 2: respondents only read pamphlets.

Literacy Practice 3: respondents read neither posters nor pamphlets.

Literacy Practice 4: respondents read both posters and pamphlets and found the language used in them very easy to understand.

Literacy Practice 5: respondents read both posters and pamphlets and found the language used in them sometimes difficult to understand.

Literacy Practice 6: respondents read both posters and pamphlets and found the language used in them very difficult to understand.

The results of this cross-referencing were then tested, with Analysis of Variance (ANOVA) and Scheffe tests run on the various results to determine any significant difference for each of the four categories. The ANOVA analysis indicated that there are significant differences for Categories 1 and 2. However, the Scheffe test only found a significant difference for Category 1 for the same Literacy Practices, and focussed on two specific literacy practices, namely between the results for respondents who did not read posters or pamphlets (Literacy Practice 1) and respondents who read both posters and pamphlets and found the material easy to understand (Literacy Practice 4). The ANOVA and Scheffe test results for the significantly different categories are presented below (Tables 4.27 and 4.28).

Table 4.27 Analysis of Variance Performed on Results for Six Literacy Practices

	F	p-value
Category 1	3.15	0.012
Category 2	3.3	0.009

Marked effects are significant at $p < .05000$

Table 4.28 The Scheffe Test Performed on Results Obtained for All Six Different Literacy Practices for Category 1

	Literacy Practices					
Literacy Practices	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
(1)		0.549	0.950	0.045	0.069	0.782
(2)	0.549		0.998	0.643	0.842	1.000
(3)	0.950	0.998		0.689	0.847	0.999
(4)	0.045	0.643	0.689		0.990	0.861
(5)	0.069	0.842	0.847	0.990		0.963
(6)	0.782	1.000	0.999	0.861	0.963	

The Scheffe test indicates a significant difference in inadequate comprehension and inadequate pronunciation scores between literacy practices 1and 4

Marked differences are significant at $p < .05000$

Finding that there is a significant difference between the results for these two Literacy Practices was fairly predictable. However, less predictable was the fact that the ANOVA and Scheffe tests found no other statistically significant differences between the other literacy practices. Thus it is noteworthy that there was no statistically significant difference between the results for respondents who read only posters (Literacy Practice 2) and those who read only pamphlets (Literacy Practice 3), suggesting that they are equally effective materials for health literacy. Similarly, it is also noteworthy that there was no statistically significant difference between the results for respondents who found the material sometimes difficult (Literacy Practice 5) and those who found the material very difficult (Literacy Practice 6). This may suggest that respondents may choose to say that they sometimes find the material difficult to understand, when in fact they find it very difficult to understand, in order to save face.

The results also suggested that different literacy practices have no effect on how many words appear in Categories 3 and 4 and this may serve to focus attention on Categories 1 and 2.

Table 4.29 Comparison between Two Significantly Different Literacy Practices

	Literacy Practice 1: Posters and pamphlets not read	**Literacy Practice 4:** Posters and Pamphlets read and English perceived as easy
Category1		
Mean	26.8(19-44 words)	6.9 (1-18 words)
Standard deviation	25.5	9.5
Category 2		
Mean	27 (19-44 words)	47.1 (45-60 words)
Standard deviation	19.8	14.4

1 **Category 1** Inadequately pronounced and inadequately comprehended

2 **Category 2** Adequately pronounced and adequately comprehended

Table 4.29 makes specific comparisons between these two literacy practices in terms of the Categories 1 and 2. On average, respondents who read posters and pamphlets are likely to be able to adequately pronounce and adequately comprehend 20 more words than respondents who do not read either posters or pamphlets (47.1 words versus 27 words). Conversely, respondents who do not read posters or pamphlets are likely to struggle to understand and pronounce 20 more words than their counterparts (26.8 words versus 6.9 words). An alternative interpretation is that respondents who adequately pronounce and adequately comprehend 45 or more words are more likely to report reading posters and pamphlets.

4.7 The Role of Sources of Health Literacy

Examining other sources of health literacy revealed the strong role social relations and the media play in developing and maintaining health literacy. Indigenous health knowledge seemed to have a lesser effect. As such, respondents list interactions with friends (92.0%)and family (95.6%) and access to broadcast media (92.0%) as primary sources of health information, while formal social settings like church, and print media play a less powerful but none the less substantial role (both 77.7%). Doctors and nurses are very likely to be consulted for health information (87.5%), while pharmacists (49.1), traditional healers (42.0%) and herbalists (40.2%) are less likely to be consulted.

Table 4.30 Various Sources of Health Literacy

Sources		N (%)
Healthcare		
Doctors/Nurses	Yes	98 (87.5)
	No	14 (12.5)
Pharmacist	Yes	55 (49.1)
	No	57 (50.9)
Social		
Friends	Yes	103 (92.0)
	No	9 (8.0)
Family	Yes	107 (95.5)
	No	5 (4.5)
Other: Church	Yes	87 (77.7)
	No	25 (22.3)
Media		
Magazines/Books	Yes	87 (77.7)
	No	25 (22.3)
Radio/TV	Yes	103 (92.0)
	No	9 (8.04)
Indigenous Knowledge		
Traditional Healer	Yes	47 (42.0)
	No	65 (58.0)
Herbalist	Yes	45 (40.2)
	No	67 (59.8)

The sources of health literacy knowledge were cross-referenced with the average results for each category on the pronunciation and comprehension matrix, but these revealed no significant difference between the sources of health literacy and scores on the REALM-M. Similarly, ANOVA and Scheffe tests were run on the sources of health literacy knowledge in

order to determine if there were any statistically significant differences. As before, statistical comparison revealed no significant differences and thus sources of health literacy seemingly have no effect on the results of the REALM-M.

4.8 Summary

When compared with the REALM-L test, despite subtle differences between the sample populations, the REALM-M may have made a more relevant and applicable selection of words. Where using the original criteria for relevance of words (results of >50%) or the less strict REALM-M criteria (largest grouping of results per word), it can be seen (in Tables 4.16 and 4.17) that the REALM-M increases the number of Category 2 words (words which can be pronounced adequately and comprehended adequately) and reduces the number of Category 3 words (words which can be pronounced adequately but are inadequately comprehended). Using the original REALM-L study (2000) criteria for acceptability which selected words with 'worked' (or combined Category 1 and Category 2) results for 80% or more of the population, the REALM-M had 38 words to the REALM-L's eight.

In addition, the average time taken for the administration of the test has decreased, with the majority of respondents (82.1 %) completing the REALM-M in less than 3 minutes, versus only 46.4 % of respondents who completed the REALM-L in the same timeframe. Arguably, a shorter time spent taking the test may be the result of the selection and inclusion of more applicable words. Time has been cited as a measure of acceptability in the original REALM-L (Lecoko, 2000, p.66) and in this regard, the REALM-M may be more acceptable and applicable than the REALM-L.

However, attempts to correlate the results of the REALM-M with various literacy practices, perceptions of language difficulty on health promotions materials, and sources of health information proved inconclusive, apart from a fairly predictable relationship between a perception of low language difficulty and a high score on the REALM-M. This lack of relationship may suggest that respondents who report that they find the material sometimes difficult to understand, may in fact find it very difficult to understand, and only choose the option of 'Sometimes difficult' in order to save face. Similarly, lack of relationship between REALM-M scores and literacy practices may indicate that posters and pamphlets are equally effective materials for health literacy. This also suggests that health literacy may be acquired from a variety of sources other than purely print-based health promotions materials.

The next chapter posits a variety of factors that may have influenced these results, and examines the applicability of the design of the REALM-M.

CHAPTER 5: CRITIQUE

5.1 Overview

The primary purpose of this thesis was to investigate the influence of relexicalising the REALM test on its applicability in a local population. This is based on the premise that replacing the words used in the original test with more locally frequent and thus more appropriate words would improve its applicability. Although the intended use of the original REALM was to screen patients for low health literacy and not to conduct a comprehensive assessment, it was hoped that modifying the test would make it a more applicable screening instrument and therefore a valuable research tool.

