

CULTURAL INFLUENCE ON NEUROPSYCHOLOGICAL TESTING IN ZAMBIA

1. INTRODUCTION

Neuropsychology (NP) is a field of study that merges medical neurology and psychology (Grieve, 1993). Clinical neuropsychology bridges interest in the biological functioning of neural cells in the central nervous system and body with the study of psychological disorders. Neuropsychologists use models of brain-behaviour relationships to determine whether expected neurobehavioral function has changed to a degree that is consistent with the impairment. Thus, assessment of functions of the brain i.e. reasoning/problem solving, learning/recall process, selective attention/concentration processes, perception, sensation, language processes, controlled/directed movement process is the domain of neuropsychologists (Lezak, Howieson and Loring, 2004).

Culture, as Ember and Ember (1985) put it, refers to that which “encompasses the learned behaviours, beliefs and attitudes that are characteristic of a particular people; in a particular society or population....the shared customs of a society” (as cited in Segall, Dasen, Berry & Poortinga, 1990, p. 3). A culture is a more or less consistent pattern of thought and action; and within each culture, there are characteristic purposes that are not necessarily shared by other types of society.

Though we are all able to identify the obvious cultural differences in societies in one way or another, it is difficult to show precisely the extent to which it affects behaviour or mental processes because it tends to be integrated. A number of studies have shown that variations in the learning environment (i.e. the child-rearing atmosphere during a person's development) produce variations in cognitive skills because environmental demands result in adjustments in social organisation that in turn, enhance psychological adaptations (Whiting, Child and Lambert, 1966; Minturn and Hitchcock, 1966; Gladwin, 1970 as cited in Berland, 1982). Environmental demands heavily influence variation in perception of external stimuli. Environmental demands, in essence, are what direct the focus of attention so that sensitisation to external stimuli by each perceiver is due to eco-cultural and social experiences

(Berland, 1982). This is important in cross-cultural psychology as it may explain the differences in performance in tests across varying cultures.

Serpell (1994) describes observations he made at the start of his research programme with the University of Zambia (UNZA) in which he makes reference to the role of children's play in development of cognitive skills. He notes that several games that children in western societies are exposed to involve solution of puzzles, books, commercial toys that he very rarely saw in Zambian neighbourhoods (especially rural). Children in Zambia play more outdoor and physical games to do with handmade balls, rubber bands, songs and dance. Psychological tests, on the other hand, seem to capitalise on children's familiarity with these western types of games. A study done among children in rural Zambia, for example, showed data reflecting a profound difference in the concept of intelligence for the indigenous people as opposed to the western view (Serpell & Jere-Folotiya, 2008) also emphasised this aspect. "Nzelu encompasses the English notions of intelligence, wisdom, cognitive alacrity (*-cenjela*), and social responsibility (*-tumikila*)."(p. 4) In the Chewa community, to qualify as intelligent, one must show both social responsibility and cognitive alacrity, whereas intelligence in school is assessed almost exclusively in terms of cognitive alacrity.

Considering that most neuropsychological tests are developed in western communities, differences in cultures in a way, subtle or obvious, affect performance on neuropsychological tests when they are administered in cultures different from "main stream, white English-speaking, European or American populations" (Ogden, et al, 2003, p. 122). This is no surprise primarily because a lot of these neuropsychological tests are culturally biased since test developers have the tendency to develop tests that assess what is valued in their communities (Ogden, et al, 2003). The importance of getting culturally appropriate neuropsychological tests cannot be over-emphasised if our intention is to get valid information about the normality of the population to be tested. Grigorenko (2009) also says that the potential for error increases as differences increase between persons who comprise source and target tests in reference to culture and other factors (some of which are related to culture in one way or the other) such as language, social class, urban-rural residence, gender and age increase. In addition, specific tests assess different cognitive constructs when

applied in different cultures. This raises questions on the confidence of diagnosis based on such test results. In fact, testing cognition is itself a cultural concept initiated in particular cultural contexts such as western societies (Ardila, 2005)

In view of this, there was a wave of excitement in the first half of the 20th century when the prospects of developing ‘culture-free’ or ‘culture-fair’ began as it appeared possible to have a sort of universal measurement of mental function. However, “....contemporary psychologists are now correcting the legacy of such errors inherited from this very forgivable passion. Researchers are now retreating and regrouping, virtually unanimously agreeing that a test unequivocally fair to all people in all cultures is a distant hope” (Brislin, Lonner & Thorndike, 1973, p109) Some modified versions of these ‘culture-free’ or ‘culture-fair’ tests are surfacing that are termed ‘culturally relevant’ bringing hope of overcoming the challenges in cross-cultural testing.

An important measure that is undertaken to prevent over- and under-diagnosis of clients is standardisation of results to create normative data sets based on the particular population. Standardisation of neuropsychological test results to create norms helps curb cultural influence on test performance (Lezak, et al, 2004). Use of normative data sets in diagnosis greatly increases the accuracy of the diagnosis and reduces misclassification (Brickman, et al, 2006). Standardisation is also the step that the Zambia Neurobehavioral (ZNB) study is taking in developing normative data sets for Zambia. While it may seem that obtaining normative data may be the solution to this challenge of cultural influence in test performance, the fact is that within a nation like Zambia, there is a wide variety of linguistic, educational, environmental and sub-cultural differences. The norms would have to “.... include stratification by other factors that impact cognition (e.g., age, education) and require a very large sample size to be established” (Brickman, et al, 2006, p94). The ideal situation would be to develop culture and language appropriate tests. However, collection of normative data is a major step towards fair assessment of culturally diverse populations.

The ZNB study involves administration on the Zambian population of a neurobehavioral test battery that has been used in the USA for assessment of

neuropsychological impairment resulting from Human Immuno-deficiency Virus (HIV) infection. The battery contains 14 individual test measures perceived to be particularly sensitive to effects of HIV infection on the brain (Cysique, et al 2003) and a few screening tests to attain participants' inclusion criteria. It will be administered on HIV negative individuals to create norms for Zambia. This study that will be looking into cultural influence on neuropsychological (NP) test results in Zambia, therefore, is derived from the bigger study, the ZNB.

1.1 RATIONALE

While developing norms for the population is certainly a major advancement, the test instruments are still imported from the western world (Ogden, et al, 2003; Grigorenko, 2009). Could it be then, that tests could be standardised and norms developed, yet they might not reflect truly the measure of what they are intended to test because of the influence of culture? Challenges definitely also arise from the fact that most studies meant to explore multicultural scope tend to be asymmetrical with the “Western cultural origin setting the defining parameters, and the non-Western collaborator “filling in the blanks” with indigenous information that is preselected, or even tailored to fit within the conceptual categories of Western Science” (Serpell, Akkari, 2001, p. 66).

Unfortunately, it may not always be possible to get culturally appropriate tests, more so for every cultural group that may live in our country (Ogden, et al, 2003). In addition, looking at only data bases takes away so much from what is actually happening ‘behind the scenes’. Roy Schafer (1948) says ‘to reason – or do research – only in terms of score-patterns is to do violence to the nature of the raw material’ (as cited in Lezak, et al, 2004, p. 136). Who are these people that appear as statistics? What does it mean if they score less on word fluency or high on the pegboard? “The number is not the reality; it is only an abstract symbol of some part or aspect of the reality measured. The number is a reduction of many events into a single symbol. The reality was the complex dynamic performance” (Lloyd Cripe, 1996a, p161 as cited by Lezak, et al, 2004). Ogunnaike also puts this point forward when she says that what we learn at home does not readily lend itself to quantitative assessment but most definitely lends itself to something (Serpell & Akkari, 2001). And it can be assumed that she does not mean ‘home’ in the literal sense of father and mother’s

house; but rather referring to region of upbringing. Nsamenang asks ‘Is psychology reality as precise as statistical packages make them to be?’ (Serpell & Akkari, 2001, p. 76). Certainly not. It is in view of this that this study will take a qualitative approach.

This study will take advantage of the existence of the ZNB. It will be the first neuropsychological test battery to be standardised in Zambia. In view of the importance of its use in HIV, it will probably be a widely used battery and as such, information about its relevance and validity in Zambia is cardinal at the onset of the project.

1.2 STATEMENT OF THE PROBLEM

Transporting NP test instruments developed in the west to a culture in which they were not developed such as Zambia, will increase the potential for error. It, however, will not be possible to capture this cultural discrepancy by simply administering NP instruments. Deeper questions need to be asked to answer the ‘why’ of the results. This research project intends to find some of these missing pieces.

1.3 RESEARCH QUESTION

There are cultural considerations to be made when applying tests developed from one culture to another. In this case, a neurobehavioral test battery has been imported from the western world for administration in the Zambian community. What is the nature of culture’s influence on performance on these tests, and what steps should be taken to ensure that the interpretation of that performance is not biased (or distorted) by overlooking that influence of culture?

1.4 GENERAL OBJECTIVE

To describe the influence of culture on Neuropsychological testing in Zambia

1.5 SPECIFIC OBJECTIVES

- To describe the perspectives of respondents about NP testing in Zambia
- To describe the experience of respondents of NP testing in Zambia
- To describe the perspectives of NP test administrators
- To make relevant recommendations to test developers and administrators

2. LITERATURE REVIEW

If the role of culture in assessment is ignored, it may compromise diagnosis and treatment of the client. For example, studies done among the Maori of New Zealand have shown that they were more cooperative and involved if the neuropsychological assessments involved aspects of their culture such as their health model (Lezak, et al, 2004; Ogden, et al, 2003). One such study done to adapt neuropsychological assessments for minority groups compared white and Maori New Zealanders (Ogden, et al, 2003). The study was aimed at establishing NP tests that were culturally appropriate for the Maori and comprised 40 participants. These 40 included 20 Maori and 20 Pakeha (white New Zealanders) aged from 16 to 30 years, men and women from urban centres but of low socio-economic status. In addition, all participants were students from a training centre designed to help those who had no qualifications or low formal education (no higher than 5th form) to be trained and get in employment. No regular drinkers were adopted for the study and participants were also screened for neurological disorders or moderate to severe traumatic brain injury (TBI).

The general hypothesis was that Pakeha would perform better on tests that rely on western culture, such as verbal concepts and knowledge than Maori and the Pakeha would perform the same on tests that appear to depend less on such concepts. It was a mixed methods study that involved administration of an NP test battery that can be used to diagnose TBI and other neurological disorders. Qualitative questions were also asked to 18 of the 20 participants of each group. Some of the tests in the battery included WAIS-R Digit Span and Digit Symbol, WMS R Logical Memory (LM) subtest, Rey's Complex Figure test and several adapted tests i.e. Vocabulary – Maori Alternative (Vocab-M), Controlled Oral Word Association – Maori Alternative (COWA-M) and Logical Memory – Maori Alternative (LM-M).

Quantitative data was analysed using both one-way and two-way ANOVA while qualitative data was analysed using coding and recursive observation. Results showed that Maori participants responded with more Maori words than Pakeha and generally performed better or the same as Pakeha on Maori adapted tests. On the other hand, Pakeha generally performed better on vocabulary tests and logical

memory with no Maori substitutions (tests that appeared to depend more on western concepts) supporting the hypothesis. There were no significant differences on performance on the Digit Span, Digit Symbol, Design Fluency, Speed of Comprehension, Trail Making and the Rey Complex Figure tests as expected. Of Maori participants, 83 percent were positive about the Maori content and only 1 participant had a preference for an assessor of the same ethnic group suggesting that the ethnic group of the assessor does not seem to be as important as the test content and cultural sensitivity. Ogden, et al (2003, p. 131) add, “even ‘culturally sensitive’ neuropsychologists from the dominant cultural group would be wise to seek consultation from a psychologist from the minority ethnic group whenever they assess or are involved in the rehabilitation of a client from the minority group. Even if the ‘consultant’ is not a neuropsychologist they may well be able to assist in interpretation of qualitative data.”

Though the study data shows the need for validation studies for minority groups, its major limitation is its small sample size (40 participants) and that the study was carried out on a small age range of adults so that findings can only be suggestive. However, though this study was not conducted in Africa, it is comparable to the Zambian population which has a vast number of people who do not speak English as a first language.

In a previous study by Ogden & MacFarlane-Nathan (as cited by Ogden, Cooper and Dudley, 2003), two groups of Maori men aged 16 to 24 years were compared; one group from an urban area and the other from a rural area totalling 24 men. The aim of the study was to develop culturally fair NP tests and normative data. It was hypothesised that the urban Maori would perform better than the rural since the urban men would be more acculturated to the Pakeha western culture. Results showed that there was no over-all difference in attitudes or test scores between the groups but both groups performed significantly higher on the LMM than on the LM by almost 1 SD. The LMM is written in English language using stories about Maori events but with grammar and sentence structure typical of that used by Maori. Once again, the limitation of this study was the small sample size, the small age range and the fact that it only had male participants.

Another study of relevance to consider is the pilot Neurobehavioral study investigating effects of HIV-1 infection (Cysique, et al, 2007). The study uses a test battery almost identical (same domains to be tested but a few tests substituted) to the one to be used in the ZNB and compares two populations, i.e. one from China and the other from USA. Since most NP assessments (and studies) done concerning HIV positive people are conducted in western countries, the study was also designed to investigate neuro-cognitive effects of HIV infection and also to explore cross-cultural validity of the test battery. The study populations comprised 28 HIV positive individuals (21 from an urban area and 7 from rural areas) and 23 HIV negative controls (16 from Beijing and 7 from rural China) being matched with 31 HIV positive and 39 HIV negative controls all of low social economic status and with CD 4 counts comparable to the Chinese study population. A control group was required in the study so as to compare with the HIV infected group to see if there were any HIV effects in the performance.

The NP test battery in this study was translated from English language to Mandarin and then back to English to ensure consistency. (Note that translation of the test battery was not done in the Zambian setting – the ZNB study). Minor adaptations were applied to the battery to improve familiarity. Data analysis was done using two-way ANOVA. The results showed significant country effects in the Verbal Fluency and Speed of Information processing domains but no significant effects on the remaining domains (Motor, Executive Function, Attention and Memory and Learning and Memory). It was also observed that the HIV infected participants showed increased impairment in the Executive Function and Speed of Information Processing domains.

A limitation of this study, once again, is the small sample size which makes it difficult to generalise results. Another is the lack of available normative data for the Chinese population. A good attempt was made to increase validity by translating and back translating the testing instruments into and out of Mandarin. It is important to note that the formal educational levels of the Chinese participants were much lower than the educational levels of their comparison group in the USA as will be expected of the Zambian participants in the ZNB study. However, the Chinese culture is different from the Zambian culture; and the Zambian population will not have the

privilege of having the tests translated into the local language. Also, the study is a quantitative study giving information only in the form of figures. Definitely, more could be learnt from a qualitative approach as well.

Even within the western culture itself, several studies have shown that there are cultural effects among various minority groups. Razani, Murcia, Tabares and Wong (2006) did a study among fluent English speaking ethnically diverse (ED) participants and Mono-lingual English Speaking Anglo-Americans (MEAA) to investigate their performance on the Wechsler Abbreviated Scale of Intelligence (WASI). The ED group comprised a total of 50 encompassing Hispanic, Asian and Middle-Eastern descent while the MEAA was 36. Results of the study showed that the MEAA performed better than the ED group on verbal tests but both groups performed reasonably well on the non-verbal tests such as Block Design and Matrix reasoning. One important predictor of performance on verbal tests was the years of formal education obtained outside the USA. This once again emphasises the point of cultural influence on test performance.

Byrd, Miller, Reilly, Weber, Wall and Heaton (2006), also compared African Americans (AA) with Caucasian Americans. Their study comprised 100 healthy participants with 75 AA and 25 CA. It looked into early environmental factors encompassing detailed childhood histories and ethnicity and how these interact with adult cognitive test performance. Similarly, results obtained showed significant differences between ethnic groups even when they were controlled for effects of age, gender and years of formal education. Results also confirmed the hypothesis that early environmental experiences relate to cognitive test performance in adulthood with notable areas being those of verbal comprehension, verbal learning, speed of information processing and attention/working memory. The findings of the study further demonstrate to the clinical neuropsychologist what has been highlighted once again, i.e. the influence of culture in NP test performance and the importance of ethnicity-specific normative data for specific populations to improve validity. A limitation of this study might have been the inadequate accuracy in retrospective recollection of one's early childhood environments.

