

**TRANSLATION OF THE REY AUDITORY VERBAL LEARNING TEST INTO
ISIXHOSA, ITS APPLICATION AND COMPARISON TO EXISTING NORMS**

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STATEMENT

I, Dorothy Calata, hereby declare that the work contained in this thesis is my own original work, and that I have not previously in its entirety or in part submitted it at any university for a degree.

ABSTRACT

In the present study the Rey Auditory Verbal Learning Test (RAVLT) is translated into IsiXhosa, applied in either English or IsiXhosa, and results are compared to the norms of Wiens, McMinn and Crossen (1988). The aim is to provide a neuropsychological test to assess an IsiXhosa-speaking population with 15 or more years of education. It is also to determine the feasibility of assessing people in a second language if they have high proficiency in that second language, or to consider new norms for a South African population. Participants were 62 “healthy” male and female IsiXhosa and English home language speaking teachers, aged between 30 and 39 years, selected from schools in the Eastern Cape. The Rey Auditory Verbal Learning Test and the instructions of the Rey Complex Figure are translated into IsiXhosa, and these are applied onto 3 subgroups: English in their home language; IsiXhosa in their home language; IsiXhosa in a Second Language, English. When the home languages groups are compared, the English home language group fared better on some trials than the IsiXhosa home language group. Between the Home Languages and the Second Language group, the former did better on some trials. However, most trials were compatible between these groups. When results from this study were compared to norms of Wiens et al. (1988), the South African population achieved higher scores on most trials. They seemed to learn more words, make fewer errors and repetitions, while the norm group recalled more words on Trial 1 and the Percentage Recall Trial (with an exception to the Home languages group). The compatibility of groups and the better South African results led to the conclusion that assessments might be done in the second language - English, if the person is proficient, and meets the criteria for the current study population.

OPSOMMING

In die huidige ondersoek is die *Rey Auditory Verbal Learning Test* (RAVLT) in IsiXhosa vertaal, toegepas in Engels en in IsiXhosa, en die resultate vergelyk met die norms van Wiens, McMinn en Crossen (1988). Die doel was om 'n neurosielkundige toets beskikbaar te stel wat toegepas kan word op IsiXhosa-sprekende persone wat minstens 15 jaar skool- en na-skoolse onderrig ontvang het. 'n Verdere doel was om vas te stel of dit wenslik sou wees om die toets toe te pas in gevalle waar Engels die persoon se tweede taal is, en ook om nuwe norms vir 'n Suid Afrikaanse populasie te bereken. Die deelnemers was 62 "gesonde" manlike en vroulike Engels- en IsiXhosa-sprekende onderwysers, tussen die ouderdomme van 30 en 39 jaar, afkomstig uit skole in die Oos-Kaap. Die *Rey Auditory Verbal Learning Test* en die instruksies van die *Rey Complex Figure* is in IsiXhosa vertaal, en op drie sub-groepe toegepas: Engels in hul moedertaal; IsiXhosa in hul moedertaal, en IsiXhosa in 'n tweede taal, Engels. 'n Vergelyking van die moedertaalgroepe het aangetoon dat die Engels- moedertaalgroep beter in sommige toetse ("trials") gepresteer het as die IsiXhosa-moedertaalgroep. 'n Vergelyking van die IsiXhosa moedertaalgroep met die tweede taal-groep het aangetoon dat die moedertaalgroep beter in sommige toetse (*trials*) gepresteer het as die tweede taal-groep. 'n Vergelyking van die IsiXhosa moedertaalgroep met die Tweede taalgroep het aangetoon dat die moedertaalgroep beter in sommige toetse (*trials*) gepresteer het as die tweede taal-groep. Die groepe het oor die algemeen baie goed met mekaar vergelyk. Die resultate van hierdie ondersoek is ook met die norms van Wiens et al. (1988) vergelyk: die Suid Afrikaanse groep het oor die algemeen hoër tellings behaal. Dit het geblyk dat die deelnemers meer woorde kan aanleer, minder foute gemaak het, en dat minder herhalings nodig was. Die normgroep van Wiens et al. (1988) het op die "*Trial 1*" en die "*Percentage Recall Trial*" (behalwe die moedertaalgroepe) meer woorde herroep. Die resultate van hierdie ondersoek dui daarop dat, indien voldoen aan die kriteria wat in die huidige projek gebruik is, die RAVLT wel in 'n toetsling se tweede taal (Engels) afgeneem kan word indien die persoon se vaardigheid in die taal goed is.

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INTRODUCTION

Normative data for most tests are lacking (Mitrushina, Boone & D'Elia, 1999). The use of inappropriate comparison data may lead to faulty inferences being drawn (Mitrushina, Boone & D'Elia, 1999). In a country as diverse as South Africa faulty inferences may often be drawn due to the lack of normative data and assessment procedures, resulting in either unnecessary treatment or therapeutic neglect. Against a historical background where invalid and inappropriate psychometric test results have been racially abused, one way of preventing this may be by contributing suitable procedures (Anastasi, 1982; Boon, 2000; Foxcroft & Roodt, 2001).

In South Africa, no study could be traced from literature that focused on translation, application, and comparison of the Rey Auditory Verbal Learning Test (RAVLT). The area of translation, application, and comparison of the RAVLT on an adult population seems to have received little attention from researchers, and particularly from those whose focal interests lie in the specialised discipline of Clinical Neuro-psychology. This is despite the culturally- and linguistically diverse nature of the country. However the need for the use of such tests as the RAVLT arguably seems to be very high, as people whose home language is *IsiXhosa* (see addendum B) who have sustained head injuries have to be assessed. Nell (2000) supports this statement by saying that "there are many brain-injured people in the developing countries of Africa, Asia, and South America, as well as those who work in isolated areas of the developed countries, to whom specialized clinical neuropsychology services are unavailable or inaccessible" (p. 108-109).

A few studies exist although patients from all cultural and linguistic backgrounds present with a need to be assessed following traumatic head injuries, closed head injuries, or degenerative conditions to the country's various hospitals and neuropsychological clinics. Nell (2000) states that diffuse traumatic brain injuries are the most commonly encountered type of brain damage worldwide. These are caused by the application of violent *accelerative* or *decelerative* (see addendum B) forces to the head (Moselenyane, 1989; Nell, 2000). Reitan and Wolfson (quoted in Moselenyane, 1989) state that "there is a relationship between types of brain injury and the mechanism that cause it" (p. 15). Injuries resulting from penetrating wounds, focal and diffuse damage share the same mechanism (Moselenyane, 1989). In South Africa 73% of all brain injuries among white males are the result of traffic accidents (Nell, 2000) while according to Channabasavanna, Gururaj, Das and Kaliaperumal, and Romer et al. (cited in Nell, 2000) in other countries the latter account for between 60% and 80% of all brain injuries. Nell and Brown (1990) state that among Black South Africans, however, interpersonal violence accounts for 51% of diffuse

brain injuries, while traffic accidents account for only 30% of all brain injuries. The large pool of diffuse traumatic brain injuries is augmented by other etiologies of diffuse brain damage such as anoxic episodes, neuro-toxicity, HIV infection, and degenerative processes such as Alzheimer's disease and Parkinsonism (Nell, 2000). Sadly, this kind of paradoxical neglect remains a stark reality for those population groups into whose languages these neuropsychological tests have not been translated and applied - a factor enough to warrant continued research in this specific area.

Adequate description of memory impairment in individuals requires a standard procedure of comparison with appropriate (complete) measures on a well-specified normal sample (Geffen, Moar, O'Hanlon, Clark & Geffen, 1990).

There is a need for assessment tools in IsiXhosa. The Western Cape has three official languages: Afrikaans, English and IsiXhosa (Grobler, Prinsloo, & Van der Merwe, 1990; Swartz, Drennan & Crawford, 1997). The language distribution in this province is 59.2% for Afrikaans, 20.3% for English, 19.1% for IsiXhosa and all others are less than 1% (Statistics South Africa, 2002). According to E. Daffue of the Health Professions Council IT helpdesk, there were 1171 registered psychologists in the Western Cape Province as at 15 January 2003 (personal communication, January 29, 2003). Their racial distribution is as follows: 459 *White*; 22 *Coloured*; 15 *Black*; 12 *Asian*; 5 *European* (see addendum B). There are no data recorded for 658 people. The home language of these psychologists was not given, but it is assumed to be markedly under proportion as well.