The critique chapter begins by exploring and discussing the applicability of the REALM-L and REALM-M, specifically examining the results of the administration of the REALM-M. In this section, a series of implications is drawn about the role of various words for the respondents who were surveyed, with specific reference to the frequencies of individual words on the list of acceptable words (Table 4.19, p. 106).

The next section discusses limitations of the study, moving from administrative issues to content and development issues and on to discussing the limitations of specific methods of formal assessment of literacy. In this section, issues such as the testing of English health literacy versus other languages, and the construct validity of the REALM and the REALM-M are critiqued.

The chapter concludes with a discussion of recommendations for further research and for improving health literacy testing, suggesting the application of an alternative model of literacy.

5.2 Interpretation of Results

5.2.1 Applicability of the REALM-M and the REALM-L

When compared with its predecessor, the REALM-M improves in two key areas, namely the time taken for administration and the number of acceptable and applicable words selected for the test. Time spent taking the test may seen as an aspect of applicable test design, as opposed to applicable word selection.

As presented in Table 4.8. (p. 94), 82.1 % of respondents completed the modified test in less than three minutes versus 46.4% for the REALM-L. Additionally, no REALM-M respondents took more than 10 minutes, whereas 11 REALM-L respondents took anywhere from 10 to 22 minutes. Significantly, this measure on both tests is directly comparable as, although modifications were added to the REALM, no changes were made to the format of the test, to the presentation of words or to the initial administration procedure used by Lecoko (2000).

As noted in the results chapter, whether applying Lecoko's original criteria for relevance[5], the REALM-M criteria for relevance[6], or the criteria for acceptability[7], the REALM-M improves over its predecessor in terms of the number of words selected, regardless of which criteria are applied. When using REALM-L criteria for relevance (Table 4.17. p. 105), the modified test had 48 relevant words which fell into Categories 1 and 2 in comparison to the original test's 23 and reduced the number of Category 3[8] words from 19 to 2. This increased to 62 (out of 66) Category 1 and 2 words when broader REALM-M criteria were applied (while REALM-L words in equivalent categories only increased to 36), with 4 words which could be pronounced adequately but not comprehended adequately, considerably less than the REALM-L's 30 words in this category.

With a significant 38 acceptable words to the REALM-L's eight, the REALM-M may be seen as more applicable in that it has selected a greater number of relevant, appropriate and

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[5] Words with results of 50% or higher
[6] Largest number of results per word
[7] Words with results of 80% combined for Categories 1 and 2 or 'Worked' 1 and 2
[8] Words which were pronounced inadequately and comprehended inadequately (Category 1) and words which were pronounced adequately and comprehended adequately (Category 2) versus words which could be pronounced adequately but were comprehended inadequately (Category 3)

meaningful words and reduced the amount, and thus negative impact, of less applicable words. Arguably this makes the REALM-M a more applicable test for local settings.

This increased applicability of individual words is assumed to be the result of relexicalisation using words gathered from and presumably used in a local healthcare context. According to this premise, Category 2 words would have a high frequency of appearance, whereas Category 1 words should be much less frequent.

However, when the results of the REALM-M for individual words are compared with their original frequency of appearance, this premise does not hold true. The analysis described in Section 4.4.4 (p. 109) of the results was unable to show any relationship between frequency of appearance in the source material and the test scores for individual words, which are used to justify acceptability and applicability. This suggests three things: firstly that either frequency alone is not a sufficient indicator of situational authenticity, secondly, that the source materials do not accurately represent the range and prevalence of key health issues for a local population, or thirdly that respondents are acquiring their health literacy from sources other than the health promotions materials available in clinics.

If the source materials from which the selection of words used to relexicalise the REALM-M was derived do not cover the key health issues of the population, it is important to examine additional factors that may have influenced the results of the test. External factors may have obscured the role of frequency for certain words, in that respondents' knowledge of the words outside a healthcare context may have resulted in a high REALM score for that word, despite a low frequency of appearance.

The factors that may have contributed to the increased acceptability of the individual words can include the high frequency usage of the word in texts in non-healthcare settings or in everyday conversation, which may in turn reveal the importance of a given word and the lexical domain with which it is associated within a particular culture or community. The value or personal investment in what a word means or the concept to which it refers may also influence its applicability.

To illustrate this point, some examples of acceptable words are discussed. Grouping these words into lexical domains may reveal their cultural, social or individual importance for members of the sample population. For example, words such as 'FEVER', 'FLU', 'HEADACHES', 'COUGH', and 'PAIN' refer to common health complaints. The frequencies for these words all fall below 23. In contrast, 'SICK' has a frequency of 204, possibly because it is a broader term which can be viewed as referencing this entire group.

As the means for remedying these health complaints, words like 'MEDICINE', 'PILLS', and 'DROPS' feature prominently. In this group, 'MEDICINE's low frequency of 5 may be attributable to a higher level of formality, while a frequency of 33 for 'PILLS', in contrast to a frequency of 7 for 'DROPS', may be because tablets, which are commonly referred to as 'PILLS' by the general public, are the most commonly prescribed oral dosage form. Although their frequencies differ, 'CLINIC' (frequency of 83), 'PATIENT' (frequency of 25) and 'DOCTOR' (frequency of 50) may be grouped together in a lexical set as the site for accessing healthcare and typical roles associated with that field.

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Other lexical domains include physiological needs, as evident in words such as 'WATER', 'EAT', and 'FOOD', as well as the body, with which 'BODY', 'HEALTH', 'WEIGHT', 'EXERCISE' and 'FAT' can be associated, and procreation and childrearing, which is represented by 'BABY', 'BREASTFEEDING', and 'PREGNANCY'.

Despite a very low frequency of appearance in the sample data for words such as 'DANGEROUS' (5) and 'SMOKING' (7), the prevalence of these words on signs both within clinics and beyond (for instance signs on electricity substations, and 'NO SMOKING' signs) may have influenced their REALM scores and increased their acceptability. Additionally, these words had high REALM Category 2 results (meaning they were pronounced adequately and comprehended adequately - 'DANGEROUS' scored 78.6% in this regard and 'SMOKING' 96.5%) which may be the result of such signs often appearing in more than one language.

Given the current HIV/AIDS pandemic and the numerous public health campaigns aimed at preventing the spread of the disease, as well as the impact on individuals, families and communities across the country, it is not surprising to find 'HIV/AIDS', 'CONDOM',

'BLOOD', 'TEST' and 'CLEAN' among the list of acceptable words. While all of these words have relatively high frequencies (ranging from 110 for 'HIV/AIDS' to 45 for 'BLOOD'), their acceptability scores may be equally attributable to the availability of HIV/AIDS-related health information in clinics (15 out of 71 pamphlets gathered in this study focussed on HIV/AIDS), and to a high frequency of appearance in conversation and media (both broadcast and printed) beyond the clinic.

As an aside, it is noteworthy that words such as 'SEXUAL', 'INFECTION', 'CONTACT', 'IMMUNE', 'TRANSMITTED', 'PROTECTION' and 'PREVENT' do not appear on the list of acceptable words, given the role these words may play in understanding HIV/AIDS. These words are more formal, technical, and are longer and therefore more complex, more difficult to pronounce and comprehend, hence a possible reason they do not feature as acceptable words. However, an understanding of these words would contribute significantly to HIV prevention programs. Hopefully, a new facet of HIV/AIDS research targeting the understanding of such terms, called 'treatment literacy', may make significant inroads into this issue.

The positing of what constitutes a key health issue for a given community may be premised on a review of the material typically available in that community, as has been done in this study. In this regard, key health issues should theoretically appear more frequently in locally available health information materials, but as has been demonstrated, this is not necessarily the case for the population of REALM-M respondents. This suggests that currently available health information materials may not address all of the key health issues prevalent for this population. As a result, two approaches are necessary. Firstly, researching the acceptability and applicability, rather than the frequency, of individual words may provide insight into community health issues, and secondly, health information material should be produced that takes cognisance of the key health issues of the community.