In another study, African American, White and Hispanic non-demented elders were subjected to cancellation tests (the Letter and Shape Tests) which are used in clinical and empirical assessment of attentional/visuospatial disorders (Byrd, Touradji, Tang & Manly, 2004). A total of 1405 participants aged 65 and above all from the Washington Heights-Inwood Columbia Aging Project participated in the study comprising 454 African Americans, 418 Whites and 533 Hispanics. All participants were screened for neurological conditions and psychiatric conditions. Spanish participants had instructions and interview questionnaires translated into Spanish.

As predicted, despite matching the groups in terms of years of education, Hispanics and African Americans took significantly longer to complete the tasks than their White counterparts. It was also noticed that the subsample of African Americans tended to be more accurate than Whites on the Shape task. Also, it was noticed that more Hispanics and African Americans committed more errors of commission (up to 3 times higher) as compared to Whites even when formal education differences were considered. These findings should caution the clinician not to interpret pathology upon finding results of high commission errors in Hispanics and African Americans. “The current study demonstrates that...if future normative samples for cancellation tests do not include adequate numbers of minority, normative data may not be representative and clinicians may be more likely to interpret the performance of minority elders as impaired” (Byrd, Touradji, Tang & Manly, 2004, p. 410). Collecting normative data is not enough. Normative data must always be representative of the population. The authors also highlight the need to understand the specific background of cross-cultural differences on tests. A limitation of the study is the small subsample size used for formal education and literacy matching.

Studies have also been done among adults in Africa. Nielsen and Wiig (2006) observed that tests typically used to assess or screen for cognitive decline or impairment associated with neurological insult “introduce cultural, linguistic and/or formal educational biases, when used outside Western cultures for which they were developed” (Nielsen & Wiig, 2006, p504). For example, the mini-mental state examination commonly used is helpful for assessment of formally educated westerners because it has components that call for reading, writing and subtraction abilities but has limited use in developing societies where literacy may not be well

established. The Alzheimer's Quick Test (AQT) was identified as a cognitive screening test that is cross-culturally applicable but also quick, reliable and objective and a study was done to generate normative data for West African speakers of Krio. The researchers were also interested in comparing naming times for Krio and American speakers.

Participants of the study were 164 normal functioning adults aged 25 to 75 years screened for neurological disorders, HIV, diabetes, and general ill health. Years of formal education ranged from 2 to 17 years with equal populations from both urban (Freetown) and rural areas (all native Sierra Leoneans) and consisted of those in formal employment, informal employment or unemployed. The assessment had two tests (Test 1 and 2) measuring perceptual speed and one (Test 3) test of cognitive speed.

Normative data was obtained for naming times and criterion cut-offs were developed. Contrary to what was expected, Krio speakers took considerably longer naming times than American speakers and this was consistent even when the naming times of literate Krio speakers was compared with those of literate American speakers. Also, it was expected that since the criterion cut-offs for Swedish and American speakers for AQT naming were identical, the criterion cut-offs for the Krio speakers would also be comparable to the results of the two groups especially that Krio has features of English. This was not the case, however, and the authors propose that this might be due to cultural effects in West Africa on the rate of speech.

The study is significant because use of this screening test will lead to more diagnoses of the condition which may reflect the true incidence of the illness and may result in policy change by the government warranting availability of prescription drugs for treatment of AD. Currently, prescription drugs for AD are not available to the majority of West Africans.

Moving to the Zambian scenario, a study of interest is that done by Serpell (1979) that compared eight-year olds in low-income neighbourhoods of Lusaka, Zambia and Manchester England on pattern reproduction in various forms (media). The researcher was motivated by existing research evidence that showed that western

participants performed better than African participants of comparable age on tests that required them to reproduce a visual representation of a pattern. A British group of boys and girls of age range 6 to 10 years old and a Zambian group of boys and girls of age range 6 to 17 both from low-income families were recruited from their local schools. There were four tasks to be done with participants as follows: 40 for plasticine modelling, 48 for wire-modelling, 62 for the drawing task and 147 for the hand positions task.

The children were asked to reproduce standardised patterns of a human figure, flower and a square with diagonals using clay-modelling, wire-modelling and pen and paper. As predicted, the Zambian children excelled in the wire modelling task while the English children performed better in the paper and pencil task. Also, as expected (since Zambian children make models of natural clay in their regular play and English children have a similar equivalent of industrially produced modelling clay), there was no difference in the clay-modelling task. There was also no significant difference in performance in the hand position task. The findings of the study suggest that perceptual skills are specific and that the (cultural) background experience directs this specificity. The key thought for test developers is that familiarity with test materials plays a role in test performance.

A strength of the study is the use of various media to test the study population as opposed to use of either pen and pencil test or clay modelling alone which made it dispel the readers' suspicion that participants that perform well in a task maybe those that are generally intelligent. Seeing the same participants perform better in one task and poorly in another helps to dispel that belief. Testing bias was reduced by getting indigenous test-administrators for both groups. Though the years of formal education and the economic circumstances of both groups was comparable, age ranges for the two groups, however, were not identical as the Zambian population included some older subjects.

More recent work by Serpell and Jere-Folotiya (2008) looked at developmental assessment, cultural context, gender and schooling in Zambia. The study sought to answer the question of the kind of early and middle childhood psychological assessment relevant to guide a child from a rural African community in the formal

educational process as s/he enters school. It also aimed to identify other dimensions of the child relevant to test that would help predict progress and if cognitive tests had predictive validity. A cohort of 46 children (27 boys and 19 girls) indigenous to a rural community in the Eastern Province of Zambia enrolled at an age range of 6 to 14 years were followed up for 14 years.

It is interesting to note that “a number of measures were developed for the assessment of young children’s cognitive abilities within their ecocultural niche” (Serpell & Jere-Folotiya, 2008, p 3). The use of these measures was inspired by the above study that compared British and Zambian children on different tests whose hypothesis that each group of children would outperform the other in the media most familiar to them was confirmed. For early childhood testing, the General Verbal Test (GVT) administered in the local Chi-Chewa language was done and the Hand Positions Test (HPT) and Panga Munthu Test (PMT) for pattern reproduction were developed locally and applied. For the qualitative component, structured interviews were conducted with non-parental, locally resident adults well acquainted with the children to discuss their personal attributes; and rank each child accordingly. In a final trace interview that focused on each participant’s life journey for the past 4-5years, adult literacy tests were informally presented i.e. the English Literacy Test (ELT) and the Nyanja Literacy Test (NLT - a local language literacy test).

Results of the study showed a stronger correlation between the male children’s cognitive abilities and their adult formal education and literacy. On the other hand, there was a strong and reliable correlation between home village ratings and level of formal education completed, as well as adult literacy in girls; but not in boys. These findings bring about the question of whether it can be concluded that the tests are valid measures of predicting formal educational progress for males and not for girls; and whether then, there would be need to develop separate valid tests for girls. Also, as mentioned in the introduction section, data collected reflects a profound difference in the concept of intelligence for the indigenous people as opposed to the western view. Intelligence (Nzelu), in the Chewa community encompasses wisdom, social responsibility and cognitive alacrity whereas intelligence in school is assessed almost exclusively in terms of cognitive alacrity.

This study shows practical use of research findings. Knowledge from findings of an earlier study (Serpell, 1979) was applied in subsequent research in later studies (Serpell and Jere-Folotiya, 2008) improving appropriateness of tests which were developed in a different culture; but whose concepts can apply. Zambian versions of the tests (GVT, PMT and NLT) were developed. The complexity of the study is that gender comes to play in the findings almost. This implies that cultural context exercises a more powerful influence in rural communities on young women than young men in predicting formal educational outcome.

In another African context, Ogunnaike and Houser (2002) in their study of 207 toddlers of low-income households of rural, urban and semi-urban Yoruba communities compared their engagement in errands with their cognitive performance. The study examined “the relationship between intelligence reflected in responsibility training (errands) and developmental outcome among Yoruba toddlers of southwest Nigeria” (Ogunnaike & Houser, 2002, p. 146). The researchers argued that errands provide opportunities for interacting with the community and environment leading to social maturity and also that the concept of intelligence in such a culture is encompassed in this interaction while the western concept of intelligence is associated with technological skills.

The age range of the children was 22 to 26 months, 92 were of the semi-urban, 95 from urban and 20 from rural samples. A Yoruba Mental Subscale (YMS) adapted from Bayley Scales of Infant Development was administered to participants while mothers of participants were interviewed using a comprehensive questionnaire with questions on socio-demographic information, beliefs, attitudes, child care and social responsibility (errands). Results of the study reflected that children engaged in errands, especially those that engaged in item purchase, performed significantly better on the YMS than those that did not. Oloko (1994, as cited by Ogunnaike & Houser, 2002) noted that Yoruba school-age performed significantly better in arithmetic, general knowledge, and English language when engaged in street trading than those that were not. The findings of this study suggest that the socio-cultural environment of an individual cannot be isolated from their cognitive performance. In essence, that the socio-cultural environment plays a major role in determining the cognitive development of an individual and that relevant aspects of this cognitive

performance is what must be assessed. However, performance on the YMS could have also been associated familiarity to the testing materials influenced by background such as whether from urban, rural or semi-urban as children from urban areas may have had more access to toys and other materials similar to those of the YMS than those in rural areas.

The aspect common about the last three studies i.e. the ones done in Zambia, Nigeria and Sierra Leone is that researchers have recognised that culture influences psychological testing profoundly and have gone a step further to adapt and develop tests appropriate to their cultures resulting in significant findings and intervention points.

3. METHODOLOGY

3.1 Study Design

Phenomenological Study. This study design is ideal for collecting qualitative data concerning information surrounding a particular occurrence such as a testing process in this case (Creswell, 2007). Participants are invited to share their thoughts, feeling and views on a particular experience and these are recorded.

3.2 Participants

A total of 48 participants were included in the study. There are two distinct types of participants that will be identified as:

- 3.2.1 Test-takers (i.e. the 40 participants recruited from among test-takers of the ZNB) and
- 3.2.2. Test administrators (i.e. 7 from the test battery administrators for the ZNB).

Below are some details of the two types of participants.

3.2.1 Test-Takers

It is important, at this point to give a brief background of the nature of test-takers of the ZNB study. These comprised 15 males and 25 females aged from 21 to 62 years old that were HIV negative (test-takers were recruited via VCT counsellors testing those that go voluntarily for testing) from both urban (Lusaka) and rural (Chongwe, Chibombo and Kafue) populations. A total of 20 test-takers were sampled from rural areas including 11 males and 20 participants of urban areas including 4 males.

Each test-taker gave signed informed consent after full explanation of the research process, provided relevant demographic details, and relevant neuromedical history. Exclusion criteria for the ZNB test-takers included factors that might have confounded neurocognitive performance such as current substance abuse (excessive alcohol intake in the past 30 days and/or drugs of abuse 3 or more times a week in the past 30 days which was assessed), history of head injury with accompanying unconsciousness of greater than 30 minutes, depression and neuromedical disorders such as stroke, epilepsy, and so on.

Years of formal education of test-takers ranged from 5 to 17 years and assessment of ability to do basic reading was done by screening with the Wide Range Achievement Test 4 (WRAT 4) Reading. Those that could not read were excluded from the study because some tests of the ZNB required an adequate level of literacy. Of the 40 test-takers, 12 were in formal employment, eight were unemployed and the remaining 20 were in informal employment such as casual work, subsistence or peasant farming, tailors, roadside businessmen, etc.

After completion of the ZNB test battery (to be described further below under ‘testing instruments’), participants were asked if they were willing to discuss their testing experience. Only after consenting were they adopted for the present study. As earlier mentioned, a total of 40 test-takers of the ZNB study comprising males and females were selected to participate in the study describing cultural influence of neuropsychological test results in Zambia. Of these 40, 11 were picked by purposive sampling to participate in in-depth interviews.

3.2.2. Test Administrators

The remaining seven participants of the study on cultural influence on neuropsychological test results in Zambia were seven out of the nine test administrators for the ZNB comprising two males and five females. These are all Master of Science students of the Clinical Neuropsychology class of the University of Zambia (UNZA) aged from 24 to 32 from whom informed consent was obtained as well. All in all, the total of study participants was 48.

3.3 Sampling Method

Convenience Sampling was used initially for the 40 participants and also for recruiting the 7 out of 9 test administrators. Test-takers and test administrators of the ZNB study that were willing to be asked about their testing experience were recruited. For in-depth interviews, purposive sampling was used to recruit 11 participants from among the 40 tested by the present author, identified as rural participants with very low formal education background or urban participants with tertiary education background, so as to include two extremes on the dimension of Western acculturation.

All participants were compensated for involvement in the study with transport and lunch allowance.

3.4 Study Location

ZNB sites i.e. selected health centres in Lusaka, Chongwe, Kafue and Chibombo with permission from Ministry of Health (Appendix B). Lusaka was considered an urban site while Chongwe, Kafue and Chibombo were classified as rural sites in the ZNB study.

3.5 Procedure

A brief description of the ZNB procedure is provided to give perspective to the present study. Demographic information of participants was obtained and assessment for depression was done using the Beck Depression Inventory (BDI). Self report questionnaires Patient's Assessment of Own Functioning Inventory (PAOFI), Activities of Daily Living (ADL) and Use of Academic Skills Questionnaires) were used to assess participants in areas of personal functioning, ability to perform daily living skills and how often they use academic skills in their everyday life. History on substance use and neurobehavioral information will also be obtained via questionnaire administration after which the test battery will be administered.

3.5.1 Zambia Neurobehavioral Study Battery

“The test battery selected for the current research taps multiple cognitive–motor ability domains that repeatedly have been found to be affected by HIV-associated brain disease in the United States” (Cysique et al, 2007 p. 784). The selected tests (instruments) for use in the study are listed below according to the domains they are designed to assess:

a) Screening for Effort

Hiscock Digit Memory Test (HDMT)

The HDMT is a test that was designed to identify an individual feigning memory impairment. The 18-item HDMT was used in the ZNB. To put it simply, in the HDMT, a test-taker is required to look at a 5-digit number on a page in a booklet for 5 seconds followed by 5 second delay (period of looking at a

blank page) and thereafter he is shown 2 sets of 5-digit numbers on the following page with one of the numbers being the one he saw on the previous page; and is required to identify the number he had just seen. There are 3 sets of these number identification trials the subsequent 2 sets having a progressive 5 second increase in the delay so that it is 10 second and 15 second delays for sets B and C respectively. (Hiscock & Hiscock, 1989:972).

b) Attention/Working Memory

Paced Auditory Serial Addition Test (PASAT)

PASAT was devised by Gronwall et al. (Gronwall, 1977; Gronwall & Sampson, 1974; Gronwall & Writson, 1974) to measure attention deficits including concentration, speed of processing, mental calculation, and mental tracking (Strauss, Sherman & Spreen, 2006) and can be used for diagnosis of cognitive impairment in persons 16 years and above. In the PASAT, an audio recorded voice states a random series of numbers from 1 to 9 at 3 second intervals while the listening test-taker is required to add the number they just heard with the number they heard before in pairs each time. This is a challenging task that involves working memory, attention and arithmetic capabilities.

Wechsler Memory Scale III (WMS-III) Spatial Span

The WMS III spatial span is a visual test of attention and memory and a derivative of the Corsi blocks test which was first developed by Corsi in the 1970s to complement the verbal memory span task. On the other hand, the digit span and PASAT are auditory measures of attention and memory. The WMS III spatial span has 10 cubes of 27cm³ size positioned irregularly on a 23cm X 28cm board. The test administrator illustrates a sequence of tapping the blocks which the test-taker is required to replicate forwards and later backwards. Wilde and Strauss (p323, 2002) highlight the assumptions of the Wechsler spatial span test as “(a) Spatial span is a visual analogue of the Digit Span, (b) the working memory demands of the Spatial Span backwards are greater than in the forward condition, and (c) Spatial Span is a valid measure of visual-spatial memory”.

c) Abstraction/Executive Functioning

Wisconsin Card Sorting Test (WCST, 64-item version)

The (WCST) is used to assess abstract thinking. It is a 64 card version of variations of 1 to 4 symbols of a triangle, a star, cross or circle that can be in red, green, yellow or blue. Each card is unique and the test-taker is required to match the changing card at the bottom of the computer screen to the consistent 4 that are shown at the top of the screen (Lezak, 2004). The three basic principles that can be used to match the cards are colour, shape or number of items on the card.

Colour Trails Test (CTT)

As in PASAT, one of the domains measured in CTT test is attention. Other aspects measured are sequencing, mental flexibility, visual search and motor function. The CTT has minimal language influence so that it can be used in cross-cultural settings. An A4 size sheet of paper with numbers from 1 to 25 each encircled is placed before the testee. Odd numbered circles are pink while even ones are yellow and the test-taker is required to draw a continuous line joining the circles with subsequent numbers as fast as they can. Part 2 shows 2 sets of numbers from 1 to 25, with one set in pink and the other in yellow where the test-taker is required to join numbers in sequence alternating between pink and yellow circles and disregarding the numbers in the circles of the alternate colour (Strauss, Sherman & Spreen, 2006).

Stroop Colour Word Test

John Ridley Stroop developed the Stroop Colour and Word Test in 1935 (Stroop, 1935). It is widely used in clinical practice to assess cerebral (frontal lobe) dysfunction. It is used to assess executive function because of the aspect of speed of word processing and colour processing and the complexity of managing interference when the process demands both word and colour processing at once. The test consists of 3 tasks 45 seconds each on white A4 sheets namely: Word, Colour and word-colour (WC) tasks. The word card has the words “blue”, “red” and “green” in black in assorted order set in columns on the page. The test-taker is required to read them out as fast as they can. The second task has ‘X’s printed out in sets of 5 in the colours red, green and blue. Test-taker is required to name them as fast as s/he can. The final task (WC) has the same words as those in the Word card; but in incongruent ink colour and the test-taker is required to name the colour of the ink ignoring the word.

Halstead Category Tests – computer version

Halsted (1947) developed this test to assess one's ability to master concepts of size, shape, number, position and colour. The version used in this study has 7 subtests, each subtest with a different principle that may be based on number of objects, spatial position or a combination of different principles. To successfully do the test, “the participant must rely on feedback based on correct or incorrect guesses to show what the principle in that subtest is. The test requires deduction of a classification principle by means of response based feedback. The use of the principle while it remains effective and to abandon the principle when it is no longer effective” (Strauss, Sherman & Spreen, 2006, p425). The test is scored based on the number of errors made.

It is possible to assess diverse skills such as “counting, perceptual organization, set maintenance, and learning facilitated performance on the Category Test” (Simmel & Counts, 1957 as Cited by Allen, Goldstein & Mariano 1999 pp237). Though both the HCT and the WCST measure executive functioning, it is proposed that the HCT should be a Test for the clinician who is interested in assessing difficult and sensitive measure of abstraction ability (Strauss, Sherman & Spreen, 2006).

d) Learning and Memory (2 domains)

Hopkins Verbal Learning Test, Revised-II (HVLT-R)

HVLT-R was developed by Brandt and Benedict (2001) to test verbal learning and memory inspired by word lists from the California Verbal Learning Test (CVLT) and the Rey Auditory Verbal Test (RAVLT). In the HVLT-R, a 12 word list of 3 semantic categories of human dwellings, precious stones and four-legged animals is read to the test-taker one word at a time at 2 second intervals. Immediately after the list is read out, the test-taker is expected to start saying back the words in any order for three trials. After a 20 minute delay (period in which the test-taker was engaged in other activity), the test-taker is asked to recall the words from the list. In the last exercise, a list of 24 words that includes 12 extra items that were not in the original list are read item and the test-taker is required to recognise words that were in the original list from it by saying ‘yes’, if it was there and ‘no’ if it was not. (Strauss, Sherman and Spreen, 2006) The HVLT-R being used in the ZNB study was adapted

to accommodate Zambian respondents by replacing Emerald, Sapphire, Jade and Pearl with Copper, Iron, Lead and Zinc respectively. (Cherner et al 2009). The HVLT-R is a test of learning ability and immediate recall on verbal information across trials.

Brief Visuospatial Memory Test – Revised (BVMT-R)

BVMT-R is a visual version of the HVLT-R and is used to assess visual learning and memory and geometrical diagrams function similar to the word-lists in the HVLT-R. It was initially developed by Benedict (1997) and revised by Benedict and Groninger in 1995 (Strauss, Sherman and Spreen, 2006). For test administration, an A4 size white card of 6 geometrical figures arranged in a 2 by 3 display is presented before the test taker for 10 seconds for study after which the test-taker is required to reproduce the images as closely as possible to the original by drawing on a similar A4 size white blank sheet of paper. Two more trials are given totalling 3 set of drawing and after a 25 minute delay (of doing other test activities), the test-taker is asked to recall and draw from memory the geometric figures he had seen. In the recognition task, the test-taker is presented with 12 figures, one at a time and asked to identify which was in the original displaying by saying ‘yes’ and ‘no’, if it was not.

e) *Verbal Fluency*

Verbal fluency tests aim at evaluating spontaneous production of words in a limited time span (Straus, Sherman, Spreen, 2006). In verbal fluency tests, the test-taker is asked to say as many words as possible from a particular category in a 60 second time period.

Controlled Oral Word Association Test – FAS

In the COWAT, phonetic fluency is assessed as the test-taker is asked to say words that start with a particular letter for the entire 60 second time period. In the FAS version, there are three trials. In the first 60 second trial, the test-taker is required to state words that start with ‘f’ only, then in the second words that start with ‘a’ only and in the last words that start with ‘s’ only. These words must exclude proper nouns or names of people or places and cannot contain variants of the same word.

Category Fluency Test

The category fluency test is used to assess semantic fluency. Word generation is for two categories, animals and actions, each in its own 60 second time intervals. Categories of the test to be considered are the ‘animal name’ generating task and action fluency verb naming task.

Both COWAT and category fluency tests impose significant language requirements and are sensitive measures of brain dysfunction (Lezak, Howieson, Loring, 2004, Straus et al, 2006).

f) Motor

Grooved Pegboard (Dominant and Non- dominant)

Grooved pegboard test is used to measure motor speed and accuracy. In this exercise, a board, with a metal tray that has 25 grooves (holes) each shaped with a round and square side but of different orientation, is placed in the mid-line before the test-taker. The test-taker is required to place a peg (a small metal rod), in a lock-and-key fashion in each hole in order beginning from left to right in their 5 by 5 rows as quickly as he can without skipping any and using only one hand. The test is done for the test-taker’s dominant hand first and then for the non-dominant hand and both trials are timed. The grooved pegboard test is useful in assessing persons that relate to machine operating, finger dexterity, speed and manual dexterity (Lafayette Instrument grooved Pegboard test Manual, 2002)

g) Speed of Information Processing

Wechsler Adult Intelligence Scale version III (WAIS-III) Digit Symbol

WAIS-III Symbol Search

The digit symbol and symbol search tests are extracted from the WAIS-III and constitute the processing speed index of it (Strauss et al, 2006). It is also thought that these tests may also assess working memory and processing speed.

In the digit symbol, there is a key of 9 symbols for each of the 9 digits (1 to 9) displayed at the top of an A4 size sheet of paper. Below this key of symbols, there are randomly placed numbers in boxes next to each other in 7 rolls, 20 numbers in each with each number having a blank box below. The test-taker is required to draw the symbols of each number in the blank box below it according to the key at the top of the page as correctly as he can without skipping in a 120 second time interval.

In the symbol search, two target shapes are presented in a roll on an A4 size sheet of paper and the test-taker is asked to recognise these two shapes in the group of five shapes in the same roll on the right. The test-taker is required to mark ‘YES’ if any of the symbols on the left appear on the right and ‘NO’ if neither of them are present as fast as he can for 60 such rolls in a 120 second time interval.

Trail Making Test Part A

Trail Making Tests A is used to assess information processing speed, attention, visual searching and the ability to mentally control simultaneous stimulus patterns. This is a number-sequencing task. The test can be used to assess global brain status but is not too sensitive to minor brain injuries (Strauss, Sherman & Spreen, 2006). The test-taker is handed an A4 size sheet of paper with numbers from 1 to 25 scattered randomly, each encircled and asked to draw a line joining them in order from 1 to 2, 2 to 3, 3 to 4 and so on until 25 as fast as he can and timed.

3.5.2. Data Collection Procedures

a) *Questionnaire*

A questionnaire consisting of 11 semi-structured questions was administered to 40 of the ZNB test-takers upon completion of the assessment.

b) *In-depth interviews*

Unstructured voice-recorded in-depth interviews were done for each of 10 test-takers that were further purposively sampled out of 40 ZNB test takers.

c) Focus Group Discussion

2 voice-recorded focus group discussions (FGDs) were conducted with 7 of the test administrators of the ZNB. The first was done at the end of testing of the rural population (FGD 1) and the second after completion of testing of the urban population (FGD 2). The purpose of the FGD was to obtain feedback from test administrators on what they observed about participants and which tests or what parts were challenging to administer.

3.5.3 Data Quality Assurance

ZNB test administrators were Clinical Neuropsychology post-graduate students trained and certified in NP test administration by staff from University of California San Diego (UCSD), HIV Neurobehavioral Research Centre (HNRC) where the test battery was developed.

The pilot study helped to sharpen data collection tools. Questionnaire interviews were documented. FGD and in-depth interviews were voice-recorded to preserve raw data and were later transcribed. Interviews accommodated use of local language to improve rapport and avoid restriction of expression of test-takers.

3.6 Project Duration

The project took approximately 8 months from initiation to production of the final report.

3.7 Data Processing and Analysis

Data processing involved transcription of recorded material and familiarisation. It was analysed by coding and recursive observation after which emerging themes were grouped into commonality and analysed as such. Divergent views were also sought and reported.

4. RESULTS AND THEMATIC ANALYSIS

The results will be presented according to the following emerging themes:

- Language
 - ✓ Actual language
 - ✓ Type of English used in the manual
 - ✓ Acculturation
 - ✓ Result was deviation from standard procedure
- Brief Visual-spatial Memory Test (BVMT)
- Computer tests
- Speed of Tests
- Questionnaires
- Rural Vs Urban
- Concluding Remarks

4.1. Results Summary

Table 1. below shows a sample of statements that were of note and their deduced meanings.

Theme	Results (significant statement)	Deductive Meaning (Analysis)
Language	<p><i>"...Firstly, just the fact that it was English was a problem. As FG3 was saying, some of the things we had to interpret and people would understand if we translate what the word is. And even the kind of English, the words that we normally use in Zambia even the English words are kind of different from the words we found in those tests. I found that people had a problem with 'irritability' and even a word like 'skip'. A simple word like skip or even 'being held back', we talk of 'repeating a grade' and things like that. And you find that people wouldn't understand the instructions even in English even if they use English in their everyday language...."</i> - FG2, test administrator</p>	<p>1. If vernacular translations of the tests and instructions were available, the understanding of the testing process by the test-takers would have improved considerably,</p> <p>2. Zambians have their version of English, which, if used in the testing process of the ZNB would have made administration easier</p>

Table 1. continued

Theme	Results (significant statement)	Deductive Meaning (Analysis)
Use of Geometrical Figures for the Assessment of Visual-spatial Memory	<p><i>"On the same BVMT, I noticed that the drawings on BVMT in rural areas were rather strange....And sometimes you would have to double check if you showed them the right form. So you would wonder whether it is a problem of visuo-spatial perspective or what.....I wonder if that is really a cultural thing....."</i> FG3, test administrator.</p> <p><i>".....I probably think it is cultural because for people who have been exposed to more western education, I think they did better..... the kind of shapes that people see in the villages and the shapes that you see in the urban set up are kind of different and the older the person is and the less education they had, the more they tended to draw things which were totally different. We had geometric shapes but some of those shapes were not even geometric"</i> FG2, test administrator</p>	<p>People who do not use pen and paper so often or live in an environment that has few pictures have problems appreciating the finer details of pictures, let alone reproduce them.</p>
Computer Tests	<p><i>"In some instances, especially on the computer quizzes, it made me feel like what my son calls me, 'BBC' – born before computers (laughter). I couldn't really figure certain things out till the end. I felt a bit inferior. I thought maybe somebody who was educated later than I could do better. A younger person. That is how I felt"</i> - female registered nurse 46yrs old</p> <p><i>"...And there were several clients that made mention of the fact that they thought that since they were using the computer for the first time it would affect their performance. They would shake their heads and say, "Computer. Computer. It is just that I don't know computers"</i> FG2, test administrator</p>	<p>The computer itself, as opposed to the tests, was a source of either excitement, demoralisation or anxiety. Of the 40 participants, 39 made a comment about computers and computer tests either as something they liked (26), disliked (23) or something that was unfamiliar (17)</p>
Speed of Tests	<p><i>"....I observed a situation where you could see that they were not trying to do their best or as fast as they can. So, they are trying to see, like they connect from one number to the next and then they start checking. And they are not trying to do it as fast as they can so I don't know whether it is a cultural factor where they don't really see time factor as something that is important or something like that"</i> FG 5, test administrator.</p>	<p>The local culture emphasises more on precision and accuracy rather than speed. The emphasis is on doing well rather than working hurriedly</p>

Table 1. continued

Theme	Results (significant statement)	Deductive Meaning (Analysis)
Questionnaires	<p><i>".....The ADL questionnaire. You look at those items that are listed there and compare our life in Africa with the USA.Here, you find that there are very few people that live on their own....they have children that do most of those activities in a home. So if it's a situation where that person, due to some neurological brain insult.....is not able to do certain things, you cannot rely on that questionnaire to really find out what is really happening to them. Because before, they were not doing their own house work. I would experience such answers. "My wife does the laundry, my wife cooks so why are you asking me all these questions?" So I think that is also a cultural bias towards the western world as opposed to our setting"</i> FG4, test administrator</p>	<p>'ADL' here refers to 'Activities of Daily Living'. Some of the questions in the questionnaire, as they are, cannot elicit the malfunction in daily life that can result from brain insult because they are not relevant. A culturally relevant equivalent in the Zambian context would have to be found.</p>
Rural Vs Urban	<p><i>"...I had a similar experience in that the urban clients were easily frustrated with the duration of the tests than those in the rural areas. I had a client that confessed that "Next time I will not allow you take this amount of time because your tests are too long and I can't afford to sit here for this long"...."</i> FG 6, test administrator</p>	<p>Urbanisation affects the attitudes and culture of those living in the cities so that they view time more like our western counterparts</p>
Concluding Remarks	<p><i>"...Actually, because of these challenges that we had we ended up measuring things like understanding of instructions. Something else ends up coming out. I don't think we will get exactly what we wanted to get out of this whole experience and I do think some changes need to be made..."</i> FG 2, test administrator</p>	<p>Validity and Reliability of results may be questionable</p>

4.2. Language

Over 25 percent (13) test-takers stated reasons of language and unclear instructions as a possible barrier to the testing process. There were 2 major aspects of language emerged i.e.

- 4.2.1. The actual language – as in whether English or not and
- 4.2.2. The type of English

4.2.1. Actual Language Used in Testing (i.e. English)

The language of instruction was a problem especially in rural areas where people use a lot of vernacular and literature in terms of the Bible, health awareness is also available in vernacular. Vernacular translations will be necessary. Below is an extract from FGD 1 (held after test administrators had completed testing the rural samples):

Researcher: How often did you find that you had to say the instructions in the local language?

FG3: Very often

Researcher: Ok. So, one of the things I wanted to find out is, what sort of challenges did you experience like, barriers of people understanding your instructions aside from language?

FG3: I think it was mostly language because after you translate, they would do the right thing.