The three institutions that offer full-time Masters courses in Clinical Psychology in the Western Cape made available the following statistics for students enrolled from the years 1998 - 2002. The University of Cape Town (UCT) had a total of 40 students in their Clinical Psychology course, and only 2 of those were IsiXhosa speaking (A Turner, personal communication, March 19, 2003). The University of Stellenbosch (US) had 44 students enrolled for the Clinical Psychology course, only 3 were *African* (see addendum B) and IsiXhosa speaking (A. T. Möller, personal communication, February 18, 2003). The University of the Western Cape (UWC) had a total of 56 students and 10 spoke African Languages (this number includes, Clinical or Counselling and Education Psychology students; the exact number of IsiXhosa speakers is unknown) (L Daniels, personal communication, February 14, 2003). Although some institutions (for example UCT) require candidates to be able to speak an African language for selection into the Masters course, it is evident that not enough IsiXhosa home language-speaking students enrol for this course. This results in an unequal proportion of clinical psychologists who are IsiXhosa speaking in the province. There is a

relatively small proportion of IsiXhosa-speaking psychologists trained in this province, for example, trainees make up 10.71% of all students in a population where 19.1% speak IsiXhosa as their home language. This makes it difficult to assess IsiXhosa-speaking individuals, who comprise a large part of the provincial population.

Against this backdrop, it would be significant to note how much impact and contribution the translation, application, and comparison of the RAVLT to the existing norms could make in countering this paradoxical neglect. Such a study would be important in a country like South Africa where testing has previously been used as a means to legitimize racial segregation and compartmentalizing racial groups into different and unequal intellectual levels (Boon, 2000; Jordan, 1998). Hence, justifying subjugation of one racial group by others (Jordan, 1998). This contribution will be of financial benefit to South Africans, as a test with an international reputation and international research will be applied, cutting out the creation of a new one (Nell, 1994; Shuttleworth-Jordan, 1996). (See addendum A for more detail).

As it is clear there is a great need for neuropsychological assessments, language is important in testing, so tools must be availed for other language groups, and there are no norms. This study was prompted by the scepticism with which established norms have to be used with second language speakers.

AIMS

The aims of this study were:

1. to translate the RAVLT into IsiXhosa;
2. to apply the IsiXhosa and the English versions on participants in their home languages;
3. to compare between existing norms and the values that resulted from the current study;
4. to apply the RAVLT on people in a second language, speaking with high proficiency in the second language.

A further aim is to ascertain if the results would make it possible for *clinicians* (see addendum B) to use existing RAVLT norms on an IsiXhosa home language speaking population with 15 or more years of education, or to consider new norms for a South African population. This investigation drew on the work of Foxcroft and Roodt (2001), who made the following observation:

Assessment measures are closely linked to the context in which they are designed. A measure is usually designed in a certain context (society, culture) for a specific purpose, and the normative information used to interpret test performance is limited to the characteristics of the normative

sample. Consequently, the appropriateness of an assessment measure for an individual, group, or organization from another context, culture, or society cannot be assumed without an investigation into possible test bias and without strong consideration being given to adapting and re-norming the measure. (p. 6)

LITERATURE REVIEW

Andre Rey, the Swiss psychologist, developed the RAVLT as a measure of verbal learning and retention and he provided the initial norms for French-speaking children and adults (Mitrushina et al, 1999; Savage & Drew Gouvier, 1992). The test was adapted to the English language by Taylor (Savage & Drew Gouvier, 1992). Ivnik, Malec, Tangalos & Petersen (1990) stated that the RAVLT has gained acceptance as a useful tool in neuropsychological assessment. It has achieved this because of its ease of administration, the information it provides regarding the learning curve, interference effects and recognition memory (Ivnik, Malec, Smith, Tangalos, Petersen, Kokmen, & Kurland, 1992; Lezak, 1983, 1995; Mitrushina, Satz, Chervinsky & D'Elia, 1991; Querry & Berger, 1980; Ryan, Geisser, Randall & George-miller, 1986; Vakil & Blachstein, 1993, 1994, 1997).

The scores reflected a verbal learning factor and a verbal memory factor. The first five learning trials were expressed as: learning curve, immediate memory (Trial 1), and best learning (Trial 5). Then there were scores indicative of the learning rate and total learning (Vakil et al., 1997). Querry, Randy & Berger (cited in Vakil et al., 1997) stated that the learning rate (Trial 5 minus Trial 1 score) represented the learning ability of the participant. Total learning (sum of the scores of Trials 1 to 5) represented the capacity to recall and accumulate words across learning trials (Vakil et al., 1997).

Information about the different measures of memory was retrieved; immediate recall, delayed recall, learning rate, recognition, proactive interference, retroactive interference, primacy effect, and recency effect (Vakil et al., 1997). According to Lezak (1995), learning strategies – or their absence – was revealed.

Normative studies using the more recent procedure of the Auditory Verbal Learning Test or parts of it were still incomplete, because some of them also had sampling problems such as using patient populations, excluding females or small samples (Geffen et al., 1990; Ivnik et al., 1992; Vakil & Blachstein, 1997).

The RAVLT lacked adequate norms until several studies recently examined the test's performance in several populations. Among these a few normative studies based on large samples of healthy people have been published (Spreen & Strauss, 1991). These values showed wide discrepancies, depending on who has been assessed, and whether age, gender or education was used as normative data. Available studies showed that age and gender accounted for a significant portion of the variance of scores, with younger individuals and females performing better than older individuals and males (Bleeker, Bolla-Wilson, Agnew & Meyers, 1988; Bolla-Wilson & Bleeker (cited in Savage & Drew Gouvier, 1992), Geffen et al., 1990; Querry & Megran, 1983).

Wiens, McMinn and Crossen (1988) published norms for 222 male and female job applicants aged between 20 and 49 years and have completed at least 12 years of education. They reported that a number of subjects had completed secondary school by passing equivalency examinations and have gained college credits. Several subjects had completed a year or more of graduate education. Their sample's education was presented as follows: $M = 14.5$ years; $SD = 1.5$; Range 12 - 19 years (Wiens et al., 1988).

Selnes et al. (1991) reported normative data for 733 sero-negative homosexual/ bisexual men stratified by age (ranging between 25 and 54 years) and education. Subjects were stratified by three levels of education: less than a college degree (<16 years), college degree (16 years), and some graduate work (> 16 years) (Selnes et al., 1991).

In all the studies where the influence of intelligence and educational levels of subjects on RAVLT performance have been evaluated, findings suggested that both these variables exerted weak and inconsistent influences on memory (Savage & Drew Gouvier, 1992). Wiens et al. (1988) reported insignificant recall on the last three RAVLT trials and the post-distraction recall trial as a function of Intelligence Quotient.

Anderson (2000) developed norms for 163 Zulu-speaking children. These norms were stratified by age, sex, and rural or urban school background (Nell, 2000). The pupils were assessed on the RAVLT Trials (1-5) and the interference list (List B) only (Anderson, 2000). Very few other studies on the RAVLT were available in South Africa.

Although a few studies existed for the RAVLT, there was some data available for studies using other tests.

Several cross-cultural studies have shown differences between the results of South Africans and international norms, and differences between results of White and Black South Africans as in the examples below (Avenant, 1988; Nell, 2000). When United States and South African norms were compared on the Logical Memory task of the Wechsler Memory Scale, the well-educated South Africans did as well as, if not better than, the Americans. However, the factory workers achieved about a standard deviation below their better-educated compatriots (Nell, 2000). Jordan (1998) inferred that these results suggested that memory is a school-developed skill. Other authors further stated that despite the dependence of illiterate or semiliterate people on memory not reinforced by written reminders, narrative memory remains education dependent (Anastasi, 1982; Jordan, 1998; Nell, 2000).

Results of the Benton Visual Retention test were compared and the six younger European samples achieved a mean recall of 8.9 designs, with a mean standard deviation of 1.1 (Nell, 2000). The mean was two standard deviations lower for Asian samples, and three standard deviations lower for South American and South African samples (Nell, 2000).

According to Nell (2000), in South Africa the well-educated subjects did very well on the Digit Span, with standard scores between 8 and 12, whilst the worker group mean were uniformly 2 or more standard deviations below the US mean.

This all means that the higher the level education of the group assessed, the better their performance on tests, and the more compatible they are to international groups, but this may not always be the case, as seen in the following examples.

Avenant (1988) reported the WAIS-R performances of 203 Black South Africans, of whom 140 were prison wardens with an education of between 9 and 12 years, and 63 were undergraduate students at the *all-Black universities* (see addendum B). Avenant (1998) stated that the test was adapted for administration in English by trained testers by replacing unfamiliar American items by similar items from the SAWAIS, and discontinuation rules were abandoned except in the Digit Span test.

Results of this WAIS - R study indicated that the Black South African undergraduates performed one standard deviation below the United States age on the first three items of the verbal scale and on Block Design (Avenant, 1988). This group mean was also more than a standard deviation below the norm for Picture Completion, Picture Arrangement and Object Assembly and not significantly

below the mean on Digit Span and Similarities (Avenant, 1988). Their Full Scale IQ (FSIQ) was 1.3 standard deviations below the norm. The less educated prison wardens fared worse with an FSIQ 1.8 standard deviations below the US norm (Nell, 2000).