5.2.2 Health Literacy Practices Questionnaire

The findings of the Health Literacy Practices Questionnaire presented in Table 4.23 (p. 113) suggest that respondents were more likely to read posters than pamphlets (88.4% versus 77.7%) while awaiting care in clinics. Despite this, there is evidence that pamphlets play a

strong role. A large proportion of the respondents (68.8%) reported that they took pamphlets home to read them. If this is considered alongside the number of respondents (95.6%) who reported discussing health with family members, one may assume that a respondent's low health literacy skills could be mitigated by discussion of pamphlets with family members. As posters cannot be removed from clinics, they may not be part of home-based discussion and possible group mediation of low health literacy.

Similarly, although 38.4% of respondents reported spending between 30 minutes and 2 hours awaiting care in clinics, we cannot assume that they read the posters during that time. Indeed, 61.6% of respondents reported waiting periods of less than 30 minutes. Given lower figures for pamphlet reading overall, one must question whether time spent awaiting care is the key factor or if a lack of social support from friends and other patients in clinical settings, or even healthcare professionals, may play a role. In this regard the majority of respondents (91.1%) reported that healthcare professionals were likely to encourage them to read the health promotions materials, though only 81.3% reported that the same healthcare professionals actually took the time to help them read the pamphlets and posters.

In terms of difficulty of the language used, there were more respondents who reported that the English used on posters was easy to understand than those who reported that the language used on pamphlets was easy to understand (26.8% versus 20.5%). However, the number of respondents who reported that the English used on posters was sometimes difficult or very difficult to understand was slightly higher than reports for the same categories for pamphlets (66.1% versus 63.4%).

What is telling in this regard is that more respondents found both posters and pamphlets difficult to understand than easy to understand. This suggests that the language used in locally available health promotion materials presents this group with the same level of difficulty, regardless of whether it appears in posters or pamphlets. Even though posters and pamphlets are used in different ways by the respondents, and in different locations, they are still difficult to understand.

What may also be important is that health literacy skill is more likely to be an indicator of whether or not patients read health promotions materials, rather than patients' choice to read

materials, or to read different types of materials, being an indicator of their level of health literacy. As suggested, an alternative interpretation of the data on literacy practices and REALM-M scores is that respondents who adequately pronounce and adequately comprehend 45 or more words are more likely to report reading posters and pamphlets.

Other findings show that respondents who read posters only are likely to struggle to pronounce more than 18 words, suggesting that posters themselves are not adequate sources of health information for this population. However, examining the sources of health information and knowledge, it seems that broadcast media play a more significant role than print media, which is not surprising given the history of literacy in South Africa. With printed material such as passbooks and other official documents associated with the former regime, it is not difficult to see why broadcast media would play such a strong role. Indeed, radio broadcasts played a role in the liberation struggle and broadcast media continue to be used as a channel for communicating health information. Most notably, clinic-based television programs produced in South Africa, like Soul City, focus on local health issues and promote critical health literacy.

Similarly, it is interesting that 87.5% of the population were likely to gain health information and knowledge from interaction with primary healthcare workers like doctors or nurses (87.5%) but were only half as likely to consult pharmacists (49.1%) and only slightly less likely to consult traditional healers or herbalists (42.0% and 40.2%, respectively) about health topics. However, the strong role of social institutions such as family, friends, and the church (95.5%, 92.0% and 77.7%, respectively), may present a key area at which to target and deliver health information. This may be a result of the importance of strong social ties and oral communication for this population group.

5.3 Limitations of the Study

The REALM-M may be criticised for administrative, development and content limitations as well as method and construct limitations. In terms of method and construct limitations, the original REALM test suffers from a number of failings, and its offspring the REALM-M may also be criticised for similar flaws. To a certain extent, a number of these flaws can be anticipated. Though the modification of the REALM mitigated the influence of the autonomous model of literacy by adding a comprehensive assessment aspect and by relexicalising the text, negative aspects of the dominant theoretical framework that informed the development of the original REALM could not be completely removed.

These negative aspects of both tests can be examined at two different levels. On a surface level, both the REALM and the REALM-M suffer from a lack of situational authenticity, from a potentially flawed qualitative selection of words, and from the use of formal assessment methods, namely the assessment of reading only, assessment via objective vocabulary testing and presentation of words in isolation. Both the REALM and the REALM-M may also be criticised for their focus on English in multilingual South Africa, and a lack of capacity and scope as a research tool.

On a deeper level, given that formal assessment methods are criticised above, the application of an autonomous model of literacy to health literacy, which drives such formal assessment methods, may be at fault. On this level, criticisms of the REALM-M focus on construct validity and whether what it tests constitutes incidental or specialised vocabulary knowledge. Thus the REALM's role as an objective vocabulary test comes under scrutiny.

The following sections discuss these limitations in depth.

5.3.1 Limitations in the Administration of the REALM-M

The administration of the test was limited for a number of reasons, including a lack of generalisability beyond the population who participated in the research. Given that the test was administered to a limited number of respondents in a single geographical area, extrapolation of the results to other groups in rural or larger urban settings may be difficult.

However, in view of the criticism of standardised testing described in Chapter 2, this is not necessarily an issue, as generalisability is not a key criterion.

The original intent of the research was to survey a sample population of patients awaiting care at public clinics, however, at some clinics, there was a strong desire by the public to participate (the gratuity may have motivated this) and this resulted in respondents participating who were not at the time awaiting treatment. However, with the help of healthcare professionals in the clinics, this effect was reduced and measures were implemented to ensure that respondents were all patients receiving regular care at those clinics.

A further limitation of the administration of the REALM-M may also have been due to both primary researcher and interpreter being male, which may have had an effect when female respondents were asked to read out words associated with taboo areas, such as 'SEXUAL' and 'MENSTRUATION'. Additionally, examination of pronunciation would have been aided by tape recording the reading out of the words in the test. This was not possible due to ambient noise levels given that most interviews were conducted in waiting rooms where there were a number of patients. Thus phonetic transcription was limited to recall by the researcher. The physical setting of the interviews may also have detracted from respondents' willingness to participate, as respondents may have been wary of participating in the study in a room with fellow patients. Physical setting may have further affected responses by respondents listening in to others who were interviewed before them, and altering what they would have said. While every precaution was taken to avoid this, such as physically separating current interviewees from those waiting to participate, it is possible that some contamination may have occurred.

5.3.2 Limitations in the Development and Content of the REALM

The development and content of the additional questionnaire had certain limitations, e.g. it relied on respondents' self-reportage and did not elicit sufficient information on a number of issues. While the questionnaire asked about the ability to read, write, listen to and speak a variety of languages, this was self-reported and none of these abilities, or the respondent's perceived proficiency in these abilities, was objectively evaluated. Similarly, the section that

examined sources of health information, which asked respondents if they discuss health with friends, family, doctors/nurses, pharmacists and others, did not examine the character, credibility or perceived value of the information discussed, nor did it ask respondents to rate or evaluate these sources.

5.3.3 Method Limitations

5.3.3.1 Situational Authenticity, Assessment of Reading Only, Presentation of Words in Isolation and Use of Frequency

While the REALM-M may be an improvement on the REALM-L in that 28 more words meet the criteria for acceptability, it did not engage respondents in health-related text-mediated tasks that they are typically required to perform such as those involving admission forms, specific instructions for care and medication, patient medication information inserts, or patient health records. The focus on health promotion materials, where reading of such materials is typically voluntary, may similarly have affected the administration of the test. As has already been discussed in Chapter 4, though the study had a principled focus on pamphlets rather than posters, this may have been misdirected, as posters were reportedly better received.

The negative impact of the autonomous assessment of reading as opposed to writing, and use of words in isolation rather than in neutral surrounding text, has already been discussed in Chapter 2. In this regard, a focus on assessment of reading can be argued for, given the predominance of received, processed texts over self-produced texts for the average person. When applied to health literacy in a second-language population, this has negative implications in terms of passivity and reduced self-efficacy, and could exclude any social characteristics of literacy and thus hamper any assessment of interactive or critical health literacy.