What I observed actually, was that first the test-administrator gave the instructions in English. And when it was realised that the test-taker did not understand the instructions, they were repeated in the local language. However, the test-administrator often did not continue asking the rest of the questions in the local language or vernacular because there was no standard questionnaire set for that. What the test-administrator hoped each time is that the test-taker would understand the English language instructions and would not have to explain again in the local language. This also meant that the testing time was lengthened because of the repetition in vernacular tiring both the test-administrator and the test-taker.

During FGD 2 (Following completion of the urban sample), one of the test administrators (FG 5 quoted immediately below) noted a difference between responses of those of rural areas and those of urban areas. He observed that those in rural areas had difficulty remembering words from the list of words that had been read to them earlier. It seemed as though as the list was being read, they simply

associated the words they heard to other English language words they knew and it did not seem to matter much for them to remember the exact same words told to them.

FG5: And then, there was also a clear indication of a difference. Of course it's not really an analysis of results. With regards to testing of those participants in the rural areas. The example of one other task is the Hopkins verbal learning task. I found that it was very difficult for some of them to generate that vocabulary to remember those words that were said. And they would...say other words or something similar to the words that you were telling them. Like, stating other animals than those that are in the list. So we are yet to expect maybe something similar or something different with the participants that we are having in the rural areas.

Aside from rural areas, people in peri-urban areas do not use English so often even though they may understand it and that limits their vocabulary in terms of usage and understanding of words that may not be common or basic. Hence, the above analysis applies to them also. One of the results of this, was an obvious limitation in vocabulary in that commonly the English language words they would generate in action fluency for example or FAS are those that relate to their profession. For example, a peasant farmer would say words like ‘cultivate’, ‘harvest’, ‘plant’, ‘plough’, etc. This is what the testers had to say in FGD 2:

FG5: Then the other thing apart from the language, I guess it's just a general experience. There was one client that said “We don't use English as much”. Of course she was saying it in the local language. But I think that has an effect as well. They don't use English so often. They know English quite alright and they can speak but they don't use it so often. Hence, they may have problems generating those words in the FAS.

FG3: And the other thing I noticed on the FAS was that people would generate words that relate to their occupation, what they do in their everyday life. So if they are farmers, they will talk about seeding, etc. In both word generation tests, they would talk about ploughing

FG4: A nurse will say ambulance on ‘a’

FG3: ‘Amoxyl’, ‘flagyl’ and things like that. They will give drugs, they will give things that relate to their occupation. So those who generally don’t do much, they don’t have any words. I had a client that generated a total of 6 words for the whole FAS. And they just did not have any words to use.

Researcher: So, in that case, do you think the performance would have been different if they were allowed to use the local language?

FG3: I would not say that because I don’t really know

FG2: I think so. I really think language was a big barrier because words that were likely to come to their minds are words that they use. ‘Salaula’ came up from a number of clients. Most of those people in the rural areas do not use English. I had quite a number of clients ask me “can I use my local language?”. They did have words in their heads in their vernacular languages but the test only allowed them to use English words.

FG6: Ya. Because you could see that when you translated the instructions, they got it just there and then. The first time you translated. You didn’t have to paraphrase the instructions in the local language. They just got it there and then. So I still feel that if they were allowed to generate words in their local language, they would perform better.

All the test-takers were multi-lingual except one bi-lingual. The majority (14) spoke four languages while 9 spoke three languages, eight spoke 5 and four spoke 6 languages. Being multi-lingual and having the common practice of people using words from different languages in a conversation referred to as ‘code-switching’ (Serpell, 1982), test-takers must have felt disadvantaged when suddenly put on the spot to say as many words as they can in one minute but in only one language. Needless to say, English language was often not their dominant language. In self

rating of English language, 8 test-takers said their English language was very good, 13 said it was good while the rest said it was fair. None said it was poor.

4.2.2. Type of English Used

One common way a person identifies a foreigner is by the way they speak a language. Typically, Zambians have a common way in which they speak English language, say things, formulate sentences and common words that they use. The type of English language used in the instruction manual was different from the ‘Zambian English’ and commented on in FGD 1.

FG2: I think language as well was a problem. Firstly, just the fact that it was English was a problem. As FG3 was saying, some of the things we had to interpret and people would understand if we translate what the word is. And even the kind of English, the words that we normally use in Zambia even the English words are kind of different from the words we found in those tests. I found that people had a problem with ‘irritability’ and even a word like ‘skip’. A simple word like skip or even ‘being held back’, we talk of ‘repeating a grade’ and things like that. And you find that people wouldn’t understand the instructions even in English even if they use English in their everyday language but the kind of words that are in this test are kind of different from the kind of words that we use in our everyday English in Zambia. So language was a problem as well.

FG4: You would have to modify certain words.

FG3: I think one of the things that can be done differently is that the instructions definitely have to be modified. There should be a way of replacing some of the words by finding synonyms or maybe finding another way of explaining so that there are some words that can be better understood in the Zambian setting.

....So maybe broadening the instructions and trying to find a way of getting an equivalent to words like ‘agitation’, ‘irritability’, ‘self criticalness’ and so on. They do not really understand what that is so they are not very reliable instruments

FG6: And then also the instructions. You say “draw it exactly the way it looks” because sometimes they would ask, “should I draw it exactly the way it looks?” or “Am I supposed to draw it exactly the way it was looking?” Then when you agree, they will actually re-arrange the drawings themselves. Not the word ‘precisely’ then you say “on the same location on the page” they won’t understand.

FG2: Ya, don’t use ‘precisely’

FG4: I think that comes back to the aspect of modifying certain words, like LK said, where we bring in synonyms of certain words as opposed to the words that are exactly in the instructional manual

Researcher: So in other words, you anticipate that some of these things will be different when you do the urban population?

FG6: Ya. We are looking forward to seeing the difference in the understanding levels, for example.

Researcher: So what tests did you find difficult to administer? Or challenging to administer and why?

FG7: Only those in which the participants were having difficulties in understanding the instructions because it was also frustrating on my part. I could also lose it a little because you have been explaining to someone until your facial expression changes. Say, for instance, you explain to someone several times and when you start the test you find that they are doing it all wrong and then you realise that this person has not understood the instructions. You restart the test again.

But for the delayed BVMT, it was actually a problem of language. When I asked some clients if they remembered those figures, they would write numbers.

FG6: I also had a similar experience

FG2: They would start writing numbers actually and even when you correct them. I had this one client who I think just forgot the shapes but since he wanted to write all the shapes, he drew about four of those figures and on the fifth, they started writing numbers. It was quite confusing. So I had to correct them, “No, we are not talking about numbers but we are talking about those particular shapes that you saw” Generally, I had similar problems that others had.

FG3: The other word that should be changed on the BVMT is the ‘figures’. They don’t know figures, they know ‘shapes’

FG4: Or ‘drawings’

FG6: Or ‘diagrams’

FG3: So when you say ‘figures’, they say, “what figures? You mean those shapes?” Then you say “Yes, those shapes” because they don’t understand the idea of figures. Because ‘figures’ relates to something else in the Zambian language (laughing). They will keep wondering what you are talking about.

FG5: I have two recommendations. On the language like FG2 said, some of the words are not very familiar among most of the people we were testing and have to be changed. Of course not changing like the full instruction but maybe just some words.

Researcher: I would also like the instruction manual to be revised. Let’s say, more Zambian friendly.

FG3: Can I say something? In the urban areas, I did not have as much of a problem with the instructional manual as I did in the rural areas.

Researcher: You did not have as much of a problem but you had a problem

FG3: One or two, yes but manageable. Not as bad as in the rural area where you had to revise the instructional manual two to three times before someone gets it

Researcher: Well, I found that a number of times I had to revise instructions. I don't know whether it makes sense to say 'revise'. If I read the manual, they still had questions so I had to explain some more after the manual. And I don't think I would like to do that because if we are all doing that, we are not doing standard instructions

FG5: I just want to echo what FG1 has said. I think it is very valid. We never really had problems with understanding of instructions in the urban areas. But some of them, probably the discussion that we had at first helped because some of the words, for instance, instead of saying 'figures' you say 'shapes', I followed quit and changed actually. And it was easier not really because it was in the urban but I think it helped to change.

FG6: Or 'diagrams' is what I said instead

Researcher: Or 'the words I read to you' other than 'the words you tried to learn' because they didn't even know they were trying to learn them

FG5: Ya. It's true so I think the instructions have to be re-done which is ok because they have to be adapted to our own setting.

The above gives us a perspective from the test-administrators side but we also have the privilege of getting a perspective of the test-takers side from the extract below taken from one of the interviews.

Researcher: What do you imagine would be a barrier to understanding the testing process in this case?

MA08: I think lack of concentration could contribute.

Researcher: Anything else?

MA08: Um...maybe the language. If one does not understand it very well, that can be a barrier also.

Researcher: Anything you want to add?

MA08: The language used should be simplified so that people can really understand well.

- 39 year old male, Subsistence farmer, 11 years of education, Rural

The test-taker talks of language being ‘simplified’ because he did not understand the language of instructions very well which would appear rather strange for a man who has had twelve years of formal education. However, it may be that he identified the language as sophisticated because it was not as familiar as the Zambian English language he is familiar with.

4.2.3. Acculturation

There is also a sense in which acculturation plays a role. Exposure to the outside world or to certain professions in this case increases familiarity with certain items and not with others. Below is an extract from FGD 1:

Researcher: One question of interest I would like to ask which may, perhaps have more to do with analysis is to do with the WRAT. If a person said ‘limo-ss-een’. Did you mark them wrong?

FG3: Yes

FG6: Yes

Researcher: So at the end of the day, WRAT measures familiarity with words or ability to pronounce words? Because I think that I found that a little confusing.

FG4: I get that point because there were clients that got the syllables right but the way the word just came out just sounded wrong. And you would kind of feel bad to mark it wrong but then you have to because those are the rules.

FG3: No but then the rules of the English language also encompass pronunciation so the ability for someone not to understand that an arrangement of a word in this manner shows that it has been changed shows that they do not have ability in that area. Because even when you learn English, you are taught dictionary pronunciations. So if it does not fit in a dictionary pronunciation, it is wrong.

FG4: But it also brings in the aspect of exposure because sometimes we try to pronounce like the word 'limousine' and you find that this is an adult who has tried to pronounce it well but you know if it was a young person who has seen this car before or watches a lot of movies, they would quickly say 'limo-z-een'.

FG3: That is what I expected but when I did come across young people who you would definitely expect to know that this is 'limo-z-een', they still would not know.

FG6: That is in a rural area.

Researcher: Like, for example, the clinic staff, I found that they are some words that 'rheumatism' on ZAT which they got right. Some really difficult word that you know they are familiar with because of their work and yet the other words that were at the end they had problems with. Like words which were much earlier which you thought they should have read right

FG3: Like 'anchor'

Researcher: Yes words which should have been simpler, were difficult for them because they have not been exposed to that.

FG5: Participants that we were testing, of course there was clear indication of the difference in the educational background. Where those who had less education found most of the tasks very difficult for them than those who had higher education. I will give a specific example of the test which has already been given as an example, PASAT. Even for those who have had higher educational levels, it is stressful for them. It became very difficult to give instructions to them and as much as possible, you try by all means to get glued to the testing manual so that you give the instructions as they are. But it became very difficult to give instructions to them. Even those that are in the book. We tried by all means to give extra examples. There are just 3 examples which are in there. So we tried to give them, maybe 2 more examples and using smaller numbers because it was easier for them to understand. Generally, on that particular task, that was a clear indication where I personally tried to go a bit further than what is in the instruction manual.

My expectation is that a young man who has exposed themselves to western movies, music videos and lives in a urban area would likely pronounce the word ‘limousine’ without even thinking twice about the actual letter consistency of the word. And the observation was that most rural and adult participants actually pronounced the word as ‘limo-syn.’ This point, for me, was further supported by the observation of the nurse who could pronounce a word like ‘rheumatism’ that is further down the line of difficulty and yet had failed to pronounce words that were on the simpler end of the list like ‘anchor.’ Exposure to certain materials, exercises and words certainly advantaged the test-taking in the testing process. This is where formal education comes in. Formal education definitely played a part in understanding of instructions and general performance and formal education itself is an agent of acculturation because it exposes to western ways as well.

FG4: My experience has been quite interesting like everyone has said. As earlier alluded to, when assessing a client with a high level of education, it becomes easier to put the instructions across, as well as for them to understand and to even do the tests quickly. What I mean is, you spend less time. Of course our expectations before we went into the field are that we would spend say maybe minimum of 2 and a half to 3 hours. But we found out that the assessment takes quite a long time especially the fact that we have a number of extra questionnaires that we have to administer and at the same time you are assessing a client that has a lower level of education. You find out that they are very slow in understanding some of the instructions. So that can be quite frustrating at times because you find that you have to explain the instructions over and over again. Especially on tests like the PASAT. You find that you've given the instructions but for some reason the client can't just get it there and then. Your patience tends to be tested.

FG7: And one other thing I noticed was with....er...I think, level of education. It really matters. The number of years an individual has spent in school is an important factor on the performance and even when it comes to understanding instructions. For some people when you read out the instructions to them and then you ask them "Are you clear?". Then they are just there staring at you. Then they say "Oh, did you ask me a question?". "I expected an answer from you". "Oh, you want me to give you an answer?". That sort of conversation. That is the experience I had from some people. So I thought that education really really matters for someone to really understand the instructions and do well on each test. And when it came to computerised tests, it was very very difficult for most of those who are of grade 9 and below level of education to just get the pattern right. That is what I noticed. And immediately they got the concept, they felt so good and it came out like a game for them.

In Zambian formal education, there is a lot of giving of and following instructions in English language. There is also a lot of testing of learning (memory) and language and use of pen and paper. It is probably why it was easier to administer tests to those

that had attained more formal years of education. Research evidence to elaborate this further is presented in the discussion.

4.2.4. Deviation from Standard Procedure

The result of the above experiences was deviation from standard procedure. Below is another extract from FGD 1.

FG6: I think as I was testing, or rather administering the test battery to one of my clients, actually the majority of my clients had difficulty to understand the instructions for administering PASAT. PASAT is test of information processing. Apart from that, other areas of brain functioning. Ok, so I had to go off the book to explain exactly how they needed to respond as the recording was playing. I think it was a very big challenge to most of my clients.

Researcher: Ok. Did you find that it was the way you expected the testing process to run or was that a surprise to you or was it as you imagined before that that would be the experience you would have?

FG6: Well, it was a surprise because I didn't expect people to...(small laugh)...Because those are basic instructions and I didn't expect people not to understand the first time you explain to them. I had to keep on explaining and explaining and...er....and in the end I was tired.

Researcher: Ok. Anyone else?

FG2: I had a similar experience where my expectations and what I found in the field were totally different. Some of it was interesting and some of it of course was tiring. What I found was that for people with less education, it was even more difficult to administer simple tests. They wanted the instructions told to them over and over. And overall, the whole assessment took longer than I had expected. Initially I thought that I would be able to do three to four clients a day but I was only able to do one and days later, I

could do two. I can't do more than 2 in a day because the participants take long to answer and all that.

FG5: Participants that we were testing, of course there was clear indication of the difference in the educational background where those who had less education found most of the tasks very difficult for them than those who had higher education. I will give a specific example of the test which has already been given as an example, PASAT. Even for those who have had higher educational levels, it is stressful for them. It became very difficult to give instructions to them and as much as possible, you try by all means to get glued to the testing manual so that you give the instructions as they are. But it became very difficult to give instructions to them. Even those that are in the book. We tried by all means to give extra examples. There are just 3 examples which are in there. So we tried to give them, maybe 2 more examples and using smaller numbers because it was easier for them to understand. Generally, on that particular task, that was a clear indication where I personally tried to go a bit further than what is in the instruction manual.

The challenge of deviation from standard procedure is that uniformity required in the standardisation process is lost. Test administrators, for example, sometimes had to speak a local language in which they were not very fluent in order to clarify instructions in English language. This may have led to questionable clarity of instructions and thus affected performance. Other test-takers may also have been ‘over-prompted’ as noted from FG 5 who said he ‘tried by all means to give extra examples’. How does one know to tell that this is enough for the standard of understanding required if there is no set guideline for all to follow?