Preliminary data gathered by UNISA Health Psychology Unit for 157 Black South Africans with less than 12 years of education, "raised similar concerns" that this group scored between 1 and 2 standard deviations below the U.S. WAIS-R norms (Nell, 2000, p. 27).

There is no reason to believe that these individuals have a lower ability level than the age-matched U.S. and English norm groups with whom they are compared. The alternative hypothesis is that for whatever reason, the Wechsler tests lack validity for these subjects, and in their use for such subjects would violate fundamental equity principles (i.e., the South African legislature's prohibition on the use of psychometric tests that are invalid or biased). (Nell, 2000, p. 27)

Avenant (1988) and Nell (2000) have speculated that language could be contributing to these differences for these participants were assessed in English. One could speculate about education level or quality of education playing a role too. It would be interesting to see findings of the present study - for a population with a minimum of 15 years of education was used. The groups in this study were matched for age and education (for the Delayed Trial), and two groups are assessed in their home languages.

Van den Bergh (cited in Nell, 1994) said the following about the importance of language:

Language is the single moderator of test performance, since the language in which the test is administered may make a range of concepts available to a non-native speaker of that language that are inaccessible in the speaker's home language, or, conversely, the translated version of a western test may deny the testee access to the language medium through which he or she has acquired most of his or her knowledge and experience. (p. 107)

According to Swartz et al. (1997), language is the primary medium of assessment and probably the primary medium of treatment as well. Translation of this tool would support the view of Swartz et al. (1997) that access to resources need not in the future be unequal because of race and language.

HYPOTHESES

H_0

IsiXhosa mother-tongue speakers and English mother-tongue speaking participants will perform equally well when assessed with the RAVLT in their mother tongues.

H_1

English mother-tongue speaking participants will perform better on the RAVLT when assessed in their home language than the IsiXhosa mother-tongue speakers who went through the South African education system prior to 1994.

H_0

People assessed in their second language (English) will not perform better than people assessed in their home languages.

H_2

People assessed in their second language (English) will perform better than people assessed in their home languages.

METHOD

Participants

There were 62 participants in the study. These participants were matched for age, education and gender. Participants included in the study had to meet the following inclusion criteria: they had to be healthy, with no history of head injuries with loss of consciousness, alcoholism, mental illness, neurological disease, or other conditions associated with impaired memory functioning. This was in line with many previous studies, for example Bleeker et al. (1988); Ivnik et al. (1990); Naeser, Albert, Duffy and McNulty, (cited in Savage & Drew Gouvier, 1992) also used the same inclusion criteria. Potential participants who endorsed any of these conditions were excluded from the analysis. For example participants who only later admitted to alcoholism ($n = 1$); cerebrovascular illness ($n = 1$); motor vehicle accident with loss of consciousness longer than 5 minutes ($n = 1$); neurosurgery ($n = 2$); meningitis and encephalitis ($n = 1$); epilepsy and seizures ($n = 2$), were retroactively excluded.

An initial total of 78 teachers selected from schools in the Eastern Cape were assessed. Schools were selected for their instruction medium. Participants were pre selected for their home language, and then all home language speaking teachers in participating schools were randomly selected. See demographic details of the final group analysed in Table 1 and the language distribution in Table 2.

Table 1

Descriptive Statistics for the Total Group. (N = 62)

	Minimum	Maximum	Mean	Standard Deviation (SD)
Age	30	39	34.82	2.70
Years education	15.0	20.0	16.5	1.29
Years employed	.5	18.0	8.17	4.03

Table 2.

Language Distribution of the Total Group.

Number of testees	Language of testing	Language Category	Subjective Language Proficiency
English	17	Home Language	80 -100 %
IsiXhosa	23	Home Language	80 - 100%
English	22	Second Language	60 - 80 %

Although not intended for this purpose, the RCF served incidentally to act as a second screening measure when its unanticipated results appeared. Many individuals achieved low scores when their raw scores were compared to Lezak (1983). Some individuals achieved in the "below average" range (24th - 11th percentile), and "borderline" range (10th - 4th percentile). These results were much lower than expected that neurological impairments such as visuo-spatial or planning difficulties were possibly indicated. This prompted the examiner to return to all participants and re-investigate their personal history. Some had important history (as seen in Participants) that they were reluctant to disclose before, or had "forgotten" to admit, resulting in a total of 8 people being excluded as they did not meet the initial inclusion criteria. Therefore N = 78, became N = 70.

One person's results were not considered because she wrote the answers on her hand in the first trials of the RAVLT, and N = 70, became N = 69.

People who were 40 years old were also assessed. There were only 7 individuals in this age range (2, 2 and 3 in each subgroup respectively). The number was not enough to analyse and the data

were not used for analysis purposes in the present study. For pure cross-analysis the 30 - 39 year old age group was used. The result was that $N = 69$, became $N = 62$ for the final analysis.

Only the results of the RAVLT were analysed for the present study and not those of the RCF.

Measuring instruments

The Rey Auditory Verbal Learning Test, and the instructions of the Rey Complex Figure Test were translated into IsiXhosa using the techniques of back-translation and the committee approach outlined in Swartz (1998) and Drennan, Levett and Swartz (1991).

Translators were multilingual senior students and staff members from the University of Stellenbosch (Department of African Languages). Different groups were involved in the translation and back-translation. Back-translation is defined as translating while trying to change as little as possible in the final version of the original language (Drennan et al., 1991). The original version was translated to IsiXhosa, then the IsiXhosa version back to English. This procedure yielded two versions of the instrument in English, and a comparison between the two provided a basis for further exploration of problematic areas and concepts (Drennan et al., 1991).

These problematic areas and concepts were explored through the committee approach (the committee included the researcher and translators inclusive of linguistic specialists). In this approach the multilingual translators worked separately on the translation and their discussion of the translation was mediated through the researcher (Drennan et al., 1991). The researcher had no contact with the translators during the translation process; she only met the translators for the committee.

It was difficult to translate certain terms into IsiXhosa. The "new common nouns", the words chosen for semantic or phonetic equivalence, could have lost their original parity when translated. For example "bird" ("*intaka*") and "mountain" ("*intaba*"); "gun" ("*umpu*") and "nose" ("*impumlo*") had phonetic equivalence in IsiXhosa. "Ranger" ("*usomahlathi*") and "stranger" ("*umhambi*") were not phonetically equivalent, but the committee found these to be the best translations, especially when trying to change as little from the original version (Drennan et al., 1991). However for recognition, it is more important to have phonetic distractors, rather than what the word means. So it is important that there should be a psychologist/s on the committee too.

Procedure

Permission to assess teachers at schools was requested from the authorities such as principals, deputies and head of departments by telephone, or visits by the researcher where possible, and a letter of application was presented to all selected schools.

Demographic data, personal history, psychiatric history and medical history were obtained by using a questionnaire compiled by Thornton (2002). Informed consent was obtained from all participants. The researcher and subject signed declaration forms for informed consent and voluntary participation in each other's presence. Witnesses also signed these forms.

The RAVLT was administered on participants individually, according to the directions for administration given in Lezak (1995). A researcher trained in the administration of the RAVLT conducted testing. The 15 RAVLT words (List A) were read to the subject by the researcher at the rate of one word per second. Participants were then asked to recall as many of the words as possible that they had just heard (Savage & Drew Gouvier, 1992). This procedure was followed in the first five trials. Responses were recorded by the examiner for each trial and were later marked appropriately as errors = E, or repetitions = R (see addendum C for an example of the IsiXhosa test sheet). The researcher did not volunteer any feedback about the number of correct responses, repetitions and errors, but if the participant asked whether they said it before, they were informed correctly (Lezak, 1995).

Upon completion of Trial 5, the interference list, a single presentation and recall of a second list of 15 words (List B) was given. Immediately following this trial (in Trial 6), participants were asked to recall the first list, without an additional reading.

Twenty minutes later (Trial 7) participants were asked to recall the first list without an additional reading (Anderson, 2000; Spreen & Strauss, 1998). Upon completion of this recall test, the recognition trial was given (see addendum D) (Geffen et al., 1990). Participants were given a list of 50 words, which included items from List A, List B and 20 nouns, with semantic or phonetic equivalence. They were asked to identify the 15 first-list words (Bleeker et al., 1988; Ivnik et al., 1990; Mitrushina et al., 1991; Querry & Berger, 1980; Ryan et al., 1986; Vakil & Blachstein, 1993, 1994, 1997; Wiens et al., 1988). Once again the number of correctly recalled words from list A (True Positives) was recorded for each subject, as were the number of omission errors (False Negatives), or words incorrectly identified as being on the first list (False Positives).

During the 20 -minute delay period of the RAVLT, a non-verbal test, the RCF was administered according to the directions given in Lezak (1983, 1995); Mitrushina et al. (1999) and Spreen and Strauss (1998). The RCF Copy and the RCF Immediate Recall Trials were used to distract and prevent rehearsal from occurring on the RAVLT Delayed Recall Trial. The RCF Delayed Trial was administered at the end to complete the assessment. Participants were also required to complete a personal data, medical and psychological screening form.

