

Performance of English, Zulu and Sotho Students on the Boston Naming Test: An Investigation into the Items Responsible for Cultural Bias

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Abstract

The Boston Naming Test (BNT) is a confrontation naming test which is used to measure naming ability. The primary purpose of this study was to identify whether cultural bias negatively affects South African's performance on the Boston Naming Test (BNT). More specifically the study aimed to identify the exact items of the BNT on which South Africans perform poorly because of cultural bias. The research identified alternate responses given by respondents in terms of a percentage. The study further aimed to explore whether there was a significant difference in performance when comparing English, Zulu and Sotho respondents in terms of item response. This investigation also intended to discover whether being bilingual would affect South African's performance on the BNT. Finally, the study aimed to explore whether there was a significant difference in the performance on the BNT when comparing male and female respondents. A significant difference was found between the South African and the Canadian sample in terms of item response. 40 items were revealed as problematic in a South African sample. Significant differences were found when comparing English respondents to Zulu respondents as well as when comparing Sotho respondents to English respondents. Although differences were found between male and female performance, the difference was not significant. Ultimately, no significant difference was found between monolingual and bilingual respondents.

Declaration

I declare that this dissertation is my own unaided work. It is being submitted as part of the requirements for the degree of Masters in Education in Educational Psychology, at the University of the Witwatersrand, Johannesburg. This dissertation has not been submitted to any other university for the purposes of any other degree or examination.

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CHAPTER 1

LITERATURE REVIEW

1.1 Introduction

The use of various tests in a country like South Africa is not new. However, the historical development and use of the modern psychological measures that were either developed or used in an environment that was initially characterised by an unequal distribution of resources that were based on racial categories (Black, Indian, Coloured and White) (Foxcroft and Roodt, 2005). The tests that were predominantly used were standardised for the white populations to draw distinctions between the races in an attempt to show superiority of one group over another (Foxcroft and Roodt, 2005).

It was Barker-Collo (2001) who reviewed the influence of multiculturalism and the fact that the cultural appropriateness of such tests such as; intelligence or neuropsychological tests, does not highlight the influence of different cultures, socio-economic and contextual factors therefore resulting in perpetuating the bias inherent in many of the Western developed tests.

The test investigated under this study is the Boston Naming Test (BNT) (Kaplan, Goodglass and Weintraub, 1983), which is likely the most frequently administered confrontation naming test that was developed in the Western world. The BNT can provide clinicians with invaluable information that can be used to detect the severity of aphasia in patients and other forms of linguistic difficulties in brain injured patients as well as those with degenerative conditions (Beatty and Monson, 1989; Lindman, 1996). Criticism has been directed at the use of the BNT in that it has been argued that one of the confounding variables that has not been considered in sufficient detail is the influence of one's specific cultural milieu and thus, may not be applicable to individuals from differing cultural backgrounds (Barker-Collo, 2001).

1.2 Testing in South Africa

Despite recent advances in test use in Southern Africa, an argument still exists regarding the nature and validity of various assessment measures (Reid, Kok, and van der Merwe, 2002). Siegel (1999) (as cited in Reid et al, 2002) claims that 'scores on tests are irrelevant and not useful and may even be discriminatory'. Despite this controversy according to Foxcroft and Roodt (2005) assessments can still have several advantages, namely the identification of strengths and weaknesses, identify training and educational needs and assessments can act as a diagnostic tool, enabling the development of possible intervention strategies.

The problem however is suitability; many of the tests such as the Binet, Wechsler and even the BNT have not been developed and normed for multicultural and multilingual societies such as those in South Africa (Skuy, Schutte, Fridjhon and O'Carroll, 2001). According to Foxcroft and Roodt (2005, p.224) a primary focus on the score alone will provide one with a highly restricted view of the individual, they suggest that 'in addition to the test score, the information in which we are interested can be obtained by examining the context in which a person lives', the context being South Africa in the present study.

Some of the aspects related to social context which question the validity of intelligence testing and neuropsychological assessments can be quality of schooling, language, culture, environmental factors and test wiseness (Foxcroft and Roodt, 2005). The BNT has been criticized for not taking into account linguistic and cultural differences and one wonders what potential biases in the BNT will emerge in a diverse country like South Africa. This will undoubtedly have clinical implications for diagnostic decision making in terms of the consideration the diversity of experience that clients bring to the testing situation, and how this will impact on performance and the resultant outcome of the test.

1.3 The Boston Naming Test

The Boston Naming Test (BNT) is one of the neuropsychological tests that was developed by Kaplan, Goodglass and Weintraub in United States in 1983. This test is a 60-item test most frequently used to detect word retrieval or naming difficulties such as anomia, which is the inability to name objects or recognize names of objects that were once known to the speaker (Goodglass and Wingfield, 1997). It is also used to provide diagnostic information in the detection of mild naming deficits and word retrieval difficulties in conditions such as those incurred from a traumatic brain injury (TBI) such as motor vehicle accidents (MVA's) and cerebral vascular accidents (CVA's) (Jordan, Cannon, and Murdoch, 1992), degenerative disorders such as multiple sclerosis and dementias (Beatty and Monson, 1989; Lindman, 1996).

However in order for the BNT to provide clinically valid data, it becomes pertinent for the clinician to consider factors that may potentially influence scores on the BNT such as cultural bias, language bias, level of education and gender. Furthermore, despite its clinical utility, the content of the BNT reflects the cultural context in which it was developed, and thus may not be necessarily applicable to persons from other cultures (Barker-Collo, 2001). There is an urgent need to address the problems of cultural and language biases in assessing South African patients (Swartz, Drennan, and Crawford, 1997 as cited in Barker-Collo, 2001). 'The field of neuropsychology is unprepared for the growth in racial, ethnic, and cultural diversity among those gaining access to cognitive assessment services and those participating in research studies. Very few neuropsychological measures have been properly validated for use among individuals who are not Caucasian, do not speak English, or lack a high school degree' (Manly, 2005, p. 278).

The abovementioned problem is prominent in South Africa, where socio-economic hardship is widespread and where those disadvantaged in terms of appropriate psychological services constitute the majority of the population in the country as the legacy of apartheid continues to linger. Anderson (2001)

highlights the urgent need in South Africa to conduct well-planned and coordinated studies that address the problems caused in neurocognitive assessment by the extent of cultural diversity that exists in the country. In the cross-cultural research Matthews and Bouwer (2009) highlight this need, adding that the Health Professions Council of South Africa echoed this call in 2005, urging psychologists in South Africa to urgently address the aforementioned issues by developing and/or adapting tests that are considered to be culturally appropriate.

1.4 Potential Biases

Various factors such as culture (Henderson, Frank, Pigatt, Abramson, and Houston, 1998), language (Barker-Collo, 1996; Strauss, Sherman and Spreen., 2006) and environmental factors (Cruice, Worrall, and Hickson, 2000) can affect performance on this test. Some of these factors have not to date been investigated thoroughly.

1.4.1 Cultural bias

Cultural bias can be defined as whether the psychological construct has the same meaning from one culture to another; how are the different items interpreted by people from different cultures; and whether the actual content (face) validity may be different for different cultures (Foxcroft and Roodt, 2005).

The administration of the same intelligence assessment across many different cultural groups is an aspect that can potentially threaten the validity of the assessment. This is due to the fact that the definition of the construct being measured, which is word retrieval in the case of the BNT, may not necessarily be identical across all the groups according to Shuttleworth-Edwards, Kemp, Rust, Muirhead, Hartman, Radloff (2004). Test items in the test may not be appropriate for all cultures (Mansur, Radanovic, Taquemori, Greco, and Araujo, 2005).

In a study performed by Cruice et al., (2000) the findings show that Australians have lower scores on the BNT compared to North American and European populations due to failure to recognise unfamiliar items such as the beaver and pretzel (Cruice et al., 2000). This study clearly illustrates that different cultures will regard different concepts as important and thus traditional Western measures, such as the BNT may cover aspects that do not include other cultures conceptualisations (Van de Vijver and Rothmann, 2004). Traditional neuropsychological tests have been said to be 'culturally loaded' with Western constructs which are not meaningful for non western cultures according to Brooks-Gunn, Klebanov and Duncan (1996).

According to Nell (1999) a clear indicator that one's culture can affect test scores, is the degree to which acculturation to the Western way of life has seen to improve the level of test performance of South African black racial groups. In South Africa, particularly post-apartheid, society was becoming increasingly individualised. Thus many black South Africans began to shift towards the adoption of Western ideologies as a means of coping with the changing social reality in the country according to Ratele and Duncan (2003). Thus a test designed for a particular culture may now not necessarily be appropriate anymore due to the individual leaving that particular culture and adopting a new culture. Claassen, Krynauw, Paterson, and Mathe, (2001, p.2) argue that the purpose of testing both globally and nationally should "discriminate between those having more or less of a certain ability" in an attempt towards obtaining culturally reduced diagnostic test outcomes.

Essentially acculturation can be seen to a positive thing in terms of measures of assessment, in other words, if one becomes immersed in Western cultural practices, one would ultimately become more familiar with the Western assessment measures according to Foxcroft and Roodt (2005). However, the process of acculturation can happen at different rates and an individual may never fully adopt the new culture only certain aspects of it, which would make it difficult to know what test is appropriate for that particular individual (Skuy, et al., 2001).

According to Foxcroft and Roodt (2005), assessment measures should attempt to measure a construct that is common across cultures as well as measuring aspects of the construct that are more group specific. This would result in a broader view of the individual that includes the context of culture. However, the task of determining what aspects of the construct being measured are meaningful across particular cultural groups may be a difficult one.

A test shows cultural bias if there is a significant difference in performance between two cultural groups and this difference is other than the ability being measured by the test (Gasquoine, 1999). The cultural bias of the BNT is a well-researched phenomenon (Barker-Collo, 2001; Cruice et al., 2000; Kim and Na, 1999 and Patricacou, Psallida, Pring, and Dipper, 2007). Because of the extensive research done on cultural bias, the BNT has been normed for various different populations like Korea (Kim and Na, 1999); Sweden (Tallberg, 2005); Greece (Patricacou, et al., 2007); and elderly Australian individuals (Cruice, et al., 2000). Culturally relevant responses given by the testees, compared to the manual, would be marked as incorrect, but in fact is not (Cruice, et al., 2000).