Similarly, the restriction of the research to solely print-oriented literacy, rather than including literacy practices that may involve both speech and literacy, may also have had a negative impact. As such, only two questions in the Literacy Practices section of the questionnaire touched on the combined interaction of patients and healthcare professionals with health promotion materials, and in this regard, there was a 10% drop from the number of

respondents who reported being encouraged to read health promotions materials and those who reported being assisted in reading those materials. This may be a key oversight, given Heath's (1982: 351) suggestion that "...examination of the contexts and uses of literacy in communities today may show that there are more literacy events which call for appropriate knowledge of forms and uses of speech events than there are actual occasions for extended reading or writing".

As Read (2000, p. 99) has suggested, a lack of context when presenting words in objective vocabulary tests can be confusing to the reader/test-taker, and this may have played a negative role in the presentation of words in isolation in the administration of the REALM-M. The word 'CONTACT' illustrates this problem, as both definitions of physically touching something (a transmission vector) and of communicating with a healthcare professional were accepted.

Frequency was chosen as an initial criterion for selecting words to relexicalise the REALM-M as a way of theoretically improving the situational authenticity of the test. This gave way to selection according to qualitative and thus potentially subjective methods, which may have detracted from the situational authenticity of the REALM-M. However, Verhoeven (1994, p. 209) suggests that "due to a restricted awareness of phoneme distribution rules, the L2 learner's inductive mechanism, which organises (grapheme-) phoneme patterns, may falter". In light of this, second-language speakers would have more trouble reading longer words and would benefit less from a selection of high frequency words than a first-language speaker. Selection according to frequency may therefore be a moot point.

This is supported by the lack of relationship between frequency and REALM-M scores for the words selected, as described in Section 4.4.4 (p. 109) of the Results chapter, and suggests that alternative criteria for word selection should be developed. While qualitative selection may be flawed due to subjectivity, it may be more effective than frequency. Taken in conjunction with the results of the Health Literacy Practices Questionnaire, what this suggests is that respondents acquire health literacy from a variety of sources other than purely from health promotions materials. Similarly, the primary mode of communication for the acquisition of health literacy may be culturally determined and thus focussed on oral rather than written communication.

5.3.3.2 Testing of Health Literacy in English versus Other Languages, and the Limited Value of the REALM-M as a Research Tool

While the REALM and REALM-M claim to test health literacy, they are more specifically testing health literacy in English. This is an important distinction, as it is likely that when these tests are administered in a local setting, they will be administered to people who speak English as a second-language, if at all. The effect of the language prejudice inherent in administering these tests to a local population in this regard is far-reaching. However, as with any language issue in South Africa, adjusting for this imbalance is a treacherous and difficult process.

To begin with, the testing of health literacy in English may be justified on a number of grounds. In terms of this study, the REALM-M was specifically administered to public healthcare system patients, and thus to an English second-language population, comprising both Afrikaans and isiXhosa first-language speakers, and not to a population characterized by a single first-language. Were either the REALM or REALM-M to be tested on a specific language group, one could quite convincingly argue for translation of the test, but in this case, as can be seen in the demographic data, first-language speakers of Afrikaans and isiXhosa were far more likely to have access to English as an additional language than was it likely for Afrikaans first-language speakers to have access to isiXhosa and vice versa.

On a broader level, most health information materials available in local clinics were produced in English, with, for instance, 71 health information brochures being available in English versus 13 in Afrikaans, 24 in isiXhosa, and five in other languages such as isiZulu, seSotho, and Portuguese (spoken in Mozambique and Angola).

Similarly, most healthcare professionals in South Africa are educated in English or Afrikaans, with little instruction or content provided in other languages. This may be the result of the political dominance of these languages in the past, and their dominance in higher education institutions. As has already been suggested, in Section 2.3.2 (p. 41), current dispensations in the assignment of healthcare professionals to rural clinics often result in English-speaking healthcare professionals assigned to communities where English is spoken as an additional language. Given that healthcare professionals are the most likely administrators of health

literacy tests, the provision of tests in English will enable these professionals to administer the tests effectively, although they would have to use interpreters, as in this study.

In addition, recent legislation on patient information leaflets and dispensed medication, (Regulation No. 10, Medicines and Related Substances Act of 1965, 2003), as passed in May 2003, which states that "each package of medicine shall have a patient information leaflet that must contain ... information in at least English and one other official language", also provides an example of the dominant role of English in healthcare.

The focus on English can also be justified by the continued economic dominance of the language in South Africa. Reagan (2002, p. 421) refers to "a language of wider communication, English, which is widely spoken throughout the country and by members of virtually all the different ethnolinguistic groups". Msimang (199, p.124) also refers to various functions of language, including use as a language of international communication, and a language of government and of national and provincial administration, with both functions in South Africa currently fulfilled by English. Similarly, Webb (1999, p.352) cites a number of examples of governmental, parastatal (large public sector organisations linked with the government, such as the Post Office, Telkom and the SABC) and private sector policy decisions made in favour of the sole use of English.

English continues to be perceived as an accessible language of power as opposed to Afrikaans, which may be perceived as a language of oppression, and also to the nine other official languages, which may be perceived as deprived given the language standardization policies of the apartheid regime. Indeed, many of the more technical terms that are included in both the REALM and the REALM-M tests have no isiXhosa equivalents, as a result of apartheid language standardization policies. In addition, the geographic spread of English in contrast to the other official languages across South Africa, though not an issue for this study, as well as the access by most first-language speakers of other South African languages to English as an additional language, may also justify the testing of health literacy in English.

However, the use of English is as problematic as it is practical. The dominance of English in South Africa both for testing health literacy, and in other spheres in South Africa, such as education, commerce, and telecommunications, may be seen as perpetuating the same

domination of indigenous languages that was present under the apartheid regime. Similarly, the economic dominance of English may be viewed as an ideologically constructed phenomenon that continues to maintain the same power imbalances on an ostensibly economic rather than political basis. Given that 26 of the brochures examined in this study were produced under the auspices of various pharmaceutical companies, it is possible that ideologically the economic dominance of English is designed to constitute groups of people as consumers rather than critically aware, health literate individuals.

While it is not economically viable to challenge the position of English, and equally economically unrealistic to expect that the official recognition of all of South Africa's languages will result in parity amongst the languages, at least in the short term, it is still important to be aware of the ideological strength of English, and to question its dominance.

5.3.4 Limitations of the Application of an Autonomous Model of Literacy to Health Literacy according to the REALM (Construct Limitations)

It may be argued that many of the criticisms discussed above are a result of the location of health literacy within an autonomous paradigm of literacy and a resultant focus on formal assessment of health literacy. The selection of certain features of formal assessment may also have been driven by issues of practicality and speed of administration, in conjunction with the dominant ideological framework.

These issues of practicality include an awareness of the pressures of time and numbers of healthcare providers versus patients in typical healthcare settings, as well as differing levels of training and knowledge amongst healthcare professionals about the concept of health literacy (as opposed to the knowledge that comprises health literacy). Indeed it is unrealistic to assume that healthcare professionals have the training and knowledge to assess literacy, as they are typically neither linguists nor educators. In addition, informal methods of literacy assessment can be time-consuming and more suited to the classroom than the clinic. Thus, standardised health literacy tests continue to be used because they are quick and easy to administer, especially in busy public health clinics, and they require little additional training or knowledge from clinical healthcare providers.

Despite this, it is important to question to what extent practicality is an issue and at what point negative impact of formal methods of assessment outweighs their practicality. While it may be the case that selection of a particular method of administering and scoring a test may be easier in terms of practicality, in this case the selection of an 'objective' vocabulary test framework has specific negative consequences. Arguably, practicality should not justify method selection and instead consequence should play a greater role. The following section discusses this in more depth.