4.3 Use of Geometrical Figures for the Assessment of Visual-spatial Memory

Interesting observations and perspectives were shared by the testers about the BVMT which was the test used for visual-spatial memory assessment. It was evident that the expected performance and what actually occurred were not congruent. Below are some of the comments from FG1:

- FG6: The BVMT is where you draw figures. There are 6 figures and you draw them in the correct location on the page. Most of my clients didn't do well on them. Maybe for the reason that it is childish and maybe they were not actually putting a lot of effort in it, looking at it and actually trying to draw the figures they way they appeared on the page...*
- FG3: On the same BVMT, I noticed that the drawings on BVMT in rural areas were rather strange. You would wonder what it is that they are trying to draw. And sometimes you would have to double check if you showed them the right form. So you would wonder whether it is a problem of visuo-spatial perspective or what. It was very strange. Some of them would be so small, some would be extremely big and some would just be totally different. So I wonder if that is really a cultural thing. There were very very strange drawings.*
- FG2: On the same one, actually, I probably think it is cultural because for people who have been exposed to more western education, I think they did better. I suspect education being western, the kind of education we have in Zambia influenced people and the kind of shapes that people see in the villages and the shapes that you see in the urban set up are kind of different and the older the person is and the less education they had, the more they tended to draw things which were totally different. We had geometric shapes but some of those shapes were not even geometric.*
- FG5: I had problems with three of the tests that I was administering. The first one is the BVMT. Of course the instructions were very clear but I would have problems when it was time for the client to start drawing. They would ask "can I have a look at it again?" after the first trial. And of course you can't do that because it is an instruction. You can't have them have a look at it again. So, I don't know. Maybe it was just a problem of not taking seriously the instructions or maybe they were not concentrating or something like that.....*

FG4: I had a problem, I think on three tests. The BVMT, the PASAT and the HCT. Actually even the WCST. On the BVMT, I'm not sure whether...er...I think we have already discussed this but I've brought it up again because I'm not sure whether it is the instructions that are not very clear or it is the issues that we have discussed before which pertain to maybe what shapes they are exposed to in everyday life. You even stress the fact that they make sure they draw them correctly, in the correct location but some of them would just draw very...

FG3: Scribble!

FG4: Ya, they would scribble. They wouldn't care what they saw as long as they just scribbled something on the paper and you are like "Ok, I thought I told this person to draw the exact figures that they have seen and in the correct location" So, I think that was a bit of a problem and it would get very frustrating.

One only realises that they make certain assumptions about life based on their experiences when they find behavioural outcomes that they thought were obvious are different from their expectations. I do not think, for one, that the participants considered their drawings to be 'strange' per se. They followed the instructions as best as they knew and thought that they made drawings that were as close as possible to what they saw. Of course FG 4 did not think they drew what they saw and neither did FG 2 who had to double check to make sure she showed them the right page. But that was what they perceived. FG 2 offers an interesting plausible reason for these 'strange drawings' or 'scribblings.' She states that it is because the shapes in rural areas that they commonly see differ from those in urban areas implying that they do not have 'an eye' for geometric shapes. With this sort of explanation, one would expect that the urban population showed a significant difference. The following comments were made after testing participants of urban areas in FG 2:

FG5: One aspect that I thought was common to both rural and urban populations was the BVMT. So, I was actually anticipating that those from urban would

perform better but it was almost just as bad and in some cases worse than the rural. So on that particular test that was common.

FG3: I observed like HZ said that there were similar experiences on the BVMT. Most of the people did the same. Both groups could not draw and their drawings were very bad and generally, I did not see much of a difference. I think the only aspect where I noticed some difference was in the tests to do with the digit symbol and the symbol search

Since there was no observable difference between the results of the performance of the urban and rural populations, the explanation for this performance has to cut across both groups. In my opinion, the culture of drawing and doing a lot of pen and pencil tests is found among the high-income population of the country which is not representative of the population of Zambia. The majority only draw when they are in school. Zambian children do not commonly draw for recreation which results in Zambian adults growing up not having done much pencil and paper work. This would explain the performance. Refer to discussion section for details.

4.4. Computer tests

The computer itself was a source of either excitement or anxiety. Some were over-excited, others intimidated and still others demoralised. Of the 40 participants, 39 made a comment about computers and computer tests either as something they liked (26), disliked (23) or something that was unfamiliar (17). For example, MA08 was not familiar with the computer and felt he had to have an idea of how to work with it prior to such a time as this. Below is an extract from his interview:

Researcher: Was there any one of them which was not familiar?

MA08: The computer tests because I am not used to the computer.

Researcher: Have you ever used a computer before?

MA08: No

Researcher: Have you ever seen one before?

MA08: Yes

Researcher: Ok but you've never touched one before?

MA08: No

Researcher: was it the computer that made you uncomfortable or what?

MA08: I wasn't ...er....what can I say? I had no idea how I would even work with it. It's not that I didn't like the computer.

- 39 year old male, Subsistence farmer, 11 years of education, Rural

MA14, being younger, may have cousins or peers in urban areas that spoke of computer lessons or indeed may have seen it on TV. This may be the reason why she seems to have perceived the use of computer during the testing process as a privilege she would like to have again.

Researcher: What part of the exercise did you like the most?

MA14: The computer lessons.

Researcher: Why did you like them?

MA14: They were so interesting. You know, the exercises were different. Sometimes you think the way you would answer this one is the way you answered the last one but they are different.

Researcher: Have you ever used a computer?

MA14: No.

Researcher: Did it intimidate you in any way?

MA14: Actually, I liked it. I wanted to learn more.

- 24 year old female, Tailor, 12 years of education, Rural

This 59 year old nurse below, from an urban area actually believes that a first time experience in using computers may be a barrier to the testing process. She did not conceal her anxiety about using the computer and one cannot help wondering whether this did not affect her ability to focus on and apply herself to the testing process. Note the extract from the interview below:

Researcher: What do you imagine would be a barrier to understanding the testing process?

MA26: I think old age (laughs)

Researcher: Ok. What else?

MA26: Also, I think a first time experience because you are not ready and not sure what to expect.

Researcher: First time to do what?

MA26: To do computer tests. I have never done this before and it is my first time

Researcher: Which part of the testing exercise did you not like?

MA26: All of them were fine except the computer tests.

Researcher: Why did you not like the computer tests?

MA26: They were confusing me. There were different pictures coming on the screen and for one to know that you are supposed to press '1' or '3' or '4' was really difficult although others were not.

Researcher: Have you ever seen a computer before?

MA26: Yes I have seen it before

Researcher: Have you ever used it before?

MA26: No, I have never used it before

Researcher: So how did you feel when you realised you had to use it?

MA26: I was anxious and wondered whether I would manage to do what was required since I have never used it before.

- 59 year old female, Enrolled Nurse, 13 years of education, Urban

MA25 is an adult female of an urban area who has even used a computer on the job and also for leisure, yet she still felt ‘inferior’ because she compared herself with younger population and her son that have better access to a computer and believed they would outsmart her in the testing process. Of course, that may not necessarily be the case if the test was a manual version implying that there is some interference or that comes with the use of a computer to a person that is not comfortable with it. I assume that the tests themselves are not meant to assess computer literacy but rather that the computer is only meant to facilitate the tests . Consider an extract from her interview below:

Researcher: Did you feel that you were expected to behave in a certain way during the testing process?

MA25: No, I believe I just had to be myself

Researcher: Can you describe your experience

*MA25: In some instances, especially on the computer quizzes, it made me feel like what my son calls me, ‘BBC’ – born before computers
(Laughter)*

I couldn't really figure certain things out till the end so..

Researcher: So how did that make you feel?

MA25: A bit inferior. I thought maybe somebody who was educated later than I could do better. A younger person. That is how I felt.

Researcher: Was there anything in the testing exercise that you were totally unfamiliar with?

MA25: No

Researcher: What part of the testing exercise did you like the most?

MA25: I think I liked the computer part better though I know it's the part that I didn't do well.

Researcher: Why did you like it?

MA25: it made me think. I think it was one of the hardest parts.

Researcher: Have you ever used a computer?

MA25: Yes

Researcher: What do you use the computer for?

MA25: Writing reports and sometimes, playing scrabble

- 46 year old female, Registered Nurse, 15 years of education, Urban

It is interesting that even though she felt inferior doing those tests, they are the tests she liked the most.

Test administrators also made a number of observations with regards to the computer tests. It is clear from the discussion of the test administrators that they tried to propose several hypotheses about why the computer tests caused a stir among participants. Some thought it was the instructions, the computer itself, the level of education and so on. Refer to the extract of FGD 1 below:

Researcher: So which tests did you have trouble administering?

FG2: For me, the three computer tests and generally, I experienced the problems that everyone has talked about. And there were several clients that made mention of the fact that they thought that since they were using the computer for the first time it would affect their performance. They would shake their heads and say, “Computer. Computer. It is just that I don’t know computers”

There are some clients who found the computer tests very interesting. They thought it was a learning experience because some of them were using a computer for the first time. And others really got frustrated with the Wisconsin because you don’t give much instruction and you expect the client to find a way of matching the cards. And when they can’t find the answers they think you are the one that hasn’t given the instructions well. There’s one particular client who actually got annoyed with me to such an extent that I got scared. He got annoyed and said that I didn’t give the correct instructions.

FG3: The test that I had problems administering is the PASAT and ...er...I think all the computer tests.... For example, on the Wisconsin, when you tell them to match the cards, at some point, I don’t know if they would get confused, they would start matching the bottom card with the answers that they have already given. And they lose track so I don’t know if it is because they do not understand the instructions or something. It was just very difficult to administer the 2 computer tests because you don’t tell them what to do. And it comes out as though they are not good at abstractional reasoning but that isn’t actually the case....And the frustration was the

Halstead Category test (HCT). Because sometimes you would prompt them and prompt them and some of them would deliberately not chose the right answer.

Researcher: But how do you know that they are deliberately not choosing the right answer?

FG3: You can tell that they are not thinking! You would give them a prompt and say “Look at this, something about it will give you the right answer” and you would notice that they would keep guessing.

Researcher: Do you think it could have been something to do with the type of games they could have been exposed to when they were growing up? Perhaps, you did more quizzes to do with matching, special paper II than they did?

FG3: Well, maybe but that was very frustrating. And the HCT is very long test. So, if they start making errors on subtest III, they will continue making errors up to subtest VII. You actually run out of prompts to tell them. You would try to tell them so that you don't give them the right answer and it is very very hard.

FG4: You ended up tending to over-prompt. But on the PASAT, I think some clients just would not get the instructions there and then and as MN said, you would even explain up to 5 times. At times you would even start the test and they will add numbers consecutively. What I mean is, you say, maybe “4, 3” then they say “7”. Then you say “5”, then they will say “12” Then you say “3” then they say “15” That kept happening, say may be even 3 times. But you keep giving instructions and keep giving instructions and that was quite frustrating. Then on the HCT, the problem that I found that some clients wouldn't understand the concept of the principle remaining the same. If on the first answer, the right one was ‘2’, they will keep pressing 2 maybe for about 6 geometric figures. So you would have to stop them and say “ok, look, it is not the number that remains the same. It is the

principle". Then they would look at you like they haven't understood the word 'principle' or 'idea'.

FG7: It is the 'idea'. The word you use.

FG4: Or idea. So I am not sure whether that was an aspect of education because I think there was even one client that had more than 13 years of education and I was thinking "ok, this person is highly educated but they just can't get it"

Researcher: Perhaps it is also the quality of education.

FG4: Ya, maybe is the quality of education. And then on the WCST, I guess this pertains to clients with a low level of education because they would not understand when you say there is a way of figuring it out. They would think, each time it is the shape, so they would continue trying and they would continue getting it wrong. And you would really just be tempted to say "it is not only the shape" but you know, we are not allowed to give such prompts on the WCST. So it was quite frustrating because if they think it is the number- in fact, very few would even figure it out. They did not think it could be the number, it could be the shape. They could just keep matching them according to shape. You know you would even look up and get very frustrated. And that kind of worried me because for my study, the hypertension study, most people with hypertension do not perform well on executive tests. And I think the HCT and WCST are quite sensitive to assess that area of the brain so I am wondering because I have so many factors to look at and I am wondering how my analysis is going to be. So, it is quite worrying because they are so many factors that are coming in but we will see how it goes.

FG4: On the computer tests, I expected that most of them would have problems, but a number of them were comfortable although it was the first time for most of the participants that I had to use the computer. But they were comfortable using it and they were very interested to do those tasks

Researcher: I think that one of the things, actually several things shocked me about the urban areas. For example, everyone I had administered tests on had seen a computer before but most people had never touched a computer and I did not expect that a computer would intimidate somebody in an urban area as much as it did some. I had one client who was doing the WCST and at some point, because she got so many things wrong, she stopped. And the reason she gave was that “I am going to destroy the computer because I keep answering wrong things”. And I had to keep encouraging her.

FG6: This was in the urban?

Researcher: Yes, urban woman with twelve years of education but she was 45 years or something.

FG4: But she was not so old

Researcher: And I found more than one client that thought that if they keep getting things wrong the computer will get damaged and they have to stop

FG3: In reference to the category test, another thing I found strange was a client in the urban area who thought there was a formula to finding answers to the category test. He would count, add, subtract, divide. (all laughing) Then he would say maybe one in this one then divide and things. And I would tell him, “Notice the numbers 1, 2, 3, 4”. But he would insist “No, there is a formula. I will show you”. Then when he gets it right he says “You see, I have found the formula”. But then when he tries it again and it has not worked, then he says “huh, the formula has changed”. And he insisted

FG4: So you let him

FG3: I let him go on with the formula.

FG5: I think that also brings in the aspect of the instructions. It is similar to what FG1 had said about a person pressing ‘9’ when the alternative is only

between 1 and 4. If they are trying to press ‘9’ then the option is to try to read the instructions again.

Researcher: And when you read those instructions, you realise that even after you read them, you still have to over them. But in this case, even after you go over those instructions and the person cannot recognise that ‘VI’. They are trying to figure out and they seem to say “This is strange. I have seen 1, 2 and 3 lines but this is different”. Then they try and press ‘9’ and when you tell them “You can only press 1, 2, 3 or 4” you think that even if they don’t know they can just guess that then that must be four. But they seem totally lost

FG3: I think it is because the ‘I’ and the ‘V’ are adjacent to each other because we normally don’t have them joined the way they are on the category test. They are not separated. When you look at the ‘I’ then the ‘II’ there are separate letters and even ‘III’ and then the ‘IV’ is joined. But still, that is odd. I never experienced it.

FG5: Maybe they were just looking at everything as being complex. I mean, it is something that is simple

FG3: People were ‘over-thinking’. It is the same thing as the formula where he was thinking there is a formula. And others were just guessing.

FG4: Others were guessing, yes. I noticed that. And they would keep on guessing even for about 6 tries. You can even tell they were guessing because all they are doing is tapping whichever key

FG6: They were fast

FG4: Yes.

FG3: You may try to correct them but no.

FG4: You try to tell them “Can you try to see what is happening” and they just keep on guessing.

FG3: Something I saw in the urban areas that I did not find in the rural areas was on the WCST, someone was getting items wrong and when they got it right, they stopped.

Researcher: Yes, I experienced that in the urban areas quite a bit.

FG3: I asked “So why have you stopped?” and she said “I got it right”

FG4: I experienced that a number of times actually in both urban and rural

In the first instance, FG2 tells of her experience with test-takers that kept alluding to the first time use of the computer as a barrier to their performance. In contrast, FG4 says she expected many of the test-takers to have problems with using the computer but observed that a number of them seemed both comfortable to use it and interested in doing the task. Perhaps, ‘a number’, in this case means that not to the extent that she had expected though some had problems using it.