It thus appears unlikely that a single version of the BNT will be considered to be culturally appropriate to differing populations and cultural contexts and thus this may perhaps be an unrealistic expectation. Thus according to Barker-Collo (2001) clinicians need to take into account the diversity of experience that their clients bring with them and make a concerted effort to understand how this links to their subsequent performance on the test.

Due to the limited validity of the BNT with culturally diverse adult populations, there is thus a pressing need to obtain normative data on general language measures reflecting the demographic diversity of the South African population (Barker-Collo, 2001).

1.4.1.1. Culture and Race

Cultural bias, in terms of race, was not only found outside of America. Strauss et al. (2006) found that Americans living in the Midwest, as well as black Americans, score lower on the BNT than those Americans for whom the test was standardised and normed for. Cross-cultural assessments consistently yield biased or skewed results while ideally they should provide consistent results in spite of factors such as race and culture (Whitfield, Fillenbaum, Pieper, Albert, Berkman, Blazer, Rowe, and Seeman, 2000). Whitfield et al (2000) found white elderly Americans score higher than that of black Americans on the shortened version of the BNT. Researchers need to be careful in attributing differences to race or culture with regards to cross-cultural or cross-racial discrepancies; differences should rather be attributed to factors such as language or level of education which have a relation to race and culture and have been found to affect neuropsychological assessment (Gasquoine, 1999).

1.4.2 Language

Language problems can also be a potent source of bias in assessment practices. This particular kind of bias is not uncommon in multicultural assessment (van de Vijver and Rothmann, 2004). Even if the test does not specifically assess linguistic skills, such as the BNT, if the individual taking the test is not proficient in the linguistic construction of the test, they will be severely disadvantaged (Skuy et al., 2001). Particularly in the context of South Africa, a poor performance on an assessment measure may not necessarily be indicative of a so called lack of ability, but rather an indicator of a language difficulty (Lansberg, Kruger and Nell, 2005).

1.4.2.1 Vocabulary

Hawkins and Bender (2002) report that a relationship between vocabulary and the BNT constantly emerges in studies containing a normal sample. Tombaugh and Hubley (1997) reported a moderate correlation of .53 between WAIS-R Vocabulary raw score (Wechsler, 1981) and BNT performance, Killgore and Adams (1999) found a .65 correlation between WAIS-R Vocabulary and BNT scores. Thompson and Heaton (1989) reported a WAIS-R Vocabulary–BNT

correlation of .79, similar to the Hawkins et al. finding of a .81 correlation between Gates-MacGinitie reading vocabulary and BNT scores (Hawkins and Bender, 2002). Killgore and Adams (1999) reported that in their normal sample, a low average WAIS-R Vocabulary score predicted a BNT score of 49.1, this was found to be well below the means for most of the published norms. Vocabulary scores that fell beneath the low average range resulted in even lower BNT scores. Developmental data also needs to be taken into consideration. In children, it was found that BNT scores depended heavily on a vocabulary factor, and poorly on verbal fluency or memory factor (Halperin, Healey, Zeitchik, Ludman, and Weinstein, 1989 as cited in Hawkins and Bender, 2002).

Language bias was demonstrated in the study by Kim and Na (1999) in which the findings revealed that Korean individuals did not find the most difficult item on the BNT, 'abacus', difficult compared to the Canadian sample (Tombaugh and Hubley, 1997). In an additional study in an Australian sample, Worrall, Yiu, Hickson, and Barnett, (1995) suggested that many of the original BNT items were noted to have frequently not been used within the Australian English language.

A further study performed in Cape Town South Africa, by Ferret, Dowling, Conradie, Carey and Thomas, (2010) revealed linguistic variations in terms of differing terminology albeit 'common' terminology for certain test items i.e.: boat for canoe; bird for pelican and chair for bench and had a significant impact on the BNT test scores. It must be noted however that differences in vocabulary as related to potential language bias are also inextricably linked to one's cultural experiences, quality of schooling and degree of exposure (Foxcroft and Roodt, 2005). Lezak (1995) states that vocabulary development is influenced more by cultural and socioeconomic factors than it is by education or academic achievement.

In an additional study performed by Worrall, et al., (1995), the Australian sample performed significantly poorly on items such as *beaver* when compared to their American counterparts, this is due to the Australian respondents' unfamiliarity with the word *beaver*. Worrall et al., (1995) suggest replacing the

word *beaver* with a more familiar term such as *platypus* would be more beneficial. Items such as the word *beaver* could be problematic for South African respondents as there are no beavers in South Africa. The word *platypus* would be equally problematic for South Africans as it is equally unfamiliar.

The findings of such studies have resulted in the authors deducing that use of the BNT outside North America may potentially require that new normative data be collected due to word/terminology differences across various culture and linguistically diverse populations (Worrall et al., 1995)

A further factor that influences scores is the order in which the items are presented. The BNT begins with items that are easily recognizable and frequently used in English, thus making them easy to name (Kaplan, et al., 1983). As respondents proceed through the test, less frequently used items are introduced making them more difficult to name (Kaplan, et al., 1983). These statements are true for American populations for whom the BNT was normed (Kohnert, Hernandez and Bates 1998). Cultural-linguistic differences influence the ease with which these are answered.

The BNT is administered individually with patients being presented with pictures, one picture at a time. The patients are then requested to name the pictures (Kaplan, et al., 1983). The level of difficulty increases as the test progresses. Most individuals who are assessed using the BNT obtain high scores on the test; it is because of this that the BNT does not discriminate well between scores at the higher levels (Strauss, et al., 2006). However, low scores are effectively identified. Patients obtaining low scores on the BNT can be said, with confidence, to have some form of deficit in naming ability (Strauss, et al., 2006).

Vocabulary appears to play a significant role in the outcome of the test as people with broader vocabularies were also found to score higher than those with limited vocabularies (Strauss, et al., 2006). Lowenstein and colleagues (1993 as cited in Kohnert, et al., 1998) used the English-language BNT and a Spanish

translation as part of their neuropsychological battery in a cross-linguistic comparison of Spanish and English speakers with mild-moderate levels of dementia and found that higher scores were achieved by the English-language speakers.

Linguistic differences have the potential to render certain words more or less salient than others, and may bias language oriented neuropsychological instruments if translated from one language to another. Furthermore, cultural and related differences between English- and non-English speaking individuals may also affect performance on neuropsychological instruments. Measures that laden with language, such as tests used to assess confrontation naming ability may be especially vulnerable to decreases in construct validity in cross-cultural applications.

However should cross cultural development of the test takes place it is still a difficult task to attempt to conserve the meaning of the word/concept that is translated rendering it the possibility that the test may measure something other than the original intended language ability due to differences in the salience of the words between the differing languages (de la Plata, Arango-Lasprilla, Alegret, Moreno, T'arragad, Lara, Hewlitt, Hynan and Cullum, 2009). This may suggest that translated neuropsychological tests may be less able to measure the construct they intend to measure.

1.4.2.2 The Question of Translation

The problems related to language and vocabulary differences cannot merely be solved by translating the measure. Some languages do not have the concepts required by the measure and thus an equivalent form of the measure cannot be successfully translated (Greive, 2005, as cited in Foxcroft and Roodt, 2005). One can also not assume that the words from the different languages are on the same level of difficulty. In the context of South Africa there are 11 official languages and one wonders which is the most suitable language to use in the administration of the BNT? Although many English second language South

African individuals may prefer to be assessed in English, they may not have the advantage of those whose home language is English and thus the results may not be comparable (Greive, 2005 as cited in Foxcroft and Roodt, 2005).

1.4.2.3 Monolingualism and Bilingualism

The majority of neuropsychological tests were normed for English people in the United States (Hebben and Milberg, 2009). Thus performance on tests, normed in the United States, is dependent on the level of mastery of the American dialect of English as well as exposure to specific customs and experiences that are central to Western culture. It cannot be assumed that tests developed in the United States and normed on primarily monolingual English-speaking Americans will have the same sensitivity when applied and translated outside of this culture (Hebben and Milberg, 2009). Although an increasing number of tests have been renormed and translated for usage outside of their countries of origin, there is limited data addressing the issue of using English-based tests on bilingual individuals. Although these bilingual individuals may appear to be fluent in two languages, their level of exposure to both cultures may not be equal (Hebben and Milberg, 2009).

According to Kohnert, et al., (1998) normative data on the BNT has been limited to monolingual speakers. Hence a first step toward accurate interpretation of naming performance of bilingual clinical populations is to obtain normative data on healthy adults who are proficient speakers of more than one African language in the South African sample used in the present study. Aside from its practical value for clinical diagnosis, validation and norming of the BNT for bilingual populations in South Africa would also prove useful for basic research on the brain bases of language and language disorders in bilingual populations.

Furthermore, due to the differences between monolingual and bilingual speakers, the use of the BNT with bilingual speakers appears problematic. The BNT pictures are ordered in what was designed to be increasing order of difficulty for English speakers. Given the differences between bilingual and

monolingual speakers (e.g., Baker, 1995; Fishman, 1965; Grosjean, 1997, 1998; for a recent review see Roberts, 2001 as cited in Konhert et al., 1998), it cannot be assumed that the order of acquisition or order of difficulty will be the same for bilinguals as it is for unilingual English speakers. For bilingual adults, the age of acquisition and frequency of use of the words pictured in the BNT are unknown and further studies are thus required.

However the question remains; can one develop appropriate tests constructed on one language group and apply them directly to another and what level of proficiency in each language is required (Kohnert et al., 1998).

1.4.3 Urbanisation

Urbanisation is an environmental factor that affects performance on an assessment measure. According to Nell (1999), urban environments are generally rich in stimuli and are associated with more formal schooling, tertiary educations and higher levels of parental education in comparison to rural environments. Urbanisation can account for the high degree of acculturation that was seen amongst the black racial groups post apartheid in South Africa (Ratele and Duncan, 2003). Both urbanisation and socioeconomic status will affect the quality of education a child receives, which is also directly related to the degree of test wiseness (Brooks-Gunn et al, 1996).