5.3.4.1 The REALM as an Objective Vocabulary Test

By testing vocabulary size in health literacy, the design of the REALM attempts to address background or prior knowledge, identified as a key factor in health literacy. However, this measure is flawed - as an objective vocabulary test the REALM is more likely to be a test of incidental vocabulary learning rather than assessing the effectiveness of health education programs.

Categorising vocabulary in terms of Nation's (1990) categories of vocabulary, namely high frequency, low frequency and specialized vocabulary groups, suggests that the specialized and restricted nature of language within the domain of health means that health words constitute specialized vocabulary. As "specialized vocabulary is likely to be better acquired through content instruction by a subject teacher than through language teaching" (Read 2000, p. 159), assessing any type of health literacy (without identifying health knowledge as a specialized vocabulary) may make false assumptions about an individual's incidental health knowledge. This incorrect labelling of formally acquired health knowledge as incidental may result in testing for formally acquired health knowledge in individuals who have not benefited from health education, which may put test-takers at a disadvantage from the outset, and may not reveal effective indicators of language ability. Thus, the REALM cannot be described at 'objective'.

Similarly, in the development of vocabulary tests like the REALM, the choice of individual items may reflect a bias towards the inclusion of more technical, formally acquired items. According to Jacoby and McNamara (1996, cited in Douglas, 2000, p. 116), "...an ongoing problem for LSP testers lies in the development of a scoring scale that is, on the one hand,

useable by people who are not specialists in the field, and on the other hand representative of the criteria that matter to those who are specialists in the specific purpose domain". Hill and Parry (1994) suggest that any test-writer's item selection reflects an association with a particular community of language users, and thus test-writers in this domain must either ally themselves with medical experts or with a patient population. This makes the selection and testing of health vocabulary very challenging. Even in this study, it was necessary to consult with health experts, in this case, a pharmacist and a medical doctor, in order to qualitatively choose the final 66 words from a quantitatively gathered sample.

The issue of dominant literacies also comes into play when health literacy is considered separate from the language in which it is rendered. If we assume, for argument's sake, that health literacy research is typically conducted in linguistically homogenous populations where all respondents share the same language used in the test, the issue of health literacy as specialized vocabulary remains. As has already been noted, the specialized and restricted nature of language within the domain of health means that health words constitute specialized vocabulary. Assessment of knowledge of this vocabulary requires a necessary distinction between the two ends of a continuum, between expert and non-expert knowledge, or health-literate and health-illiterate individuals. This often means two categories of either healthcare professional or patient, and this represents a power imbalance constituted out of knowledge or lack of knowledge of health vocabulary. Given that knowledge of health vocabulary is typically formally acquired, expecting individuals who have not undergone this formal acquisition to display knowledge in this area puts them at a disadvantage.

This issue may also be affected by the role of health literacy as a Discourse[9]. Gee suggest that Discourses are mastered through apprenticeship and "by enculturation into social practices through scaffolded and supported interaction with people who have already mastered the Discourse" (1990, p. 146). Similarly, MacDonald (2002, p. 451), writing about medical discourse, refers to readers of medical textbooks and "the primary purpose of regulatory discourse ... to inculcate them in the knowledge that will one day enable them to 'think the unthinkable' alongside the other members of the social group on which this privilege has been conferred", in other words, to access elaborated codes within medical discourse. In view

[9] Gee (1990, p.142) refers to Discourse (with a capital D) as "ways of being in the world, or forms of life which integrate words, acts, values, beliefs, attitudes, social identities..." as different from 'discourse' (small d) which refers to a stretch of language. Section 2.2.2 contains extensive discussion of this concept.

of this necessary apprenticeship and enculturation, it seems unlikely that the average patient would have access to the 'privileged' and specialized vocabulary of this Discourse.

Relying on vocabulary tests such as the REALM, the TOFHLA or the MART also prohibits the assessment of any critical aspect of health literacy, as they focus on assessment of reading skill as opposed to writing ability, and thus excludes any assessment of the social characteristics of literacy. As screening instruments, they focus on identifying patients with low health literacy and are unconcerned with testing interactive or critical health literacy. This can be viewed as disempowering because it excludes respondents from being tested for or achieving these levels, and restricts them to a particular subject position. In this regard, because formal methods of assessment remain firmly grounded in the autonomous paradigm their application to the evaluation of health literacy represents a misfit of construct and assessment. This disparity in assessment may detract from, rather than promote, positive health outcomes.

5.4 Recommendations

In order to mitigate or reduce the flaws inherent in the application of the REALM-M, a number of steps can be taken. Replicating the research on the current selection of words in the REALM-M could improve the reliability of the test, and focus attention on words which achieve consistent results. Similarly, research conducted to refine the REALM would make it a more effective tool with increased sensitivity. Additional research validating the criteria used for acceptability in this study and Lecoko's REALM-L study, or suggesting alternative criteria, would be a positive step. Only 66 out of 274 possible heath-related words from the sample of health promotions materials were included in the REALM-M. Research following on from both of these studies could test the acceptability of the remaining 208 words which could be tested, perhaps 66 at a time, in order to determine the most acceptable. Testing of individual items for inclusion could also involve testing the translations of those items for applicability.

The modifications made to the REALM-M to localise the original test have attempted to increase the test's sensitivity, but other modifications could also be made. One could present the words in the REALM in a neutral sentence that directs respondents to select an appropriate medical or health definition of the word. The inclusion of a solid comprehension section, for instance, a Cloze procedure that requires respondents to fill in a given word in context, would also improve the instrument. Some measure of writing ability, for instance one which asks respondents to practise skills they would use in a healthcare context, for instance filling in a form, would improve the interactive authenticity of the test.

At some stage, in order to cover and assess all aspects of health literacy, this would mean designing an entirely new instrument, rather than retrofitting features onto the REALM. This may be difficult- as described earlier, formal methods of assessment, while they may be easier in terms of practicality to administer and score, and easier to make comparisons in terms of research, have specific negative consequences. Another alternative would be to validate informal methods of health literacy assessment, to give them more credibility. In this regard, concern for the personal and individual consequences would play a greater role in method selection than practicality.

However, these represent only partial solutions, and ideally addressing the disparities inherent in health literacy assessment would require the application of a completely different research paradigm, the ideological model of literacy. The conclusion chapter provides some brief insight into the application of an ideological model of literacy to health literacy.

CHAPTER 6: CONCLUSION

6.1 Overview

The final chapter briefly explores the application of an ideological model of literacy to the assessment of health literacy, taking as its departure point the criticisms and limitations of the autonomous model of literacy discussed in the previous chapter. By way of discussion, recent developments in the field of health literacy which acknowledge a more social and ideological aspect to the concept are included, followed by recommendations for further research.

6.2 Applying an Ideological Model to Health Literacy

Applying an ideological model to health literacy would necessitate a reconceptualisation of health literacy, creating a model that takes cognisance of the role of ideology in health communication and health literacy. This model would also take into account the power imbalances between healthcare professionals and patients and how these are expressed through language. Specifically, investigating the Discourse(s) (Gee, 1990) of health would reveal key ideologies about what constitutes health literacy, with a view to clarifying what level of health literacy is being assessed by tests such as the REALM, TOFHLA and the MART, or to conducting assessment with less biased methods.

6.2.1 Potential Benefits

Applying a discourse or ideological model to health literacy assessment would have a number of benefits, including more realistic or balanced expectations about the health literacy proficiencies of healthcare professionals and patients. For instance, according to this model, it is realistic to expect that healthcare professionals will have close access to a secondary Discourse of health, and consequently that they will have a higher level of health literacy, as a result of their overt instruction and enculturation in the field.

Conversely, we can also not expect patients to have the same proximity of access to the Discourse of health. As a result of restricted access to the Discourse of health, patients will probably only demonstrate basic or 'functional' health literacy, as a result of incidental

vocabulary learning. They may be able to access a marginal Discourse of health that is dominated by the Discourse that healthcare professionals have access to, as such to a restricted code subject to the elaborated code of healthcare professionals. However, this Discourse is likely to assign them a particular subject position of 'patient' in a professional-patient structure.