Statistical analysis

The Statistical Package for Social Sciences (SPSS) was used to do the statistical analysis. Descriptive statistics such as the mean (M) and standard deviation (SD) were determined for the different groups. Paired sample tests (t-tests) were used to determine differences between groups. Analysis of Variance (ANOVA) was used to determine differences between and within groups, and the Bonferroni post hoc comparisons were used to determine the definite difference between groups. Each group was scored separately and data analysis and comparison of all groups were done later. All groups assessed are compared among themselves first and then to the established norms from Wiens et al. (1988) and Selnes et al. (1991) for the Delayed Trial to create a similar basis of comparison. The norm group will be referred to as Wiens et al. (1988) for easy reading although Selnes et al. (1991) was used in one trial (Delayed Trial) because this mean was not supplied by Wiens et al. (1988).

RESULTS

The RAVLT in home language

Results of the groups assessed in their home languages were compared to determine if there were differences between the two groups. The descriptive statistics for the home language groups will follow in Tables 3 and 4 for the English and IsiXhosa groups respectively.

Table 3

Descriptive Statistics for the English Home Language Group (EHL). (n =17)

	Minimum	Maximum	Mean	S D
Age	30	39	33.06	2.54
Years education	15.0	19.0	16.53	1.01
Years employed	4.0	16.0	9.47	3.61

Table 4

Descriptive Statistics for the IsiXhosa Home Language Group (XHL). (n = 23)

	Minimum	Maximum	Mean	S D
Age	31	39	35.87	2.60
Years education	15.0	20.0	16.30	1.26
Years employed	.5	18.0	7.48	4.91

The RAVLT in home language and in second language

The two home language groups were then combined and compared to the results of the group of subjects assessed in a second language to determine if they performed better as stated in the second hypothesis. Variance between means of these groups was then determined. The results are shown in Table 5.

It was not easy to declare which group did better overall, because there is no total sum on the RAVLT, but differences in the different trials will be discussed.

All these results were then compared to Wiens et al. (1988).

Table 5.

Comparison of Means of the English Home Language Group and the IsiXhosa Home Language Group. (n = 40)

Different trials of the RAVLT	Mean EHL	Mean XHL	t-test	p
Trial 1	6.71	6.48	-.51	.611
Trial 5	13.88	14.04	.48	.637
List B	6.53	6.35	-.36	.722
Trial 6	12.94	12.30	-1.36	.183
Del Trial VII	13.53	12.43	-2.28	.029
Total Words	57.18	55.09	-1.30	.203
Words learned T5 - T1	7.24	7.57	.82	.420
Percentage Recall B VI/V x 100	88.32	87.62	-2.09	.043
Recognition TP/15	14.47	14.17	-.93	.357
Errors I - V	.059	.48	2.26	.032
Repetitions I - V	1.24	2.78	2.03	.049

The means of the EHL and the XHL groups were compared in Table 5. Results indicated a significant difference between the means scores on four trials. On the Delayed Trial the EHL group ($M = 13.53$) scored significantly higher than the XHL group ($M = 12.43$) ($t(38) = -2.28, p < .05$). On the Percentage Recall Trial the EHL group ($M = 88.47$) scored significantly higher than the XHL group ($M = 87.62$) ($t(38) = -2.09, p < .05$). The EHL ($M = .06$) group scored significantly less than the XHL group ($M = .48$) on Errors, ($t(38) = 2.26, p < .05$). The EHL ($M = 1.24$) group scored significantly less than the XHL group ($M = 2.78$) on Repetitions, ($t(38) = 2.03, p = .05$). No significant differences occurred on Trials 1, 5 and 6, List B, Total Words -, Words Learned-, and Recognition Trial.

The descriptive statistics for the group assessed in a second language and the Home Languages group are shown in Tables 6 and 7, followed by the analysis of variance between the means of these groups in Table 8. Then, these results were compared to Wiens et al. (1988) (referred to as the norm group). Results are presented in the following order: The total group will be discussed first. Then the descriptive statistics between the home languages group and the norm group will follow, before the latter is compared to the statistics of the Second Language group, the English home language group and the IsiXhosa home language group.

Table 6

Descriptive Statistics for the Group Assessed in a Second Language (SL). ($n = 22$)

	Minimum	Maximum	Mean	S D
Age	31	38	35.09	2.31
Years education	15.0	20.0	16.68	1.52
Years employed	.5	13.0	7.89	3.15

Table 7

Descriptive Statistics for the Home Languages Group (English and IsiXhosa groups combined). ($n = 40$)

	Minimum	Maximum	Mean	S D
Age	30	39	34.67	2.90
Years education	15.0	20.0	16.40	1.15
Years employed	.5	18.0	8.33	4.47

Table 8

Analysis of Variance between the means of the Home Languages Group and the Second Language Group.

Different Trials of the RAVLT	Mean HL	Mean SL	ANOVA F	p
Trial 1	6.57	6.32	.49	.486
Trial 5	13.98	13.18	6.85	.011
List B	6.43	6.95	1.31	.257
Trial 6	12.58	11.23	9.45	.003
Del Trial VII	12.90	11.95	4.08	.048
Total Words	55.97	52.73	5.19	.026
Words learned T5 - T1	7.42	6.95	1.38	.245
Percentage Recall B VI/V x 100	90.06	85.17	3.41	.070
Recognition TP/15	14.30	13.95	1.509	.224
Errors I – V	.30	.27	.03	.868
Repetitions I – V	2.13	3.41	.05	.051

In Table 8, results indicated a significant difference between the groups In Trial 5 ($F(1, 60) = 5.24$, $p < .05$), with the HLs group ($M = 13.98$) scoring significantly higher than the SL group ($M = 13.18$). Results indicated a significant difference between the groups on Trial 6 ($F(1, 60) = 9.45$, $p < .01$), with the HLs group ($M = 12.58$) scoring significantly higher than the SL group ($M = 11.23$). On the Delayed Trial (VII) results indicated a significant difference between the groups ($F(1, 60) = 4.08$, $p < .05$), with the HLs group ($M = 12.90$) scoring significantly higher than the SL group ($M = 11.95$). There were significant differences for the Total Words Learned between these groups ($F(1, 60) = 5.19$, $p < .05$), with the HLs group ($M = 55.97$) scoring significantly higher than the SL group ($M = 52.73$). There were no significant differences on Trial 1, List B, Words Learned Trial, Percentage Recall Trial, Recognition Trial, Errors, and Repetitions.

Table 9 shows the analysis of variance between the means of the English home language group, the IsiXhosa home language group, and the Second language group.

Table 9.

Analysis of Variance Between the EHL, XHL and the SL Groups.

Different Trials of the RAVLT	Mean EHL	Mean XHL	Mean SL	ANOVA F	p
Trial 1	6.71	6.48	6.32	.37	.690
Trial 5	13.88	14.04	13.18	3.47	.037
List B	6.53	6.35	6.95	.70	.503
Trial 6	12.94	12.30	11.23	5.50	.006
Del Trial VII	13.53	12.43	11.95	4.12	.021
Total Words	57.18	55.09	52.73	3.36	.041
Words learned T5 - T1	7.24	7.57	6.95	.91	.406
Percentage Recall B VI/V x 100	88.32	87.62	85.17	3.45	.038
Recognition TP/15	14.47	14.17	13.95	1.13	.329
Errors I - V	.059	.48	.27	2.43	.097
Repetitions I - V	1.24	2.78	3.41	4.18	.020

In Table 9, results indicated a significant difference in means between the three groups in Trial 5, ($F(2, 59) = 3.47, p < .05$). Bonferroni post hoc comparisons only showed a significant difference ($p < .05$) between the IsiXhosa HL groups (XHL and ESL groups respectively), with the XHL group ($M = 14.04$) scoring significantly higher than both groups and the EHL group ($M = 13.88$) scoring significantly higher than the ESL group ($M = 13.08$).

In Table 9, results indicated a significant difference in means between the three groups in Trial 6, ($F(2, 59) = 5.50, p < .01$). Bonferroni post hoc comparisons showed a significant difference ($p < .01$) between the IsiXhosa HL groups, with the EHL group ($M = 12.94$) and the XHL ($M = 12.30$) scoring significantly higher than the ESL group ($M = 11.23$).

In the Delayed Trial (VII) of Table 9, results indicated a significant difference between the mean score of the three groups ($F(2, 59) = 4.12, p < .05$). Bonferroni post hoc comparisons only showed a significant difference ($p < .05$) between the IsiXhosa HL groups, with the EHL group ($M = 13.53$) scoring significantly higher than both groups and the XHL group ($M = 12.43$) scoring significantly higher than the ESL ($M = 11.23$).

There were significant differences in Table 9, for the Total Words Learned between the mean scores of the three groups ($F(2, 59) = .91, p < .05$). Bonferroni post hoc comparisons only showed a significant difference ($p < .05$) between groups, with the EHL group ($M = 57.18$) scoring significantly higher than both groups and the XHL group ($M = 55.09$) scoring significantly higher than the ESL ($M = 52.73$).

Significant differences between mean scores also occurred in Table 9, on the Repetition Trials ($F(2, 59) = 4.18, p < .05$). Bonferroni post hoc comparisons showed a significant difference ($p < .05$) between groups, with the EHL group ($M = 1.24$) scoring significantly less than both groups and the XHL group ($M = 2.78$) scoring significantly less than the ESL ($M = 3.41$). There were no significant differences on Trial 1, List B, the Words Learned Trial, Recognition Trial, and the Errors Trial.

Values from the current study compared to Wiens et al. (1988).

In Table 10 the means of the Total Group assessed in the present study are compared to the international norms of Wiens et al. (1988).

Table 10.

Means of the Total Group Compared to Wiens et al. (1988) Norms. (N = 62)

Different Trials of the RAVLT	Mean Total group	Mean Weins et al. (1988)	SD Total group	SD Wiens et al..(1988)	t test	p
Trial 1	6.48	7.40	1.38	1.90	-5.24	.000
Trial 5	13.69	12.70	1.20	1.80	6.54	.000
List B	6.61	6.50	1.75	1.70	.51	.613
Trial 6	12.10	11.70	1.76	2.20	1.78	.081
Del Trial VII	12.56	10.92	1.81		8.05	.000
Total Words	54.82	54.20	5.55	8.30	.88	.381
Words learned T5 - T1	7.26	5.30	1.51	1.90	10.18	.000
Percentage Recall B VI/V x 100	88.321	92.00	10.177	12.70	-2.86	.006
Recognition TP/15	14.18	14.20	1.06	1.10	-.17	.868
Errors I - V	.29	2.30	.61	2.5	-25.90	.000
Repetitions I - V	2.58	5.00	2.49	5.5	-7.66	.000

See Table 1 for demographics of this group. In Table 10, results indicated a significant difference between the mean score of the test group and the mean norm score on Trial 1, ($t(61) = 15.24, p < .01$). The test group ($M = 6.48$) scored significantly lower than the norm group ($M = 7.4$). Trial 5 also showed a significant difference between the mean norm scores ($t(61) = 6.54, p < .01$), the test group ($M = 13.69$) scored significantly higher than the norm group ($M = 12.70$). Differences in the Delayed Trial (VII) were significant ($t(61) = 8.05, p < .01$), the test group ($M = 12.56$) scored significantly higher than the norm group ($M = 10.92$). The Words Learned Trial showed a significant difference ($t(61) = 10.18, p < .01$), the test group ($M = 7.26$) scored significantly higher than the norm group ($M = 5.30$). Mean scores on the Percentage Recall Trial indicated a significant difference ($t(61) = -2.85, p < .05$), the test group ($M = 88.32$) scored significantly lower than the norm group ($M = 92.00$). There was a significant difference in the mean score of the test group and the mean norm score on the Errors ($t(61) = -25.90, p < .01$), the test group ($M = 0.29$) scored significantly lower than the norm group ($M = 2.30$). The difference in the mean score of the test group and the mean norm score was also significant on Repetitions ($t(61) = -7.66, p < .01$), the test group ($M = 2.58$) scored significantly lower than the norm group ($M = 5.0$). There were no significant differences on List B, Trial 6, Total Words Learned, and the Recall Trial.

In Table 11 the means of the Home Languages group are compared to those international norms of Wiens et al. (1988).

Table 11.

Home Languages Group Means Compared to the Norms of Wiens et al. (1988) Group. (n = 40)

Different Trials of the RAVLT	Mean HL	Mean Wiens et al. (1988)	SD HL	SD Wiens et al. (1988).	t test	p
Trial 1	6.57	7.40	1.38	1.90	-2.79	.001
Trial 5	13.98	12.70	1.05	1.80	7.68	.000
List B	6.43	6.50	1.57	1.70	-.303	.764
Trial 6	12.58	11.70	1.48	2.20	3.73	.001
Del Trial VII	12.90	10.92	1.58		8.82	.000
Total Words	55.97	54.20	5.08	8.30	2.21	.003
Words learned T5 - T1	7.42	5.30	1.26	1.90	10.68	.000
Percentage Recall B	90.06	92.00	8.94	12.70	-1.38	.177
VI/V x 100						
Recognition TP/15	14.30	14.20	.99	1.10	.637	.528
Errors I - V	.30	2.30	.69	2.5	-18.42	.000
Repetitions I - V	2.13	5.00	2.47	5.5	-7.36	.000

Refer to Table 7 for demographic details of this group. In Table 11, results indicated a significant difference between the mean score of the HLs group and the mean norm score on Trial 1, ($t(39) = 3.79, p < .01$). The test group ($M = 6.57$) scored significantly lower than the norm group ($M = 7.40$). Trial 5 showed a significant difference between the mean norm scores ($t(39) = 3.16, p < .01$), the test group ($M = 13.98$) scored significantly higher than the norm group ($M = 12.40$). Trial 6 also showed a significant difference between the mean norm scores ($t(39) = 3.73, p < .05$), the test group ($M = 12.58$) scored significantly higher than the norm group ($M = 11.70$). The Total Words Learned had a significant difference ($t(39) = 2.21, p < .05$), the test group ($M = 55.97$) scored significantly higher than the norm group ($M = 54.20$). Differences in the Delayed Trial (VII) were significant ($t(39) = 8.82, p < .01$), the test group ($M = 12.90$) scored significantly higher than the norm group (10.92). Results indicated a significant difference in the scores on the Total Words trial ($t(39) = 2.21, p < .05$), the test group ($M = 55.97$) scored significantly higher than the norm group ($M = 54.20$). The Words Learned Trial showed a significant difference ($t(39) = 10.68, p < .01$), the test group ($M = 7.42$) scored significantly higher than the norm group ($M = 5.30$). There was a significant difference in the mean score of the test group and the mean norm score on the Errors ($t(39) = -18.42, p < .01$), the test group ($M = .30$) scored significantly lower than the norm group ($M = 2.30$). The difference in the mean score of the test group and the mean norm score was also significant on Repetitions ($t(39) = -7.36, p < .01$), the test group (2.13) scored significantly lower than the norm group (5.0). There were no significant differences on List B, the Words Learned Trial, Percentage Recall Trial, and Recognition Trial.

In Table 12 the means of the Second Language group are compared to the international norms of Wiens et al. (1988).

Table 12.

Second Language Group Means Compared to the Norms of Wiens et al. (1988). (n = 22)

Different Trials of the RAVLT	Mean SL	Mean Wiens et al. (1988)	SD SL	SD Wiens et al. (1988)	t- test	p
Trial 1	6.32	7.40	1.39	1.90	-3.64	.002
Trial 5	13.18	12.70	1.30	1.80	1.74	.096
List B	6.95	6.50	2.03	1.70	1.05	.307
Trial 6	11.23	11.70	1.93	2.20	-1.15	.262
Del Trial VII	11.95	10.92	2.06		2.84	.010
Total Words	52.73	54.20	5.87	8.30	-1.18	.253
Words learned T5 - T1	6.95	5.30	1.89	1.90	4.11	.001
Percentage Recall B VI/V x 100	85.17	92.00	11.68	12.70	-2.74	.012
Recognition TP/15	13.95	14.20	1.17	1.10	-.98	.338
Errors I - V	.27	2.30	.46	2.5	-20.86	.000
Repetitions I - V	3.41	5.00	2.34	5.5	-3.18	.004

The demographic details of the test group are summarised in Table 6. In Table 12, results indicated a significant difference between the mean score of the test group and the mean norm score on Trial 1, ($t(21) = -3.64$, $p < .01$). The test group ($M = 6.32$) scored significantly lower than the norm group ($M = 7.40$). Differences in the Delayed Trial (VII) were significant ($t(21) = 2.84$, $p < .05$), the test group ($M = 11.95$) scored significantly higher than the norm group ($M = 10.92$). The Words Learned Trial showed a significant difference ($t(21) = 4.11$, $p = .01$), the test group ($M = 6.95$) scored significantly higher than the norm group (5.30). Mean scores on the Percentage Recall Trial indicated a significant difference ($t(21) = -2.74$, $p < .05$), the test group ($M = 85.17$) scored significantly lower than the norm group (92.00). There was a significant difference in the mean score of the test group and the mean norm score on the Errors $t(21) = -20.86$, $p < .01$, the test group ($M = 0.27$) scored significantly lower than the norm group ($M = 2.30$). The difference in the mean score of the test group and the mean norm score was also significant on Repetitions ($t(21) = -3.18$, $p < .01$), the test group ($M = 3.41$) scored significantly lower than the norm group ($M = 5.00$). There were no significant differences on Trial 5, List B, Trial 6, the Total Words Trial, and the Recognition Trial.

In Table 13 the means of the English home language group are compared to those international norms of Wiens et al. (1988).

Table 13.

English Home Language Group Means Compared to Norms of. Wiens et al. (1988). (n = 17)

Different Trials of the RAVLT	Mean EHL	Mean Wiens et al. (1988)	SD EHL	SD Wiens et al. (1988)	t test	p
Trial 1	6.71	7.40	1.40	1.90	-2.04	.058
Trial 5	13.88	12.70	.93	1.80	5.26	.000
List B	6.53	6.50	1.62	1.70	.08	.941
Trial 6	12.94	11.70	1.30	2.20	3.94	.001
Del Trial VII	13.53	10.92	1.55		6.80	.000
Total Words	57.18	54.20	4.33	8.30	2.83	.012
Words learned T5 - T1	7.24	5.30	1.30	1.90	6.14	.000
Percentage Recall B VI/V x 100	88.32	92.00	8.63	12.70	.65	.526
Recognition TP/15	14.47	14.20	.62	1.10	1.79	.093
Errors I - V	.059	2.30	.24	2.5	-38.10	.000
Repetitions I - V	1.24	5.00	1.75	5.5	-8.87	.000

See Table 3 for demographic details of the EHL group. In Table 13, Trial 5, a significant difference between the mean scores was indicated ($t(16) = 5.26, p < .01$), the test group ($M = 13.88$) scored significantly higher than the norm group ($M = 12.70$). Trial 6 also showed a significant difference between scores ($t(16) = 3.94, p < .01$). The test group ($M = 12.94$) scored significantly higher than the norm group ($M = 11.70$). The difference in the Delayed Trial (VII) was significant ($t(16) = 6.80, p < .01$), the test group ($M = 13.53$) scored significantly higher than the norm group ($M = 10.72$). There was a significant difference between the mean norm scores on the Total Words Learned Trial, ($t(16) = 2.83, p < .05$), the test group ($M = 57.18$) scored significantly higher than the norm group ($M = 54.20$). The Words Learned Trial showed a significant difference ($t(16) = 6.14, p < .01$), the test group ($M = 7.24$) scored significantly higher than the norm group ($M = 5.30$). There was also a significant difference in the mean score of the test group and the mean norm score on the Errors trial ($t(16) = -38.10, p < .01$), the test group ($M = 0.06$) scored significantly lower than the norm group ($M = 2.30$). The difference in the mean score of the test group and the mean norm score was also significant on Repetitions ($t(16) = -8.87, p < .01$), the test group ($M = 1.24$) scored significantly lower than the norm group ($M = 5.00$). There were no significant differences on Trial 5, List B, Percentage Recall Trial, and the Recognition Trial.

In Table 14 the means of the IsiXhosa home language group are compared to those international norms of Wiens et al. (1988).

Table 14.

IsiXhosa Home Language Group Means Compared to Norms of Wiens et al. (1988). (n = 23)

Different Trials of the RAVLT	Mean XHL	Mean Wiens et al. (1988)	SD XHL	SD Wiens et al. (1988)	t test	P
Trial 1	6.48	7.40	1.38	1.90	-3.21	.004
Trial 5	14.04	12.70	1.15	1.80	5.62	.000
List B	6.35	6.50	1.56	1.70	-.47	.644
Trial 6	12.30	11.70	1.58	2.20	1.84	.080
Del Trial VII	12.43	10.92	1.47		5.96	.000
Total Words	55.09	54.20	5.49	8.30	.77	.447
Words learned T5 - T1	7.57	5.30	1.24	1.90	8.78	.000
Percentage Recall B VI/V x 100	87.62	92.00	8.53	12.70	-2.46	.022
Recognition TP/15	14.17	14.20	1.19	1.10	-.11	.917
Errors I – V	.48	2.30	.85	2.5	-10.33	.000
Repetitions I – V	2.78	5.00	2.75	5.5	-3.87	.001

See Table 4 for demographic details of the test group. In Table 14, results indicated a significant difference between the mean scores of the two groups in Trial 5 ($t(22) = 5.62, p < .01$). The test group ($M = 14.04$) scored significantly higher than the norm group ($M = 12.70$). Differences in the Delayed Trial (VII) were significant ($t(22) = 5.96, p < .01$), the test group ($M = 12.43$) scored significantly higher than the norm group ($M = 10.72$). The Words Learned Trial showed a significant difference ($t(22) = 8.78, p < .01$), the test group ($M = 7.57$) scored significantly higher than the norm group (5.30). Mean scores on the Percentage Recall Trial indicated a significant difference ($t(22) = -2.46, p < .05$), the test group ($M = 87.62$) scored significantly lower than the norm group (92.00). There was a significant difference in the mean score of the test group and the mean norm score on the Errors ($t(22) = -10.33, p < .01$), the test group ($M = 0.48$) scored significantly lower than the norm group (2.30). The difference in the mean score of the test group and the mean norm score was also significant on Repetitions ($t(22) = -3.87, p < .01$), the test group (2.78) scored significantly lower than the norm group (5.00). There were no significant differences on List B, Trial 6, the Total Words Trial, and the Recognition Trial.

On all the Delayed Trials the South African results were higher than the international norms.

DISCUSSION

The aim of this study is to provide a neuropsychological test to assess IsiXhosa mother-tongue speakers by translating the RAVLT into IsiXhosa; applying it and comparing its results to existing norms. Another aim is to determine the possibility of assessing IsiXhosa mother-tongue speakers in a second language if the person is proficient enough.

The first hypothesis states that there will be no differences between the two groups assessed in their home languages (the English and IsiXhosa HL groups). As seen above the EHL group does significantly better on four trials when compared to XHL group. They seem to recall more words, make fewer errors and repeat fewer words than their counterparts. This leads to the rejection of H_0 and acceptance of the H_1 (for the 4 measures), but acceptance of H_0 on the other 7 measures.

Assuming the above statement is true, one has to account for these differences because the subjects are matched for age, gender and education. These latter factors account for a significant portion of the variance on the RAVLT (Bleeker et al., 1988; Bolla-Wilson & Bleeker (cited in Savage & Drew Gouvier, 1992), Geffen et al., 1990; Querry & Megran, 1983). The finding that Africans do worse is in accordance with results from previous cross-cultural studies that have shown differences between the results of South Africans and international norms, and differences between results of White and Black South Africans (Nell, 2000). There are various reasons why the EHL group may do better than the XHL group, for example educational background, education level, language medium, socio-economic factors, cultural factors and urbanisation. Nell (2000) and Roodt and Foxcroft (2001) list these as factors that put white English speaking individuals in South Africa at an advantage. Other authors such as Lezak (1995) and Mitrushina et al. (1999) also list these as important factors in international studies. "Under the impact of natural sciences, we have come to believe that to understand a phenomenon, and certainly to control or change it, it is not enough to describe what one sees. Its cause must also be known" (Nell, 2000, p. 107). (Addendum A attempts to explain the differences in scores by briefly providing information about the history of education in South Africa, which is regarded as a cause).

According to Kendall, Vaster and Von Mollendorf (cited in Nell, 2000), the number of years of formal education is a critically important predictor of test performance. "However, simple statements about level of education or schooling can be seriously misleading" (Nell, 2000, p. 76). "Years of schooling is therefore a crude indicator of educational attainment because it says nothing about those aspects of school quality that are taken for granted in Western settings" (Nell, 2000, p.

76). This is evident in the case of Black South Africans, who had unequal learning opportunities in the Apartheid era as confirmed by IDAF (1991). It has not been long since schools have been integrated and the education system had been comprehensively reformed (IDAF, 1991). Participants of the current study received their education when schools were still segregated. The majority of the IsiXhosa-speaking teachers assessed are products of the Bantu education system and they received their training from colleges in the then *bantustans* (see addendum B) (IDAF, 1991). Testing cannot be viewed as separate from the socio-economic and political background of participants as poignantly outlined by Claassen (cited in Foxcroft and Roodt, 2001) who asserts that “testing in South Africa cannot be divorced from the country’s political, economic, and social history” (p. 22). “Indeed, any account of the history of psychological assessment in South Africa needs to point out the profound impact that Apartheid policies had on test development and use” (Foxcroft and Roodt, 2001, p. 22). (For more information about the history of tests and South Africa, please see Addendum A).

Once again the quality of education plays a role in the differences between these scores. The learning strategy used by the IsiXhosa groups, that is, memorisation, seems embedded in their education. When given the RCF, many participants complained of an inability to draw, which is a result of lack of exposure to Mathematics, technical subjects, Designing, or Art. They often enjoyed the verbal test because they associated it with recitations. This lack of exposure is described in Nell (2000, p. 76)

Almost without exception, classroom instruction takes place at the formal level; children may see diagrams and photographs of objects they learn about, but the objects themselves are rarely available to the children. Instead, the child's role is primarily characterized by rote memorization of facts and events. (Rogan & MacDonald, cited in Nell, 2000, p. 76)

The second hypothesis states that people assessed in their second language will not perform better than people assessed in their home language. The Home Languages group does better when compared to the SL group on four measures, the other 7 measures were not significant. This leads to the acceptance of H_0 and rejection of H_2 only for the 4 measures.

It may be true that the EHL group and the Home Languages group achieve higher scores on some measures, yet it is also true that there are no significant differences on most measures analysed for these groups. It is therefore very difficult to accept or reject hypotheses because there is no composite score on the RAVLT. Only a minority of the RAVLT scores imply statistical significance, however on the majority statistical difference is not proven.

The RAVLT does not have a total sum. It is therefore not easy to determine which group does better overall. Differences occurring apply to trials of the test, and not to the overall test.

It seems as if there is greater variance between the IsiXhosa home language groups (XHL and SL) than with the English home language group, although the latter does better in some of the significant trials. If this is true, then differences between XHL and the SL may be attributed to demographic factors such as language of testing and urbanisation, as both groups fair worse on Repetitions. Taking a closer look at these results, it is evident that differences often occurred on some trials (often the learning tasks, see literature review). When the three groups are compared directly, they are fairly compatible. Some fair better on specific tasks while others fair worse on other tasks, but they were overall compatible.

Considering the compatibility of these results, the following: 1). the diversity of the South African culture; 2). the fact that Blacks are educated in English, their second language; 3). the subjective ratings of language efficacy in a second language being 60 - 80 %, are important to note in this study. These factors validate the suggestion that the individual may be assessed in English if he or she is highly proficient, and can speak on a first language level.

When local values are compared to international norms, the above results show that the South African group predominantly does better than the Wiens et al. (1988) group. There is a general trend for South Africans to recall fewer words than the international group on immediate recall (Trial 1) and on the Percentage Recall Trial, but they learn more words, make fewer errors and repeat fewer words. Also important to note here is that the scores of South Africans are on par with those of international normative studies as in Lezak (1995).

Education of the participants seems to play an important role on the RAVLT, because results are compared to norms of Wiens et al. (1988) with an education mean of 14.5 years. However, the South African group managed to achieve higher scores than the international norms on the Delayed Trial when participants are matched for education with the Selnes et al. (1991) norms (College education = 16 years of education). So it is not due to chance that the results of the present study are better.

These results are consistent with those of the Logical Memory task of the Wechsler Memory scale described by Nell (2000), where the well-educated South Africans do as well or better than the Americans. The South African well-educated group do well on the Digit Span too (Nell, 2000).

However, all other studies with individuals with less than 15 years of education, for example, the undergraduates and those with 12 or less years of education, show that South Africans achieve lower scores, 1 or more standard deviations less.

There are speculations about education and language in these results (as tests were "adapted" to suit the South African population) (Avenant, 1988; Nell, 2000). Results of the present study confirm that education is an important variable. It seems logical in South Africa currently that the higher educated the individual, the higher his/her proficiency in English, as "English has retained its dominance as the language of education, especially higher education, science and international communication" (Bona Art Assembly, 2002). He further states that South Africa has a policy of additive multilingualism that asserts that "in a multilingual country like [South Africa], it is necessary for learners to reach high levels of proficiency in at least two languages, and to be able to communicate in at least one other language." (Bona Art Assembly, 2002). The IsiXhosa home language participants are often bilingual or multilingual, and they often put English as their second language.

CONCLUSION

The current study not only provides an RAVLT in IsiXhosa to assess mother-tongue speakers, but it also supports pursuing the use of standard cognitive tests with black populations. By providing this tool in IsiXhosa, it is enough argument to warrant assessment in English of IsiXhosa mother-tongue speakers with a minimum of 15 years of education and who are proficient English. There will no longer be an "unavailability" of an RAVLT in future for this group. This tool will make assessment possible, not only with the "more educationally advantaged black populations who are proficient in the English medium" (Shuttleworth-Jordan, 1996), but those who desire testing in IsiXhosa as well.

Norms can give valuable clinical information about use of translated tests in neuropsychology. It is hoped that in the future there will be sufficient numbers of people assessed to generate new norms, or to identify the different ways the test should be appropriately transformed as opposed to merely translated. Nell (1994) and Shuttleworth-Jordan (1996) also share the view that the very large body of clinical interpretative literature on the RAVLT provides a valuable resource that will be denied to South African psychologists if another local test is produced.

Nell (1994) stated that

South Africa can play a leading role among the world's developing countries in devising and demonstrating innovative measures of human ability that are culturally appropriate, sensitively normed, and identify both achievement in the broadest sense and the potential to achieve. (p. 106)

It might be difficult to generalise these results due to the educational advantage of the teacher population. Results in this study were established on a high-education population (minimum 15 years of education), and "must be used very tentatively with other education groups until more applicable normative data are available" (Shuttleworth-Jordan & Bode, 1995, p. 56). Future research that will assess an all-inclusive population is needed; that is, larger numbers of people in different education, socio-economic and regional (urban or rural) groups.

"Clinicians are advised to use tests which meet international standards" (Shuttleworth-Jordan, 1995, p. 244). These tests have advantages of being accompanied by attributes of familiarity, experience, and often a vast body of research data (Shuttleworth-Jordan, 1996, p. 98).

Nell (2000) implies that psychiatric tests are biased against non-Western individuals, but the long-term goal is to accommodate the bias and work with it, without overlooking it. The aim of this study is not to develop separate values for different groups in order to manifest separatism, as stated by Nell (2000), but it is intended to address differences if they do occur. It is only by showing differences that they can be addressed and catered for.

As seen above, if an IsiXhosa-speaking person is proficient in English (and meets the criteria for the current study population), he or she may be assessed in English with the RAVLT. This will be without prejudice to the testee's results. According to Anastasi (1982) tests can be misused in testing culturally disadvantaged persons as in testing anyone else, but when properly used, they serve an important function in preventing irrelevant and unfair discrimination. Anastasi (1982) makes a powerful statement that "when evaluating the social consequences of testing, we need to assess carefully the social consequences of not testing and thus having to rely upon alternative procedures for decision making" (p.61).

An important lesson to be learned from close on a century of cross-cultural psychological assessment is that unless language proficiency, educational quality, test-wiseness, cognitive style and socially mediated definitions of what it means to be smart have been shown beyond any reasonable doubt to be equivalent for the groups whose scores are being compared, score

differences cannot be attributed to genetic differences (Nell, 2000). One cannot emphasise the importance of future research sufficiently.

Limitations

Participants assessed were teachers only, so the study had an education bias.

There was only one psychologist in the translation committee and a group of linguists.

Language efficacy was not measured objectively.

Recommendations

Studies based on other official languages will need to be initiated to enable the assessment of all South Africans so that access to resources may not be limited by language (Swartz et al., 1997).

Objective measurement of language efficacy will also be important to assess.

Future studies will need to have more than one psychologist involved for the committee that discusses translations in order to validate the words used to translate tests, without adaptation that may lose the purpose intended by the test.

Education quality or levels of education will need to be measured and compared objectively. There will also need to be an objective measurement of socio-economic status, for there were discrepancies in the salaries of the Black and White teachers in the current study.

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Note

See addendum E for additional references utilised for addenda A to D.

Addendum A

Apartheid ideology and education

Education does not operate autonomously in any society... It cannot be understood apart from its cultural context, and it is that cultural context which determines the focus and ideal of the education system. Education functions to socialize people about the way things appear to be, rather than how they are, or could be. It treats appearance as reality. (Work In Progress, 1979, p. 10).

Apartheid ideology treated appearance as reality. "People who live under a particular hegemony experience the dominant ideology as reality, and those who are not part of the dominant group accept the group's definition of them as reality" (Work In Progress, 1979, p. 11).

The Bantu Education Act

In South Africa education was subjected to powerful controls within the Apartheid system (International Defence and Aid Fund for Southern Africa (IDAF), 1991). It was used to help perpetuate segregation and domination by preparing black children for economically and politically subordinate positions in society (IDAF, 1991). Separate development was applied with special ferocity to education for Blacks. According to the Eislen Commission of 1949 – 1951, education has the effect of making the native more intelligent, more civilised and more loyal and of increasing his wants (Work In Progress, 1979). In response to this, Minister H.F. Verwoerd stated that he would reform native education (IDAF, 1978; Pomeroy, 1986). The Bantu Education Act of 1953 separated the education of the Black majority from the national and provincial departments of education and transferred it to the Department of Bantu Affairs (IDAF, 1984; IDAF, 1991; Pomeroy, 1986). According to Pomeroy (1986, p. 19) and Work In Progress (1979, p. 13) Minister H.F. Verwoerd declared that the aims of the Bantu Education Act were that:

Education must train and teach people in accordance with their opportunities in life, according to the sphere in which they live... If the native in South Africa today in any kind of school in existence is being taught to expect that he will live his adult life under a policy of equal rights, he is making a big mistake)... The Bantu must be guided to serve his own community in all aspects. There is no place for him in the European community above the level of certain forms of labour. Within his own community, however, all doors are open... What is the use of teaching a Bantu child mathematics when it cannot use it in practice...? It is therefore necessary that native education be controlled in such a way that it should be in accordance with the policy of the state. (p. 19; p. 13).

The commissioners stated that "the education of the white child prepares him for life in a dominant society and the education of a black child for a subordinate society" (Work In Progress, 1979, p.

12). Blacks were denied decent education and had to wait until the 1980s before they could be trained as artisans (IDAF, 1991).

Intelligence testing during Apartheid.

It has often been claimed that the majority of Blacks did not have the intelligence to benefit from secondary and higher education (The myth of intelligence tests, 1954). It was claimed that the latter statement was supported by science, which provided the necessary instrument in the form of psychometric tests (The myth of intelligence tests, 1954). These tests, especially those measuring intelligence, have often been used to discriminate against Blacks. Psychologists have not yet agreed on a definition of intelligence, but many admit that intelligence is that which is measured by intelligence tests (The myth of intelligence tests, 1954). The decisive element was therefore the psychologist who set the test questions because s/he chose those, which s/he thought, tested what s/he thought was intelligence (The myth of intelligence tests, 1954). Success in these tests depended to a large extent on the general opportunities a child has had for learning, be it from parents, teachers or other sources of information (The myth of intelligence tests, 1954).

Dague (cited in Nell, 2000, p. 31) commented that "no test of intelligence could be independent of cultural factors." This statement was supported by Ardila (cited in Shuttleworth-Jordan, 1996, p. 96), who stated that "Psychometric tests represent in their contents learned abilities which will reflect the testee's learning opportunities and contextual experiences and hence test findings". Ardila (cited in Shuttleworth-Jordan, 1995, p. 96) further stated that "culture dictates what is and what is not relevant, and provides models for ways of thinking, acting and feeling, with resultant variations in cognitive testing." Preparing a person for the tricks and trade of these tests could have a considerable effect on the results; people performed better if they were familiar with the subjects of the questions, and Africans were often not familiar with these subjects (The myth of intelligence tests, 1954). This was supported by Scarr (cited in Nell, 2000), who mentioned "that black children are being reared in circumstances that give them only marginal acquaintance with the skills and knowledge being sampled by the tests" (p. 83). According to Nell (1994), African children were denied the opportunity to acquire "test wiseness".

The Intelligence Quotients of Africans were reported to be lower, but tests standardised for Whites and the norms of Whites were used in the assessments. Foxcroft and Roodt (2001) confirmed this by stating that "even before the Nationalist Party came into power in 1948, the earliest psychological measures were standardized only for whites," and were used to draw distinctions that demonstrated white superiority (p. 22). It was the dubious origin and adequacy of many of the

published test norms that led Vernon (cited in The myth of intelligence tests, 1954) to advise testers to use norms with caution.

Addendum B

Glossary of terms

Accelerative forces - occur when a moving object hits a motionless head, such as in pedestrian motor vehicle accidents and from blows in the head (Moselenyane, 1989; Nell, 2000).

All Black universities - These universities are listed as the University of Fort Hare, the University of Zululand, the University of the North, and the Medical University of South Africa (Avenant, 1988; Nell, 2000).

Apartheid - divided the population of South Africa into separate groups. People's lives were governed by classification at birth based on skin colour, physical appearance, language group and descent. The classification decided the kind of work open to them and the accordance or denial of rights. It decided where they could live, whom to live with, whom they could marry which schools they could attend, what transport to use, which places to enter (IDAF, 1991).

Bantustans/ homelands/ native reserves/ African states - were demarcated areas where the majority of Africans stayed with a limited measure of self-rule (Pomeroy, 1986). Whenever they moved beyond the borders of these homelands, they needed to have permits and passports showing their origin and the length and cause of visits to the rest of the country (IDAF, 1991). It was official policy that Africans should be trained in the bantustans and employed there after qualification, so as not to enlighten the rest of the natives, or to disturb the whites in the Republic of South Africa (IDAF, 1991).

Clinicians - in the present study refers to registered psychologists and psychometrists who are trained and qualify to administer the Rey Auditory Verbal Learning Test.

Decelerative forces - occur when a moving head hits against a motionless object, for example during heavy falls, and for the occupants of motor vehicles involved in accidents (Nell, 2000).

Europeans - the Health Professions Council (HPC) refers to psychologists who are not of South African origin as Europeans (E. Daffue, HPC helpdesk, telephonic communication, January 29, 2003).

IsiXhosa - is the current English spelling, and is used by the Pan South African Language Board (North West PLC , 2002).

"Race prejudice is to be found in many places... but in South Africa [it was] built into the laws of the land, enforced by the courts and encouraged by the theology of the Dutch Reformed Churches of South Africa" (Youth & Education Department, 1964). The racial classification was Whites, Coloureds, Asians, and Bantus (a term meaning people, which referred to Blacks) (Youth & Education Department, 1964).

- ❑ *Asians* - referred to people of Asian or Middle East origin, whose skin colour was not classified as black, brown or white and had their own subcultures in the broader South African system. This group was also marginalized (personal communication, G. Skweyiya, May 20, 2003).
- ❑ *Blacks/ Africans/ Bantus*- was a term used to classify people whose colour was black and who were of African origin.
- ❑ *Coloureds* - was a term used for a race of South African origin not considered as Black or White, but of mixed blood. This group originated from intermarriages between Europeans and Africans and from East Indians (Youth & Education Department, 1964).
- ❑ *Whites* - referred to individuals who originated from Europe with a white skin colour.

Standardization - is the processes and procedures for establishing a set of norms for a test (Reber, 1985).

ADDENDUM C

UVAVANYO LWE-NEUROPSYCHOLOGY
RAVLT - ISXHOSA

Igama lomthathi nxaxheba:

Inombolo ye-ID:

Umhla wokuzalwa:

Umhla wokuhlola:

Umdloli ngu:

	LIST A	I	II	III	IV	V	LIST	B	VI
1	Igubu								
2	Ikhethini								
3	Intsimbi								
4	Ikofu								
5	Isikolo								
6	Umzali								
7	Inyanga								
8	Isitiya								
9	Umnqwazi								
10	Umfana								
11	Impumlo								
12	Ikalikuni								
13	Umbala								
14	Indlu								
15	Umlambo								
	Total								
	X								
	S								
	Z								
	Percentile								

	Patient's	Mean	Std deviation	Z score	Percentile
V)					
Words learned (V-I)					
% recall after B (VI/V*100)					
% recall on delay (VII/V*100)					
% recall after B (VII/VI*100)					
Recognition: true positives (/15)					
Recognition: true negatives (/35)					
Recognition total (/50)					
Repetitions					
Errors					

This is a reproduction and translation of the version as used by Thornton (2002).

Addendum D

UVAVANYO LWE-NEUROPSYCHOLOGY

RAVLT: RECOGNITION LIST (A)

Igama lomthathi nxaxheba: _____

Inombolo ye-ID: _____

Umhla wokuzalwa: _____

Ubudala: _____

Umhla wokuhlola: _____

Umdloli ngu: _____

Instructions: (Read the columns vertically)

"Ndizakufundela uluhlu lwamagama, ndifuna uthi EWE okanye HAYI, ngokokucingela kwakho ukuba igama belikhona kola luhlu bendilifunde kahlanu"

INTSIMBI	IKHAYA	ITAWULI	IPHENYANE	IIGLASI
IFESTILE	INTLANZI	IKHETHINI	SHUSHU	IKAWUSI
UMNQWAZI	INYANGA	INTYATYAMBO	UMZALI	ISIHLANGU
ISHEDI	UMTHI	UMBALA	AMANZI	UTITSHALA
USOMAHLATHI	IBHALONI	IDESIKA	UMFAMA	ISITOVU
IMPUMLO	INTAKA	UMPU	IROSI	ISANDLWANE
IMOZULU	INTABA	IKHRAYONI	ILIFU	ABANTWANA
ISIKOLO	IKOFU	ICAWA	INDLU	IGUBU
ISANDLA	IMPUKU	IKALIKUNI	UMHAMBI	ITHOFI
IPENSILE	UMLAMBO	UMTHOMBO	ISITIYA	ITAKANE

	Patient's score	Mean	Standard Deviation	SD above / Below
True positives (out of 15)				
False positives (out of 35)				
False negatives (out of 15)				

This is a reproduction and translation of the version as used by Thornton (2002).

Addendum E

References to addendum A to D.

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