1.4.4 Education

The effect of the level of education has been found in various tests of neuropsychological functioning. Verbal fluency of African-American, Chinese, Hispanic, Vietnamese, and white individuals were seen to be directly affected by education level and age (Kempler, Teng, Dick, Taussig and Davis, 1998). Education level is found to affect not only verbal skills, but also non-verbal skills; these include for example, 'spatial memory, cancellation tasks and copying

of simple line drawings' (Lezak, Howieson and Loring, 2004, p. 315). However, increasingly it is being ascertained that the level of education attained becomes a poor predictor of test performance in countries in which the quality of education available to different race groups is not equal. (For example, Manly, 2005; Shuttleworth-Edwards et al., 2004).

Furthermore, educational levels within non-westernized groups has also been described as a poor predictor of neuropsychological test performance. Other research has found that different regions can also produce variations in quality of education recieved. In the study performed by Hanney (1992 as cited in Lezak, 1995) drew attention to the regional variations in test performance in his research, as he found that significant differences in test performance were evident in individuals from inner city versus small rural schools in the USA. The inner city test performance was found to be significantly higher, as these two school systems vary according to the quality of education reflected in different types of skills and knowledge that are imparted (Hanney, 1992 as cited in Lezak 1995).

In terms of the BNT, the paper by Hawkins and Bender (2002) in terms of a review of the psychometric properties of the BNT findings regarding the effect of education levels and performance on the BNT were fixed. Heaton, Avitable, Grant, and Mathews (1999) documented a relationship between education and the BNT score throughout the educational range. Hawkins, Sledge, Orleans, Quinlan, Rakfeldt and Hoffman (1993) also reported a relationship between education beyond twelve years and BNT performance. These findings are important to clinicians due to the fact that the BNT is widely used in both geriatric and dementia evaluations, because according to Hawkins and Bender (2002) since education declines with age of cohort, the issue is especially pertinent in these applications of the test.

In South Africa, differences in quality of education have been a particularly marked phenomenon starting when the South African government passed

legislation to ensure variations in quality of education according to race due to Apartheid. In this context, there has been a legacy of inequality in the quality of education provided to different racial groups at both primary and high school levels of education (Claassen et al., 2001). The Bantu Education Act of 1953 ensured Government control over the education system, in that there were separate and differentiated qualities of education for each of the racial groupings in the country (du Toit, 1996).

The apartheid regime lasted from 1948 to 1991 with the first democratic election taking place in 1994. During apartheid the political policy and doctrine of that time stated that different races were required to perform different 'levels' of work, and thus the majority of black South African learners were deprived of some academic subjects in favour of subjects such as gardening. The majority of black South Africans under apartheid were educated in schools run by the Department of Education and Training (DET), which acquired only 5-25% of the financial resources expended on white Afrikaans and white English first language pupils (Claassen, et al., 2001), despite representing more than 75% of South African population. Furthermore, white Afrikaans and white English first language pupils were educated in either in Private/Model C institutions (Kallaway, 1984). Kallaway (1984) considered Private/Model C schooling to be of a superior level while DET schooling represented a lower standard of education.

Despite the change in legislation, former DET schools continue to be affected by the legacy of apartheid. Although, in essence, the DET system no longer exists, the problems seem to have remained. In 1991, on average, Black schools in the Eastern Cape with a thousand students had only 24 teachers while an equivalent Model C School had 59 teachers. Although in 2005, both types of schools had about 31 state paid teachers, although the ex-Model C schools continue to pay about 12 additional teachers privately (Van Der Berg, 2004). South African Democratic Teacher's Union deputy Provincial chairman of the Eastern Cape, Mzolele Mvara stated that the Eastern Cape is short of 22 000 teachers (Cooper, 2004 as cited in Gaylard, 2005). According to Mvara, 80% of Eastern Cape schools do not have electricity or computers. Thus, more than fourteen years

after apartheid has ended, there remain significant discrepancies between the quality of education available to black students.

Furthermore, in the South African context, the effects of quality of education have been found in the comparison of performance on other neuropsychological tests. Recently, Grieve and Viljoen (2000) administered the Austin Maze test to 30 Vondan University students. They found a lowering of performance yet other students from a privileged University achieved better results (Gaylard, 2005). This discrepancy in performance was explained as a residual effect of disadvantaged education, where disadvantaged schools focus on rote learning (Grieve and Viljoen, 2000) rather than facilitating problem solving skills.

1.4.5 Gender

A study conducted by Moore, Miller, Andersen, Arndt, Hynes and Mose (2010) assessing gender differences in cognition in an elderly sample of individuals ($N = 88$; 38 women, 50 men) found a significant female advantage on multiple neuropsychological tests. This gender effect was reduced somewhat but remained significant when controlling for education. Their study suggests that gender differences in cognition persist into older age.

In an additional study that attempted to contrast gender differences on neuropsychological tests, the female sample tended to exhibit a greater flexibility in linguistic tasks (Weiss, Kemmler, Deisenhammer, Fleischhacker and Delazer, 2003). Women tended to be better than men in rapidly identifying matching items, a skill defined as perceptual speed. Common linguistic skills, in which females were found to be superior to males, were verbal fluency, speech articulation, grammatical skills, and use of more complex and longer sentences (Weiss et al., 2003). Morley (1957 as cited in Weiss et al., 2003) found that in childhood, females usually learn to speak earlier, they also have larger vocabularies and perform better on immediate and delayed memory recall. After puberty, when hormonal and psychosocial influences increase, the gap between boys and girls on verbal tasks widens (Weiss et al, 2003).

The study performed by Zec, Burkett, Markwell and Larsen (2007) compiled normative data for age, education and gender on the BNT. The resultant findings on gender revealed a clear and consistent, albeit non significant trend for a male advantage on the BNT across age groups and educational levels (Zec et al., 2007). Additionally the study performed by Storms, Saerens and De Deyn (2004) showed significant gender differences with the males outperforming the females.

1.5 Anomia

Anomia is defined as the “impaired ability to name objects or retrieve words” (INS Dictionary of Neuropsychology, 1999 as cited in Budd, 2007). The term anomia refers to a pathological difficulty in word retrieval and not normal difficulties in word retrieval (Budd, 2007). As mentioned previously anomia is the most common symptom of aphasia as it is found in almost all types of aphasia however, not all individuals experiencing difficulties with word retrieval are aphasic (Goodglass et al., 2001 as cited in Budd, 2007).

Although the term anomia refers to a clinical inability to retrieve words, normal individuals can experience anomia or dysnomia when they struggle to remember or find the word needed and at the same time experience a feeling of having the word on “the tip of the tongue” or TOT experience (Budd, 2007). The TOT experience was first defined by Brown and McNeill in 1966 when they indicated the experience of anomia in individuals without cognitive impairment, this was after these individuals were presented with definitions of uncommon words in a word-finding test (Budd, 2007).

Anomia has been found to exist on a continuum with the one end being normal individuals experiencing occasional intermittent TOT state and the other end being individuals with aphasic disorders and severe clinical anomia experiencing a perpetual TOT state (Budd, 2007).

1.6 Traumatic Brain Injuries and Dementia

Traumatic brain injuries, although common in motor vehicle accidents are also common in sports such as; equestrian events, gymnastics, cheerleading, gun shot wounds, fighting and falls (Zillmer and Spiers, 2001). Traumatic brain injuries manifestations range from complaints of memory difficulty, attention and concentration, as well alterations in mood (Zillmer and Spiers, 2001). These symptoms often initially remain undetected and cause difficulties when the individual returns to work or school. It can thus be assumed that the aforementioned symptoms could potentially affect one's performance on the BNT without the individual being consciously aware of the effects specifically in the undetectable early stages of the injury.

Dementia is defined as a "syndrome characterized as a decline in more than one area of mental function" (Mace, 2005. 56). A single disease or cause has yet to be attributed to the development of dementia (Zillmer and Spiers, 2001). Research has identified over fifty potential causes of dementia and among the well known are Parkinson's and Alzheimer's disease, however vascular, infectious and other toxic conditions can be implicated in the syndrome (Zillmer and Spiers, 2001). The main feature of dementia that would affect BNT test performance would be a decline in memory, and thus the individual would experience difficulty in recalling the names of the test items (Zillmer and Spiers, 2001). Therefore although the individual may be able to have a tip of the tongue experience or be able to describe the test item, according to the BNT scoring manual, unless the test item is recalled correctly the individuals test performance would be affected.

1.7 Rationale

Although the BNT is the most widely used confrontation-naming test, it cannot be assumed that the BNT is valid for populations other than the one it was

normed for (Kohnert, et al., 1998). As described previously, many factors can influence scores on the BNT; with cultural experience being one of these factors. Low scores on the BNT, in cultures other than that for which it was normed, could be due to cultural linguistic differences and not neuro-linguistic shortfalls (Kohnert et al., 1998).

As language is the verbal expression of culture, cultural bias becomes a crucial factor in scoring the BNT. Presently South Africa has eleven official languages making it the country with the most multilingualistic state policy in the world (Paxton, 2009). The specific items that South Africans struggle with, due to cultural bias, need to be identified, as a first step towards standardisation of this test in a South African population.

Research conducted, by Ferrett, Dowling, Conradie, Carey and Thomas (2010) at the University of Cape Town and Stellenbosch University, explored adapting the BNT short form for use in the South African context. They used a sample of English, Afrikaans and isiXhosa respondents between the ages of 7 and 25. This study will make use of respondents from English, Zulu and Sotho speaking backgrounds as these language/culture groups are dominant in the Johannesburg region and this is a starting point to discover the way in which South Africans perform on the BNT and whether this performance is influenced by cultural bias.

CHAPTER 2

METHODOLOGY

2.1 Aims of the Study

This study firstly aims to investigate cultural bias on item response of the BNT in a South African sample comprising of 3 culture groups, English, Zulu and Sotho. It will do so by comparing these groups to a Canadian sample. The second aim of the study is to identify the specific items that are problematic within this English, Zulu and Sotho sample. The third aim of the study is to identify the items involved in cultural bias in the Boston Naming Test when used in these three cultural. The fourth aim of the study is to explore the differences between item response between male and female respondents. A further two aims were added to the study, namely, to explore whether there was a difference in item response between monolingual and bilingual respondents and to identify common responses given by respondents.