Ideological health literacy research would make significant inroads in addressing the disparity between dominant and marginal health discourse, and between low and critical health literacy. This would involve researching the attitudes that the public have about health, including the language they use and the conversations they have with each other and with their healthcare providers. Similarly, this would involve studying similar conversations, language and attitudes that healthcare providers have with each other and with their patients.

One possible outcome is the reduction of the distance between dominant and marginal health Discourses, and a positive shift in power imbalances between healthcare providers and patients. There is considerable research currently directed at reducing this gap. A number of initiatives already in place in the United States concentrate on lowering the literacy level of healthcare communication to patients by raising awareness of the disparity in health literacy and its consequences amongst healthcare professionals and by giving them the tools to produce health promotions materials at a lower literacy level (for instance, Jacobson and Buck, 2003) This awareness raising is targeted at both in-service professionals and at those currently being educated to enter the field. The tools advocated by initiatives like the American Medical Association Foundation Health Literacy Program (2003), the Partnership for Clear Health Communication (2003) or the Plan Language Action Network typically measure readability of texts according to ratios of multisyllabic words, suggesting that the higher the number of multisyllabic words, the harder a text will be to read. While this may be true, these measures may be flawed because they are expressed as grade level equivalents, and because they do not take into account semantic complexity either at the word/concept or phrase level. Thus ideological health literacy research could develop better means of producing more readable and applicable health promotion materials.

However, focussing efforts solely on health professionals is one-sided, and attention should also be paid to interventions that seek to increase the health literacy levels of the average

citizen. An ideological model could take into account community-mediated health literacies that involve patients, and their written and spoken interaction about health, in a variety of wider social relationships, including friends, family, and pharmacists. This model would also be open to the assistance of healthcare professionals in negotiating health literacy issues with patients.

6.2.2 Potential Barriers

There could be a number of barriers to applying an ideological model to health literacy. Researching the discourse of health would focus on exposing implicit power imbalances or disparities in healthcare and health communications. Research from this perspective would examine the words and uses of language used to preserve and/or counteract those imbalances. Exploring dominant and marginal health discourses would be a difficult undertaking, prone to resistance from those who embody the dominant discourse and are reluctant to lose the status and social goods implied in those positions. Thus, one can expect resistance from healthcare professionals, who are either unaware of their dominant discourse roles or aware and keen to preserve the status quo, or even reluctant to change years of ingrained behaviour.

6.3 Recent Advances in Health Literacy

However, recent work in resolving health disparities in other areas, such as access and poverty, may prove beneficial to research on improving health literacy. Similarly, there is a growing awareness in the field of public health of the role of social connections, communication and culture in health literacy (Schillinger et al, 2003; Lee, Arozullah and Cho, 2003; Parikh, Parker, Nurss, Baker and Williams, 1996). Recent work in discourse analysis on health topics (Coupland and Willams, 2002; MacDonald, 2002) would also inform this research. Thus, the application of the ideological model and associated concepts such as multiliteracies and discourse analysis may become easier.

6.4 Recommendations for Conducting Further Research of Health Literacy

Given that there is a link between health education and the development of an ideologically aware, critical health literacy (Van Reusen, 1996), improving the provision of health education at schools would increase levels of health literacy across the population for future generations (St Leger, 2001). Assessment of this critical health literacy would best be conducted from an ideological paradigm, given both the typical use of informal methods of literacy assessment in education settings, and the association of such methods with an ideological model of literacy. Thus, research on assessment could be linked specifically to a health literacy education program. Such research has already been conducted in the U.S., for instance examining the effect of cardio-vascular disease education in a population of English-as-a-second-language (ESL) students (Elder et al, 1998), and would be valuable in South Africa.

However, while improving school-based health education may be important for South Africa's future, it would exclude many adults who already suffer as a result of the country's deprived educational history. Community health literacy programs could hopefully resolve this issue. Community-driven health literacy initiatives could overcome the inherent cultural insensitivity of health literacy assessment instruments and researching such initiatives would assist in the development of criteria for health literacy that were culturally and locally relevant.

Researching the assessment in a community health literacy initiative according to an ideological model would have to take into account a wide variety of factors and ideological issues surrounding health and health literacy. A comprehensive or ecological view would be necessary, a view that included social, environmental, organisational, political, historical, interpersonal and individual responses to literacy in a healthcare setting. Conducting research that adequately examined all of these issues would be an extensive and difficult process, but one which would be ideally situated in a given community, making it sensitive to local conditions.

In this regard, the use of ethnographic or participatory research methodologies may be most appropriate. Watters' (2003) description of an interdisciplinary literacy for health (ILH)

model, specifically developed for interventions in less developed settings, provides an example of how this could work.

Watters (2003, p. 50) suggests a comprehensive, ecological approach that draws in interdisciplinary collaboration from the disciplines of "anthropology, linguistics, literacy and nursing", as well as community leaders to develop a health literacy intervention. Presumably, nursing represents a healthcare component which could be replaced by collaboration from public health or pharmacy administration and practice researchers. Watters (2003, p. 51) refers to a six-step process that begins with fieldwork, in which "anthropological research and linguistic survey provide the necessary data and analysis to begin to understand the culture and language of the priority population". In this step, linguistic research can reveal phonological, syntactic, semantic and even orthographic data about the language of the target (or priority) population as well as socio-political attitudes towards the language.

The next step involves an environmental assessment, not only of social, political and economic factors that may affect the priority population, but also a review of all relevant epidemiological data. This is intended to identify factors which could contribute to or detract from the program. Collaborative development of materials follows, with input from all of the associated disciplines, and a field trial is then conducted.

This field trial should include representatives of the priority population whose role is to "review the materials and either accept or suggest additional modifications" (Watters, 2003, p.53). The next step that Watters recommends is diffusion through peer outreach, in which "literacy classes are first taught to respected leaders in the priority population who are willing to adopt and diffuse their knowledge to their community" (ibid) with the intention that these leaders both model literate behaviour and act as facilitators (similar to Padmore's (1993) concept of 'guiding lights') for literacy classes. The final step is to evaluate the effectiveness of the program and suggest modifications to benefit the continued implementation of the program. This model is built on peer facilitation to ensure community sustainability of health literacy instruction.

A comprehensive research project could study this process from start to finish, while smaller projects could evaluate specific steps. It is conceivable that researching the implementation of

an IHL model in South Africa could produce assessment techniques that address practical organisational considerations, meet community health literacy needs and yet not be culturally or ideologically biased. It is important to note that this would not produce an instrument that would work in all communities, but would at best, provide a model for developing unique, locally sensitive tests.

6.5 Closing Remarks

The discussion in this thesis of the modification and administration of the REALM in a local population has revealed a number of limitations in health literacy assessment in local settings. While the relexicalisation of the REALM has greatly increased its acceptability, the use of objective vocabulary tests, reading recognition and pronunciation as a measure of comprehension in assessment of health literacy are problematic. In other words, although modification does improve the content validity of the REALM, the construct validity of the test remains limited and is possibly constrained by the autonomous paradigm in which the most dominant conceptualisation of health literacy is situated. Unless efforts are made to improve the construct validity of the REALM and indeed of all standardised health literacy tests, no improvements in content validity can have any positive holistic effect.

However, in the short term, a holistic improvement may not be the primary goal. Given practical concerns like ease of use, speed of administration and training needed, perhaps some improvement of the REALM's content validity may be all that is required for it to be implemented and be useful in local settings. If this is the case, either the REALM-M or another version of this test, utilising the same method of relexicalisation and sampling locally available materials, can fulfil this role. It remains to be seen if the same principles can be applied to improve other health literacy tests, both in a South African context and elsewhere.