Judging from the length at which respondents spoke in the interviews on computer tests, it is clear that these caused quite a stir for the test-taker and test-administrator. I find it amusing that FG 3 even thought the test-takers were deliberately choosing the wrong answer. I agreed with FG2 that it was the unfamiliarity of the computer and further proposed that it was the difference in games played in childhood that made it such a challenge to ‘figure out’ the rules of computer tests. They were mainly like quizzes that draw on the principles of one of the National Grade Seven Selection Examination papers called ‘Special Paper II’. The paper has figures that require matching in one way or the other. That would basically summarise the experience of quizzes that my respondents allude to and not necessarily having quiz books. If one had a lot of experience with Special Paper II, it would definitely help in getting the answers of the computer test right. In the in-depth interviews, most said they did not have toys growing up at home and a couple stated that the only puzzles they did were at school which was rare as resources were limited.

The discussion of quality of formal education came in because of trying to explain why an adult of 13 years of formal education would not understand instructions that were thought to be straightforward. Perhaps the 13 years of formal education obtained may not necessarily translate to a quality of formal education equivalent to that period of time in school. It is possible that being in a school in a rural area, the quality of education was compromised by manpower and material resource constraints.

Of course there are a few notable observations worth discussing. How would a person think that the computer will get destroyed because you keep putting in wrong answers? One reason would be if the test-taker thinks the test is about the computer and how it functions. If it is understood that the computer is only a medium for the test, the test-taker is unlikely to think like that. Perhaps that sort of thinking may come from talk heard from computer users about ‘computer jams’. Not knowing how a ‘computer jam’ can occur, the test-taker thought it wise to stop in case this is one of those ways. This action of treading carefully with computers most likely signifies a genuine lack of knowledge of how computers work. And FG 3 tells of one that stopped doing the test after she got one right. She probably thought the computer was asking her different questions till she gets it right. She did not understand that there were several slides which would continue till the end regardless of whether she got it right or wrong.

Others thought it was a matter of instructions. FG 2 refers to a client who thought he was being given wrong instructions. FG 7 proposes that it is certain words like ‘principle’ that confuse the test-takers and suggests using a word like ‘idea’ in its place. FG 4 talks of how she found herself over prompting the test-taker in efforts to improve understanding.

FG 3 refers to a client who totally ignored her instruction on a computer test and followed his own set formula despite efforts to let him know that there was not a formula but rather, a principle.

Over all, some aspect of the computer tests needs to change.

4.5. Speed of Tests

The local culture emphasises more on precision and accuracy rather than speed. Competitiveness is not encouraged as a good spirit. The emphasis is on doing well and steadily rather than working hurriedly. This background may explain the extract below from FGD 1:

FG3: Ya, such things were always coming up. And if you look certain tests like the trail making tests, usually, even when we were practising how to use the test battery on each other, we would hardly see anyone who would take more than 40 seconds to finish Trails A. But when we went into the rural area, I had to stop one client because they went beyond 92 seconds and they could not finish. And so many of them. If it comes to the colour trials, some people would take so long to finish and I think that the concept of how doing things fast is not a part of our culture really came out. Because even for grooved pegboard, you try to say to people “As fast as you can” and you really can notice that this is not as fast they can but they are more focused on doing it accurately than doing it faster. So it was a really difficult thing, especially on tests of speed.

FG5: Then the trail making test again has very simple instructions but then I observed a situation where you could see that they were not trying to do their best or as fast as they can. So, they are trying to see, like they connect from one number to the next and then they start checking. And they are not trying to do it as fast as they can so I don't know whether it is a cultural factor where they don't really see time factor as something that is important or something like that.

Interviewer: One thing that surprised me about the trail making was how some of them were trying to make sure that the line was straight.

All: Yes

Interviewer: And then also they would try to make sure that it doesn't go through the circles so they would curve around the circles. I found that really strange

because I thought they should just touch the numbers and do it as fast they can. But I found that they were really trying to make sure that the line was straight and they would even erase if it was a bit bent.

FG3: Someone actually asked me “can they cross each other?” When you give them the instructions, they look at the paper and then they say, “So even if they cross each other?” then you say “No, actually, when you finish the test you will realise that they do not cross each other so just do what you can”. And, I don’t know if some people were doing it deliberately but some would not just give any effort. So you would find that three quarters of the time they would spend more than 3 seconds on one number you would actually have to show them through the entire test. And I don’t know if that concept that says if a client spends more than 3 seconds on one number, show them the next number would actually apply. Because some of them, most of them actually, would spend more than 3 seconds before they can find the next number.

FG5: Actually, some of them would just give up and just stop.

FG3: They would just be looking at you

FG3 reports having observed a difference in speed of doing the tests between rural and urban. FG suspects that she may have missed this expected difference because of the nature of their clients. Consider the extract from FGD 2 below:

FG3: I think the only aspect where I noticed some difference was in the tests to do with the digit symbol and the symbol search. Most people could complete more of the pages in the urban area than they could in the rural areas. And even the scores are higher on the digit symbol in the urban areas than the rural areas. You can see that even the aspect of speed really comes in.

FG4: Well, for me, I am not sure whether I can really remember clear differences because first of all, most of the population I was capturing were older clients above 40 years old. So some of the differences were not so distinct

because in the urban area, for instance maybe on the tests of speed, you find the accuracy aspect we spoke about was still there. Whereby they would rather not do it as fast as they can but as accurately as they could. And I did not see much of a difference with the clients that I tested regards to urban and rural. Maybe it is because they are older people like I earlier mentioned. Some of them would look at it like, "You know I am old. I went to school in the sixties and seventies and it seems you are just playing on my mind". And I was having those comments from both the urban and rural clients.

FG3: I don't know if this was a question of experience in that you have learnt to administer the test battery but I think that the urban population was generally faster than the rural population. So I don't know whether it is us that had improved in our test administration or it is just that people in urban areas were generally faster

Did I expect to see a difference? Yes, I did. And in fact, I observed a difference. The urban population, it seemed, could not wait to get to their next appointment! They therefore did things faster.

4.6 Questionnaires

It is clear that the questionnaires will have to have some items revised so that they are culturally relevant to the local environment. The following is an extract from FGD 1:

FG3: Well, it's hard to talk when everyone has talked about their experience. They are generally similar. First of all, people had problems understanding the instructions and like everyone else has said, sometimes you have to cut in and explain the words in the local language because they just would not get what you are trying to say. Especially, maybe not on the tests themselves but on the questionnaires. It was very difficult to explain especially the activities of daily living. It was cumbersome but in the end I stopped letting the participants answer themselves but instead I would administer the questionnaire. I think when I went through half way I noticed that most of

the people didn't know how to answer that. And even when you give them instructions they won't know. Most of them in the times where you are asking them if they have any difficulties, they would start talking about their financial difficulties and their living difficulties instead of talking about their different areas of functioning so there really was a difference in understanding of things.

Interviewer: When one of my clients got to the point where they had to say one of the areas they have difficulties in, he replied "rural areas"

(All laugh)

FG4: Well, I want to just add on what FG3 has said. For instance, the ADL questionnaire. You look those items that are listed there and compare our life in Africa with the USA. In the USA, you can find an old man that probably lives alone. Here, you find that there are very few people that live on their own. You find that they are married or they have children that do most of those activities in a home. So even if it's a situation where that person was, maybe due to some neurological brain insult and something happened to them and they are not able to do certain things, you cannot rely on that questionnaire to really find out what is really happening to them. Because before, they were not doing their own house work. they would say, "No, my wife does all that". I would experience such answers. "My wife does the laundry, my wife cooks so why are you asking me all these questions?". So I think that is also a cultural bias towards the western world as opposed to our setting.

FG5: Then the questionnaire on the Patient's Own Function, I think some of the questions were not really appropriate and they were not applicable. For instance, "after your last accident-"

FG3: Yes. It continues "-are you as bright as you were before?"

Researcher: Also the questions on driving or getting on a bus. These people live in the village.

FG5: Generally, that questionnaire is meant for patients I think.

FG4: I think I must have pointed out to you to say certain items are very westernised. The do not make sense here. Especially the activities of daily living. You ask the client whether ‘now’ and at ‘best’ they did this, they will say that “my wife” or “my children have always done the laundry”. So it doesn’t just make sense. But if you look at maybe the western world, they have men that do those things

FG5: And of course some of the questionnaires were not necessary. Some of them were like the BDI and the neurobehavioral screen. But the PAOFI?

FG3: It is for patients

FG5: And you know, some of them, like in the urban areas I had to stop giving them to self administer but to administer because on the question that says ‘Since the last accident?’, they would ask, “Which accident?” They would ask those questions so in the end I rather asked them myself

I think the first observation is to revise certain words in the questionnaires that are not commonly used in Zambia. The matter of ‘Zambianised English’ has re-surfaced. Some examples have been given such as ‘irritability’ or ‘self-criticalness’.

The second is that as consideration is made to translate the instruction manual, the questionnaires should go along with that. FG 3 explains her frustration in trying to explain activities of daily living referred to in the questionnaire to the test-taker. An example to which I make reference in the discussion is of the words ‘fit’, ‘pass out’, ‘black out’, ‘faint’ or ‘falling unconscious’ which in some local languages all have the same word meaning ‘to fall’.

The third is the cultural relevance of some of the questions. It is ridiculous, in many parts of the Zambian society, to ask a married man if he is currently able to do his laundry or clean house, let alone cook for himself and plan a meal. Where would his wife and all his dependents be? In my opinion, questions on activities of daily living in Zambia should be gender specific. Ask a woman about domestic chores. Ask a man about occupational chores and recreational activities he does. Then depending on what one observes from the culture, you could slot in a few activities that cut across such as bathing oneself, ability to make a lump of nsima in one's hand (for motor skill) and so on.

4.7. Rural Vs Urban

Test-administrators gave an interesting discussion in FGD2 having completed both rural and urban groups. Some details of this discussion are in the extract below:

FG5: One aspect that I thought was common to both rural and urban populations was the BVMT. So, I was actually anticipating that those from urban would perform better but it was almost just as bad and in some cases worse than the rural. So on that particular test that was common. But of course there were clear differences as regards performance. I can point to one test where you generate words, that is the HVLT and the category fluency. That was expected that those from the urban would perform better. They did not really have problems generating words. So, basically, those were my observations.

FG3: I observed like FG5 said that there were similar experiences on the BVMT. Most of the people did the same. Both groups could not draw and their drawings were very bad and generally, I did not see much of a difference. I think the only aspect where I noticed some difference was in the tests to do with the digit symbol and the symbol search. Most people could complete more of the pages in the urban areas than they could in the rural areas. And even the scores are higher on the digit symbol in the urban areas than the rural areas. You can see that even the aspect of speed really comes in.

FG4: But generally, what I noticed on almost all the tests, the people in the rural areas were very willing to take part in the study because for them it was more like an adventure aside from the compensation part of it. But they looked at it like “Wow! These people have come for a research and they are from the university” while in the urban population they were just like “ok, UNZA students”. I saw certain complacency, you know. Sometimes the nurses had to really plead with them. If I ask for specifics of a client like a male of certain age group and education level, then she would say “I am trying to call that client and he is not picking his phone.” I think there was one time one client was waiting for me and I was late by 30 minutes and he left. But in the rural area, someone would be willing to wait even an hour. So I am not sure I that is cultural or it is because they look at the compensation and think it is not much. Or it is just maybe one of those things. You find that even the testing process, most of the clients in the urban area were looking at it like “These are pre-school kind of games. Are you people playing on our minds?” There were so much of those comments. While in the rural area, they would find it exciting. So that was one of the biggest differences that I saw.

FG6: Picking it up from FG4, I had a similar experience in that the urban clients were easily frustrated with the duration of the tests than those in the rural areas. I had a client that confessed that “Next time I will not allow you take this amount of time because your tests are too long and I can’t afford to sit here for this long”. And you could see that they were really frustrated and they were tired easily compared to the clients in the rural areas. I had not experienced any client who had those comments.

FG5: Also, I think this is a cultural thing FG4 had alluded to. I did not have many problems and I am guess most of us did not have many problems testing those in the urban areas because it was easier to give the instructions than it was with the rural populations. So maybe it was a cultural thing and those in urban areas seemed more quick. They complained that it was boring, it was for pre-school but you wouldn’t hear those comments from the rural population. It was easier to do those tests in the urban and they

were more free to express themselves and when they needed a break they would easily say it.

Interviewer: I think I also experienced that being in urban areas, people either complained about the time or the money. They felt that for that amount of time they should have been given more money. One nurse actually commented saying "I have really worked a lot for this amount of money". So, also, I think the aspect of being in an area where every hour counts for work and so on. So, it was also a bit different in the approach.

FG4: And also, the other observation I made was as regards to questionnaires. It seems that the people in the rural areas had more difficulties filling in the questionnaires because some of those items like laundry, there were just some items that were so foreign to them as compared to client in the urban area. Ok, even if they would ask to say "my wife does the cooking so what do you mean?" I just noticed that it was easier for the urban population to answer the questionnaires as opposed to the rural population. Maybe because the urban was more familiar with the items as compared to the rural population.

Notice also the difference in lifestyle of an older participant in a rural area and that of a young adult in an urban area. Immediately below we see a person in a rural area with 7 years of education, brought up with parents and siblings that were not educated and recreational activities that hardly had to do with toys or books because of unavailability. Also, notice him and his family's current lifestyle where they do not own a TV at home, let alone listen to the radio. Most rural participants, however, did have a radio but often listened to local vernacular programmes and news likewise. This reduces their exposure to the western world or urbanisation:

Researcher: What games did you play when you were growing up?

MA09: I played football. . .er. . . high jump, long jump and also did running.

Researcher: Did you have any toys when you were growing up?

MA09: Yes we did

Researcher: What kind of toys

MA09: We had some that were used to make things.

Researcher: What things?

MA09: Er.. like this....(has difficulty explaining)

Researcher: Were they many or few? Or were they only found at school or maybe at the neighbours?

MA09: They were very few that were found sometimes at school

Researcher: What about books? Were you reading story books? Would you sit with your friends and read story books or would you do read only at school?

MA09: We would read with friends at school and during the holidays sometimes we would sit down together with friends

Researcher: Ok. Did members of your family go to school?

MA09: We were only two of us. My other sibling completed form II. He started getting sick and then didn't go further in education

Researcher: Were your parents educated?

MA09: No. They were not educated

Researcher: Do you have a TV at home?

MA09: No, I don't

Researcher: What about a radio?

MA09: The children damaged it.

Researcher: So what do you do for leisure? You sit and tell stories only? What do you do for entertainment since you also stated that you don't drink?

MA09: well, we sit and tell stories alright.

Researcher: What kind of stories?

MA09: Folk tales like the ones passed down to us by our grandfather. He would tell us about their times, the activities they did and so on

Researcher: What is your typical day like?

MA09: When I wake up in the morning, I wash my face and then I start doing some work at home.

Researcher: What does that work involve?

MA09: Like around this time I am making bricks for building houses. I have also been clearing a field at home also that will be used for cultivating
- 56 year old male, Subsistence farmer and builder, 7 years of education, Rural

Below is that of a male of an urban area. His upbringing (though it also had limitations of toys and puzzles at school) and lifestyle is more westernised than that of the rural participant above including the bonus of his extra years of formal education and career choice. His parents and siblings both attained tertiary education and his choice of leisure activities and favourite TV programmes that are all in English language also reflect this westernisation. He understood instructions well,

had better speed on tests than most participants and applied himself to a high extent on all the tests with very good alertness:

Researcher: What types of games did you play when you were growing up?

MA16: I played soccer, basketball, game (chicken in the den). I also played touch and war – throwing stones at each other

Researcher: Did you have any puzzles and toys?

MA16: Yes, we had a number of toys

Researcher: Ok. Any other toys or puzzles or games that you had? Board games or something?

MA16: Draft, chess and scrabble

Researcher: Did you have puzzles?

MA16: other than crossword, no.

Researcher: Ok, so you had crossword puzzles. Did you have them at home or at school?

MA16: At home

Researcher: Did you have toys at school and puzzles?

MA16: No

Researcher: Did your other siblings go to school?

MA16: Yes.

Researcher: How far did they go in education?

MA16: They all went past grade 12 and on to college

Researcher: And where your parents educated?

MA16: Yes and they both went to college and graduated from college

Researcher: What types of programmes do you watch on TV?

MA16: On TV I watch talk shows, soccer and the news

Researcher: And on radio, what do you listen to?

MA16: I listen to news and music on certain channels.

Researcher: Do you listen to any vernacular programmes or are they all in English?

MA16: yes, they are all in English

Researcher: And the music you listen to is it local?

MA16: Both local and international music

Researcher: What is your typical day like?

MA16: On a typical week day, I wake up quite early at about 8 00hrs and then I will be at work the whole morning

Researcher: What kind of work do you do?

MA16: I have a technical job that involves a lot of designing on the computer and occasionally go out into the field to look at technical things in the field.

Researcher: What kind of technical things are those?

MA16: Equipment placed in the field at different specific locations.

Researcher: What is this equipment used for?

MA16: This equipment is for technology that we have deployed throughout the country

Researcher: And what kind of technology is this?

MA16: It is a wireless communication technology

- 27 year old male, engineer, 17 years of education, Urban

4.8. Concluding Remarks

Some inferences made from the experience:

Researcher: Did you feel that in the end, we were able to measure what we were intending to measure?

FG2: No. No we were not. Actually, because of these challenges that we had we ended up measuring things like understanding of instructions. Something else ends up coming out. I don't think we will get exactly what we wanted to get out of this whole experience and I do think some changes need to be made. The standardisation process should take into account the language used, whether it will be in English or not. We need some translation actually in our local languages. Two, if we are going to use English, let us try and use words that are commonly used in Zambia. I think, Zambians use English which is closer to British English than American English. And unfortunately the tests that we have use American English. So people end up not understanding the instructions because of simple words that are not commonly used in our everyday English in Zambia. So there is need for translation for people who are not very comfortable with using English.

There is also need to change some of the words used even if it is within English.

FG5: I would like to get back to the earlier question that you asked about whether the tests measured what they were intended to measure? To a large extent, I think, yes. Rather than not. The reason is that, of course there were just specific tests that we had difficulty in administering that we gave examples of. So I think to a larger extent we will get what we were required to get.

5. DISCUSSION

At the start of the study, it was expected that the test-takers would be a rich source of information since they were probably a ‘test-naïve’ population (or mostly so) with regards to psychological testing. In fact, only 1 out of the 40 said he had ever had a psychological assessment. However, the test-takers tended to be less informative. It may be because they were being invited to discuss a foreign or unfamiliar phenomenon too early before they could fully recollect themselves (since the interviews were done soon after the testing process). They may still have focused more on the nature of the methods by virtue of their roles as test-takers. Or indeed, it may be due to the culture of not displeasing ‘strangers’ or ‘visitors’ that demands that you say only acceptable things to them. Not being sure about what might have been acceptable to me, they may have opted to say as little as possible to remain ‘safe’.

It may also be due to the concept of ‘background authority’ that Ardila (2005) refers to that takes away their freedom of expression. “In a standard testing situation, the examinee has to follow (obey) the instructions given by the examiner, and hence, the examiner is supposed to have a background or situational authority. It may be not so easy, however, to understand by whom and why this authority was conferred. Why should the examinee obey the examiner? This reluctance to obey may be especially evident if the examiner has certain personal characteristics; for example, age, gender, ethnicity, class or caste relative to the examinee.” (p 189). In this case, the researcher, for those in rural areas, was a ‘formally educated young woman from the city’. While for those in urban areas, who mostly comprised those of peri-urban areas, it was ‘a formally educated young woman from Zambia’s most prestigious institution of learning’. They may wonder, if they volunteer their thoughts and views, will they measure up?

In a culture like Zambia where many activities are done in a societal way, the idea of a one-to-one relationship such as in testing may be uncomfortable (Ardila, 2005). The idea of sitting in an isolated room with a stranger (sometimes of the opposite sex) with doors closed especially for those from the rural areas (from

whom I hoped to learn a lot) may have made them uneasy. It may have made a test-taker want to answer quickly and leave.

In contrast, this was far from the case with test-administrators who went on talking and competing for a chance to speak till the tape finished! This may have been because the test-administrators were more confident of their contributions having had the background of training in their master of science in clinical neuropsychology class. Because of that sufficient knowledge, it also enabled them to observe with a critical eye of analysis each test-taker. By virtue of their role, they were observers of the test-takers as well, which gave them chance to study clients. In addition since they had several test-takers (36 each), over time they acquired skill and got comfortable with the methods so much that administration was no longer a distraction (unlike the test-takers who only had one testing experience). Also, the test-takers could only speak from their own individual experience while the test-administrators had several experiences though from a different perspective. General principles become apparent when reflecting on several examples (a larger sample size) than on one example (small sample size). The test-administrators also got the privilege of doing a comparison of general performance among test-takers. They also did not have limitations that come with relating to a stranger because we had interacted in the master of science class for over a year by the time of focus group discussions. They shared their experiences, expressed their opinions and observations freely.

5.1 Language

It is certain that language cannot be separated from culture. In fact, language is the main transmission tool of culture. Hence it is not surprising that a huge component of the results of this study consists of language-related findings. The fact that the tests were done in a second language to the respondents would affect their performance as research has shown.

5.1.1 Actual Language Used in Testing (i.e. English)

Obvious difficulties have been recognised with use of English for testing in Zambia especially in rural and peri-urban populations that predominantly use the local language in day to day activities. Limitations in use of the language were observed.

For example, on the COWAT-FAS, where the test-taker is asked to say as many words as possible that start with ‘f’, ‘a’ and ‘s’ respectively in a 60 second time period for each letter, some test-takers could only come up with three or four words! Studies of verbal fluency that have compared monolingual and bilingual speakers typically show mono-linguals outperforming bilinguals especially on the category fluency task (Bialystok, Craik & Luk, 2008; Gollan, Montonya & Werner, 2002; Portecarrero, Burright & Donovick, 2007; Rosselli, Ardila, Araujo, Weekes, Caracciolo, Padillo, et al, 2000 as cited by Bialystock, Craik, Green & Gollan, 2009). A more dramatic demonstration was by the findings of Linck, Kroll and Sunderman that “reported that English-speaking college students living in a Spanish-speaking environment for 1 year produced fewer words on a verbal fluency test in English than did monolinguals who did not travel abroad!” (2009 as cited by Biastock, et al, 2009, p95). Several explanations are offered for the difference. First, that bilinguals probably possess less overall vocabulary in each language than a monolingual would in one language. Second, bilinguals continually have to manage competition from the other language causing delay in word production so that the 60 second time period may curtail their performance. Research in picture naming tasks demonstrates bilinguals taking longer to retrieve each item.

It is important to note that all the test-takers of this study spoke more than one language (only one test-taker spoke just two languages, while the rest spoke three or more). In fact, for most of them, English language was not even their main language further disadvantaging them. It was observed that several rural participants were unable to produce simple action words such as ‘saw’, ‘sleep’, ‘run’ but instead produced words that were related to their profession such as ‘cultivate’, ‘harvest’, ‘weed’, and so on. Language development is much related to its use. An individual tends to develop more the vocabulary that is related to his occupation or job. Linguists refer to the unique variety of language a person or people use associated to their profession as ‘register’ (Wilkins, 1972). The language that a person uses to talk about money transactions, for example, will not be quite like the language an accountant would use. The vocabulary is often specialised with little resemblance to the language that the accountant uses in general conversation. For a Zambian bilingual living in a rural area, though formally educated, what simulates the role of a ‘register’ is their collection of English language words only for use as their

occupation requires (e.g. words that pertain to agriculture) and mother-tongue in all other instances.

English language is often used in training workshops for farmers organised by the governments or non-governmental organisations or when farmers are appealing to donors for funding of their projects. English language is learnt in this case for the non-educational functions it plays (i.e. not for the purpose for passing an examination or acquiring a certificate). If the local language could carry out these functions well, the need for use of English language or indeed learning it, greatly diminishes. Luria and Vygostky (cited by Wilkins, 1972) theorised that a child ends up developing language in his early years because it assumes a function of helping him obtain assistance. The same may be applied in this instance. Wilkins (1972) puts it well when he discusses motivation for learning a language saying,

“....in an alternate language situation....the most powerful motivation of all for learning a foreign languageis where the only means available to exercise control over events and people outside ourselves is the foreign language. If to satisfy our needs, to influence the actions and thoughts of others, to pursue our occupation and our recreation, it is necessary to use a foreign language, then we will learn that foreign language more rapidly and effectively than under any other conditions” (p181)

In this scenario, however, English language is for such official use only and commonly used vocabulary when English language is spoken is what comes to mind. Recreational activities and satisfaction of basic needs can occur smoothly without the use of English language. This is probably why it was noted in the present study that some participants in rural areas, when asked to generate action words mainly produced words related to farming rather than simple words relating to activities of daily living. There are various social factors that come to play in a person's choice of language and this choice may be manifested in the form of a dialect, a variant or style, etc (Gumperz, 1972). In this case, English language may only be spoken on certain occasions when it is pre-meditated and well calculated as opposed to use for free expression. Thus when put on the spot for FAS, the test-taker may perform very

poorly because the test instructions restrict the test-taker to the use of English language.

If participants are not fluent in a language, this will invariably affect word-fluency tests. As cited earlier in the study of the Maori and Pakeha people of New Zealand (Ogden, et al, 2003), it was observed that the Maori said significantly more words after they were allowed to use Maori words than when they were not. The reliability and validity of results of person with different linguistic backgrounds is questionable (Kaplan & Saccuzzo, 2001). As a standard, examinees that are multi-lingual should have the test administered in the language they consider is their best one. A possible solution seems to be to translate into the local language. However, cross-cultural translations have limitations and certain considerations have to be made.

“The rules for translatable English imply that the original passage must be written in simple, third-level English” (p50, Brislin, R. W., et al, 1973). However, it cannot be assumed that the reliability and validity of the translated version can be compared to the version in English language (Kaplan & Saccuzzo, 2001; Brickman, et al, 2006) Complex concepts like those pertaining to health and diagnosis may have no translatable equivalent in the local language (Brislin, R. W., et al, 1973). For example, in the ZNB study, all participants underwent a neurobehavioral medical screen in which they were asked several questions among which were four questions – one asking about ‘a blackout’, another about ‘passing out’, a third about ‘fainting’ and a fourth about ‘having a seizure’. In the local languages spoken in the areas the participants of the study came from, there is one word used to encompass all four terms and differentiating which is which is done on the basis of the circumstances of ‘the fall’ as they call it. Other terms in the screening questionnaire that test administrators also confessed to be a challenge were ‘neurologic illness’ (and the examples that were given such as Parkinson’s Disease and so on), ‘dyslexia’ and ‘attention deficit hyperactivity disorder’. Even for words that may not have complex concepts, often to have the same clarity as the English language, many more words in the local language would be required to clear out ambiguity and ensure uniformity in the instructions, questions or the message being put forward.

The nature of psychological tests is complex, so much so that merely translating the tests may miss certain characteristics the test is intended to elicit. For example, doing the COWAT (F-A-S) as a direct translation may not elicit the same equivalent response if the language has limited words that start with ‘F’ by the nature of it. The aim should be to find a genuine equivalence in the target culture.

“The goal should be translation for equivalence, a dual process, and a major problem is that the equivalence can be established only through a common external criterion, which may itself be elusive.....The United States phrase “Every family owes it to the city to keep its lawn mowed in the summer and the sidewalks shovelled in the winter” has its intuitive French equivalent in the French item “The good citizen does not throw his garbage down the stairwell”. There must be a matching of empirical connotations, item by item, culture by culture” (Brislin, et al, 1973 p114)

Such a task will not be easy but necessary. Brislin et al (1973) insist that translation is the most vital part of the test adaptation process.

5.1.2. Type of English Used

The type of English language used in one part of the world may be different from another resulting in simple things being missed. Results of this study show, for example, that the use of the word ‘precisely’ was not immediately thought to mean the same as the phrase ‘on the exact same location on the page and as closely as possible to the way it appears’. The use of the word ‘figures’ did not necessarily translate to ‘numbers’ to all participants. Thus there will be need to revise the type of English in the study to a more ‘Zambianised’ version. As stated by one of the test administrators (FG), Zambians use English language closer to British English language having once been a colony of Britain.

Wilkins (1972), in his chapter on ‘The Social Function of Language’ discusses the use of foreign language and the variations it may take depending on whether the person learning the language is learning it for the purpose of use with a native speaker of the language or to facilitate communication with another local with whom he may not have the same mother tongue. He argues that often, for example in a

country like Zambia and many other commonwealth countries, English language is not learnt for the purpose of visiting England. In such a population, a distinct non-standard variety of English language is spoken locally.

Pride (1982), in his book, “New Englishes” acknowledges the presence of local varieties of English languages where English language is learnt as a second language. He compiles writings from authors or researchers that highlight how different countries interact with English. From his observation from the African situations cited in his book, he says “The fundamental lesson here is that bilingualism and biculturalism are two sides of the same coin, and that the wisdom of educational policy decisions will always, in the long run, be measured against this fact”(Pride, 1982, p 6,7). In the same book, Serpell writes,

“The English spoken in Zambia by the African population differs in several notable ways from the English spoken in Britain. There are also well-known contrasts between British and American English, and between southern and northern English in England. One school....considers them as errors arising from interference between the speakers’ first (Bantu) languages and their control over the rules of standard English.....If we can show that a feature of English spoken in Zambia is systematically predictable with reference to a grammatical “rule,” the mere fact that the rule in question does not feature in the grammar of standard English should not deter us from recognising it as a valid dialectal variant” (p 110, 111).

Serpell continues to add that the parents and teachers of Zambian children speak the Zambian dialect of English language.

In trying to elicit best performance in a population, language of instruction should resemble what is commonly used in the land to improve familiarity. In using rigid stereotyped language, one can seem distant, artificial or even distasteful to a testee that is unfamiliar with psychometric testing (Ardila, 2005). It is imperative that the instructions be revised.

5.1.3. Deviation from Standard Procedure

Consequently, each test administrator had their own way of revising or clarifying the instructions. The ‘standard procedure’, which is an important component of the standardisation process, would be lost in such a case. There was no agreed upon revised version. In fact, several times the test administrators even had to use vernacular languages with which some were not very familiar, to try and explain instructions further.

5.1.4. Acculturation

“Acculturation is a concept borrowed from anthropology that describes the socialization process whereby members of minority groupings gradually learn and adopt certain elements of mainstream culture from continuous first-hand contact” (Gasquoine, 2008, p 255). Literature documents that lower levels of acculturation are related to comparatively poor performance on language, memory and visuo-perceptual skills (Gasquoine, 2008). Acculturation certainly plays a role in affecting the test performance (Brickman, Cabo & Manly, 2006). In this study, an example, as stated in the results, is of a screening test called the Zambia Achievement Test (ZAT) that contains a word ‘limousine’ – a word which is not read exactly according to the basic rules of English. A person in rural Zambia (like MA09), that watches local soaps and has no idea about that car would most likely miss the pronunciation more than a young adult in an urban area (like MA16) who watches western movies and is up to date with western style. In this case, the aspect of acculturation through exposure to media rather than literacy may come in. This was noted by the test administrators as well. Another example that showed how familiarity had an effect was the clinic staff who would pronounce a hard word like ‘rheumatism’ but failed to pronounce easier words like ‘anchor’, not because of their reading ability but rather due to familiarity.

Similarly, there is a way in which formal education in its arrival carries with it western influence. Formal education or literacy is also a source of acculturation (Brickman, Cabo & Manly, 2006) as persons get exposure to the outside, western world through books, programmes, etc. It was observed by the testers that respondents that were more educated generally understood instructions better. Of course we cannot deny the fact that literacy also had a lot to do with it. Formal

education plays a major part in awareness of science and technology leading to cultural homogenisation (Ardila, 2005). Formal cognitive testing assesses those qualities that educated people obtain training in, and as a result it is no surprise that they outperform those that have little or no formal education.

5.2 Use of Geometrical Figures for the Assessment of Visual-spatial Memory

In this case, the BVMT was used. A test-taker is presented with an A4 size white card of 6 geometrical figures for 10 seconds for study after which the test-taker is required to reproduce the images as closely as possible to the original diagrams in both shape and location by drawing on a similar A4 size white blank sheet of paper. This is not only difficult for people that do not regularly use pen and paper but people to whom the concept of certain shapes is not important. They do not have an eye for such detail. Most of the respondents described their up-bringing as that of playing with wire cars, clay dolls and listening to folk tales rather than being exposed to puzzles, books or conventional toys as we know them. This affects their knack for identifying such things. As the literature reviewed below suggests, other objects more familiar would have to be used instead.

Ortar (1963, as cited by Brislin, et al 1973) counters the assumption that non-verbal stimuli will be more fair cross-culturally by stating that while language use as a means of communication is advanced in all cultures, the practice of using pictures and other visual means to communicate different subject-matters may not be as prevalent in other cultures. Lovegrove (1968 as cited by Brislin, et al 1973) writes:

“In industrial societies, visual perception is the predominant means of communication. Pictures and diagrams are part-and-parcel of everyday living as is spatial thinking an essential feature of problem solving in a technological culture. This is not the case with African populations. Indeed tests with high diagrammatic or spatial content, instead of favouring Africans present them with considerable difficulty. (p. 758)

In the BVMT, this ‘difficulty’ came out as many test-administrators mentioned the inability of subjects to reproduce a semblance of the diagrams. In fact, one tester (FG3) described it crudely as ‘scribbling’ as opposed to drawing, to which her colleague agreed (FG 4). Apparently, this is no new finding as Jahoda (1956) observed the kind of rotation error he observed among Ghanaian participants copying the orientation forms was a kind that was so rare in western that he did not think it was considered in the Block Design Task by the test developers. This was in 1956! Yet today, testing using exotic unadapted tests in Zambia has continued. Ortar (1963) also lists 5 items that he describes as being complex to adapt to:

- a) Models or pictures
- b) Materials used for Abstract performance
- c) Paper and pencil tests that are abstract
- d) Language materials
- e) Number materials

Furthermore, the study earlier alluded to by Serpell (1979) that compared eight-year olds in low-income neighbourhoods of Lusaka, Zambia and Manchester England on pattern reproduction in various forms (media) point to specificity in perceptual skills as the reason for the performance differences. When the children were asked to reproduce standardised patterns of a human figure, flower and a square with diagonals using clay-modelling, wire-modelling and pen and paper, the Zambian children excelled in the wire modelling task while the English children performed better in the paper and pencil task. Also, as expected there was no difference in the clay-modelling task between the two groups because both groups were exposed to clay moulding practices whether with natural (Zambian children) or industrially produced (British children) clay. The findings of the study suggest that familiarity with test materials plays a role in test performance. These findings certainly have implications for test developers. It is not that our western counterparts have the privilege of seeing and using the actual testing items but rather that they have had the privilege of being exposed to relevant items and activities (such as building patterns with blocks, sorting out jig-saw puzzles, drawing and colouring of pictures) that psychological tests draw from.

5.3. Computer Tests

Computer technology has brought many advantages to the field of psychological testing. Some advantages of use of computers in testing include control of bias, that timed responses are precise, standardisation of administration, that manpower needs are reduced and that testee is not rushed (Kaplan & Saccuzzo, 2001). However, these benefits may not translate immediately to a culture that does not have computers freely and easily accessible for day to day use.

Of the three computer tests done (WCST, HCT and PASAT), the first two were aimed at assessing abstraction and/or executive function. In discussing the above, it was noted that tests of abstraction or materials used for assessing abstraction tend to be culture bound. It is no wonder that the computer tests elicited interesting reactions among subjects. Some were excited, others intimidated or anxious about its use. In the first instance, in the Zambian society, the computer is not something that is readily available to the general public. It is two of the urban test-takers that actually stopped midway in the test administration because they feared that the computer would get damaged since they were getting so many answers wrong! A nurse (MA26) also reported that she had never used a computer before. In fact, of the 40 respondents, only 2 had used a computer ever before. Even the test administrators had lengthy discussion proposing several hypotheses as to why the computer tests caused a stir among participants. Some thought it was the instructions, the computer itself, the level of education and so on. All participants had seen it before but had never used it. Other participants mentioned to the test administrators that they were sure they would have done better had they been more familiar with computers.

It is needless to mention that the aim of using computer tests was not to assess familiarity or level of comfort with computer usage. And as such, ideally, the use of a computer should be as neutral as a paper required to administer a test on is to a student or pupil, but it was not. The mere use of a computer brought fascination so much so that the testing process ended up also being about the experience of using a computer which elicited varied responses. Of note was the amusement by a few participants about how the computer could ‘talk back at them’ telling them whether the answer was right or wrong. Research (Geertz, 2000 and Harris, 1983 as cited by Ardila, 2005) has shown that the test material/apparatus (physical elements or testing

media as referred to above) are culture-dependent elements. These materials may be unfamiliar or much less familiar to the examinees of a different cultural background. The trouble with this scenario is that the test-takers do not often share the implicit presumptions assumed by these tests (Greenfield, 1997 as cited by Ardila, 2005) some of which are gained by having a certain background knowledge pertaining to testing materials or instruments. Often this background comes by sharing values of the culture of origin of the instruments in question. Unfamiliarity with computers definitely affected performance in the ZNB study population even though there is no definite way of ascertaining how exactly it may have also affected performance on tests. Where possible, a manual version of the test should be used to administer the test.

5.4. Speed of Tests

Speed during tasks is perceived differently in various cultures and has different emphasis. In some cultures, speed is perceived as being hasty and thus compromising quality of work. Rather, the emphasis is on doing something well- or accurately as earlier noted in the introduction. The Zambian culture is such a one. But this scenario is not unique to Zambia as other literature shows. Brislin, et al (1973) actually advise testers to avoid use of speeded tests in cross-cultural testing unless it is absolutely critical in what is being assessed. Ardila (2005) adds that speed tests are inappropriate in many cultural groups. He notes that motivation varies in different cultures and reduces in non-European groups where the competitive spirit is less strong. Responses elicited vary from hostility towards the testing process to declining to do the tests or better still, doing the tests with little or no effort. This, too, was noted among the test administrators that felt they constantly had to encourage the test-takers to do things as fast as they could. In contrast to viewing time as a natural phenomenon, time can be perceived as a cultural and social construct because the nature of interaction with time varies among different cultures (Ardila, 2005).

5.5. Questionnaires

If these are supposed to help in screening and diagnosis, they will need to be revised in terms of the language and relevance. A note was made, for example, on the BDI that many subjects did not understand the concept of ‘irritability’. Also, that some of the items in the ADL or the PAOFI were not culturally relevant and if such

assessments are required and are to be done in this population, it will be necessary to change some of those items that are not culturally relevant rather than just skip the items. An earlier mentioned study done among the Maori of Australia showed that most were likely to cooperate and be more engaged when there were items related to their language and culture (Ogden, et al, 2003).

5.6. Rural Vs Urban

Test administrators noticed a difference in attitude in the urban population as compared to the rural population. It was easier to administer tests and they were faster in tests of speed but in addition, they were less willing to give of their time for the study. The sense of value for time or urgency was higher in the urban population than in the rural. Brickman, et al (2006) refer to one's residence (urban Vs rural) as one of the factors that significantly interacts with cultural background to influence cognition. Urbanisation spells a certain lifestyle where usage of time in a day is related with the income one earns. The fact is, there is an element of acculturation that comes with urbanisation due to the daily demands of urban lifestyle maintenance aside from the influence that comes through association with foreigners, access to media and so on (Segall et al, 1990). Acculturation has been discussed more above. Another factor contributing to the rural-urban discrepancy is that rural participants are also not normally test-wise because of limited education centres and the type of occupations they commonly have that do not include frequent assessments. Rural populations also tend to be of low socio-economic status and such a background has been found to impact negatively on their performance due to poor nutrition and low access to good health care (Brickman, et al, 2006). This was even more evident from the experience of the test administrators that had a better time with the urban population (like MA16) in terms of understanding of instructions and speed of doing tests. The rural participants (like MA09), on the other hand, were slower, sought more clarification of instructions and were generally more difficult to administer the tests on. This is an important consideration that clinicians will have to make as they make use of normative data for clients in daily practice.

5.7. What Can Be Done?

“How should one approach the assessment of intelligence in the case of an adult patient referred for treatment because of socially deviant behaviour in a community?

Modern psychiatry takes account of a patient's intelligence in determining psychological problems and in planning course treatment. But none of the tests standardised for school going population seem at all appropriate for the assessment of intelligence in an adult who has never been to school, has not learnt to read and write, and has lived all her or his life within a subsistence agricultural community." (Serpell, 1994, p 160). The ideal situation that should be sought to effectively handle the influence of culture is that of developing tests within a particular culture specific for that culture. This, however, may not be possible considering how many subcultures there could be in this world and considering the variety of tests that that would have to be done for! (Brickman, et al, 2006) let alone that the vast amount of time and resources required to do this will not be available.

Also, with globalisation, it is almost impossible to draw a straight line marking the boundaries of a culture. Cultures are evolving daily in subtle ways. However, throwing this knowledge aside and going ahead regardless of obvious cultural differences is certainly not an effective way to proceed either. A compromise has to be reached that will give us the best of both worlds. Tests that can be adapted should be adapted to improve relevance. Tests that can be translated, should be translated. The point is not to change the whole neuropsychological test exercise into an English comprehension class. As much as possible, efforts should be made to use tests that are either relevant to the culture or at least closely related to it.

As the field of neuropsychology evolves, and Zambia joins this evolution, it is vital to factor in the above issues since they affect a person's perception and resulting response.

6. CONCLUSION

The influence of culture on neuropsychological testing in Zambia is evident from the results. However, this situation is not unique to Zambia and similar occurrences have been observed in situations where neuropsychological tests batteries have been administered in cultures that vary greatly from the cultures in which the tests were developed. While collection of normative data reduces errors that arise from misdiagnosis based on such tests, adaptation and development of tests within the target cultures for that culture will do much more. The practicalities of doing tests in each domain for each culture may be a challenge but the solution is certainly not to forsake efforts towards this development.

Taking a qualitative approach in this research has added a wealth of detail that would otherwise be missed if a quantitative approach was taken. For example, results would show that a particular test-taker completed a computer test with so many correct and so many wrong but information would be missed on the interaction of the test-taker with the testing apparatus (computer in this case). There would be no room to record that the subject stopped half-way through the test because s/he thought the computer would be damaged if s/he continued doing the test and kept getting the answers wrong. Or that the test-takers were observed to pay more attention to drawing nice connecting lines on a timed test rather than on how fast they could finish the test. There would also be no room for the test administrators to state their difficulty in administering instructions in non-standard translations of vernacular or even giving revised English language versions of the instructions. This approach will contribute greatly to considerations that ought to be made as one sets out to develop tests in the Zambian context and culture.

6.1 Recommendations

Following the findings of the study, the recommendations below have been made:

1. Translation of instruction and testing manual to 7 major languages of Zambia
2. Revision of the English language used in the instruction and testing manual

3. Use a local equivalent of the BVMT for testing visuo-spatial abilities or have one developed
4. Avoiding use of computer tests where a manual equivalent version of a test can be found. A less effective alternative is to provide introductory exposure to computers to prevent the overwhelming first-time experience reaction
5. An aspect which is not new, be mindful of differences from rural and urban populations and develop separate normative data for the two strata.

6.2 Suggestions for Further Research

- ▶ This study has a qualitative approach. Further research in this area could explore comparison of qualitative responses to quantitative results on test performance (for the ZNB study) on highlighted problem areas
- ▶ Compare the Zambian normative data sets with data sets generated in western countries with the same test battery noting individual test variations in view of plausible explanations from qualitative results
- ▶ Intervention studies involving test adaptation and test development can be done as well based on recommendations above.

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Appendix A

Questionnaire

Name:

Id:

Age:

Date of Birth: ____/____/____

Address:

1. Have you ever had a psychological assessment? If yes, how long ago?
2. Did you feel that you understood what you were asked to do? All the time/most of the time/some of the time/very few times/did not understand any of the instructions or tasks I was asked.
3. What do you imagine would be a barrier to understanding the testing process in this case?
4. What do you think the tester was trying to achieve by testing you?
5. Did you feel that you were expected to behave in a certain way in the test situation? Describe your experience
6. Was there anything in the testing exercise that you were totally unfamiliar with? If so, what? Why?
7. What part of the testing exercise did you like most? (Do you need to be reminded of the tests?) Why do you think?
8. Which one did you not like? Why?
9. How much effort did you put into the whole process?
All my effort/Most of my effort/Very little effort/Not at all
10. Did you enjoy this experience?
Yes/Somewhat/Not at all
11. Do you have any more comments to make?

Appendix B

All Correspondence should be addressed to the
Permanent Secretary
Telephone: +260 211 253040.5
Fax: +260 211 253344



In reply please quote:

No.....

REPUBLIC OF ZAMBIA MINISTRY OF HEALTH

NDEKE HOUSE
P. O. BOX 30205
LUSAKA

13th May 2010

School of Medicine,
Department of Pediatrics and Child Health
P.O Box 50110,
Lusaka

Dear Prof. MPS Ngoma,

Re: Request for Authority for Dissertation Proposals in respect of nine Neuro-Psychology Students

The Ministry of Health is in receipt of your request on behalf of Neuro-Psychology Students to conduct research in the following areas:

1. Neuro-cognitive functioning in Hypertension; Measured in battery – A Pilot Study.
2. The Relationship between Literacy and Neuropsychology Test Performance among Adults in Zambia
3. The Relationship Between individual's Number of Languages Spoken and Performance on the Clinical Neuropsychological Test Battery
4. Influence of Education and age in Performance on the Zambia Neurobehavioral Test Battery with the Zambia Achievement Test as a Measure of Educational Attainment.
5. Social Economic Status and Neuropsychological Assessment in Zambia
6. Cultural Influence on Neuropsychological Test in Zambia
7. Effect of Quality of Education on Neuropsychological Tests performance Among Zambian Adults
8. The Relationship between Moderate Alcohol Consumption and Cognitive function
9. Performance of Urban and Rural Adults in Neuropsychological Tests in Zambia

I wish to inform you that following submission of your research proposals and subsequent communication to my Ministry, our review of the same and in view of the ethical clearance, my Ministry has granted you authority to carry out the studies on condition that:

1. The relevant Provincial and District Directors of Health where the study is being conducted are fully appraised
2. Progress updates are provided to MOH quarterly from the date of commencement of the study.
3. The final study report is cleared by the MoH before any publication or dissemination within or outside the country.

Yours sincerely,

Dr. Peter Mwaba
Permanent Secretary

Appendix C



THE UNIVERSITY OF ZAMBIA

BIOMEDICAL RESEARCH ETHICS COMMITTEE

Telephone: 260-1-256067
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Assurance No. FWA00000338
IRB00001131 of IORG0000774

Ridgeway Campus
P.O. Box 50110
Lusaka, Zambia

26 April, 2010
Ref.: 021-04-10

Ms Maria Akani A.
School of Medicine
P.O. Box 50110
LUSAKA

Dear Ms Akani,

RE: SUBMITTED RESEARCH PROPOSAL: "CULTURAL INFLUENCE ON NEUROPSYCHOLOGICAL TEST RESULTS IN ZAMBIA"

The above-mentioned research proposal was presented to the Biomedical Research Ethics Committee where changes were recommended. We acknowledge receipt of the revised proposal with corrections/clarifications. The proposal is approved.

CONDITIONS:

- This approval is based strictly on your submitted proposal. Should there be need for you to modify or change the study design or methodology, you will need to seek clearance from the Research Ethics Committee.
- If you have need for further clarification please consult this office. Please note that it is mandatory that you submit a detailed progress report of your study to this Committee every six months and a final copy of your report at the end of the study.
- Any serious adverse events must be reported at once to this Committee.
- Please note that when your approval expires you may need to request for renewal. The request should be accompanied by a Progress Report (Progress Report Forms can be obtained from the Secretariat).
- Ensure that a copy of final results of the study is submitted to this Committee.

Yours sincerely,


Dr James Munthali
A/CHAIRPERSON

Date of approval: 26 April, 2010

Date of expiry: 25 April, 2011