2.2 Research questions

1. Is there a difference between the Canadian sample and the South African sample as a group in terms of overall scores which will indicate item bias?
2. Which are the specific items of the Boston Naming Test that are problematic within the three South African groups in terms of cultural bias?
3. In addition, what are the common responses given for items by the respondents?
4. Is there a difference between the English, Zulu and Sotho cultural groups with regards to item response?
5. Does any difference exist in terms of item response between male and female respondents?
6. Does any difference exist in terms of item response between monolingual and bilingual respondents?

2.3 Sampling

The sample consisted of 116 first year students which were drawn from the University of the Witwatersrand. Initially it was proposed that the sample would consist of first year psychology students however at the time of the sampling a departmental decision was made that first year psychology students have been participating in too many research projects. Therefore the researcher was obliged to use a sample consisting of a wider range of first year students at the University of the Witwatersrand.

The sample was drawn using convenience and purposive sampling. Convenience sampling is a nonprobability method whereby respondents will be selected according to their availability and willingness to participate (Gravetter and Forzano, 2006). Nonprobability sampling is effective as it aids the researcher in generating theory and a wider understanding of the social process (Gravetter and Forzano, 2006). A convenience sample involves a group of individuals that is accessible and available to the researcher (Fink, 2003). This method of sampling was used with regards to the students accessed, as the researcher was able to access students at the University of the Witwatersrand with ease. Convenience sampling has been criticized as being a weak form of sampling as the researcher makes no attempt to know the population. It is however, the most common form of sampling used by researchers as it is inexpensive, and takes less time to gather the desired sample (Gravetter and Forzano, 2009).

The second method of sampling used by the researcher was one of purposive sampling. This method of sampling is a non-probability procedure of sampling and involves the researcher selecting the sample based on his or her judgement of what elements will aid the investigation (Adler and Clark, 2008). Purposive sampling requires the researcher to think critically about the parameters of the population and choose the sample based on these parameters (Silverman, 2010). The researcher utilized purposive sampling strategies when selecting the

respondents so as to ensure that only English, Zulu and Sotho first year students were used.

2.3.1 Selection Criteria

Respondent selection was guided by the following criteria:

1. The respondents were between the ages of 18-21years.
2. The respondents were first year students attending the University of the Witwatersrand.
3. The respondents' home language was English, Zulu or Sotho.
4. Respondents were included in the sample on the basis that they had no neurological deficits such as neurological disease, dementia, brain damage or having suffered from a stroke.

2.3.2 Accessing the respondents

The researcher approached students in a communal area during their lunch hour. The researcher verbally explained the study to the respondent and invited them to participate. It was explained that the participation is voluntary and that the respondent would not be advantaged or disadvantaged in any way for participating and that they were free to decline or leave at any time. The researcher explained to the respondents that their responses were confidential as no identifying information was requested. The respondents were asked three questions, their home language, what year of studying they were in and their age. If the students responded by saying that they were English, Zulu or Sotho, between the ages of 18 and 21 and that they were in their first year the researcher included them in the study. The respondents were then requested to read and sign a written consent form.

2.3.3 Profile of the respondents

The respondents were aged 18-21 with the mean age being 19.3 years. The age of the sample was selected so as to discard factors of age and level of education obtained by respondents. A profile of the respondents is illustrated in table 2.3.3 below.

Table 2.3.3 Profile of the respondents

Age in Years	Age Frequency	Gender Frequency		Home Language Frequency			Frequency of Bilingualism	Frequency of Monolingualism
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
		Male n=56	Female n=60	English n=41	Zulu n=43	Sotho n=32		
18	28%	27%	30%	22%	33%	31%	36%	64%
19	30%	30%	30%	27%	30%	34%	49%	51%
20	20%	13%	27%	34%	12%	13%	35%	65%
21	22%	30%	13%	17%	25%	22%	44%	56%

2.4 Measures or Instruments

The 60-item Boston Naming Test developed by Kaplan et al. (1983) was administered to all respondents. As mentioned earlier, the BNT is an established test used for assessing deficits in naming associated with neuropathological conditions (Lichtenberg, 1998). The BNT involves verbally identifying a visually presented stimulus (Murray, 1994). There are currently three versions of the BNT being used in assessment. The original version was published with 85 items (Kaplan, Goodglass and Weintraub, 1978 as cited in Lichtenberg, 1998). This version is now known as the 85 item experimental version of the BNT. The 60 item version was derived from the 85 item version and is currently the most commonly used version of the BNT (Butler, Terzlaff, and Vanderploeg, 1991).

Kaplan, Goodglass and Weintraub (1983) devised the 60 item BNT by using 60 of the 85 original drawings and rearranging them. The third version of the BNT was created by Huff, Collins, Corkin and Rosen in 1986 and consists of 42 items (Murray, 1994). The three versions of the BNT correlate with each other with r values ranging between 0.92 and 0.96 which is significant at the .001 level (Thompson and Heaton, 1989). The 60-item version of the BNT relies on normative data derived from small groups of subjects that were poorly stratified (Murray, 1994).

Moderate to high levels of internal consistency ($\alpha = 0.78-0.96$) and of test-retest reliability ($r = 0.62-0.89$), when retested after approximately one year have been found for the 60 item BNT (Strauss et al. 2006). The BNT has also shown good convergent validity with measures such as the Visual Naming Test of the Multilingual Aphasia Examination ($r = 0.76-0.86$) (Strauss et al. 2006). However, this test has not been standardised on a South African population. The present study hopes to contribute towards the start of this process.

The BNT is administered individually with patients being presented with pictures, one picture at a time. The patients are then requested to name the pictures (Kaplan, et al., 1983). The level of difficulty increases as the test progresses. Most individuals who are assessed using the BNT obtain high scores on the test; it is because of this that the BNT does not discriminate well between scores at the higher levels (Strauss, et al., 2006). However, low scores are effectively identified. Patients obtaining low scores on the BNT can be said, with confidence, to have some form of deficit in naming ability (Strauss, et al., 2006).

2.5 Research Design

The present research is largely non-experimental in nature and employs a cross-sectional, quantitative method of research design. The research design used in this study was a non-experimental ex post facto. It is non-experimental as no

Independent Variable (IV) was manipulated and there was no control group. It is ex post facto as both language and culture are pre-existing variables and cannot be manipulated. There was therefore no random assignment to a control or experimental condition. The IV (being a South African citizen) already exists and therefore couldn't be manipulated. It was a cross-sectional and between subjects design because measurement took place at once only and comparisons were made between respondents. Groups were compared against pre-existing norms.

The present study makes of a cross-sectional design which measures the respondent's behaviour at one specific time and place and allows for comparisons to be made between the research subjects. Although this method of design has been critiqued as preventing the opportunity to compare one measure to another in order to determine growth or development; it remains the most practical form of analysis (Murphy and Davidshofer, 1998)

Furthermore, a quantitative research design was chosen. This design is a formal, objective, systemic process involving rigidity in implementation generating scientific knowledge (Burns and Grove, 2003). It utilizes a numerical representation and manipulation of observations so as to describe certain phenomena (Babbie and Mouton, 1998). This method of data collection allowed the researcher to describe and study variables and to examine relationships between variables. "Quantitative research reflects the traditional scientific approach to problem solving. It assumes that there is a single reality that can be broken down into variables. Identifying and isolating variables can establish cause and effect relationships. The purpose of this type of research is to test hypotheses that have been developed before the research project started and to form conclusions that can be generated to other situations. The emphasis in this approach is on measurement, comparison and objectivity" (Creswell, 1994, p. 27).

2.6 Procedure

Ethical clearance was obtained from the Human Research Ethics Committee of the University of the Witwatersrand. Although permission from the head of department and the various lecturers was sought (Appendix B and C), sampling was actually undertaken as a wider sample due to the difficulties previously discussed point 2.4. Students were approached at a student communal area at the University of the Witwatersrand where they were approached with the following questions:

1. What is your first language?
2. Are you in first year?
3. Are you between the ages of 18 and 21?

If the respondents answered that their first language was English, Zulu or Sotho, and answered yes to the next two questions, they were invited to participate in the study as discussed in point 2.4.1.

The respondents were assessed individually for 3 minutes and informed that they could answer in the language they felt most comfortable with. Respondents were then requested to name each item presented to them. The answers to the BNT were recorded by the researcher and scored. All responses were scored according to the standard single-word scoring key presented in the BNT response booklet. Basal and ceiling levels were ignored and all 60-items will be administered to each respondent.

2.7 Ethical Considerations

Ethical considerations were strictly adhered to. Ethical clearance was obtained from the Human Research Ethics Committee of the University of the Witwatersrand. (Appendix A) An information sheet informing the respondents about confidentiality, test administration, the right to participate or not, with or without negative consequences as well as a discussion in terms of what will

ultimately happen to the results was presented to all respondents when they were invited to partake in the study. A consent form was then presented to the respondents and they were requested to sign it (Appendix E)

2.8 Data Analysis

Data analysis is *“the process of bringing order, structure, and meaning to the mass of collected data”* (Rossman and Rallis, 2003, p. 278). In order to test whether the parametric assumptions were met, Kolmogorov-Smirnov and Shapiro-Wilk tests of normality were performed. These indicated that parametric assumptions were not met. The central limit theorem states that when an infinite number of successive random samples are taken from a population, the distribution of sample means calculated for each sample will become approximately normally distributed (Rossman and Rallis, 2003). Due to the limited sample size in this study, a normal distribution was not achieved, hence non-parametric analyses were run.

Once the researcher scored the responses given by the respondents, a Wilcoxon signed rank test was carried out with the mean for Canadian adults aged 23-34 as stated by Tombaugh and Hubley (1997) as the comparison mean to the South African responses. The Tombaugh and Hubley (1997) norms were selected because they are the most widely used norms for young adults (Strauss, et al. 2006 and Barker-Collo, 2001). There were considerations that were made with regard to the usage of the Tombaugh and Hubley (1997), norms in this study. Firstly, these norms are used for people older, age 25-34, than that of the sample group, approximately aged 18-21. This slight age discrepancy poses no foreseeable problem for the current study. The age of the sample was selected so as to discard factors of age and level of education obtained by respondents. Secondly, these norms are from Canadian populations and not American, where the BNT was developed. It may be argued that this could affect the performance of the Canadians on the BNT due to the geographical regions differing and this affecting performance on the BNT (Strauss, et al., 2006). Barker-Collo (2001)

found that, although the Canadian culture differs from the American, they are similar enough to ensure there isn't a significant effect on performance on the BNT. She supported this claim by finding statistics indicating that there was no significant difference between the performance of the Canadian samples and the Americans on the BNT (Barker-Collo, 2001).