APPENDIX I

Directions for administering the REALM-M

1. Introduce yourself to the respondent and explain the purpose of the study. Say the following:

   "Hi, my name is ..... and I stay in ..... Here with me is Chris La Rose, who is studying at Rhodes University. Chris is doing a project for his studies and I was wondering if you could help us with the project. We are testing to see how well people know health-related words. Would you like to help us?"

   If they indicate consent, you need to ask them:

   "Can you tell us if you can read English or not, as we need you to read a list of medical words."

   If they again agree to participate, say:

   "Please make yourself comfortable, this won't take long. Before we begin, could you answer a few questions about yourself and about what you read at clinics?"

2. Administer the literacy practices questionnaire and then the demographic questionnaire.

3. Give the respondent a laminated copy of the REALM and score answers on an unlaminated copy that is attached to a clipboard. Hold the clipboard at an angle so that they are not distracted by your scoring procedure. Say:

   "I want to hear you read as many words as you can from this list. Begin with the first word in Column 1 and read aloud. When you come to a word you cannot read, do the best you can or say 'blank' and go on to the next word."

4. If the respondent takes more than 5 seconds on a word, say 'blank' and point to the next word, if necessary, to move the patient along. If they begin to miss every word, have him/her pronounce only known words.

5. Record the time per list. Count as an error any word not attempted or mispronounced. Score by marking a plus (+) after each correct word, a tick (✓) after each mispronounced word, and a minus (-) after words not attempted. Count as correct any self-corrected word.

6. Go through the list again, and ask the respondent to try and define each of the words. Count as an error any explanations which do not match the sense of the sample definition provided for each word.

7. Thank the respondent for their time, give them their gratuity and make sure they sign for it.

APPENDIX II

RAPID ESTIMATE OF ADULT LITERACY IN MEDICINE- MODIFIED (REALM –M)

PATIENT COPY

REALM-M has been developed to assess the ability of an adult patient in a local setting to read and understand common medical terms and lay terms for body parts and illnesses. It is designed to ultimately assist medical professionals in estimating a patient's literacy level so that the appropriate level of patient information materials or oral instruction may be used. It is based on health information materials available in local clinics. Thus it also tests the effectiveness of health information materials such as posters or pamphlets.

An attached questionnaire has been added to gather data on literacy practices in primary healthcare settings.

EAT	DROPS	STOMACH
FAT	FEVER	SWOLLEN
FLU	HEART	BACTERIA
BABY	LIVER	BREATHING
BODY	VOMIT	EXERCISE
CURE	WATER	MEDICINE
DOSE	CONDOM	REACTION
FOOD	CONTACT	DANGEROUS
IRON	DOCTOR	INFECTION
LUMP	HEALTH	SYMPTOMS
LUNG	HIV/AIDS	PROTECTION
PAIN	IMMUNE	TRANSMITTED
PILLS	SEXUAL	ANTIBIOTICS
RASH	SLEEPY	HEADACHES
SICK	THROAT	EMERGENCY
SKIN	WEIGHT	PREGNANCY
SORE	ALCOHOL	VACCINATION
TEST	ALLERGY	MALNUTRITION
BLOOD	DISEASE	TUBERCULOSIS
CLEAN	PATIENT	MENSTRUATION
COUGH	PREVENT	BREASTFEEDING
CLINIC	SMOKING	CONTRACEPTION

RAPID ESTIMATE OF ADULT LITERACY IN MEDICINE- MODIFIED (**REALM –M**)

Patient Name/ Subject #_____ Reading Level_____
Date of Birth_____ Grade
Date_____. Clinic_____ Completed_____
Examiner_____

Scoring the REALM-M Test

List 1	Reading		Understanding	
EAT			Put (food) into the mouth and chew and swallow it	
FAT			A natural oily substance in animal bodies especially when deposited under the skin or around certain organs or a person having too much excess fat.	
FLU			Influenza or any similar milder infection, symptoms of which are	
BABY			A child or animal that is newly born	
BODY			Physical structure including the bones, flesh or organs of a person or animal	
CURE			To relieve of the symptoms of a disease or condition by treatment or remedial action	
DOSE			A quantity of medicine or drug taken at one time	
FOOD			Any nutritious substance that people or animals eat or drink or that plants absorb in order to maintain life or growth	
IRON			A strong hard magnetic silvery-grey metal used as a nutritional supplement	
LUMP			A swelling under the skin	
LUNG			Each of a pair of organs within the ribcage into which air is drawn by breathing so that oxygen can pass into the blood and carbon dioxide be removed	
PAIN			A strongly unpleasant bodily sensation such as is caused by illness or injury	
PILLS			A small round mass of solid medicine for swallowing whole	
RASH			An area of reddening of a person's skin sometimes with raised spots	
SICK			Affected by mental or physical illness	
SKIN			Thin layer of tissue forming the natural outer covering of the body of a person or animal	
SORE			Painful or aching, suffering pain or a wound	
TEST			A procedure used to establish the quality, performance or reliability of something, or an examination of the body for medical purposes	
BLOOD			The red liquid that circulates in the arteries and veins carrying oxygen to and carbon dioxide from the tissues of the body	
CLEAN			To free from dirt, pollutants or harmful substances	
COUGH			Expel air from the lungs with a sudden sharp sound or a condition of the respiratory organs causing coughing	
CLINIC			A place where specialised medical treatment or advice is given	

Time taken to read this List _____.

Total number words adequately defined _____.

List 2	Reading		Understanding	
DROPS			Liquid medication applied in very small amounts	
FEVER			An abnormally high body temperature usually accompanied by shivering, headache, and in severe cases, delirium	
HEART			A hollow muscular organ that pumps blood through the circulatory system by rhythmic contraction and dilation	
LIVER			A large lobed glandular organ in the abdomen involved in processing digestive products, neutralising toxins, secreting bile and other metabolic processes	
VOMIT			Eject matter from the stomach through the mouth, emit in an uncontrolled stream or flow	
WATER			Liquid which forms the seas, lakes, rivers and rain and is the basis for the fluids of all living organisms	
CONDOM			A thin rubber sheath worn on the penis during sexual intercourse as a contraceptive or to protect against infection	
CONTACT			The state or condition of physical touching	
DOCTOR			A person qualified to practice medicine	
HEALTH			A state of being free from illness or injury	
HIV/AIDS			Abbreviation for human immunodeficiency virus, a retrovirus which causes AIDS	
IMMUNE			Resistant to a particular infection owing to the presence of specific antibodies or sensitised white blood cells	
SEXUAL			Relating to the instincts, physiological processes and activities connected with physical attraction or intimate physical contact between individuals	
SLEEPY			Needing or ready for sleep	
THROAT			Passage which leads to the aback of the mouth of a person or animal	
WEIGHT			A body's relative mass or the quantity of the matter contained by it, giving rise to a downward force.	
ALCOHOL			A colourless, volatile, flammable liquid which is the intoxicating constituent of wine, beer, spirits, etc	
ALLERGY			A damaging immune response by the body to a substance to which it has become hypersensitive	
DISEASE			A disorder of structure or function in a human, animal or plant, especially one that produces specific symptoms or that affects a specific part	
PATIENT			A person receiving or registered to receive medical treatment	
PREVENT			To keep from happening or arising	
SMOKING			To inhale and exhale the smoke of tobacco or a drug	

Time taken to read this List _____.

Total number words adequately defined _____.