Because a significant difference was found between the South African and Canadian samples, the error rates for each item was compared between the two groups. Error rates are discussed in terms of percentage of correct response for each item. Significance of the difference between error rates were assessed using a two tailed z test for proportion. Large discrepancies between the error rates for the South African sample and the Canadian sample on certain items indicated cultural bias of those items towards South Africans as a whole. Common responses given by respondents were measured in terms of percentages for each item.

The Kruskal-Wallis signed rank test was applied to determine differences between the English, Zulu and Sotho language groups in terms of item response.

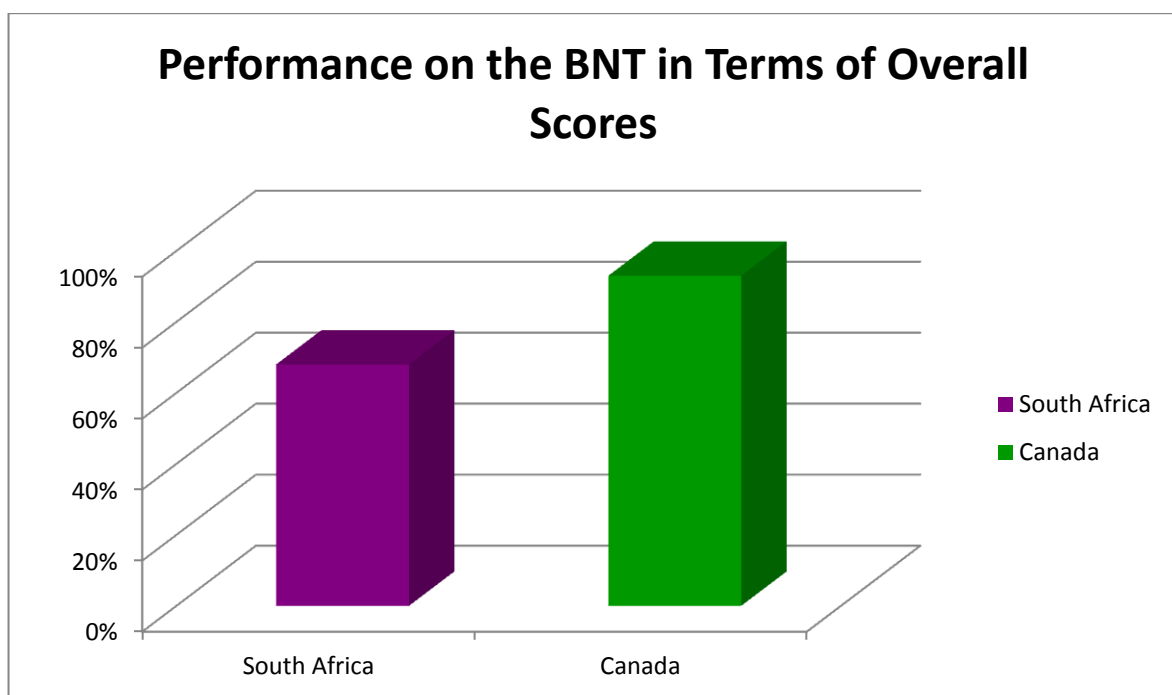
A non-parametric two sample t-test (Kruskal-Wallis) was carried out between male and female respondents to explore whether any differences existed between item responses. An additional two sample t-test was carried out between monolingual and bilingual respondents to explore whether any differences existed between item responses.

CHAPTER 3

RESULTS

3.1 Results for Research Question 1: Is there a difference between the Canadian sample and the South African sample as a group in terms of overall scores?

Graph 3.1: Depicting Differences between Canadian and South African Samples' Performance on the BNT



A significant difference between South African and Canadian samples in terms of item response was indicated by t-testing as demonstrated in Graph 3.1. The mean score for the South African sample (n=116) as a whole is 40.89 with a

lower confidence limit of 38.87 and an upper confidence limit of 42.92; Standard Deviation (*S.D.*) = 11.01. The result for the one sample t-test carried out on the group as a whole are: $t(115) = -14.778$; $p < .000$.

A statistically significant effect size, $d=1.37$, was found between the Canadian and South African respondents as measured by Cohen's d (a measure or index of how big the difference is between two means). This is an indication of the exceptionally large difference between the mean of the present sample and the mean of the Canadian sample. This also indicated that the difference between the means is not only statistically significant but it is practically significant too. The results indicate that there is a significant difference between the two countries with the Canadian having increasingly higher scores than the South African sample.

3.2 Results for Research Question 2: Which are the specific items of the Boston Naming Test that are problematic within the three South African groups in terms of cultural bias?

In order to assess the relevance of the items of the BNT in the South African context, the percentage of correct responses for each item were compared between the South African and Canadian samples. The results of this test serve to highlight problematic items in the unstandardised test. To do this, percentage values for correct responses were converted to proportions and assessed in a two-tailed z test for proportion. The results yielded are presented in table 3.2. An alpha level of 5% was used. Where z-values exceeded +/- 1.96 item differences were considered significant. Table 3.2 presents the percentages of correct responses in each group, the z value and whether or not there was a significant difference between the values.

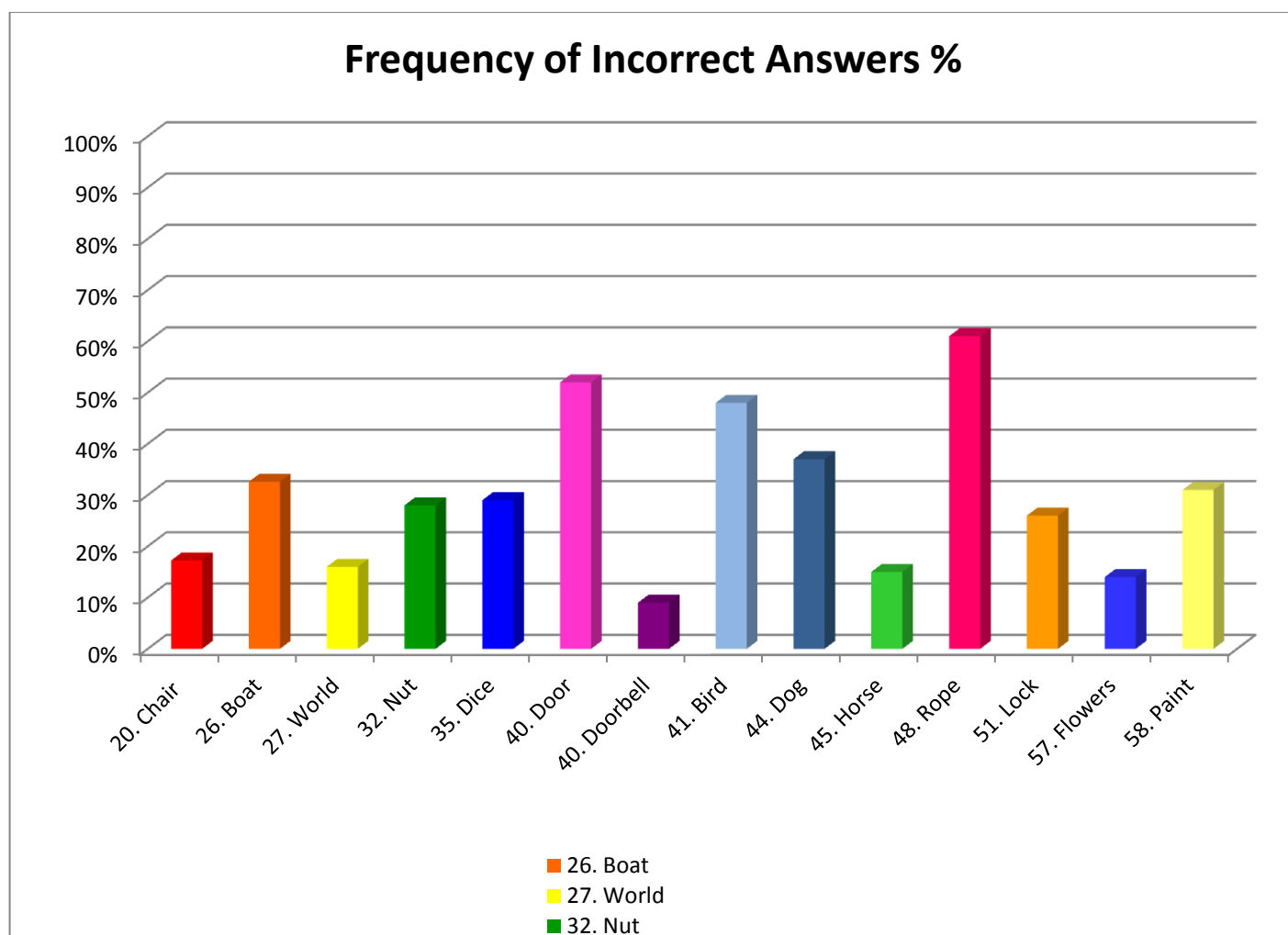
Table 3.2 depicting significant differences in item response between the South African and Canadian samples.

	Canada Percentage	South Africa Percentage	Z	Significant
01. Bed	1	0.9652	2.777	Yes
02. Tree	1	0.9828	1.946	No
03. Pencil	1	0.9397	3.672	Yes
04. House	1	0.9224	4.179	Yes
5. Whistle	0.9954	0.9224	3.733	Yes
06. Scissors	1	0.9914	1.374	No
07. Comb	1	0.9483	3.395	Yes
08. Flower	1	0.9828	1.946	No
09. Saw	1	0.8707	5.444	Yes
10. Toothbrush	1	0.931	3.934	Yes
11. Helicopter	0.9909	0.9138	3.613	Yes
12. Broom	1	0.9655	2.765	Yes
13. Octopus	0.8995	0.8879	0.330	No
14. Mushroom	0.9954	0.9655	2.145	Yes
15. Hanger	1	0.9741	2.392	Yes
16. Wheelchair	1	0.9914	1.374	No
17. Camel	0.9909	0.9655	1.668	No
18. Mask	0.9863	0.9914	-	No
19. Pretzel	0.9224	0.5345	8.265	Yes
20. Bench	0.9994	0.8276	6.295	Yes
21. Racquet	1	0.8993	4.780	Yes
22. Snail	0.9543	0.9741	-	No
23. Volcano	0.9772	0.9397	1.758	No
24. Seahorse	0.8493	0.9051	-	No
25. Dart	0.9863	0.7155	7.614	Yes
26. Canoe	1	0.6379	9.522	Yes
27. Globe	0.968	0.6997	7.067	Yes
28. Wreath	0.9954	0.3448	13.46	Yes
29. Beaver	0.9772	0.431	11.63	Yes
30. Harmonic	0.968	0.3793	12.07	Yes

31.Rhinocero	0.8995	0.9483	-	No
32.Acorn	0.9361	0.5172	8.972	Yes
33.Igloo	0.9909	0.7152	7.846	Yes
34.Stilts	0.9498	0.6379	7.442	Yes
35.Dominoes	0.9087	0.6035	6.682	Yes
36.Cactus	1	0.7069	8.452	Yes
37.Escalator	0.9909	0.8103	6.098	Yes
38.Harp	0.9726	0.7069	7.135	Yes
39.Hammock	0.9406	0.5172	9.116	Yes
40.Knocker	0.9771	0.1724	15.26	Yes
41.Pelican	0.9269	0.3879	10.70	Yes
42.Stethosco	0.9498	0.681	6.681	Yes
43.Pyramid	0.968	0.8707	3.420	Yes
44.Muzzle	0.9269	0.4224	10.17	Yes
45.Unicorn	0.9132	0.6983	5.089	Yes
46.Funnel	0.9589	0.8017	4.657	Yes
47.Accordion	0.8174	0.25	10.18	Yes
48.Noose	0.9132	0.2586	12.28	Yes
49.Asparagus	0.9361	0.5086	9.109	Yes
50.Compass	0.6895	0.6207	1.27	No
51.Latch	0.8082	0.2414	10.12	Yes
52.Tripod	0.895	0.4397	9.009	Yes
53.Scroll	0.9269	0.5517	8.122	Yes
54.Tongs	0.8447	0.3103	9.821	Yes
55.Sphinx	0.758	0.4655	5.364	Yes
56.Yoke	0.6301	0.0776	9.695	Yes
57.Trellis	0.7717	0.0948	11.82	Yes
58.Palette	0.6895	0.3017	6.795	Yes
59.Protracto	0.3973	0.7328	-	Yes
60.Abacus	0.5753	0.5431	0.565	No

3.3 Results for Research Question 3: What are the common responses given for items by the respondents?

Graph 3.3: Bar graph depicting frequency of incorrect but associated responses given by respondents.

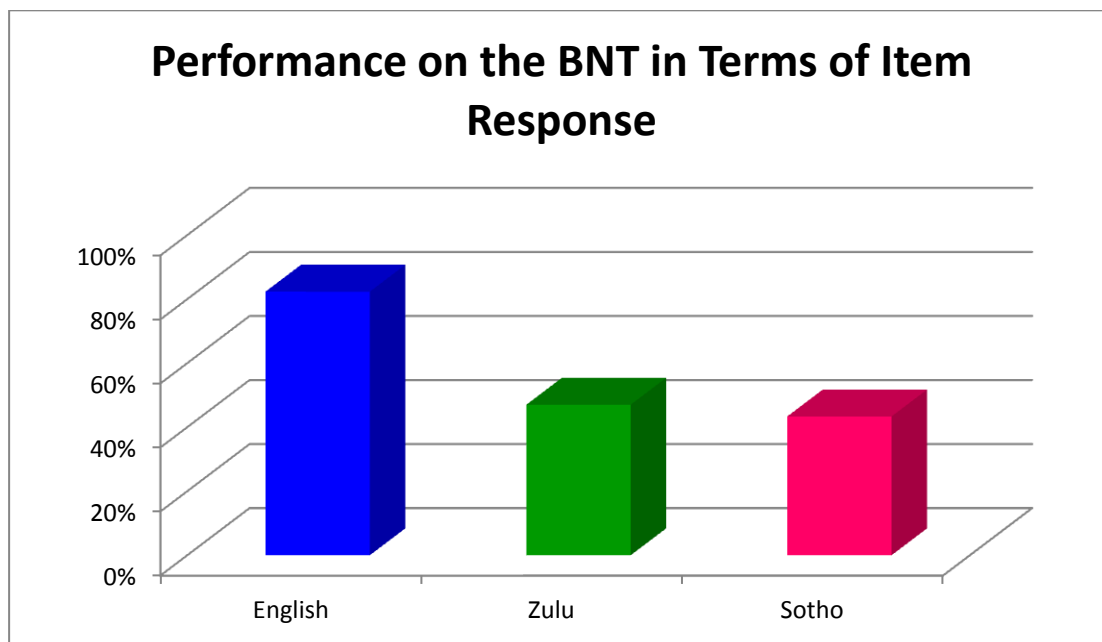


Although not a specific research question outlined in the current study, the results showed an interesting pattern in terms of the frequency of alternate responses provided by the South African sample when compared to the standardized answers as deemed correct by the BNT scoring manual. 17% of the sample responded with “chair” instead of “bench” on item 20; 33% responded “boat” for “canoe” on item 26; 16% responded “world” for “globe” on item 27; 28% responded “nut” for “acorn” on item 32; 35% responded “dice” for “dominoes” on item 35; item 40 presented difficulties for the respondents with 52% of them responding “door” and 9% responding “doorbell” for “knocker”; 48% of respondents responded “bird” for “pelican” on item 41; 37% responded “dog” for “muzzle” on item 44; 15% of respondents responded “horse” for “unicorn” on item 45; 61% responded “rope” for “noose” on item 48; 26% responded “lock” for “latch” on item 51; 14% responded “flowers” for “trellis” on

item 57 and finally 31% of the respondents responded “paint” for “palette” on item 58 as can be seen in Graph 3.3.

3.4 Results for Research Question 4: Is there a difference between the English, Zulu and Sotho cultural groups with regards to item response?

Graph 3.4. Differences between English, Zulu and Sotho respondents in terms of item response.



The Kruskal-Wallis test revealed significant differences between the groups' scores. It was therefore important to assess where the differences in groups arose. Post hoc testing was therefore conducted.

Results from the pairwise post hoc comparisons between language groups show some significant differences. This difference between the groups' performances is significant when comparing Zulu to English, as well as Sotho to English students as can be seen in Graph 3.4. In both cases, the English sample scored significantly higher results on the BNT. There was, however, no significance in the difference between the test performance of the Zulu and Sotho respondent groups. The results of this analysis are depicted in Table 3.4 below.

Table 3.4. Depicting differences between English, Zulu and Sotho respondents in terms of item response.

Sample	Test Statistic	Standard Error	Standard Test Statistic	Significance	Adjusted Significance
Sotho-Zulu	3.691	7.845	.471	.638	1.000
Sotho- English	39.010	7.926	4.922	.000	.000
Zulu-English	35.319	7.335	4.815	.000	.000

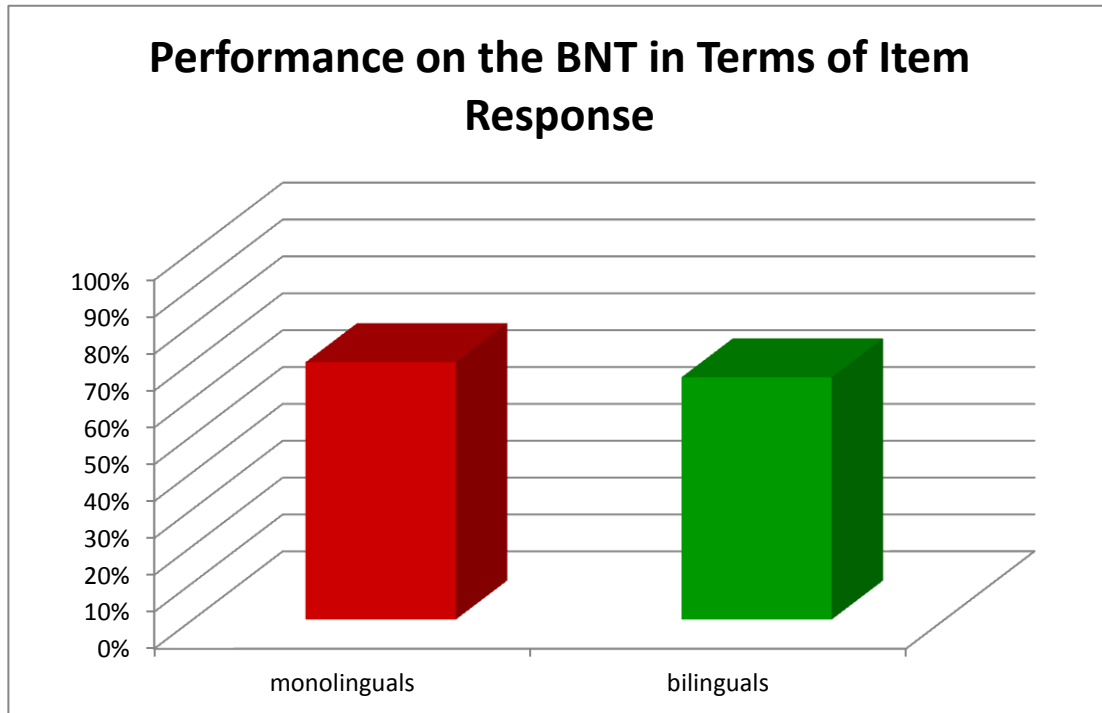
Table 3.4 thus illustrates the difference in test performance when the three language groups are compared. Significant differences are indicated in yellow. Significance was found at the .05 confidence level between the English and Zulu respondents as well as between the English and Sotho respondents. This was expected as, in this South African sample; the monolingual group was only composed of English individuals and as discussed previously, their exposure to education was expected to be greater than non-English South Africans.

3.5 Results for Research Question 5: Does any difference exist in terms of item response between male and female respondents?