List 3	Reading		Understanding	
STOMACH			An internal organ in which the first part of digestion occurs, being in humans and many mammals, a pear-shaped enlargement of the alimentary canal linking the oesophagus to the small intestine	
SWOLLEN			Past participle of swell, to become larger or rounder in size, especially as a result of accumulation of fluid	
BACTERIA			Unicellular micro-organisms which have cell walls but lack an organised nucleus and other structures, and include man disease-causing forms	
BREATHING			Taking air into or expelling from the lungs	
EXERCISE			Activity requiring physical effort carried out for the sake of health and fitness	
MEDICINE			A drug or other preparation for the treatment and prevention of disease	
REACTION			An instance of reacting to or against something, to respond in particular way or with particular behaviour	
DANGEROUS			Able or likely to cause harm or injury	
INFECTION			The process of infecting or state of being infected (to affect someone with a disease-causing organism	
SYMPTOMS			A feature which indicates a condition of disease, in particular one apparent to the patient	
PROTECTION			To keep safe from harm or injury	
TRANSMITTED			To cause to pass on from one place or person to another	
ANTIBIOTICS			A medicine that inhibits the growth of or destroys micro-organisms	
HEADACHES			A continuous pain in the head	
EMERGENCY			A serious, unexpected and potentially dangerous situation requiring immediate action	
PREGNANCY			The condition or period of being pregnant (of having a child or young developing in the uterus)	
VACCINATION			To treat with a vaccine to provide immunity against a disease	
MALNUTRITION			Lack of proper nutrition caused by not having enough to eat, not eating enough of the right things or being unable to use the food eaten	
TUBERCULOSIS			An infectious bacterial disease characterised by the growth of nodules in the tissues, especially the lungs	
MENSTRUATION			Discharge of blood and other material from the lining of the uterus at intervals of about one lunar month	
BREASTFEEDING			Feed (a baby) with milk from the breast	
CONTRACEPTION			The use of artificial methods or other techniques to prevent pregnancy	

Time taken to read this List _____.

Total number words adequately defined _____.

TIME
Column 1_____
Column 2_____
Column 3_____
Total Time Taken_____

SCORE
List 1_____
List 2_____
List 3_____
List 4_____
Raw Score_____

Section 1: Literacy Practices Questionnaire

1.1 How often do you visit the clinic?

Twice a month[1]	Once a month[2]	Every 2 months[3]	Every 6 months[4]	1
Once a year[5]	Other[6] : Specify:			

1.2. When you visit the clinic, how long do you wait before you are attended to?

Within 15 mins[1]	15 – 30 mins[2]	30 mins – 1 hour[3]	1 – 2 hours[4]	Other[5] : Specify:	2

1.3 Do you read the posters while you wait?

Yes[1]	No[2]	3

1.4 How helpful is the information on the posters?

Very helpful[1]	Helps sometimes[2]	Not helpful[3]	4

1.5 How easy is it to understand the English on the posters?

Very easy[1]	Sometimes difficult[2]	Very difficult[3]	5

1.6 Do you read the pamphlets available at the clinic?

Yes[1]	No[2]	6

1.7 Do you take any of the pamphlets home to read?

Yes[1]	No[2]	7

1.8 How helpful is the information in the pamphlets?

Very helpful[1]	Helps sometimes[2]	Not helpful[3]	8

1.9 What sort of information do you choose to read about?

Nutrition[1]	Pregnancy and Childrearing[2]	Sexually Transmitted Diseases[3]	9

1.10 How easy is it to understand the English on the pamphlets?

Very easy[1]	Sometimes difficult[2]	Very difficult[3]	10

1.11 Other than the posters and pamphlets available at the clinics, where else do you find out about health issues?

Friends	Yes[1]	No[0]	11
Family	Yes[1]	No[0]	12
Doctors/nurses	Yes[1]	No[0]	13
Magazines/Books	Yes[1]	No[0]	14
Radio/TV	Yes[1]	No[0]	15
Traditional healer	Yes[1]	No[0]	16
Pharmacist	Yes[1]	No[0]	17
Herbalist	Yes[1]	No[0]	18
Other- Specify	Yes[1]	No[0]	20

1.12 Do the doctors/nurses encourage you to read the posters and pamphlets?

Yes[1]	No[2]	21

1.13 Do the doctors/nurses help you to read the posters and pamphlets?

Yes[1]	No[2]	22

Section 2: Demographics Questionnaire

NAME OF INTERVIEWER: _____ | | 23

TEST SITE: _____ | | 24

NAME OF RESPONDENT: _____ | | 25

2.1 Gender

Male [1]	Female [2]		26

2.2 Age

< 21 [1]	21–40 [2]	40–65 [3]	> 65 [4]		27

2.3 Race

Asian [1]	Black [2]	Coloured [3]	White [4]		28

2.4 Home Language

Xhosa [1]	English [2]	Afrikaans [3]	Sesotho [4]	Other [5]	29	30

If 'Other', please specify _____

2.5 Language Proficiency:

	Listen [1]	Listen + Speak [2]	Listen + Speak + Read [3]	Read only [4]		
Home Language						31
English						32
Afrikaans						33
Other (specify) _____						34

2.6 Highest education qualification (Grade = Standard + 2)

None [1]	Grade 1 [2]	Grade 2 [3]	Grade 3 [4]	Grade 4 [5]	Grade 5 [6]	Grade 6 [7]	35
Grade 7 [8]	Grade 8 [9]	Grade 9 [10]	Grade 10 [11]	Grade 11 [12]	Grade 12 [13]	Tertiary [14]	

2.7 Place of Residence

Suburbs[1]	Township[2]	Farm[3]
Hostel[4]	Other[5] (specify):	

36

2.8 Are you currently employed?

Yes[1]	No[2]

37

2.9 If unemployed, in what area were you previously employed?

Clerical[1]	Farm[2]	Labourer[3]	Domestic[4]	Education[5]
Shop assistant[6]	Hospital worker[7]	Self-employed[8]	Other[9]: Specify:	

38 39

2.10 Where are you working now?

Clerical[1]	Farm[2]	Labourer[3]	Domestic[4]	Education[5]
Shop assistant[6]	Hospital worker[7]	Self-employed[8]	Other[9]: Specify:	

40 41

2.11 Can you tell the time from a clock face?

Yes[1]	No[2]	Digital time only[3]	Both[4]

42

Section 3: Grading the Test
Scoring System as per the REALM grading system

3.1 Pronunciation of the words

List 1	0 – 6 [1]	7 – 14 [2]	15 – 20 [3]	21 – 22 [4]	43
List 2	0 – 6 [1]	7 – 14 [2]	15 – 20 [3]	21 – 22 [4]	44
List 3	0 – 6 [1]	7 – 14 [2]	15 – 20 [3]	21 – 22 [4]	45
Overall	0 – 18 [1]	19 – 44 [2]	45 – 60 [3]	61 – 66 [4]	46

3.2 Understanding of the words

List 1	0 – 6 [1]	7 – 14 [2]	15 – 20 [3]	21 – 22 [4]	47
List 2	0 – 6 [1]	7 – 14 [2]	15 – 20 [3]	21 – 22 [4]	48
List 3	0 – 6 [1]	7 – 14 [2]	15 – 20 [3]	21 – 22 [4]	49
Overall	0 – 18 [1]	19 – 44 [2]	45 – 60 [3]	61 – 66 [4]	50

3.3 Length of time it takes to read the test

≤ 3 mins [1]	> 3 – 5 mins [2]	> 5 – 10 mins [3]	> 10 mins [4]	51

3.4 Reading Score as per the original REALM grade ranges

0 – 18 [1] (≤3rd grade)	19 – 44 [2] (4th – 6th grade)	45 – 60 [3] (7th – 8th grade)	61 – 66 [4] (≥9th grade)	52

3.5 Understanding Score as per the original REALM grade ranges

0 – 18 [1] (≤3rd grade)	19 – 44 [2] (4th – 6th grade)	45 – 60 [3] (7th – 8th grade)	61 – 66 [4] (≥9th grade)	53

3.6 Number of words the patient could read but not understand (indicates failure of an item)

List 1	None [1]	≤3 [2]	4 – 7 [3]	8 – 11 [4]	≥ 12 [5]	54
List 2	None [1]	≤3 [2]	4 – 7 [3]	8 – 11 [4]	≥ 12 [5]	56
List 3	None [1]	≤3 [2]	4 – 7 [3]	8 – 11 [4]	≥ 12 [5]	57
Overall	None [1]	≤3 [2]	4 – 7 [3]	8 – 11 [4]	≥ 12 [5]	58

3.7 Total actual reading score (see page -3-) 59

3.8 Total actual understanding score (see page -3-) 60

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