Results from the independent samples Kruskal-Wallis one-way analysis of variance indicated that no statistically significant difference was found between the male and female respondents. The test produced a p-value of 0.734 and as result, at a 5% level of significance, it is understood that the difference in scores between male and female respondents was non-significant. Although the male respondents, as a group, scored higher than the female respondents as a group, the difference was not statistically significant.

3.6 Results for Research Question 6: Does any difference exist in terms of item response between monolingual and bilingual respondents?

Graph 3.6 Depicting differences between monolingual and bilingual respondents in terms of item response.



Although not a specific research question, the researcher felt it was important to compare the performance of monolinguals and bilinguals on the BNT as many of the respondents were bilingual (41%) refer to graph 3.6. Results from the two sample Mann Whitney u test demonstrated a significant difference ($p=0.045$) between the monolingual and bilingual respondents at the 5% significance level, with the monolingual respondents achieving higher results.

CHAPTER 4

DISCUSSION

4.1 Discussion for Research Question 1: Is there a difference between the Canadian sample and the South African sample as a group in terms of overall scores?

The results from the present study clearly indicate that the mean of correct responses in the South African sample (40.89) is significantly smaller than the mean of the Canadian sample (56). $t(115) = -14.778$; $p < .000$. This is clear evidence of the cultural bias of the BNT. Based on the results of this study and the fact that performance increases with education, it can be assumed that the average South African would achieve lower results than those in the study. It is therefore clear that the results of the BNT when administered to a South African sample are not valid. For example, one respondent in the study could only name 19 items accurately. If this respondent was being assessed by a clinician who didn't consider cultural bias as a confounding factor, they would be considered to exhibit severe anomia. However, this respondent's performance was not resulting from a neurological deficit but is due to the cultural bias of the test.

4.2 Discussion for Research Question 2: Which are the specific items of the Boston Naming Test that are problematic within the three South African groups in terms of cultural bias?

Results from the z test comparing item response between the South African and Canadian samples demonstrated statistically significant differences on several items. These items include the following "bed", "pencil", "house", "whistle", "comb", "saw", "toothbrush", "helicopter", "mushroom", "hanger", "pretzel", "bench", "racquet", "dart", "canoe", "globe", "wreath", "beaver", "harmonica",

“acorn”, “igloo”, “stilts”, “dominoes”, “cactus”, “escalator”, “harp”, “hammock”, “knocker”, “pelican”, “stethoscope”, “pyramid”, “muzzle”, “unicorn”, “funnel”, “accordion”, “noose”, “asparagus”, “latch”, “tripod”, “scroll”, “tongs”, “sphinx”, “yoke”, “trellis”, “palette”, and “protractor”.

Although overall statistically significant, the difference between the South African and Canadian groups is practically non-significant on certain items, such as “bed”, “hanger”, “broom” and “comb”. The three respondents that scored incorrect answers on the item “bed” all said sleeping. They therefore understood the picture presented to them but answered in a more abstract manner. Similarly, respondents answered “sweeper” for “broom” and “brush” for “comb” thus understanding the item presented just answering in a way that differs from the responses expected according to the BNT answer booklet. In addition, the South African sample scored significantly higher than the Canadian sample on one item, 39.7% of the Canadian respondents could name protractor compared to 73.3% of South Africans. This is the only item that is significantly higher in the South African when comparing it to the Canadian sample. The reasons for this significant difference when comparing percentages on this item are unclear. Other items where South Africans achieved higher scores than their Canadian counterparts included “rhinoceros”, “seahorse”, “snail”, and “mask”. Although these differences were not significant, discrepancies were found.

Forty items on the BNT were indicated as being inappropriate for use in a South African context. These 40 items include items such as “trellis”, “yoke”, “knocker”, “latch”, “noose”, “accordion”, “wreath”, “palette”, “tongs” and “harmonica”. These are the ten items that respondents scored the lowest. The highest of these ten items was “harmonica” which only 37.9% of the respondents were able to answer correctly. Items such as this should undoubtedly be excluded from any future South African version of the BNT. The next set of 10 items is “abacus”, “sphinx”, “tripod”, “asparagus”, “muzzle”, “pelican”, “hammock”, “acorn”, “beaver”, and “pretzel”. Out of these ten items, the highest percentage of correct responses was 54.3%.

Additional evidence of the bias of the BNT is that in the Canadian sample, the percentage of correct responses was above 90% on 50 items while in the South

African sample, only 20 items had correct responses of 90%. This is clearly unacceptable on a test on which normal respondents are supposed to achieve high scores. The BNT is meant to discriminate well among low scores- this is obviously not the case when the BNT is used in South Africa.

Furthermore, not only are the items on the BNT not appropriate for use in South Africa but additionally, the order of the items from easy to difficult does not hold either. The order appears to hold for the first 20 items, excluding one or two items. However, from then on, the order in which the items are presented gives no indication of their difficulty in a South African sample. There were certain items that appear in the middle of the test such as “wreath” and “beaver” that South Africans struggled to answer while the last two items on the test, “protractor” and “abacus” seemed to be answered with ease.

4.3 Discussion for Research Question 3: What are the common responses given for items by the respondents?

Results from the present study illustrate that certain items produced common answers (although incorrect) from the respondents. The most common alternate response given was “door” for “knocker” with 52% of the respondents answering this way. This could be explained by the fact that door knockers are not common in South Africa as it is more common to have a doorbell or intercom system. This may also be explained by the fact that knocker’s are outdated and therefore aren’t seen often by people aged 18-21, as was the case of this particular sample.

Common errors made by respondents could be seen as vocabulary errors as they were given in the correct context and indicated a clear understanding of the item presented to them, however, they were deemed incorrect according to the standardized BNT norms. Errors based on vocabulary were “chair” for “bench”; “boat” for “canoe”; “nut” for “acorn”; “rope” for “noose”; “lock” for “latch”; and “paint” for “palette”. While linguistic difficulties do affect test performance on the BNT, it appears that vocabulary is a confounding factor in the performance on the BNT. A recent South African study (Ferret et al., 2010) yielded similar

results. South Africans were found to give responses such as “boat” for “canoe”, while this is considered incorrect according to the response booklet of the BNT, it is culturally appropriate as South Africans are more familiar with the term “boat”. This was also highlighted in a study by Strauss et al. (2006) where respondents with broader vocabularies scored higher than those with limited vocabularies.

Results from other studies have found that cultural groups outside of North America perform significantly poorer on the BNT when item responses are compared. Cruice et al (2000) found that Australians had significantly lower scores when compared to North American and European respondents on the BNT. They attribute these lower scores to an inability to recognize unfamiliar items. The study done by Cruice et al (2000) is a clear indication that different cultures regard different items as important and therefore measures such as the BNT, which are traditional Western measures, include items that are unfamiliar to non-western cultures. A study by Worrall et al (1995) suggested that many of the items in the BNT are not words that are frequently used within the Australian English language and they thus suggested that the BNT requires normative data to be collected due to differing terminologies outside of North America. This was found in the preset study too where certain items were answered correctly but the terminology given by the respondents was not that in the response booklet and was therefore considered incorrect (e.g. “bird” for “pelican”).

4.4 Discussion for Research Question 4: Is there a difference between the English, Zulu and Sotho cultural groups with regards to item response?

The results from the present study show that the overall percentage of correct responses of the English respondent’s (82%) is significantly higher than that of

the Zulu (47%) and Sotho (43%) respondents. The difference between the Zulu and the Sotho respondents, albeit noticeable, is not significant. Although all respondents are enrolled at an English-speaking university, it is clear that English respondents are more proficient in English as it is their first language. As the English respondents had the most exposure to English, it was expected that their results would differ to those of the Zulu and Sotho respondents who had less exposure to the English language.

Lowenstein and colleagues (1993) found that English-language speakers achieved higher results than their Spanish counterparts (Kohert, Hernandez and Bates 1998). As mentioned in the results, many respondents in the present study were bilingual. Kohert, Hernandez and Bates (1998) state that the normative data on the BNT is limited to monolingual speakers. The BNT is ordered in such a way that the level of difficulty increases as the test progresses, but this poses a problem for bilingual speakers as the order of difficulty may be different for a person proficient in more than one language (Kohert, Hernandez and Bates, 1998).

Strauss et al. (2006) found that black Americans as well as Americans living in the Midwest achieved lower scores on the BNT. It can therefore be said that factors such as geographical region, race and level of acculturation affect performance on the BNT (Strauss, 2006). It is therefore reasonable to assume that in the present study, race is a factor that needs to be taken into consideration. The English respondents were either from a white or Indian racial background while all the Zulu and Sotho respondents were black. Whitfield et al. (2000) supported that race affected performance on the BNT when it was found that elderly white Australians performed better than black Americans on the short version of the BNT. While race is a factor in the performance on the BNT, the language related to race is a more confounding factor and is thus considered more important (Gasquoine, 1999).

4.5 Discussion for Research Question 5: Does any difference exist in terms of item response between male and female respondents?

Results from the present study indicate that although male respondents achieved overall higher results than their female counterparts, the difference was not significant. At a 5% level of significance $p=0.734$. A study conducted in 2004 by Storms et al., showed significant differences in gender with the male respondents outperforming the female respondents. However, in a more recent study by Zec et al. (2007) exploring the effects of age, education and gender on the performance on the BNT, it was found that male respondents achieved higher scores than the female respondents but that this difference in scores was not significant.

4.6 Discussion for Research Question 6: Does any difference exist in terms of item response between monolingual and bilingual respondents?

Results from the present study ($p=0.045$) indicated that there was a statistically significant difference between monolingual respondents and bilingual respondents, with the monolingual respondents performing better. As mentioned previously, a difference was expected as the monolingual group comprised of English respondents only. This is in line with evidence found by Kohnert et al (1998) illustrating that bilinguals may be at a detriment when it comes to performance on the BNT as normative data on the BNT has been limited to monolingual speakers.

The BNT pictures are designed to be in an increasing order of difficulty for English speakers. But taking into account the differences between bilingual and monolingual speakers, it cannot be assumed that the order of difficulty will be the same for bilinguals as it is for monolingual English speakers. For bilingual

adults, the age of acquisition and frequency of use of the words pictured in the BNT are unknown and further studies are thus required.

CHAPTER 5

Conclusion and Recommendations

5.1 Conclusion

This research set out to identify the items on the BNT responsible for cultural bias in a South African sample consisting of English, Zulu and Sotho first year university students. Results indicated that significant differences were found when comparing the overall scores of the South African group as a whole to that of the Canadian group. Significant differences were also found between the English and Zulu respondents as well as between the Sotho and English respondents, in terms of item response. Items responsible for cultural bias were identified and levels of significance were calculated. Furthermore, common incorrect responses given by respondents were identified. While no significant difference was found between male and female respondents, a statistically significant difference was found between monolingual and bilingual respondents with the monolingual respondents achieving higher results.

This research has found that South Africans as a group score significantly poorer scores on the BNT than the Candia sample due to cultural bias on certain items of the BNT. If the BNT is to be used in South Africa, it is recommended that the items are modified so that more culturally familiar items are included in the BNT. It is recommended that the BNT is normed and standardized for a South African population.

5.2 Potential Limitations

A potential problem for this study is that of IQ and vocabulary extent of the respondents, as this had not been controlled for in the present study. These two factors have been found to impact BNT scores quite drastically (Strauss, et al,

2006). Due to the selection criteria and that respondents were assigned accordingly, it is possible that the groups are not equivalent. As the groups were not matched according to IQ and vocabulary, it is possible that the difference in their performance owes to a difference in one or both of these factors. Although, this was out of the scope of the present study, it is worth considering in future studies.

Another potential problem is that all of the respondents in the study are highly educated, having completed 12 years of schooling. They may therefore perform better than other South Africans who are less educated. Strauss, et al (2006) found that increased levels of education are expected to increase performance on the BNT. While the respondents were highly educated and this may pose as a concern for the present study, it also strengthens the claim that the BNT is culturally biased as the respondents performed poorly regardless of their level of education. In other words, increased levels of education are not enough to combat the effects of cultural bias. Specifically, it is possible that respondents may be able to name certain items, because of their high level of education, which less-educated South Africans may not be able to name. This may lessen the apparent effects of cultural bias of the BNT in South Africa.

Finally, all the respondents were young, aged between 18 and 21. It is possible that their naming abilities differ to that of older South Africans. It has been found that older adults show poorer performance on the BNT than younger adults do (Strauss, et al., 2006). This affects the researcher's ability to generalise the results to the wider population, specifically older South Africans, this problem may be particularly telling when clinicians wish to administer the BNT to older individuals who are suspected of having dementia. The results of the present study may not be appropriate in understanding how the cultural bias of the BNT would affect their performance on the test.

5.3 Directions for Further Research

- A direction for further research would be to establish items on the BNT that are suitable for a South African sample.
- A second direction for research would be to standardize and norm the BNT for a South African population.
- Thirdly, a direction for future research is conducting a study similar to the present study with a more representative sample in terms of education and age.
- Additionally, translating and norming the BNT for other South African languages besides English is an important area of research.
- And finally a useful area of research would be creating norms for the BNT for monolingual and bilingual individuals.

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Appendices

Appendix A: Ethics Clearance Certificate

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

HUMAN RESEARCH ETHICS COMMITTEE (SCHOOL OF HUMAN & COMMUNITY DEVELOPMENT)

CLEARANCE CERTIFICATE

PROTOCOL NUMBER: MEDP/10/008 IH

PROJECT TITLE:

Performance of English, Zulu and Sotho Students on the Boston Naming Test: An investigation into the Items Responsible for Cultural Bias

INVESTIGATORS

Juliana Mendonca

DEPARTMENT

Psychology

DATE CONSIDERED

16/05/10

DECISION OF COMMITTEE*

Approved

This ethical clearance is valid for 2 years and may be renewed upon application

DATE: 19 August 2010

CHAIRPERSON 
(Professor K. Cockcroft)

cc Supervisor:

Dr. C. Gordon
Psychology

DECLARATION OF INVESTIGATOR (S)

To be completed in duplicate and **one copy** returned to the Secretary, Room 100015, 10th floor, Senate House, University.

I/we fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure be contemplated from the research procedure, as approved, I/we undertake to submit a revised protocol to the Committee.

This ethical clearance will expire on 31 December 2012

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES



Psychology

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Dear Professor Duncan,

My name is Juliana Mendonça and I am currently a Masters student in Educational Psychology at this university. In order to fulfil the requirements for my degree, I am conducting a research project exploring the cultural bias on the items of the Boston Naming Test (BNT). This is a test comprising of 60 pictures that need to be named to identify word finding difficulties. However, it has not been standardized for a South African population and may contain items that are culturally biased. I hereby request your permission to conduct this study involving approximately 80 English, 80 Zulu and 80 Sotho first year psychology students. The lecturers will be approached first with a request to address their students and then the students will be invited to participate in the study. The study will consist of them being assessed using the Boston Naming Test where students will be requested to name 60 items presented to them. Individual appointments will be made with the respondents in a suitable venue. Each respondent will be individually for approximately 3 minutes. Before the respondents can be assessed, they will be requested to give written consent for participation in the study.

It will be explained to them that participation in this study is voluntary and there are no positive or negative consequences for participation or not participating. There are no risks involved in this study. All responses given by the respondent will be kept confidential, as no identifying data will be used in the report. Identifying information will only be seen or heard by the

researcher and the research supervisor. Respondents will be allocated codes such as "Respondent A" so that confidentiality will be ensured. Respondents have the freedom to stop the test at any time and have the freedom to choose which items he/she is comfortable answering without any negative consequences. Once the research has been completed, the responses will be kept for six years upon completion of the study or for two years after publication. The results to this study will be made available upon request.

Your assistance in this study would be greatly appreciated as it will contribute towards the research of an under researched test in South Africa.

Kind regards,

Ms. Juliana Mendonça

Researcher

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Appendix C: Lecturer Information Sheet



Psychology

School of Human and Community Development

Private bag 3, Wits 2050, South Africa. Telephone: +27 11 717 4500/2/3/4. Fax: +27 11 717 4559

Dear Sir or Madam

My name is Juliana Mendonça and I am currently a Masters student in Educational Psychology at this university. In order to fulfil the requirements for my degree, I am conducting a research project exploring the cultural bias on the items of the Boston Naming Test (BNT). This is a test comprising of 60 pictures that need to be named to identify word finding difficulties. However, it has not been standardized for a South African population and may contain items that are culturally biased. I hereby request your permission to conduct this study involving approximately 80 English, 80 Zulu and 80 Sotho first year psychology students. The lecturers will be approached first with a request to address their students and then the students will be invited to participate in the study. The study will consist of them being assessed using the Boston Naming Test where students will be requested to name 60 items presented to them. Individual appointments will be made with the respondents in a suitable venue. Each respondent will be individually for approximately 3 minutes. Before the respondents can be assessed, they will be requested to give written consent for participation in the study.

It will be explained to them that participation in this study is voluntary and there are no positive or negative consequences for participation or not

participating. There are no risks involved in this study. All responses given by the respondent will be kept confidential, as no identifying data will be used in the report. Identifying information will only be seen or heard by the researcher and the research supervisor. Respondents will be allocated codes such as "Respondent A" so that confidentiality will be ensured. Respondents have the freedom to stop the test at any time and have the freedom to choose which items he/she is comfortable answering without any negative consequences. Once the research has been completed, the responses will be kept for six years upon completion of the study or for two years after publication. The results to this study will be made available upon request.

If you wish to assist, please complete the attached consent forms. My contact details are provided below if you need to contact me or if you have any questions or concerns.

Kind regards,

Ms. Juliana Mendonça

Researcher

082 903 0755

julianamendonca131@gmail.com

Appendix D: Respondent Information Sheet



Psychology

Dear Student

My name is Juliana Mendonça and I am currently a Masters student in Educational Psychology at the University of the Witwatersrand, Johannesburg. In order to fulfil the requirements for my degree, I am conducting a research project exploring the cultural bias on the items of the Boston Naming Test (BNT). This is a test comprising of 60 pictures that need to be named to identify word finding difficulties. However, it has not been standardized for a South African population and may contain items that are culturally biased. You are invited to participate in this study which will involve approximately 80 English, 80 Zulu and 80 Sotho speaking first year psychology students and will consist of you being assessed using the Boston Naming Test where you will be requested to name 60 items presented to you. You will be assessed individually in a prearranged venue at the University of the Witwatersrand for approximately 3 minutes. Before you can be assessed, you will be requested to give written consent for participation in the study.

Participation in this study is voluntary and there are no positive or negative consequences for participation or not participating. There are no risks involved in this study. All answers given by you will be kept confidential, as no identifying data will be used in the report. Identifying information will only be seen by the researcher and the research supervisor. You will be allocated codes such as "Respondent A" so that confidentiality will be ensured. You have the freedom to stop the test at any time and have the freedom to omit answering questions without any negative consequences. You are also free to answer the questions in the language you are most comfortable with. Once the research has been completed, your responses will be kept for six years upon completion of the study or for two years after publication at the University of the Witwatersrand. The results to this study will be made available to you upon request.

Your assistance in this study would be greatly appreciated as it will contribute towards the research of an under researched test in South Africa.

If you wish to assist, please complete the attached consent forms. My contact details are provided below if you need to contact me or if you have any questions or concerns.

Kind regards,

Ms. Juliana Mendonça

Researcher

082 903 0755

julianamendonca131@gmail.com

Appendix E: Respondent Informed Consent Form

I _____ have read the above sheet (Respondent information sheet) and understand both the nature and purpose of the research conducted and therefore agree to be assessed by Juliana Mendonça for her study.

In agreement of participation in this study, I understand that:

- Participation in this study is voluntary
- That I may refuse to answer any questions
- That I may withdraw from the study at any time

- No identifying information will be included in the research report and responses will remain confidential
- Should I request to see the results, they will be made available to me in summary
- Participation in this study involves no benefits and no negative consequences should I withdraw.

Respondent:

Researcher:

Signed: _____

Signed: _____

Date: _____

Date: _____

Appendix F: Demographic Questionnaire

Respondent A

Age: _____

Degree: _____

Gender: _____

Education level: _____

Home Language: _____

Language in Primary school: _____

High School: _____

Most Proficient Language: _____

Primary School(s) Attended: _____

High School(s) Attended: _____

Have you ever suffered from any head injury? If so, explain the specific injury below:

Have you ever suffered from a stroke?

Have you ever suffered from any other neurological disease? If so, explain the neurological disease below:

