

**Lay Persons' Perceptions of Intelligence: Students' Estimates of Their Own and Their  
Parents' Overall and Multiple Intelligences**

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## **Declaration**

I hereby declare that the work is the author's original work and that all sources have been accurately reported and acknowledged, and that this document has not previously in its entirety or in part been submitted at any university in order to obtain an academic qualification.

Boithatelo Mokoena

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## Abstract

Intelligence as a psychological construct has received vast attention from professionals and lay persons. The theory of multiple intelligences as a perspective of understanding intelligence has enjoyed extensive research. The present study took advantage of the theory of multiple intelligences as stipulated by Gardner (1983), which puts forth seven types of intelligences (verbal/linguistic, bodily – kinesthetic, musical, logical/mathematical, spatial, interpersonal and intrapersonal intelligence). The aim of the study was to investigate the relationship between these types of intelligences and gender, age and education. Participants comprised of 83 female and 75 male university students between the ages of 18 years and 50 years. Participants were requested to estimate their own and their parents' scores for the seven multiple intelligences and overall intelligence. For parents' estimates on overall and multiple intelligences, there was no statistically significant difference in those types of intelligences traditionally associated with females (musical, interpersonal, intrapersonal intelligences) and those traditionally associated with males (logical and verbal intelligences). Parents' level of education had a significant impact on their estimated levels of intelligence; those parents in the *Diploma/Degree* category were rated as statistically significantly more intelligent than those in the *No Diploma/Degree* category. The mothers in the *Diploma/Degree* category were rated as significantly more intelligent on overall, verbal, logical, spatial, musical, and interpersonal intelligences, while the fathers in the same category were estimated as significantly more intelligent on overall, verbal and logical intelligences. Future studies on lay persons' conceptions of intelligence should include more refined measures of socio-economic status and level of education. Qualitative investigations into the meaning of intelligence in different cultural contexts are also needed.

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# **CHAPTER ONE**

## **INTRODUCTION**

### **1.1. Background to the Study**

The concept of intelligence has enjoyed extensive attention for centuries in the field of psychology. As far as the written literature is concerned, conceptualisations of intelligence date back to the ancient Greeks (Sternberg, 1990). As early as the 4<sup>th</sup> century BC, Plato spoke of the relationship between intelligence and the ability to learn, while Aristotle spoke of intelligence as “quick wit” (Sternberg, 1990, p. 30). In the 18<sup>th</sup> century, Kant referred to intelligence as “the higher faculties of cognition” (Sternberg, 1990, p. 30). In more recent years, in the 19<sup>th</sup> century Spearman’s (1904) notion of the general factor of intelligence, ‘g’, emerged, while Boring (1923) suggested that “intelligence is what the tests test” (in Neisser, 1979, p. 180; Sternberg, 1990, p. 33). Gardner (1983) suggested that intelligence is more than a single entity but rather it has multiple components to it and individuals possess these different components at different strengths. The current research focused mainly on Gardner’s (1983) theory of multiple intelligences.

### **1.2. Controversies around Intelligence**

#### **1.2.1. Defining intelligence**

The greatest controversy in psychology has been the subject of intelligence (Sternberg, 1990). To date different views on what constitutes intelligence persist. Over the years the work of Spearman influenced many (Boring, 1923; Jensen, 1969; Binet & Simon, 1916 & Stanford & Binet, in Sternberg, 1990) to accept the view that intelligence is comprised of a single factor, ‘g’ – the general factor (Spearman, 1904). These researchers were influenced amongst others, by Spearman to develop tests to assess the level of this factor in individuals, or to embark on cross-racial research based on ‘g’. Spearman described the general factor as the single essential entity that underlies all intellectual performances and behaviours (Taub & Hayes, 2000). This common view or derivative thereof led to the invention of tests of intelligence, which also led to the attempt to quantify intelligence in terms of Intelligence Quotient or IQ score. The more tests were developed, the more the controversy brewed surrounding what intelligence is.

The definition of intelligence based on the Intelligence Quotient has come to be better known as the psychometric point of view. This view seeks to measure specific, identifiable mental abilities (Eysenck, in Eysenck & Kamin, 1981) of the individual that may possibly be quantifiable to a single digit (IQ score) that indicates the individual's level of intellectual ability.

The view that intelligence has multiple components stands in contrast to the psychometric view. Those propounding that intelligence has multiple components argue that intellect involves the individual's ability to adapt to his or her immediate environment in a manner that is culturally acceptable (Gardner, 1983). This approach challenges the universalised, notion of general intelligence that is Spearman's (1904) 'g' factor.

Neisser (1979) adopts Eleanor Rosch (1978) and associates' concept of analysis in defining intelligence. The analysis includes the categorising of objects and events "...of the ordinary environment..." (Neisser, 1979, p. 181) in order to form definitions of the objects or events. In her analysis Rosch (1978, as cited by Neisser, 1979) uses categories to define or identify objects and events. The main characteristics of these are: "...absence of decisively defining features, existence of 'best' or 'prototypical' instances as well as marginal ones, hierarchical arrangements of categories with one level being 'basic' and various special characteristics of that basic level" (Neisser, 1979, p. 181). According to Neisser (1979) "...our confidence that a person deserves to be called 'intelligent' depends on that person's overall similarity to an imagined prototype, just as our confidence that some object is to be called [a] 'chair' depends on its similarity to prototypical chairs" (p. 185). The definitive criteria for intelligence are difficult to establish; two people may both be very intelligent yet have a few characteristics in common. These two people represent the same prototype equally well but at differing magnitudes (Neisser, 1979). From this Neisser deduced that "... there is no such quality as intelligence, any more than there is such a thing as chairness" (Neisser, 1979, p. 185). A holistic singular approach towards defining intelligence is not only challenging but possibly impossible as a number of factors may be of influence in defining an 'intelligent person' and subsequently intelligence. These factors could include but not be limited to, for example, the individuals' culture, as different cultures inform differing beliefs of what constitutes intelligence.

To conclude, definitions of intelligence vary greatly. As a construct intelligence has various conceptions and understandings. From a traditional, psychometric point of view intelligence

may be understood to be a fixed general ability that is mainly deemed important within the educational setting. This ability may also be quantifiable in the form of standardized tests of ability. A more contemporary view of intelligence involves theories that define intelligence more broadly and consisting of a variety of competencies and abilities that are important in various aspects of an individual's life. Gardner and Hatch (1989) define intelligence as being “the capacity to solve problems or to fashion products that are valued in one or more cultural settings” (p. 5). Gardner's approach accounts for culture as being the fundamental component to intellectual development as different cultures value certain competencies over others.

### **1.2.2. Nature of intelligence**

The debate on intelligence has also focused on its nature. Theorists, psychologists and researchers have investigated intelligence “... in terms of the functioning of genes...” (Sternberg, 1985, p. 343), suggesting intelligence is an inherited portion of the individuals' cognitive abilities (Sternberg, 1985). This inherited portion explains the degree of variance in intellectual abilities between individuals (Eysenck & Kamin, 1981). On the other hand, there is the view that intellectual abilities are formed predominantly by their environmental surroundings. A person's environment may either assist the development or hinder the development of one's optimal level of intelligence. This is generally known as the nurture-nature debate (Sternberg & Grigorenko, 1997); this debate is not the major focus of the current study.

### **1.3. Theories of Multiple Intelligences**

Over the years there has been a shift in the conceptualisation of intelligence as a single entity to incorporate theories of multiple intelligences. Amongst these are, Thurstone's (1938) view of intelligence as Primary Mental Abilities (Gardner, Kornhaber, & Wake, 1996); Sternberg's Triarchic Theory of Human Intelligence (Sternberg, 2004); and Gardner's theory of Multiple Intelligences (Gardner, 1983). While recognising the importance of other approaches to multiple intelligences, it is Gardner's (1983) theory of multiple intelligences that is the major focus of this study. At the first publication of the theory of multiple intelligences in 1983, Gardner afforded theorists, researchers, psychologists and psychometrists an attempt at conceptualising intelligence universally through the use of his intelligences subtypes. Gardner introduced his theory as one which considers individuals in their natural habitat –

their cultural context, which informs their belief systems and ways of living (behavioural patterns). Gardner suggests that individuals' intellectual capacity may be determined "... by how one solves complex problems, analyse patterns or synthesizes disparate pieces of information" (Gardner, 2002, p. 139). In each culture individuals are afforded with opportunities in which they may develop these skills, through interaction with the physical environment and the unique experiences of every culture.

These intelligences subtypes as described by Gardner are: *linguistic* or *verbal*, which refers to the ability to use words, whether spoken or written including "...the ability to learn languages..." (Furnham *et al.*, 2002, p. 3); *logical-mathematical*, the ability to reason logically and "...solve maths problems and investigate issues scientifically" (Furnham *et al.*, 2002, p. 3); *spatial* intelligence, involving "...sensitivity to colour, line, shape, form, space, and the relationships that exist between these elements. It includes the capacity to visualize, to graphically represent visual or spatial ideas, and to orient oneself appropriately in a spatial matrix" (Noruzi, 2010, p. 119); *bodily-kinetic* intelligence enables one to manipulate objects and fine tune physical skills (Shaffer, 2011); *musical* intelligence refers to the ability to perceive and create rhythmic patterns; this extends to showing "...marked sensitivity to pitch, melody, rhythm, and tone" (Shaffer, 2011, p. 13); *interpersonal* intelligence is the ability to understand other people by being able perceive, distinguish and respond adequately to "... the moods, intentions, motivations, and feelings of other people. This can include sensitivity to facial expressions, voice, and gestures" (Noruzi, 2010, p. 120); and *intrapersonal* intelligence refers to individuals' ability to understand themselves, by forming a "... accurate perception of self. Additionally, that person has the knowledge in planning and directing another's life" (Shaffer, 2011, p. 12). The differing levels of importance of these subtypes by various cultures result in these cultures presenting in divergent perceptions of intelligence. Gardner suggested that these intelligences "...each [follow a] somewhat different developmental [pathway]" (Weinberg, 1989, p. 99). For example, verbal/linguistic intelligence is said to "...require a period of apprenticeship and imitation" (Weinberg, 1989, p. 99) in order to fully develop.

To understand how these forms of intelligence manifest themselves, Gardner suggested that it is important to study individuals' interactions with others in their daily environment, rather than the "...IQ testing room" (Weinberg, 1989, p. 99). The current study followed Gardner's suggestion by studying students' daily interactions with persons in their immediate environment (their parents). These interactions are translated in the form of evaluations. The

participants (university students) rated theirs and their parents' level of intellect based on Gardner's seven types of intelligence and general or overall intelligence, 'g'.

#### **1.4. Research on Multiple Intelligences**

Research studies on multiple intelligences based on Gardner's intelligences subtypes and /or general intelligence (IQ scores) have generally been interested in lay people's understanding of intelligence (Furnham & Baguma, 1999; Furnham, Clark, & Bailey, 1999; Furnham, Hosoe, & Tang, 2002; Furnham, Tang, Lester, O'Connor & Montgomery, 2002; Furnham, Reeves, and Budhani, 2002; Neto & Furnham, 2006). Often, subjects (university or tertiary level students) are required to estimate their level of intelligences. Other studies extend these ratings to parents, siblings or partners (Furnham & Chamorro-Premuzic, 2005; Neto, Furnham & Pinto, 2009; Swami, Furnham, & Kannan, 2006; Swami, Furnham & Zilkha, 2009). The analysis involved may include comparisons between genders, cultures, or birth order. Other researchers have been interested in correlating various studies of a similar nature to obtain an overview of a given population's rating patterns. Cross-cultural studies on self-estimates of multiple intelligences suggest that some cultures believe to have particular superior abilities over others. For example, American subjects rated themselves higher on spatial intelligence than the British in a study conducted by Furnham, Tang, Lester, O'Connor and Montgomery (2002). In another study by Furnham, Hosoe, and Tang (2002), Americans rated their overall IQ the highest with an average of 108.73, followed by the British with an average score of 106.78, and the Japanese with an average score of 101.73. Generally, males tend to be consistent in ratings themselves higher than females, specifically on mathematical and spatial intelligences (Furnham *et al.*, 2002; Furnham, Clark & Bailey, 1999).

The above-mentioned findings can be attributed to implicit theories of intelligence (Wambugu, 2006). Wambugu (2006) further suggests that "...peoples' thoughts and actions in relation to intelligence are governed by personal definitions of intelligence and beliefs about how to advance and evaluate intelligence..." (p. 1). These beliefs and conceptualisations of intelligence contribute to self-ratings of intelligence, suggesting that males tend to have more positive understandings of their own intellectual abilities compared to women. It may also be considered that traditional "...sex roles, rather than sex differences..." (Furnham, Clark, & Bailey, 1999, p. 255) may be accountable for the



repeatedly reflected findings of males rating themselves higher than females (Furnham, Clark, & Bailey, 1999). Due to the culturally stereotyped masculinity and femininity roles in which males and females are socialized into, those subscribing to the "... feminine cultural stereotypes tend to [underestimate] their own intelligence" (p. 255) as modesty is often a desired and socially rewarded characteristic in females.

### **1.5. Research Problem and Hypotheses**

This research study tested the following hypotheses:

1. How do Black African university students rate their overall and multiple intelligences compared to those of their parents?
  - a. *HO*: There are no differences in the way Black African university students rate their own and their parents' general ('g') and multiple intelligences;
  - b. *HI*: University students will estimate their general ('g') and multiple intelligences to be higher than their parents'.
  
2. Do students' ratings of the overall and multiple intelligences of their parents differ according to the gender of the parents as well as the gender of the students?
  - a. *HO<sub>1</sub>*: There will be no differences in the students' ratings of their parents' overall and multiple intelligences that could be attributable to the gender of the parent being rated;
  - b. *HI<sub>1</sub>*: University students' ratings of their parents' general and multiple intelligences will differ depending on the gender of the parent being rated;
  - c. *HO<sub>2</sub>*: There will be no differences in male and female students' ratings of their parents' overall and multiple intelligences;
  - d. *HI<sub>2</sub>*: Male and female students will differ in their ratings of their parents' general and multiple intelligences.
  
3. Are male students self-estimates of their multiple intelligences higher than female students' self-estimates?
  - a. *HO*: There will be no difference in male and female students' self-ratings;

- b. *HI*: Male students' self-estimations will be higher than those of female students.
  
- 4. What is the relationship between parental level of education and their ratings by the students on the multiple intelligences proposed by Gardner?
  - a. *HO*: There is no relationship between parental level of education and their ratings by students on multiple intelligences;
  - b. *HI*: As parents level of education increase so will their ratings on the multiple intelligences.

### **1.6. Justification of Study**

Implicit theories of intelligence are those theories that are situated in people's minds (Weinberg, 1989). These are laypersons' conceptions of the psychological construct, intelligence. They also form part of their beliefs about intelligence whilst also directing their individual intellectual behaviours. Since these theories already reside within the person's mind in some form (Sternberg, 1985) they only "...need to be discovered rather than invented..." (p. 31) by theorists and researchers. The goal in researching implicit theories then becomes focusing in "...[finding] out the form and content of peoples informal theories" (Sternberg, 1985, p. 31). Therefore, when researching these theories, the researcher may work towards reconstructing theories that already exist rather than constructing new ones that may not be a correct reflection of human abilities (Sternberg, 1985).

Implicit theories of intelligence serve to create an understanding of human behaviours in terms of expected intellectual abilities in individuals within a given cultural context. Such theories also explain the differences in cultural constructions of intelligence (Demetriou & Papodopoulos, 2004). A person also uses these theories to form conclusions on themselves by "...[forming schemata], which filter and organize new material" (Ruisel, 2007, p. 105) about the self. Lastly implicit theories direct research on intelligence that may in turn inform explicit theories of intelligence. Since implicit theories of intelligence originate from the person, it is important to consider them in forming an understanding of the individual at large.

Over the years popular books about intelligence have been written. The fact that "...lay people have long been interested in the topic [of intelligence] suggests that people in general may be relatively well informed about [intelligence]" (Furnham, 2000, p. 510). It is also likely that the average person has been exposed to an IQ test or evaluation, whether by having one administered on them or simply being informed about it. This then suggests that people in general have "...reasonable insight into the concept of intelligence and their own personal ability" (Furnham, 2000, p. 510). Therefore, researching laypersons' evaluations of their own level of intelligence and that of their parents, may direct the research towards useful conclusions on the implicit theories of intelligence based on the assumption that participants of the study are informed to some extent on the subject. University students are most likely to be informed about the concept of intelligence, be it formally (e.g. through studying subjects such as psychology) or informally by means of personal encounter with intelligence testing, amongst other possibilities.

### **1.7. Description of Methodology**

A quantitative design was adopted for the purpose of this study. Data for this study was collected using a questionnaire. A questionnaire consisting of two pages was administered to a sample of students from the University of Kwa-Zulu Natal, Pietermaritzburg campus. The students were asked to complete the questionnaire and provide basic demographic information about themselves. Thereafter they rated their own level of intelligence and that of their parents based on Gardner's theory of multiple intelligences (MI).

### **1.8. Outline of Thesis**

The following is a brief outline of each of the six chapters in the thesis.

Chapter one provides the study introduction, the background, as well as the research questions and hypotheses. Chapter Two discusses the relevant literature, while Chapter Three presents the study methodology. The findings are presented and discussed in Chapters Four and Five respectively. Chapter Six concludes the study, highlighting recommendations for theory, research and practice as well as the study limitations.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1. Introduction

In this chapter the focus is turned towards theories that inform the views of intelligence as a psychological construct, by reviewing some of the prominent understandings of intelligence over the years. Over centuries two dominant approaches to intelligence have emerged and crystalized. Firstly is the understanding of intelligence as a general factor; a view that was pioneered by Spearman (1904). In the second school of thought, there is the belief that intelligence is multifaceted, namely that there are different types of intelligences that could be understood independently of each other and are known to develop at different levels within the population. These forms of intelligences appear to also relate to gender, educational background, and the generational gap in intelligence. One of the developers of the multi-facet concept of intelligence is Howard Gardner (1983) and is supported by Sternberg (1985) amongst others.

Although the core of the current dissertation has its basis on Gardner's theory of Multiple Intelligences (MI), it is pivotal to consider other theorists in the field who may have directly or indirectly contributed to the development of Howard Gardner's theory. The ideology of the general factor or 'g' approach to intelligence, spearheaded by Spearman (1904), gave rise to numerous debates on whether there can be indeed "...one pure factor..." (Gardner, Kornhaber, & Wake, 1996, p. 66) that truly defines human cognitive abilities and intellectual structure at a universal level. Through further indulgence of the work of Spearman and other theorists, one may begin to understand the derivative of Gardner's work on multiple intelligences. A great supporter of Gardner's work, Sternberg (1985) developed his own theory, the Triarchic Theory of Human Intelligence, in which he argued that there are three forms of intelligence that could be considered to be present at a universal level. This theory will be reviewed and discussed in references to the current study.

The Flynn effect refers to the progressive gains in IQ scores over a long period of time (Daley, Whaley, Sigman, Espinosa & Neumann, 2003; Scott & Poncy, 1999). This phenomenon suggests generational differences in IQ scores. The current study investigates intergenerational differences in IQ scores by comparing students' self-ratings as well as how

they rate their parents on overall and multiple intelligences. Thus, discussion of the Flynn Effect is called for in order to understand these differences. Research on lay people's perceptions of intelligence seems to indicate the presence of the Flynn Effect. Intelligence as a construct will also be discussed in relation to other social factors such as culture, race, education and gender stereotyping.

## **2.2. Theories of Intelligence**

Two main theoretical approaches are considered in this review, namely explicit and implicit theories. The former refers to a psychometric approach to intelligence, an example being Spearman's Two Factor Theory of intelligence. The latter refers to those approaches that highlight the multifaceted nature of intelligence, as exemplified by Gardner's (1983) Theory of Multiple Intelligences and Sternberg's (1985) Triarchic Theory of Human Intelligence.

Explicit theories measure intelligence by administering tasks. Intelligence tests are presumed to be valid measures of intellectual functioning (Sternberg, 1985). These batteries of tests are administered with the purpose of isolating "...the proposed sources of intelligent behaviour in test performance" (Sternberg & Powell, 1982, p. 976). Sternberg (1985) posits two forms of theorizing human intelligence within the realm of explicit theories (a) Differential or psychometric theorizing and (b) Cognitive theorizing. The current study attends to differential theorizing in depth.

### **2.2.1. Psychometric or differential approach**

The psychometric or differential approach to the understanding of intelligence is by far "the oldest and best established" (Maharaj, 2006, p. 26) of the two schools of thought on the nature of human intelligence. These theories are referred to as such because their main goal is to investigate "...individual differences among people" (Sternberg, 1985, p. 4) in order to "...understand intelligence in terms of a set of underlying abilities" (p. 4). To identify abilities underlying intellectual functioning, factor analysis, the single most common component of these theories, is used (Sternberg, 1985). The difference between the theories is the number of factors associated with each theory. For example, on the lower end of the scale is Spearman's Two Factor Theory of intelligence. Thurstones's (1938) Seven Primary Abilities are somewhat midway and Guilford's (1980 as cited in Sternberg, 1985) 150 factors

are at the upper end of the scale (Sternberg, 1985). The second main difference is in the geometrical arrangement of the factors in the theories (Sternberg, 1985).

Within the domain of differential or psychometric theorizing, a theory that uses psychometric theorizing is Spearman's two factor theory. This theory is indeed the most influential in the history of research on human intellect (Sternberg, 2004). This is seen in present day use of psychometric tests in workplaces and schools, amongst others. Spearman regarded 'g' as "...the single most important factor in predicting scholastic and occupational achievement, as well as a host of desirable and undesirable social outcomes" (Taub & Hayes, 2000, p. 40).

### **2.2.1.1. Spearman's theory of intelligence**

Spearman's Two Factor Theory has been the most influential theory in the history of research on intelligence (Sternberg, 2004). The theory suggests that human intelligence, its development and function, can best be understood in terms of 'g', the general factor, and 's', specific factors (Vandenberg & Vogler, 1985). The general factor of intelligence, 'g', is regarded as the most influential. Through the use of psychological testing to understand individual intellectual capacity the notion of *g* extended to that of the Intelligence Quotient (IQ) scores or level. The use of the IQ score is deemed to be of importance in two major settings of one's life, scholastic and occupational settings (Taub & Hayes, 2000).

Spearman's theory led to the emergence of other theories of intelligences, some of which were advancements of Spearman's work, whilst others offered different approaches to intelligence by critiquing Spearman's work. The following section focuses on one dimension of the Two-Factor Theory, the general factor ('g'), incorporating its uses and critiques.

#### **2.2.1.1.1. *General factor of intelligence (g)***

Spearman's main assumption is that the general factor, 'g', can be held accountable for all intellectual functioning in humans (Gardner, Kornhaber, & Wake, 1996). This intelligence factor Spearman believed is involved in different intellectual activities and "... diverse kinds of problem solving..." (Gardner, Kornhaber, & Wake, 1996, p. 60) in everyday life. In an attempt to prove his theory, Spearman conducted a series of tests on a group of 24 school-going children. The measurements included assessments by the children's teachers on their "...cleverness in school..." (Gardner, Kornhaber & Wake, 1996, p. 60). This was determined by assessing their performances in school subjects such as mathematics and languages. The children were also evaluated outside their school environment by other students on items

considered to reflect "...common sense out of school and assessments of their ability for sensory discrimination of lights, weight and pitch" (Gardner, Kornhaber & Wake, 1996, p. 60). There was a "positive relationship among all [his] different measures even between sensory discrimination tasks and evaluations of students' academic ability" (Gardner, Kornhaber & Wake, 1996, p. 60). Spearman found that "all the tests correlated positively with each other, and that some tests correlated more highly than others..." (Gardner, Kornhaber & Wake, 1996, p. 65). This suggested to Spearman that the positive relationship may be due to an underlying variable that could be responsible for intellectual performances of human beings. This variable Spearman called 'g', which he regarded as the single most essential and common element in intelligence (Taub & Hayes, 2000). This element was to be found later to be the "...most important factor in predicting scholastic and occupational achievements, as well as a host of desirable and undesirable social outcomes" (Taub & Hayes, 2000, p. 40). As cited by Weinberg (1989), Spearman also argued that "...people who do well or poorly on some intelligence tests also do well or poorly on a variety of intellectual tasks..." (p. 98).

Spearman (as cited in Sternberg, 1985) also proposed that differences in 'g' that may be observed in individuals could be due to either/or the "...differences in the levels of mental energy..." (p. 4) an individual may bring whilst approaching an intellectual task; or, the individual differences could be understood according to one's ability to make use of three qualitative principles of cognition: (1) apprehension of experience, refers to an individual's understanding of concepts; (2) education of relation, refers to "inference of the relation between..." (Sternberg, 1985, p. 5) concepts; and (3) education of correlates, refers to the ability to transfer the acquired "...inferred principle..." (Sternberg, 1985, p. 5) to a new situation.

#### **2.2.1.1.2. *Practical and social implications of 'g'***

- Through meta-analysis it was found that 'g' is a plausible predictor of an individual's success in the workplace (Taub & Hayes, 2000); thus a higher IQ result in psychometric tests in the workplace results in a position that requires complex functioning within the individual's scope of practice.
- One of the leading causes of promotions in the USA have been found to be an individual's level of 'g' (or, now translated to IQ level). In many skilled and professional occupations there is a *de facto* minimal requirement of an individual's

level of 'g' for entry into those careers (Taub & Hayes, 2000). At a certain level of 'g', or IQ score below a certain level some individuals may not pursue certain professions as the skills and intellectual capacity of the individual may not be compatible with those required "...to access some occupations..." (Taub & Hayes, 2000, p. 44) (for example, lawyer, doctor, engineer or teacher). "Therefore to a large degree, g is related to personal success and economic prosperity" (p. 44).

- There is a host of socially acceptable and unacceptable outcomes that differing levels of IQ scores have revealed to be accountable for. Research has shown that a convicted criminal has an average IQ of 85. An implication of this may be that "...individuals who find themselves adjudicated within the court system have poor judgement reflective of poor problem solving abilities..." (Taub & Hayes, 2000, p. 44), which is related to low intellectual capacity and "...sub-average level of Spearman's g" (Taub & Hayes, 2000, p. 44).

#### **2.2.1.1.3. Critique of the notion of the general intelligence ('g') factor**

Spearman's 'g' "...has proved to be [a] durable phenomenon, and compatible with many different theories of intelligence" (Deary, Egan, Gibson, Austin, Brand, & Kellaghan, 1996, p. 105), yet it goes without saying that it has its shortcomings. Sir Godfrey Thomson's main argument against Spearman's theory as cited by Gardner, Kornhaber and Wake (1996), was that most of the tests used by Spearman measured "...different underlying processes, rather than any sort of pure 'factor'" (p. 66). Furthermore, Thomson argued that although Spearman used correlation coefficients in his calculations and "...found a hierarchical order among them, there was no evidence that such findings represented an underlying entity..." (Gardner, Kornhaber & Wake, 1996, p. 66) which is located within the human nervous system. On the other hand, Vandenberg and Vogler's (1985) counter argument to the concept of general intelligence is based on the cognitive tests' level of consistency in their measurement of intelligence which appears to differ from year to year.

#### **2.2.2. Implicit theories of intelligence**

Implicit theories of intelligence refer to laypersons' conceptions of intelligence; the ordinary person's views, beliefs and understanding of intelligence, based on their day-to-day life perspective. These beliefs are of importance in the formation of implicit theories. In essence,



“...implicit theories need to be ‘discovered’ rather than ‘invented’ because they already exist in some form, in people’s heads” (Sternberg, 1985, p. 31). These theories provide a gateway into understanding the diverse conceptions of intelligence. Various cultures tend to acknowledge different types of intelligent behaviour, which pertains mainly to problem solving skills (Weinberg, 1989). Through the study of implicit theories, understanding of these diverse cultural and social conceptions of intelligence may be developed (Maharaj, 2006). Studies on implicit theories of intelligence have shown that western notions of intelligence are not always shared by other non-western cultures. Cultural variations in the conceptualization of intelligence may be attributed to the influences of their “...unique socio-cultural histories...” (Mpofu, 2004, p. 364).

Weinberg (1989) noted that westernised laypersons gave three main themes in their definitions of intelligence: (a) practical problem solving, (b) verbal ability, and (c) social intelligence. These beliefs about intelligence are based possibly on their life experiences.

Implicit theories of intelligence may be broken down further into two sub-theories, namely *entity* and *incremental* theories. An implicit entity theory of intelligence refers to the view that intelligence is a fixed, unchangeable and uncontrollable entity within the individual (Blackwell, Trzesniewski & Dweck, 2007). From this perspective, people may be seen as possessing “...a lot or a little of...” (p. 247) intelligence. From this perspective, people perceive themselves as either capable or incapable of a particular skill (Blackwell *et al.*, 2007). Such people tend to stick to the tried and tested philosophy when approaching intellectual challenges. The second sub-theory is incremental theory, which views intelligence as flexible (Blackwell, Trzesniewski, & Dweck, 2007). Incremental theorists tend to focus more on how people improve their abilities by engaging in challenging tasks. Individuals make an effort to acquire and master skills using multiple strategies (Blackwell *et al.*, 2007).

People are influenced greatly by their form of implicit theory (i.e. entity and incremental theory) when pursuing life challenges (Blackwell *et al.*, 2007). This suggests that implicit theories are more than held beliefs and perceptions of constructs such as intelligence; they also serve the purpose of directing everyday life evaluations of the self and others. Societal and cultural differences in intelligence may be explained by the different implicit theories of intelligence held by each culture or society (Demetriou & Papodopoulos, 2004).

To conclude, lay people's implicit theories of intelligence are vital to research on intelligence. Implicit theories could extend our understanding of intelligence by allowing for conclusions to be formed based on the understanding of the everyday person. Implicit theories could thus inform explicit theories of intelligence. It has been found that academics researching on intelligence are in consensus with the layman's implicit views of intelligence (Weinberg, 1989). The understanding of intelligence as being multiple and contextual in character emanates largely from the study of implicit theories of intelligence.

### **2.2.2.1. Theories of multiple intelligences**

In this study two main approaches to multiple intelligences are considered: Sternberg's Triarchic Theory of Human Intelligence and Gardner's Theory of Multiple Intelligences. The main premises of each theory, its weaknesses and implication for the current study, are discussed.

#### **2.2.2.1.1. Sternberg's triarchic theory of human intelligence**

Sternberg speaks of successful intelligence, which he defines as "the ability to adopt, shape, and select environment so as to accomplish one's goals and those of one's society and culture" (Sternberg, 2004, p. 428). Sternberg further defined intelligence "...as [a] mental activity directed toward purposive adaptation to, and selection and shaping of, real-world environments relevant to one's life" (Sternberg, 1985, p. 45). The ability to manipulate the environment in order to achieve high levels of success in daily living is critical to this definition. Sternberg suggested that there are some underlying, universal processes to all aspects of intelligence. Amongst these are "...the need to define problems and translate strategies to solve these problems..." (Sternberg, 2004, p. 429). Furthermore these universal processes "...are applied to different kinds of tasks and situations depending on whether a given problem requires analytical thinking, creative thinking, practical thinking, or a combination of these kinds of thinking" (p. 429).

Sternberg (2004) identified three types of intelligence: *componential*, *experimental*, and *contextual* intelligence. He further noted however that these types of intelligences are not to be considered as the only ones; rather his theory is to be seen as an extension of already existing theories (Wambugu, 2006). Thus, his triarchic approach to intellectual ability forms part of a broader aspect of intelligence that "... [comprises of] a common set of processes which are assumed to be universal..." (Maharaj, 2006, p. 36) in nature.

#### 2.2.2.1.1.1. *Contextual intelligence*

This form of intelligence is based on “...viewing intelligence partially in terms of the context in which it occurs...” (Sternberg, 1985, p. 43) with the possibility that different contexts can offer different levels of stimulation to one’s intellectual abilities and mental abilities to adapt to the environment. This sub-theory therefore emphasises mostly “...on the mental activity involved in attaining fit to context...” (Sternberg, 1985, p. 45) rather than the physical activity or influences that may aid the activity in context (Sternberg, 1985). In more contemporary terms, this cognitive ability can be referred to as being “...street smart..” (Maharaj, 2006, p. 37) which can be defined as the “...ability to apply knowledge in the real world and the ability to shape and choose one’s environment according to one’s skills and values” (Maharaj, 2006, p. 37). The above Sternberg also refers to as being part of the adaptation process involved in contextual intelligence, which involves trying to fit in well into one’s environment (Sternberg, 1985).

The processes involved in contextual intelligence are hierarchical in nature or relational, of firstly human beings attempting to adapt to the environment in which they find themselves. Should failure to fit in arise “...one may attempt to select an alternative environment...” (Sternberg, 1985, p. 46) to which they are best suited or “...potentially able to attain a better contextual fit” (Sternberg, 1985, p. 46). The alternatives that are considered are those that are available to the individual and feasible to attain resulting in maximum fit (Sternberg, 1985). This however is not always feasible. In the case of unfeasibility the third and last option in the process is available, which is shaping. In this option the individual may attempt to reshape the environment so as to best fit them (Sternberg, 1985).

This view of environment-person fit gives the implication that adapting, selecting, and shaping “...may differ across persons...” (Sternberg, 1985, p. 46) and across environments. This further implies that “...intelligence [is] likely [not] to be exactly the same thing at different points in the life span...” (Sternberg, 1985, p. 46) of an individual and the contextual fit requirements will shift as individuals grow and find themselves in different environments, throughout the different stages of life.

#### 2.2.2.1.1.2. *Experiential intelligence*

The second component, *experiential* intelligence, is also known as *creative* intelligence. This form of intelligence involves diverse ways of thinking and one's ability to generate new ideas (Maharaj, 2006) in relation to one's experience. Two skills are important to the measuring of one's intelligence, these being the ability to deal with novel tasks and situational demands, and the ability to automatize the processing of information skill.

Ability to deal with novel tasks depends on one's understanding of the task at hand and how challenging it is viewed to be (Sternberg, 1985) by the individual. Sternberg (1985) suggested that "...in essence, the novelty is in learning how to do the task rather than in actually doing it" (p. 69). The idea of this skill as a form of measuring a person's intelligence is not based on how one best encounters regular everyday situations but rather how "...in extraordinary situations..." (Sternberg, 1985, p. 69) a person experiences the challenge as a way of coping with the environment (Sternberg, 1985). The second skill of automatizing information processing is based on the assumption that the administration of the task, a complex cognitive one can only be properly executed "...because many of the operations involved in their performance have been automatized" (Sternberg, 1985, p. 71). Should one fail to automatize such operations, it results in improper functioning in terms of information processing; therefore one's task performance intellect decreases.

#### 2.2.2.1.1.3. *Componential intelligence*

The third component of the theory is *componential* intelligence which is involved mainly in highlighting "...the mental mechanisms underlying intelligent performance..." (Sternberg, 1985, p. 97) or intellectual thinking. The componential intelligence "...focuses on internal information processing processes underlying intelligence" (Wambugu, 2006, p. 20). These kinds of components of intelligence can be at a functional level and at a general level. At a functional level, components serve three different functions: (1) meta-components, (2) performance components, and (3) knowledge acquisition components. Firstly the meta-components involve being able to identify the problem or what task is to be performed rather than how; the ability to "...select a set of lower-order components to use in the solution of a given task..." (Sternberg, 1985, p. 100); being able to correctly choose ways of representing information that is being processed; sequence lower-order components in such a way as to facilitate task performance; adequately decide on how much attention one will allocate to a task in order to yield quality performance in the given task; and lastly one is required to

develop the skill of understanding feedback and also recognise its implications to performing in a task (Sternberg, 1985).

Secondly is the performance component which is used in the performance of various tasks through the adoption of various strategies for each task (Sternberg, 1985). Sternberg (1985) suggested that performance components "...tend to organize themselves into stages of task solution that seem to be fairly general across tasks" (p. 105). These stages are (1) encoding of stimuli – mainly the process of storing newly acquired information and forming of an initial perception of this information; (2) combination and comparison of stimuli, which involves being able to systematically put together similar information while performing a task or being able to compare information that is being received; and (3) responding to the information received (Sternberg, 1985).

The third and last functional level component is knowledge acquisition. This component is involved in the process of gaining new knowledge which is done through the use of further three other components namely, encoding, combination and comparison, which are similar to that of performance component discussed above (Sternberg, 1985).

At the general level of componential intelligence, components are classified according to the contribution they make towards task performance. Sternberg (1985) suggested three components at this level, each required for different stages of task performance and completion. The general is required "...within a given task universe..." (p. 108), while the class is required "...to perform a proper subset of tasks that includes at least two tasks within the task universe..." (p. 108) and lastly the specific components are for performing single tasks within a task universe (Sternberg, 1985).

In summary, Sternberg's Triarchic Theory of Intelligence identifies three types of intelligence which he proposed "...give a full understanding of intelligence" (Wambugu, 2006, p. 20). These three types of intelligences, which are componential, experiential and contextual, form part of a broader aspect of intelligence that "...[comprises of] a common set of processes which are assumed to be universal..." (Maharaj, 2006, p. 36) in nature. These are also considered to "...serve a range of purposes..." (p. 36) within one's own environmental context (Maharaj, 2006).

### **2.2.2.1.2. Gardner's theory of multiple intelligences**

Gardner's theory of multiple intelligences was published in 1983 and later revised and republished in 1998. The theory emerged from studies done on children with a "...breakdown of intelligence capacities due to brain damage. From these investigations, [Gardner] developed an important, testable, scientific base from which his theory of multiple intelligences emerged" (Lessem, 1996, p. 47). Gardner's theory of multiple intelligences has been employed in many studies (Furnham, 2000; Furnham & Baguma, 1999; Furnham & Mkhize, 2003; Maharaj, 2006; Wambugu, 2006).

It should be noted that the purpose of the current study is not to validate Gardner's theory; rather, the study takes the theory for granted and as such, it seeks to establish if university students' estimates of their own and their parents' multiple intelligences differ by gender, age and level of education attained. For the purposes of this study it will suffice to state that rather than relying only on factor analysis to determine or identify the existence of a discrete kind of intelligence. Gardner drew up a set of criteria to determine his types of intelligences: (1) potential isolation by brain damage, in that the damage of a specific area may result in the enhancement or impairment of the display of a particular intelligence; (2) the individuals that possess extraordinary ability or the lack of a particular intellectual behaviour; (3) the exhibition of identifiable operations required for the performance of a kind of intelligent behaviour; (4) presenting with expert performance with the indication of having developed to the level of mastery; (5) the increased level of intelligence may be attributed to the ability to adapt to the environment; (6) cognitive-experimental research providing evidence of the type of intelligence; (7) evidence provided by psychometric testing; and (8) allowing encoding in a symbol system (Sternberg, 2004).

In his original conception of the theory of multiple intelligences, "Gardner proposed that there is no single, unified intelligence, but rather a set of relatively distinct, independent, and modular multiple intelligences" (Sternberg, 2004, p. 426). All individuals have the "...potential to exercise a set of intellectual faculties..." (Gardner, 1983, p. 337). An emphasis is placed on one's environment as Gardner (1983) tended to value cultural and/or environmental differences and their influence on intelligence. Various studies based on Gardner's types of intelligences have highlighted different cultural perceptions of intelligence (Furnham & Baguma, 1999; Furnham & Chamorro-Premuzic, 2005; Furnham, Rakow, Sarmany-Schuller & De Fruyt, 1999; Persaram, 2005).

As the theory was developed further, the assumption that intelligence should be measured or evaluated on a number of abilities rather than on the traditional view of intelligence ('g') emerged (Furnham *et al.*, 1999). The basis for this rationale, Gardner argued, was that the existence of several intelligences was due to the "...separate and autonomous cognitive processes..." (Wambugu, 2006, p. 2) within the human mind which "...seem to inspire performance on intellectual tasks" (Wambugu, 2006, p. 2). Gardner further argued that the traditional conceptualisation of intelligence (overall intelligence as the 'g' factor) does not take into account cultures other than the western culture understanding of intelligence. Wambugu (2006) argued that intelligence is measured differently depending on the cultural context "each culture [Gardner] maintains, affords those within it different physical environments, different patterns of experience and different opportunities to develop and demonstrate skills" (Wambugu, 2006, p. 2).

In attempting to explain the uses of multiple intelligences, Gardner (1983) suggested that the different forms of intelligences are intertwined or co-facilitators in task performance. Thus, according to the Multiple Intelligences Theory, when performing a task, it is difficult to isolate the different intelligences (Sternberg, 2004). Rather the performance of an activity appears to require a combination of intelligences in order to succeed in the activity. An example to consider is that of dancing, it "...might involve both musical and bodily-kinetic intelligences" (Sternberg, 2004, p. 426). The need to use a combination of intelligences in task performance may suggest that one may possess more than one form of intelligence in which they excel, and their potential is widespread. One can then assume that the more potential an individual possess in different forms of intelligences the more intelligent they may be considered to be.

Gardner defined intelligence as "the ability to solve problems or to create products that are valued within one or more cultural settings" (Furnham *et al.*, 2002, p. 3). From this definition, Gardner (1983) identified seven forms of intelligences: "linguistic, logical-mathematical, spatial, bodily-kinetic, musical, interpersonal, and intrapersonal" (Klein, 1997, p. 377). These seven forms of intelligences can further be sub-categorised into three sub-categories; firstly, object-related intelligences (Logical-mathematical, Spatial, and bodily-kinetic), secondly, the object-free intelligences (musical and verbal), and lastly, personal intelligences (interpersonal and intrapersonal) (Furnham *et al.*, 2002).

#### 2.2.2.1.2.1. *Linguistic/verbal intelligence*

Verbal/ linguistic intelligence Gardner (1983) defines as the ability to use words effectively either in written or spoken capacity. This refers to "...a sensitivity to the meaning of words...; to the order among words... at a somewhat more sensory level...and to the different functions of language" (Gardner, 1983, p. 77).

Within the realm of normal individuals, linguistic intelligence is said to be a universal native form of intelligence that rapidly develops with one's speech capacity (Wambugu, 2006). This form of intelligence involves the use of but not limited to humour, storytelling, reading, writing, symbolic thinking, and conceptual patterning (Armstrong, 1994; Wambugu, 2006). The use of language either spoken or written is an important communication tool universally and the mastery of these skills results in effective communication. Verbal intellect also has great cultural importance as a tool of "...[transferring] information and symbols [which] is necessary for effective adaptation" (Maharaj, 2006, p. 31). Spoken linguistic skills are acquired as the individual grows and interacts with their environment. The skills of writing and reading appear to be mastered through practice and meaningful use of words. Gardner (1983) suggested the individual "...must be superlatively sensitive to the shades of meaning of a word; indeed rather than shaving off connotations, he must try to preserve as many of the sought out-after meanings as possible" (Gardner, 1983, p. 75). The use of words in this manner tends to be evident in writers, journalists, playwrights, editors and poets whom are said to "...have a proclivity for this type of intelligence..." (Maharaj 2006, p. 31).

Linguistic competency in its right is a form of intelligence, an "...intellectual competence.." (Gardner, 1983, p. 78) that is shared universally (Gardner, 1983). Gardner (1983) identified functions of linguistic competency which one may possess at varying degrees. These include firstly the "...rhetorical aspect of language..." (p. 78), which involves using language to persuade, manipulate and convince others to engage in a desired action. The second is "...the mnemonic potential of language whereby one uses the tool to aid their cognitive processes such as memory" (Gardner, 1983, p. 78). The use of language to explain processes is the third aspect of its functioning. Here language is used in the processes of teaching and learning in the oral and written methods. Finally, the use of language "...to reflect upon..." (p. 78) itself, explain language using language, a process Gardner (1983) refers to as the metalinguistic analysis.



#### 2.2.2.1.2.2. *Musical intelligence*

This form of intelligence refers to one's aptitude to produce music through perception, whilst being able to discriminate, transform and express musical forms (Noruzi, 2010). This includes being able to engage and respond to music at a personal level (Stollery & McPhee, 2002). These abilities are displayed by singers, performers, music producers, composers and those who play instruments. Gardner (1983) suggested this form of intelligence differs across different cultures including the value placed on it. Traditionally most cultures considered musical ability to be a talent rather than a display of high intellectual ability. There has been a shift in this view, especially within the western culture, where musical capacity is linked to exceptional intellect. Engaging with music and developing one's musical ability has been found to stimulate one's capacity to learn in general, with specific influences in mathematics within the school environment (Stollery & McPhee, 2002), which is often highly associated with great levels of intellect.

#### 2.2.2.1.2.3. *Logical/mathematical intelligence*

Logical-mathematical intelligence accounts for one's capacity to reason logically, by being able to "distinguish logical or numerical patterns" (Maharaj, 2006, p. 31). Logical-mathematical intelligence also refers to "...sensitivity to logical patterns and relationships, statements and propositions (if-then, cause-effect), functions, and other related abstractions" (Noruzi, 2010, p. 119). This form of intelligence is of greater value in the educational systems; in this setting one's mathematical abilities tend to follow a developmental process occurring over time. Armstrong (1994) outlined the developmental process as beginning with a relationship with objects in which they are ordered and explored; this is followed by realising the differing actions that can be administered with the objects including ways of manipulating them. Lastly the relationship progresses to the use of objects at a less physical manner, here the manipulations occur mentally (e.g. inductive reasoning).

#### 2.2.2.1.2.4. *Spatial intelligence*

The ability to perceive visual and/or spatial surroundings in a fashion that allows for navigation and transformation of space with great accuracy is known as spatial intelligence (Gardner, 1983; Noruzi, 2010). This occurs through cognitive processing and modifying of the information available, even without the physical visuals (Gardner, 1983). Research has shown spatial processing to be a multi-dimensional concept; it includes "...spatial perception,

memory, operations (e.g., rotation or reflection of spatial representations), and construction (putting the parts of an object together to create a whole)” (Raushcer, 1999, p. 37). Spatial processing also enhances mathematical ability through the use of abilities required in mathematical reasoning. These are spatial imagery, temporal ordering of objects, and symmetry recognition (Raushcer, 1999).

#### 2.2.2.1.2.5. *Bodily kinetic intelligence*

Body-kinetic intelligence refers to the intellectual ability that allows an individual to utilise parts or the whole body to perform movements and skilled actions. The control of fine and gross motor functions and the use of external objects, Gardner (1983) emphasises to be the crucial elements to displaying high bodily-kinetic intelligence. Sculptors, artists, gymnasts, dancers, athletes and surgeons are some of the individuals that demonstrate great intellectual ability of this kind.

#### 2.2.2.1.2.6. *Interpersonal intelligence*

Gardner (1983) identified ability to detect and distinguish the feelings, beliefs and intentions of others effectively as the major feature of interpersonal intelligence. People with this skill demonstrate great relations with others as they are able to understand and interpret others’ feelings, behaviours, moods and intentions effectively. Such individuals are sensitive to and able to discriminate others’ body language, facial expressions, gestures and other social cues (Noruzi, 2010).

#### 2.2.2.1.2.7. *Intrapersonal intelligence*

Intrapersonal intelligence refers to the ability to understand oneself in terms of one’s feelings, moods, weaknesses, strengths and behaviours. Obtaining such knowledge about the self allows the individual to act accordingly based on this knowledge (Armstrong, 1994; Wambugu, 2006). Excelling in this type of intelligence is observed in individuals that reflect a direct sense of self, good judgement and personal ethics that allows one to assess situations objectively.

Since the conception of the MI theory, Gardner has proposed the addition of three other types of intelligences (Gardner, 1999). Naturalistic intelligence has been selected as a confirmed addition to the theory (Sternberg, 2004). This form of intelligence Gardner defines as “the kind shown by people who are able to discern patterns of nature” (Sternberg, 2004, p. 426).

The other two types have been considered as suitable candidates for addition in to the modular forms of intelligence, yet due to lack of substantial evidence these forms of intelligence cannot be included in the theory (Gardner, 2004). These are spiritual intelligence, which involves “a concern with cosmic or existential issues and the recognition of the spiritual as the achievement of a state of being...” (Sternberg, 2004, p. 426); the second is existential intelligence which regards to the “...concern with ultimate issues” (Sternberg, 2004, p. 426) of the state of being.

#### 2.2.2.1.2.8. *Critique of multiple intelligences theory*

Sternberg (2004) has cautioned against welcoming Gardner’s theory as offering the final verdict on the understanding of human intelligence. Since the first publication on the theory in 1983, MI theory has failed to provide scientific evidence in the form of empirical testing. Secondly Gardner is seen as being biased towards his own work; the reviews he does tend “...to dwell on studies that support the proposed point of view...” (Sternberg, 2004, p. 428) that is favouring his work. On the other hand other theorists’ reviews seem to be on studies that are designed to test psychometric theories of intelligence. Noruzi (2010) reflects Gardner’s point of view on the matter of scientific evidence by suggesting that Gardner maintains that “...intelligences cannot be seen or counted” (Noruzi, 2010, p. 118) as Spearman (1904) advocated; the functions of intelligence are activated in the cultural settings by processing information required to solve problems or create products (Noruzi, 2010). As the processes involved in the existences of these multiple intelligences is cognitive, pinpointing and confirming Gardner’s theory becomes difficult considering the delicacy of the human brain (Wambugu, 2006).

Thirdly is the argument that the intelligences identified by Gardner may well be referred to as talents rather than intelligences. If this were the case, it may be possible that there are other forms that Gardner has not listed. In Gardner’s defence, Sternberg (2004) puts forth that this argument would be plausible if it were “...based on the working definition of intelligence” (Sternberg, 2004, p. 428). Gardner maintains that “an individual’s level of each intelligence is the result of both ‘nature’ and ‘nurture’” (Klein, 1997, p. 381), suggesting intelligence may be cultivated further according to one’s potential and cultural input. Gardner’s seven types of intelligences are said to be universal and the same may not be said about talents. When it comes to talents its either one has it or not, talents are unique to each individual (Checkly, 1997) and can be developed further once they have been discovered.

Finally, Sternberg (2004) further argues that the theory lacks a strong psychometric base and hence it is not easy to validate. However the need to test Gardner's theory psychometrically is unnecessary in his view as his theory rejects the notion of psychometric testing altogether (Checkly, 1997). Developing a test for the types of intelligences proposed by Gardner or developing seven different tests to accommodate these different types, from Gardner's perspective, would amount to "...re-creating the sin of the single intelligence quotient [a notion Gardner rejects] and just multiplying it by a larger number" (Checkly, 1997, p. 12). The argument of providing psychometric evidence to Gardner's multiple intelligences, fails to acknowledge that Gardner rejects the notion of psychometric testing in the assessment of intelligence.

Although the viability of Gardner's theory has been questioned, it appears to have served a very useful purpose in educational or scholarly settings especially in North America (Klein, 1997). Gardner's (1983) guidelines have been used to enhance students' multiple intelligences in order to assist them in their learning. This has shown positive results. The theory's limited scientific base has not limited its popularity amongst lay persons. This may suggest that Gardner's work may have uncovered lay persons' conceptions of intelligence much clearer than other theorists' work (Furnham, Tang, Lester, O'Connor, Montgomery, 2002).

### **2.3. The Flynn Effect**

In the study of Gardner's multiple intelligences on lay persons, inter-generational estimates are often made (e.g. Daley, Whaley, Sigman & Espinosa, Neumann, 2003; Furnham & Mkhize, 2003; Furnham & Akande, 2004). The results of these intergenerational estimates tend to reflect the Flynn Effect often noted in intelligence testing.

The concept of the Flynn Effect (F.E) was developed by James R. Flynn (Scott & Poncy, 1999). Through his work in psychological testing, Flynn observed a trend in IQ levels across generations. Younger generations tend to present with higher IQ scores on tests of fluid intelligence (Sternberg & Kaufmann, 1998), particularly "...culturally reduced tests like the Raven's Progressive Matrices" (Daley, Whaley, Sigman & Espinosa, Neumann, 2003, p. 215).

The main rationale behind the F.E is that there appears to be a "...great generational difference in IQ..." scores (Sternberg & Kaufmann, 1998, p. 488). This phenomenon is also assumed to be universal in nature (Scott & Poncy, 1999) and has been noted to be occurring over the last century (Sternberg & Kaufmann, 1998). The earlier generations present with lower IQ scores than those of generations younger than them due to numerous factors. The evidence of these differences is noted mostly in the administration of standardized IQ tests. Standardized norms of early versions of a test suggest that the current test takers have higher IQ scores than the subjects on which the tests were normed, the normative group being the older generation. This suggests younger generations possess greater intellectual capacity than the generations before them (Flynn, 2006). Research has shown that these generational differences in aptitude scores are by at least .15 points of IQ per generation (Sternberg & Kaufmann, 1998).

Although deemed as universal, the F.E. has been investigated mainly in developed countries. From these investigations a number of factors have been suggested to account for this progressive increase over time (Daley *et al.* 2003; Scott & Poncy, 1999). These facts are assumed by Sternberg and Kaufmann (1998) to be environmental in nature rather than genetic mutation since a century is a short period of time for the mutation to have occurred "... and exerted such an affect..." (p. 488).

These factors include but are not limited to: (1) better nutrition which is mostly prominent in developed countries and is hypothesised to positively affect brain functioning (Sternberg & Kaufmann, 1998; Daley *et al.*, 2003). Cognitive performance is better accounted for by improved nutritional status in children. For children that are malnourished their "...reasoning and perceptual-spatial functioning..." (Daley *et al.*, 2003, p. 215) is compromised. Reduced attention span and concentration alongside with poor general school performance is also found to be negatively affected by low nutritional status (Daley *et al.*, 2003); (2) increased environmental complexity such as technology and complex visual world through toys, games, television and computers may affect performances on IQ tests (Daley *et al.*, 2003) in children. With adults, taking up jobs that are found to be "...intellectually stimulating and complex..." (p. 215) results in advanced cognitive abilities (Daley *et al.*, 2003); (3) family structure and parental factors have also been hypothesised to impact on aptitude performances. Smaller families could result in an increase of resources that are available for the child. With regards to parents, their level of literacy and education contributes to the income they obtain and resources they can afford their children (Daley *et al.*, 2003). In addition parents with an extensive educational background are more inclined to influence

their children positively about the value of education and in turn expose their children to an intellectually stimulating environment; (4) scholastic factors such as prolonged school attendance could account for IQ gains in adults since their cognitive abilities will be developed further and for longer periods. This may also encourage diversified forms of intellectual stimulation; (5) Sternberg and Kaufmann (1998) also include less childhood disease as a possible explanation of the Flynn Effect.

For the Flynn Effect to be considered universal, it is important to conduct further research in rural areas of developing countries. From the developmental stages of the theory empirical evidence to prove it plausible has been conducted in highly industrialised, resourceful and urban countries (Daley *et al.*, 2003) where the above-mentioned factors that may be held accountable for the progressive increase of IQ scores over generations in the last century have been seen to change. There are fewer malnourished children in developed countries in general. Their environment is more stimulating as it is technologically advanced while most adults have secondary or tertiary schooling, better jobs and are able to provide adequate resources for themselves and their children.

Plausibility of the F.E has become questionable considering the inconsistencies that have been found between the increase in IQ scores and scholastic achievement. High correlations have been found between aptitude (IQ scores) and school achievement scores (Scott & Poncy, 1999); a trend of declining achievement scores has also been noted over the years (Scott & Poncy, 1999) whilst the increases in IQ scores have been found in inter-generations (Flynn, 2006). The decline in achievement patterns places the concept of F.E. in question considering the relationship between achievement patterns and aptitude scores.

### **2.3.1. Intergenerational estimates of multiple intelligences**

The concept of “intelligence is of considerable interest to academics and lay people alike” (Furnham & Mkhize, 2003, p. 83). Studies of self-estimates of intelligence have noted differences between parents and children (Furnham & Mkhize, 2003; Furnham & Akande, 2004); between races (Furnham, Mkhize & Mndaweni, 2004; Wambugu, 2006); and “...among people from Africa, America, Asia, and Europe” (Furnham & Mkhize, 2003, p. 83). Furnham (2000) suggests that research on parental beliefs of their children’s intelligence is of importance, as results of such research may lead to the understanding of child rearing and the expectations that parents have of their children. The expectations that parents have about the development of their children according to Goodnow and Collins (1990 in

Furnham, 2000) "...influence objective child outcomes" (Furnham, 2000, p. 583). The expectations that parents have on their children's behaviours can be attributed to the perceived levels of intelligence of their children.

In previous studies, there has been a great focus on parents' estimates of their children's intelligences (based on Gardner's multiple intelligences). Furnham and Mkhize's (2003) study of Zulu mothers' beliefs about their own children's intelligences found that Zulu mothers estimated themselves to have high levels of spatial intelligence, closely followed by interpersonal intelligence. These estimates by the Zulu mothers were found to be similar for their children. Other studies showed that fathers estimate their intelligence to be higher when compared to the mothers' self-estimates (Furnham, Mkhize, & Mndaweni, 2004), and a few sex differences were found between the children.

#### **2.4. Culture and Intelligence**

The narrow understanding of intelligence as a construct that is defined by one's scholastic performance and "culture-bound, [or] ethnocentric..." (Berry, 1986, p. 35) background appears to be shifting. Rather intelligence is beginning to be viewed as a universal construct with multiple components or types which cultures share; yet, some cultures or societies may place a specific emphasis on other types of intelligences more than others. Mpofu (2004) argues that there are mainly five factors that can be linked to the differing perspectives on intelligence by various nations or cultures. Firstly it is the differing cultural beliefs of the members of these communities, which tend to influence their perceptions of intelligence. The second is the "...availability and accessibility of formal education to the general public..." (p. 364). Thirdly, different nations tend to have different social and economic goals that they are aiming to achieve. Fourth is the "level of industrialization [or development] of nations or communities and the values underpinning the achieved or aspired developmental statuses" (p. 364). Lastly is the "availability of human and material resources for the study of intelligence" (p. 364), in order to advance societies' knowledge of intelligence. All these factors impact differently on different cultures and their perspectives on intelligence and the meaning of the concept.

Howard Gardner's Theory of Multiple Intelligences appears to have better accounted for the differing views of intelligence. Describing intelligence as a multi-faceted construct

accommodates various communities and their understanding of intelligence. Numerous researches have been done based on his concept of multiple intelligences and lay people's perception of intelligence (Devlin, 2010; Furnham, 2000; Furnham, Rakow & Mak, 2002; Neto & Furnham, 2006; Sternberg, Conway, Ketron & Bernstein, 1981; Swami, Furnham, Kannan, 2006;). The current research is a continuation of these studies by Furnham and colleagues around the world. Lay persons' views of multiple intelligences appear to reflect the differences in different cultures well.

Cross cultural studies on intelligence have raised the necessity to "...consider cultural values and context in any understanding of intelligence" (Pellegrino, 1985, p. 113). Research done by Furnham and his colleagues better illustrates this. These studies suggest that "...some cultural groups tend to rate themselves higher than other cultural groups" (Wambugu, 2006, p. 31) in repeated studies related to lay persons' understanding of multiple intelligences.

A cross cultural study amongst Africans, Americans, and British participants by Furnham and Baguma (1999), resulted in the Americans (IQ mean = 114) rating their overall IQ to be higher than the Africans (IQ mean = 110) and the British (IQ mean = 109). Furthermore the Americans rated themselves higher on verbal, musical, bodily-kinetic, logical-mathematical, and spatial intelligence, compared to the ratings by the British. When compared to the Americans and British participants, the Africans were less likely to have not taken an IQ test nor believe in higher intellectual differences between genders or races.

The variations demonstrated by the numerous studies on self-estimates of multiple intelligences contribute vastly to the understanding of different cultures' and races' perceptions of their own intelligence compared to the rest of society. As Pellegrino (1986) suggests, Western societies value scholastic performance as a great indicator of intelligence, "...thus, academic intelligence is prototypical..." (p. 114) of Western concepts of intelligence. Mpofo (2004) suggests that, "...conceptions of intelligence and associated practices vary widely across societies and are influenced by the unique socio-cultural histories of these societies" (p. 364). When observing developed countries Serpell (2000 as cited by Mpofo, 2004) considered the example of the complex socio-technical systems that exist in these countries. These systems within these societies may be placed at a higher level of importance on "...technical and bureaucratic efficiency than in the developing countries, which tend to have simpler socio-technical systems" (p. 364). Therefore intellectual



functioning may be viewed as being on a hierarchy based on the society at which the construct is viewed within.

In contrast, developing countries may place more value on interpersonal relations as an indicator of a desired level or form of intelligence. Awareness of such differences creates an enhanced understanding of multiple intelligences, and how the different types may supersede each other according to the different cultural, societal, and racial context at which they exist. An example of this is the Zimbabwean traditional conception of intelligence. That is possessing "...expertise in interpersonal relationships and success with everyday activities..." (Mpofu, 2004, p. 366).

## **2.5. Race and Intelligence**

Alongside the concept of intelligence and IQ testing, the relationship between race and intelligence remains a controversial topic. Discussions and debates of a heated nature tend to arise when the notion of race is mentioned. Regardless of the discourse the mere mention of the term evokes a number of connotations and at most negative ones. As a social concept, race has an existence, yet from a biological point of view it has been proven timelessly to be false (Lewontin, 1972 in Alland, 2002; Jensen & Burt, 2002) suggesting that there are no fundamental differences between so-called races either than that of skin colour. The relationship between race and IQ has also proven to be an unfruitful one as it has resulted in social tension and hierarchical social status of the different races that are seen to exist within a particular community (Alland, 2002; Jensen & Burt, 2002; Onwuegbuzie & Daley, 2001).

Attempting to define the concept of race is a difficult task. The term seems to be used mostly socially yet is assumed to have a biological origin and thus it should be accepted as a naturally occurring phenomenon. Racial classification can only exist if the degree of genetic variation "... between a set of populations is lower than the amount of genetic variation between that set and another such set of populations" (Alland, 2002, p. 45). This variation will then allow for each race to be classified as a different species with differing qualities, abilities, features and behaviours. Due to the human species highly polymorphic nature (Jensen & Burt, 2002), it is not possible to separate each race or population because "... human populations display wide internal variations in genetic traits, not to mention cultural variation...genetic differences within populations are wider than genetic differences among

different populations” (p. 84). From this we can conclude that the concept of race from a biological point of view ceases to exist.

Refuting race as of biological nature gave rise to the scrutiny of the notion that IQ is predominantly hereditary and that it is primarily determined by genetic factors (Onwuegbuzie & Daley, 2001) and that deficits in IQ of some races is genetic by nature (Jensen & Burt, 2002). The main reasons behind these assumptions are based on research conducted by hereditarians on twins reared apart, where a proportion of within-group variations were found. From those within-group conclusions, it was assumed that “... it must also explain a similar proportion of the differences in IQ levels between groups...” (Onwuegbuzie & Daley, 2001, p. 211).

The above findings leave us with the view of race or racial classification as being a sociology or psychology term. From this point of view the term race is “...by no means a neutral concept” (Jensen & Burt, 2002, p. 81), but rather one that is characterised by connotations of in-group and out-group bias. Certain racial groups attain superior positions in society whilst others are relegated to an inferior status. Historical factors such as apartheid in South Africa tend to influence these social hierarchies. As Furnham, Mkhize, and Mndaweni (2004) discuss in their study of lay persons (parents) perspective of intelligence, that some races “... were accorded ‘higher status’” (p. 10) than others during apartheid. In particular, with the Indians and the Africans (Blacks) as a result of this attained ‘higher status’, the one race was afforded with more resources and an opportunity for better socio-economic success which is often assumed to be directly linked to superior intellectual functioning. Thus in estimating their own intelligence the African subjects generally rated themselves lower than the Indian participants. This was assumed to be due to the above mentioned factors (Furnham *et al.*, 2002).

It is common that people tend to assume great racial differences in IQ (Jensen & Burt, 2002). This is also due to the historical theory of merit which assumes dominant groups their status in society purely by merit (Jensen & Burt, 2002). According to the theory “...merit was linked directly to heredity...” (p. 82), therefore other members of the dominant group could claim social dominance since it was a genetic right. Furthermore since the turn of the 20<sup>th</sup> century, merit has been portrayed as intelligence and “...socially acceptable hard work” (Jensen & Burt, 2002, p. 82). Thus members of the in-group whether be in terms of race, culture, ethnicity, or religion are assumed to be of greater intelligence than their subordinates.

In the USA where the 'IQ argument' has entered mainly around the relationship between IQ and race, IQ tests have been developed in order to understand racial differences in IQ, if any. In his attempt to understand the real nature of these supposed racial differences, Onwuegbuzie and Daley (2001) wrote:

*...most of the studies examining racial differences in intelligence have used either univariate analyses (e.g., t test, analysis of variance) or have involved multivariate analyses that have assumed that the relationships between variables are in one direction (e.g., multiple regression, multivariate analysis of variance). Disturbingly, there has been a paucity of investigations using more complex statistical models such as structural equation modelling and multilevel modelling, which may more adequately explain the intricate relationships among intelligence, race, economic status, and other sociocultural factors. (p. 214)*

From the above, Onwuegbuzie and Daley (2001) appear to be suggesting that these statistical differences in IQ between races that have been reported, such as a 1 standard deviation difference between Caucasian Americans and African Americans in 1932 by the first Stanford-Binet IQ test to be normed may have not been analysed and interpreted appropriately or objectively. Bearing in mind that the findings of these tests were used to marginalise those "...of the lower end of the intelligence continuum..." (Onwuegbuzie & Daley, 2001, p. 214) the presence of objectivity in this study is suspect. This allows the role of intelligence testing to be viewed as "...essentially a theory of boundaries and social caste" (Onwuegbuzie & Daley, 2001, p. 215) which warrants racial differences as the best way to set these boundaries. It could be argued further that the objectivity of researchers and their research purpose should be questioned. Questioning their research does not necessarily assume that they are racist but rather that their research objectives and aims require a shift in focus to, as suggested by Onwuegbuzie and Daley (2001) to "...systematic studies of factors and mechanisms that mediate these differences" (p. 216). That is, cultural and environmental variance that may aid results indicating racial differences. As often argued, an essential amount of intelligence tests are culturally bias to some extent. Ignoring the role of culture has led to the misinterpretations of intellectual abilities, beliefs and representations of certain cultural groups (Onwuegbuzie & Daley, 2001).

The relationship between race and intelligence and intelligence testing is a controversial one. As early as World War I, tests of intelligence have demonstrated significant differences in

racial IQ scores, especially between Caucasian Americans and African Americans (Onwuegbuzie & Daley, 2001). Since the days of the Army Alpha tests, the opinion of intelligence testing has been subject to scrutiny especially in relation to the documented racial differences. Political oppression gave rise to racial classification and division in terms of a number of characteristics such as social status, economic status and intellectual abilities. All these factors continue to fuel racial divides in society.

## **2.6. Education and Intelligence**

This study looks at an individual's perceived intellectual ability. One's assumed level of intelligence may be influenced by numerous characteristics which may or may not be obvious to the perceiver. One of these characteristics is an individual's level of education.

Historically, South Africa has not afforded Blacks, the African community in particular, with good quality education. In relation to the context of which the study was conducted and also to gain a theoretical concept of the influence of education on one's level of intelligence (perceived or real), the literature shall turn to discussing intelligence in relation to education. South Africa's educational background (of Black education) shall be discussed alongside schooling factors that have been found to influence intellectual capacity.

### **2.6.1. The effect of schooling on intelligence**

Intelligence testing is largely used to measure and predict scholastic achievements of individuals. Thus the need to understand the relationship between intelligence and education becomes important in order to understand the influence IQ has on the learning environment (Ceci, 1991). Traditionally, the relationship between intelligence and schooling has been that the level of intelligence influences how many years of schooling can be completed by an individual. Ceci (1991) proposes that rather schooling has a particular influence on an individual's intellectual capacity. That is the number of years a person has completed in school determines their IQ level, the quantity of schooling influences the quality of intelligence. Eight forms of evidence were formulated by Ceci (1991) to support this hypothesis. These are (a) the link between grade attained and IQ; (b) the impact of summer vacation; (c) the relationship between intermittent attendance and IQ; (d) the effect of late school on set; (e) the effect of early school (f) the equivalence of aptitude and achievement test scores; (g) the result of cohort-related changes; (h) historical changes in the IQ-schooling link (Ceci, 1991, p. 711). These were later revised, removing the 'equivalence of aptitude and

achievement test scores' and adding 'the effect of early-year birth dates' (Ceci & Williams, 1997). The main premises of these 'types of evidence' on the influence of schooling on IQ are twofold. Firstly, the presences of a child at school in the form of regular attendance and extensive years of schooling which provides mental stimulation in the form of engaging in academic activities is an advantage to improving one's IQ score. Thus, the important factors are commencing school at the appropriate age, staying in school for the minimum required years plus continuous attendance without prolonged disturbances in attendance. It appears that discontinuing school or loss of years in school may result in a loss of up to 1.8 IQ points and completing high school gives an 8 IQ points advantage to the individual (Ceci, 1991; Ceci & Williams, 1997). Secondly, the presences of particular behaviours and characteristics of the individual in relation to schooling influence their IQ. Socio-economic status is not included as it seems, these 'evidence types' are concerned with the availability of schools under any economic status as the salient factor rather than the quality of education provided. Ceci, (1991) believes all individuals are born with their innate intellectual abilities which have the potential to improve further, thus requiring stimulation to develop further. Schooling appears to be the most advantageous method of developing ones intelligence further.

## **2.6.2. South Africa's Black education: A brief historical background**

### **2.6.2.1. The rise of Bantu education**

Previously to the infamous apartheid era, most Black South African schools were run by missionaries, mainly English speakers. When the Nationalist government (representatives for the Afrikaner people) came into power, plans and action were taken to gain control of these schools under the Natives Affairs Department. This department's aim was to control the education given to Blacks by means of finances and the syllabus to be adapted in the schools. These schools were to provide education that was perceived to be in accordance with the needs, lifestyle and cultural heritage of the Blacks (Christie & Collins, 1982). From this, Bantu education was born. The ideology behind providing Bantu education to the Blacks only was:

*the blacks would be taught not merely the value of their own tribal cultures but that such cultures were of a lower order and that, in general, the blacks should learn to prepare themselves for a realistic place in white dominated society, namely (at that point in time) to be 'hewers of wood and carriers of water' (Christie & Collins, 1982, p. 60, italics added).*

The youth of that time were rapidly becoming indoctrinated by the whites to believe that they were of an inferior race and hold no importance in society and thus should be kept together by means of segregation in order not to contaminate the whites with their tribal ways of living. This was reflected in the quality and value attached to the education to be given to them. The teachers were trained in government colleges in which the syllabus was controlled by the government and also emphasised the inferiority of the Black race (Christie & Collins, 1982). By providing a poor standard of education, the Blacks would be condemned to a life of limited growth, as dignified individuals and in their financial wellbeing. By preventing the formation and attainment of particular skills and capabilities in the educational setting black people's lives would always be of a lower standard than their white counterparts (de Kadt, undated).

#### **2.6.2.2. Inequalities in education**

Inequalities were seen firstly in the Black teachers' own level of education. Only 2.3% of the black teachers had a university degree and "82% had not even reached the Standard 10 matriculation" (Boddy-Evans, undated), whilst a third of the white school teachers had university degrees and the rest only had passed their matric (Boddy-Evans, undated). The limited level of education obtained by Black school teachers meant the quality of education they offered was limited. The poor quality of schooling received by Black learners meant that they had limited access to university (van der Berg, 2007) and colleges. This created a vicious cycle of poorly educated, skills-limited Blacks who would serve the life purpose intended by their oppressors. To further limit the educational development of the Black school child, the government invested less on the education of a Black child than a White child. In 1982, government was spending an average of R139 per child towards the schooling of a black child, whilst the white counterpart had R1 211 invested into their education (Boddy-Evans, undated). Such low expenditure on Black education meant limited resources and facilities were available for schooling, such as the shortage of teachers, furniture, and books (Christie & Collins, 1982).

Another factor that impacted on schooling for Black children was their geographical positioning. More often less Black children compared to White children attended school. This was due to the demands of living. Families in rural areas had livestock that needed attendance (Boddy-Evans, undated) and other daily chores that needed to be done before attending school. School attendance was disrupted by these lifestyle demands and often children in

rural areas started school later than those in urban areas. Later school debut was further met with problems of being taught in unfamiliar second languages which meant more pupils would fail end of year exams and repeat the same grade (Boddy-Evans, undated).

Since they were fewer opportunities for Blacks to further their education due to limited resources, late school debut, and lifestyle demands, reasons to stay in school diminished and less blacks obtained schooling. It seemed there was no difference between a Black person who had gone to school and one that had not since in those days most jobs reserved for Black people were unskilled positions (Boddy-Evans, undated).

### **2.6.3. Black education, intelligence, and estimated intelligence**

The legacy of apartheid in South Africa has compromised the quantity and quality of education afforded to the Blacks. As seen above, the attainment of education appears to be valuable in the formation, development and maintenance of one's intellectual abilities (Ceci, 1991). Apartheid may have impacted on the growth potential of Blacks' intellectual capacities, due to the above-mentioned reasons. It is possible that this could also influence the perception of their intellectual abilities in a negative way.

Differences in estimates of intelligence could be accounted for by educational background. For example, gender differences in parental estimates of intelligence (Furnham, Rakow, & Mak, 2002) may be due to males having higher educational qualifications than females in the earlier days; generational differences have also been attributed to the younger generation attaining more years of schooling and superior education compared to their parents (Swami, Furnham & Zilkha, 2009) and grandparents; culture or racial group differences in self-estimates of intelligence have also been accounted for by educational background (Furnham, Mkhize & Mndaweni, 2004). Amongst others, the current study aims to investigate the relationship between level of education and the various types of multiple intelligences as estimated by a sample of university-going Black students.

## **2.7. Stereotypes and Intelligence**

At times self and others' estimates of multiple intelligences have been attributed to stereotyping. Gender differences in particular are often thought of as due to sex-typing or common gender role stereotyping (Rammstedt & Rammsayer, 2000). Understanding the

nature of stereotypes and sex roles are the building blocks to conceptualising lay persons' perceptions of their own and others' intellectual capabilities.

### **2.7.1. Stereotypes**

The term 'stereotypes' stems from the work of Lippman in 1922, in which he described stereotyping as the "...pictures in our heads" (Lippman, 1922, cited in Stangor, 2000). The catalyst to describing this form of categorization was Lippman's interest in individuals' reactions to persons from other countries, and people of different races to themselves (Stangor, 2000). These stereotypes people held about others allow for the formation of assumptions, perceptions and sets of beliefs about each other (Bar-Tal, Graumann, Kruglanski, & Stroebe, 1989) based on the characteristics of the group that one belongs to (Stangor, 2000); whether these groups are racial, religious, gender or of an age group, people tend to form stereotypes based on the commonly found characteristics of those groups. This association between the characteristics and the social label given to people stems from the long-term semantic memory of a person. This information is stored categorically in our memory; this allows for easy access when the information is needed (Simard, undated). In different situations that we have encounters with the many social groups around us, the association is automatically activated without us being consciously aware and we act accordingly (Stangor, 2000), the categorisation of information is a simple cognitive task which allows for quick decision making about others. Our actions towards a group are guided mainly by the stereotypes held, whether negative or positive, exaggerated or not, furthermore we also hold stereotypes about the social groups in which we belong (Simard, undated).

To account for this behaviour, Devine (1989, in Stangor, 2000) suggests that stereotypes are conceptually distinct cognitive structures and that these structures represent only part of an individual's entire knowledge base of a particular group. This knowledge base is formed by a person's experiences, encounters, and social rearing on different social groups. The perceptions developed through the experiences, encounters and rearing allows for one to form stereotypes or conform to already existing stereotypes of others and the groups they are categorised into.

### **2.7.2. The social role theory**

The development of the social role theory was with the aim of understanding the cause of the social behaviours of the two sexes through the observation of their differences and



similarities (Eagly, Wood & Diekmann, 2000). Although there are other types of social roles such as age roles, the theory focuses mainly on gender roles. According to the social role theory, the difference in the behaviours of women and men that is generally observed originates from contrasting distributions of these genders into social roles (Eagly *et al.*, 2000). This approach aims to bring into awareness the impact that the set social roles has on the different sex's social behaviours (Eagly, 1978); which results in these genders being expected to behave according to these prescribed roles. According to Eagly (1978) social roles are not only the main predictors of sex differences in society; they also account for the differing social positions of women and men. Societal expectations reflect a gender hierarchy through the use of status and power differences (Eagly *et al.*, 2000), with women often taking the inferior position. These social structures in the form of gender hierarchy and/or patriarchy are believed to be the root cause of gender-based differences in behaviour and appraisal of self-worth (Eagly *et al.*, 2000). Research has shown that gender based differences in behaviour and not only seen as appropriate and desirable but also tend to be rewarded by society (Eagly, 1978). For example, females in most societies are reared to be humble and assume inferior positions in order to receive social rewards (Furnham, Hosoe, & Tang, 2002; Purvis, 1987). On the other hand, women who do not conform to societal stereotypes are treated as the out-group because their actions disorganise the gender hierarchy and power status that has been built. It is important to note however that as early as the 1960s perceptions have been shifting and physiological sex differences seem to have less and less influence in defining sex-roles (Rosenkrantz, Vogel, Bee, Broverman, & Broverman, 1968).

Basically social roles stem from the expectations that have always been place on people. They become the stereotypical view of people, where it is believed that people should act in a certain manner. If the roles that people perform were to change this could probably change the stereotypical views that we have of each other.

### **2.7.3. The validity or invalidity of stereotypes**

The accuracy of stereotypes has sparked great debate. People have long assumed that stereotypes are inaccurate and that their use results in inaccurate judgements (Ryan, 2002). This assumption can be deemed as valid if stereotypes are meant to apply to all the members of the group (Ryan, 2002). Stangor (2000) argues that stereotypes would probably not continue to exist if they were completely inaccurate – suggesting that there is a kernel of truth in stereotypes. This notion is supported by Triandis and Vassiliou (in Oakes, 1994) who

suggest that the kernel of truth in most stereotypes is present when they are elicited from people who have first-hand knowledge of the group being stereotyped. The view that there is truth in some stereotypes is based on the social roles and positions occupied by individuals from different societal categories (Stangor, 2000; Nelson, 2002). It should be noted however that this view does not account for the power dimensions between groups which positions groups differently in society.

Once established, stereotypes are difficult to change. In particular, it is difficult to change gender-based stereotypes because they are learned very early in life and tend to be firmly established by the time children attend primary school (Purvis, 1987). The greatest influencers of these learned stereotypes have been found to be parents than teachers. Typically, parents of low socio-economic status tend to enforce gender-role stereotypes more than parents from high socio-economic class (Purvis, 1987). Although difficult to change, stereotypes are found to be more flexible than it is often assumed. Social events that disrupt intergroup relations have been found to change stereotypes depending on the effect these events may have on the context in which they occur and the perceptions formed as a result (Oakes, 1994). Social changes such as the rising trend of "...role-free rearing of children..." (Purvis, 1987, p. 17) has resulted in the shift of some gender stereotypes; such as confining baby girls to pink clothing and baby boys to blue clothing (Purvis, 1987). Likewise, changes in beliefs about gender-roles and the related stereotypes have been noted in university students (Rosenkrantz, Vogel, Bee, Broverman, & Broverman, 1968).

#### **2.7.4. Multiple intelligences and gender differences: male hubris and female humility**

Studies on the estimations of overall intelligence reflect a particular pattern in which males are often found to estimate themselves higher than females (Furnham, Tang, Lester, O'Connor & Montgomery, 2002; Neto & Furnham, 2006); it has also been found that fathers are rated higher than mothers, grandfathers higher than grandmothers, and male children higher than female children (Furnham, Rakow, Sarmany-Schuller, & De Fruyt, 1999). These gender differences appear to be applicable cross-culturally (Petrides, Furnham, & Martin, 2004) and cross-nationally (Furnham, Hosoe, & Tang, 2001; Furnham, Rakow, Sarmany-Schuller, & De Fruyt, 1999). When the estimates are extended to Gardner's seven types of multiple intelligences, males often rate themselves and are rated as more intelligent on mathematical/logical intelligence (Furnham, Rakow, Sarmany-Schuller, & De Fruyt, 1999), spatial intelligence and verbal intelligence (Neto & Furnham, 2006).

Western cultures are assumed to favour males when stereotyping on intelligence (Bennett, 1996), as men tend to be viewed as "...logical, rational, and instrumental..." (Bennett, 1996, p.411), while women are seen as "...empathetic, intuitive, and nurturant..." (Bennett, 1996, p.411). Evidence of these gender stereotypes is reflected often in studies of estimates of multiple intelligences (Bennett, 1996; Furnham & Buchanan, 2005), in which males rate themselves or others rate males as more intelligent on overall intelligence, mathematical/logical, or verbal intelligence and/or spatial intelligence. It is unlikely, yet not impossible for females to be rated significantly higher than males on mathematical intelligence due to the widely held negative stereotype about females being seen as "...weak in math ability" (Spencer, Steele, & Quinn, 1999, p.4). It is also unlikely for men to be rated highly on intrapersonal or interpersonal intelligence as females are often described as being "emotional... very affectionate... aware of the feelings of others, very tactful, and are able to devote themselves completely to others" (Purvis, 1987, p. 17).

These gender differences in intelligence ratings are often attributed to gender-role rearing and stereotyping. In Western culture it appears that male characteristics are stereotyped to encourage socialisation on male hubris and female humility which results in self-enhancing bias by men in their estimates of overall intelligence and those multiple intelligences associated with general intelligence, such as mathematical ability.

## **2.8. Concluding Comments**

The current study takes the arguments presented above as its point of departure. Its focus is on how Black (African) university students estimate their own overall and multiple intelligences as well as the intelligences of their male and female parents. Using parents' level of education as a proxy measure, the study also investigates the relationship between socio-economic status and students' estimates of their parents' multiple intelligences.

## **CHAPTER THREE**

### **METHODOLOGY**

The current chapter presents the study's research design. The quantitative research design that was employed is justified with reference to the study purpose. The study methodology is then presented. The sampling procedure that was employed in collecting data as well as a breakdown of the participants involved in the study is also discussed. This is followed by the procedure involved in the collection of the data; the challenges encountered during data collection will also be reflected upon in this chapter. The questionnaire utilised in the study will be described and its validity and reliability will also be discussed. A detailed description of the analysis that was employed in the study will also be a part of the current chapter. The ethical considerations of the study will then precede the concluding comments on the chapter.

#### **3.1. Research Design**

The focus of this investigation was to understand how students rated themselves and their parents on the general (*g*) and multiple dimensions of intelligences as postulated by Gardner (1983). The study employed a cross-sectional, correlational, quantitative research design. The correlational nature of the study arises from the fact that it aimed to assess and explain the relationship between gender, level of education and the ratings on the general and multiple intelligences (cf. Babbie, 1992). The study design is cross sectional: several different people with different variables of interest were sampled and compared at one single time. This form of study design was conducted as it is easier to conduct "...because the researcher [could not] collect all the needed data at a single time" (Leedy & Ormrod, 2005, p. 181). This design was suitable to the current study due to time constraints. The independent variables in the study are gender (of the students and the gender of the parents) and parents' level of education (as a proxy of socio-economic status), while the dependent or outcome variables are general intelligence and the multiple intelligences (linguistic/verbal, logical-mathematical, spatial, bodily-kinetic, musical, interpersonal, and intrapersonal intelligences).

### **3.2. Sampling**

The process of "...sampling enables the researcher to study a relatively small part of the target population, and yet obtain data that [is] representative of the whole" (Sarantakos, 2005, p. 152) population. In cases where "coverage of the whole [target] population is not possible" (Sarantakos, 2005, p. 153), due to constraints such as time, and resources, sampling the target population is often ideal.

While it would have been ideal to obtain a random sample for a study of this nature, this was not possible due to time constraints and the limited scope of the project. Hence, the researcher resorted to non-probability sampling, targeting those students who were available and willing to participate. While this opens a room for uncontrolled sampling bias or error (for example, students availing themselves for participation on the basis of some selective variables unknown to the researcher, or the problem associated with intact, captive classroom samples) Terre Blanche *et al.*, 2006 suggest that non-probability sampling is useful for testing theories that are considered to be universal or have reported similar results under a number of different settings. This is applicable to the current study as a number of studies (Adewusi, 2011; Furnham, 2001; Furnham & Baguma, 1999; Furnham & Mkhize, 2003; Furnham, Mkhize, & Mndaweni, 2004; Maharaj, 2006; Wambugu, 2006) have been done across the world requesting people to estimate their own levels of intelligences and that of others. The non-probability sampling procedures that were employed in this study were convenience sampling and snowball sampling. The use of these different types of sampling procedures was with the aim at obtaining "information that would reveal certain aspects of the lifestyle in question" (Sarantakos, 2005), in the case of the current study, that is students perceptions of their own and their parents multiple intelligences.

### **3.3. Participants**

For this study, 158 participants were used, which consisted of students from first year of study (20%), second year of study (27.1%), third year of study (38.1%), honours year of study (11.6%), and masters year of study (3.2%) as shown in Table 1. All the students were from the University of KwaZulu-Natal, Pietermaritzburg campus. The participants were initially drawn from the four South African 'race' groups: Black/African, Indian, Coloured and White. Different response patterns from these groups led to disproportionate cell sample

sizes which would have complicated and even compromised data analysis. Eventually, the analysis proceeded with the data from Black Africans only.

Table 1

*Participants' descriptive statistics: Year of Study*

|                |                 | <i>Frequency</i> | <i>Percent</i> | <i>Valid Percent</i> | <i>Cumulative Percent</i> |
|----------------|-----------------|------------------|----------------|----------------------|---------------------------|
| <i>Valid</i>   | <i>1ST YEAR</i> | 31               | 19.6           | 20.0                 | 20.0                      |
|                | <i>2ND YEAR</i> | 42               | 26.6           | 27.1                 | 47.1                      |
|                | <i>3RD YEAR</i> | 59               | 37.3           | 38.1                 | 85.2                      |
|                | <i>HONOURS</i>  | 18               | 11.4           | 11.6                 | 96.8                      |
|                | <i>MASTERS</i>  | 5                | 3.2            | 3.2                  | 100.0                     |
|                | <i>Total</i>    | 155              | 98.1           | 100.0                |                           |
| <i>Missing</i> | <i>System</i>   | 3                | 1.9            |                      |                           |
| <i>Total</i>   |                 | 158              | 100.0          |                      |                           |

There was no age group limit for the participants as university students are a large and diverse population. The minimum age was 18 years. Figure 1 shows the percentage of students within each age group. The eldest participant was 50 years old. A majority of the participants (n=32) were aged 21 years old (20.3%). Of the 158 respondents, 83 were female while 75 were male (Table 2).

Table 2:

*Participants' distribution statistics by gender*

|                | <i>Frequency</i> | <i>Percent</i> | <i>Valid percent</i> | <i>Cumulative percent</i> |
|----------------|------------------|----------------|----------------------|---------------------------|
| <i>Females</i> | 83               | 52.5           | 52.5                 | 52.5                      |
| <i>Males</i>   | 75               | 47.5           | 47.5                 | 100.0                     |
| <i>Total</i>   | 158              | 100.0          | 100.0                |                           |

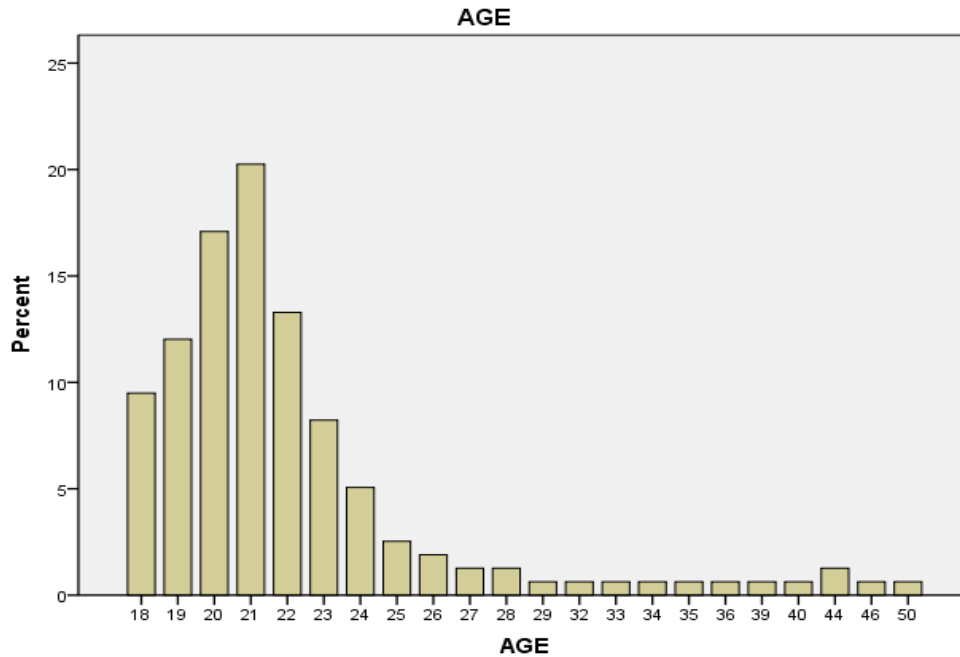


Figure 1: Participants' age distribution by percentage.

### 3.4. Procedure

Participants were approached in residences, the library, the University cafeterias and other places on campus where the students normally congregate outside of lectures. In some cases, participants were sampled in the lecture halls before or at the end of their lecture period. Upon the participants indicating their willingness to listen to the researcher, the study was explained to them for a period of 5 minutes. During this time the students were also given the opportunity to ask questions and read the written consent form which they had to sign (Appendix 1). Data were also collected during the class time where feasible. Otherwise, the researcher approached the students at residence halls, and lawns outside the library, and lecture halls. Where data was collected during class time, permission was obtained in advance from the relevant Heads of Schools and the course coordinators. The permission was requested in writing.

Participants were informed of the main aim of the study, which was to observe lay persons' perceptions or understanding of multiple intelligences. Furthermore, that this was to be obtained through the use of a questionnaire in which individuals were to estimate their level of multiple intelligences and that of their parents. The bases of these seven multiple intelligences were explained, thus giving a brief overview of Gardner's (1983) Theory of

Multiple Intelligences. The focus on this overview was mainly on the definitions of the seven types of intelligences. Thereafter the normal distribution curve on the questionnaire was explained to the participants on request basis (Appendix 2). Thereafter the participants completed the questionnaire at their own pace without any assistance from other participants or non-participants. The completion time of the questionnaire varied with each participant, an average time of approximately 7 minutes was noted as the general completion time.

The data was collected by the researcher and data collectors. The data collectors were classmates of the researcher. They were recruited on the basis of availability and their extensive knowledge in psychology and research in the field. Prior to data collection process, the researcher and data collectors engaged in a meeting whereby background information, aims and data collection process of the study were discussed.

### **3.4.1. Challenges**

The main challenge in the collection of data was that most participants were discouraged by the lengthy consent form which they had to read and sign prior to answering the questionnaire. Most students assumed the task would be tiresome and time consuming. No incentives were offered to the students. Other students suggested having the consent form read to them or briefly explained to them. Whilst filling in their demographics, a portion of the male students tended to have an argument with the data collators concerning the use of the word “Africans” to describe the Black population of South Africa. These students felt that this form of labelling was discriminating as other races in the country were also African in their own right. This argument on politically correct terms did not affect their willingness to participate in the study. These participants emphasised that they were merely expressing their opinions and concerns on the use of the term.

### **3.5. Research Instrument**

This quantitative study was carried out in the form of collecting data through the use of questionnaires. Conducting a survey as a method of data collation in the social sciences is very common (Sarantakos, 2005) and even more so in psychology (Leeuw, 2008). The main reason for using surveys and questionnaires is that lay persons are familiar with surveys as they encounter them in their everyday lives. These encounters could include, taking part in a census survey, filling out a questionnaire in their application for a loan at a financial service



provider or an application for admission into an academic institution or applying for membership into a club (Sarantakos, 2005). These everyday incidences suggest familiarity with surveys and what they are all about, thus "...surveys are not only a common research tool, but also a part of a person's life experience" (Sarantakos, 2005, p. 239). Such familiarity with questionnaires and surveys by the general public is a great advantage to a social science researcher who intends to use questionnaires in their research study of lay persons.

Familiarity with the type of research instrument by the participant allows them to feel comfortable and competent whilst partaking in the research study. Other advantages of conducting research data collection by questionnaire, are, (1) results can be attained quickly as most questionnaires are designed to be quick, precise and to the point; (2) by using questionnaires the researcher is able cover a wide range of participants at a time by distributing the questionnaire simultaneously; (3) there is great assurance of anonymity and less opportunity for bias that could be caused by the presence of an interviewer (Sarantakos, 2005) as it could occur in interview situations.

Although it could be argued that administering questionnaires does not allow for participants to probe and ask questions of clarity as a disadvantage, a questionnaire that has been well constructed with good questions and without the threat of specification error or lack of construct validity (Leeuw, 2008) is a greater advantage in data collection. A good question item contains simple words, avoids ambiguity and asks one question at a time (Leeuw, 2008). Another disadvantage of conducting surveys is the lack of the opportunity for respondents to be motivated to answer questions in the survey or participate in the survey (Sarantakos, 2005), this then results in partial response to the questionnaire items. Yet, assuring anonymity is empirical to a study as this allows for participants to be honest in their responses. Also minimized time of contact between the researcher and/or data collectors and respondents reduces biasness and does not impact on the uniform process of collecting data.

For the current study a self-administered questionnaire was utilized to collect data from participants. The questionnaire that was used was developed by Furnham and Gasson (1998), and has been utilised in a numerous studies (Adewusi, 2011; Wambugu, 2006; Maharaj, 2006; Furnham, Mkhize, & Mndaweni, 2004; Furnham & Mkhize, 2003; Furnham, 2001; Furnham & Baguma, 1999). This questionnaire Furnham (2009) has termed to be the *Self-Assessed Multiple Intelligence Questionnaire*. The questionnaire included a normal distribution curve of IQ scores with the means, standard deviations, and together with a simple explanation of what the normal distribution indicates (see appendix 1). This was then

followed by a table containing the seven different types of intelligences as outlined by Gardner (1983) as well as the overall intelligence in a column. The table also includes three columns in which participants were asked to estimate their own intelligence and that of their parents. The questionnaire also included six questions for the participants to answer. These were asking for their input and views on issues related to intelligence and intelligence testing. Finally, the questionnaire also included demographic questions concerned with the students' parents; these were age, race, and highest level of education and occupation. Students were also asked to fill in demographic information about them. These were their race, age, gender, and year of study.

### **3.5.1. Reliability and validity of the research instrument**

The reliability of the research instrument refers to its ability to yield consistent and similar results should the instrument be administered on the same or similar population repeatedly. The questionnaire administered in this study has been used in "...numerous studies (Furnham, 2001; Furnham & Baguma, 1999; Furnham & Budhani, 2002; Furnham & Gasson, 1998) and has consistently been found to be reliable in producing findings..." (Maharaj, 2006, p. 62) of self-estimates of overall and multiple intelligences. The questionnaire has been used within the "...South African context and has proven to be [both] reliable and valid for use in a multi-cultural context" (Maharaj, 2006, p. 62).

### **3.5.2. Reliability and validity of self-report measures**

The use of direct self-report measures of intelligence like the questionnaire used in this study, has been argued to be acceptable primarily because perceptions are subjective; they are not open to objective testing (Furnham, 2009). Furnham (2009) also argues that in order for these self-reports of intelligence to be recognized they could be viewed as being "...a trait multiple intelligence..." (p. 235) measure rather than an "...ability intelligence test..." (p. 235).

In a study on the validity of a self-report measure of multiple intelligences, more than half of the eight (linguistic, musical, mathematical, spatial, interpersonal, intra personal, bodily-kinetic, and natural intelligence) scales did not "...reach the generally accepted level [of] internal validity (Alpha = .70)" (Furnham, 2009, p. 236). There was also an overlap between some of the multiple intelligences as mapped out by Gardner (1983) and Big Five Personality traits (Costa & McCrae, 1992). These were Interpersonal intelligence and Extraversion; and

Linguistic intelligence and Openness. This was thought to suggest that the same construct was being measured and the only difference is in terminology (Furnham, 2009). Further work is therefore needed to establish the relationship between Gardner's multiple intelligences, the social ones in particular, and some measures of personality. Paulhas, Lysy, and Yik (1998) suggest ways of improving the validity of self-report measures of intelligence. These are (1) indirect measurement strategy, whereby the use of subtle, nonobvious questioning is employed in order to mask the purpose of the test; (2) aggregation strategy, this involves aggregating a set of items to improve reliability; and (3) weighting strategy, this is done by weighting item according to their level of importance. In applying these strategies to their own study, Paulhas *et al* (1998) found self-report measures of intelligence to be reliable in predicting IQ scores; this is due to the "...restricted range of abilities in competitive college samples, however the validity limit appears to be .30" (Paulhas *et al.*, 1998, p. 551).

From the above cited studies, it could be noted that determining the reliability and validity of self-report measures of intelligence and multiple intelligences is a challenging task which requires that the definition of multiple intelligences, its relation to other psychological constructs such as personality traits, be considered. In addition strategies for improving self-report measures of intelligence have been developed and found to be useful in limited samples.

### **3.6. Internal Validity of Study**

Internal validity of a study refers to "...the extent to which the results of a study can be attributed to treatments (variables) rather than flaws in the research design" (Bergh, Hanke, Balkundi, Brown, & Chen, 2004, p. 351). Flaws in the research design are caused by factors which pose a threat to the internal validity of a study. The factors which when unaccounted for may pose a threat to the internal validity of a study are: history, maturation, testing, instrumentation, regression, selection, mortality and ambiguity about causal inference (Bergh *et al.*, 2004). Bergh *et al.* (2004) found in their study "...that some threats are particular to whether a research design is cross-sectional or longitudinal..." (p. 350), while other threats are found to exist for both research designs. The current study is a cross-sectional design and several threats to the internal validity of this study need to be considered. These are testing, instrumentation, selection, and ambiguity about direction of causal inference.

### **3.7. Testing**

This threat to internal validity refers to a subject's familiarity with the research instrument or administration of a test that may be linked to the research instrument of the current study (Bergh *et al.*, 2004). This threat appears may have been present in the current study as intelligence testing is fairly common in academic settings or otherwise in South Africa. A subjects experience in IQ testing may have influenced their estimations on their overall intelligence score. In an attempt to account for this threat, participants were asked whether they had taken an intelligence test before. Analysis on this question showed that 28.7% of the participants had taken an intelligence test whilst a majority (71.3%) of the participants had not. With a majority of the participants having not taken an intelligence test before, this suggests that (previous) testing as a factor that may threaten the internal validity of this study is not a major concern.

### **3.8. Instrumentation**

Instrumentation refers to the "...autonomous changes in the measuring instrument which might account for..." (Bergh *et al.*, 2004, p. 352) changes in the results of study. These changes may also be in the administrators of the study, for example the interviewer or the data collectors (Bergh *et al.*, 2004). The data collector and/ or researcher of this current study may have influenced (unknowingly) the participants scoring process if one or either of the following relationships existed between them and the participant: (a) fellow classmate; (b) past module tutor; (c) both parties resided in the same residence; or (d) both parties were acquaintances or friends. Such familiarities between the data collectors and participants may have produced shifts in the participants' response to participating in the study and responses on the questionnaire. In an attempt to control for the effects of instrumentation, participants were selected in different areas of the campus. Different (three) field workers assisted with data collection.

### **3.9. Selection**

This refers to the selection of study participants on the basis of them possessing particular characteristics which may be related to the dependent or independent variables (Bergh *et al.*, 2004). A few of the questionnaires were blank or not completed in full and had to be excluded from the analysis. It is not possible to establish if the participants that returned blank or incomplete questionnaires represent a typical group. In addition, although the study was initially designed to take a sample across the South Africa's four main 'race' groups (Black African, Coloured, Indian and White), very few responses were received from groups other than Black Africans. Responses from other groups had to be excluded from analysis due to highly disproportional sample (cell) sizes. The current study is thus limited to Black Africans. It was not possible to follow up the reasons for poor responses amongst other groups, due to time constraints.

### **3.10. Ambiguity about direction of causal inference**

This occurs when the causality of the relationships found in the results of the study are unclear (Bergh *et al.*, 2004). This form of threat is said to be common in "one-time period" (Bergh *et al.*, 2004) study designs such as the current study. As an attempt to control for this ambiguity, Cook and Campbell in Bergh *et al.*, (2004) suggest the collection of data at multiple time periods. The current study applied the above suggestion as an attempt to minimize internal validity of the study. However, even if attempts have been made to control for the ambiguity about the direction of causal inference, it is important to note that more often than not, in numerous studies, "...it is impossible to determine an ordering of the relationships, thus raising the likelihood that alternative explanations may account for the effects" (Bergh *et al.*, 2004, p. 354). Although attempts may be made by the researcher to minimize threat to internal validity of a study, these threats may not be completely eradicated, and in some instances they may have little effect. It is suffice to underscore the fact that the current study is not primarily concerned with causal effects; it is about the relationship between the predictor (independent) and outcome (dependent) variables. Causal effects should be left to future studies designed for this purpose. Future studies designed for this purpose will establish the casual effect.

### **3.11. Analysis**

The statistical Package for Social Sciences (SPSS) was used to analyse the data that was collected. The average mean for each of the types of intelligences for the male and females students was calculated alongside with that of the parents (as rated by the students). For the students' rating of their parents, the means were compared by gender (of student and parent) and by parents' highest qualifications, as reported by the students. Inferential statistics, by way of independent t- tests, multivariate analysis of variance (MANOVA) and multiple regressions were conducted, depending on the research question. The MANOVA involved a 2 (gender of self) by 2 (gender of parents) by 3 (race: Black,) factorial manipulation, with the eight dimensions of intelligence (General, verbal/linguistic, logical-mathematical, spatial, bodily-kinetic, musical, interpersonal, and intrapersonal intelligences) as independent variables. The Follow up analysis involved the use of univariate analyses and for the means that were found to be statistically significant, they were compared using Scheffe's family-wise procedure so as to be able to determine the source of difference between these means. For the six 'yes' or 'no' questions (see Appendix 2) that also formed part of the questionnaire, they were analysed using the Pearson's Chi-squared test of independence. A comparison of the participants' response was done according to their genders. The best predictors of overall intelligence were also determined using multiple regression analysis.

### **3.12. Ethics**

In order to commence with the current study, ethical clearance needed to be obtained from the higher degrees committee of the School of Psychology (UKZN) and from the University of KwaZulu-Natal's Social Sciences and Humanities Research Ethics Committee. Clearance from both committees was attained successfully. These committees are present to uphold ethical research principles within the university community in their respective disciplines by attempting to "balance two occasionally contradictory interests or needs" (Schuler, 1982, p. 166) in the field of research. These needs are "the need to contribute to the accumulation of knowledge and the need to avoid harming others" (Schuler, 1982, p. 166). As a university the on-going contributions to research are vital and so is the need of conducting research in an ethical manner. When conducting research a number of ethical issues need to be considered and adhered to. Those relating to the current study will be discussed below.

### **3.12.1. Informed consent and voluntary participation**

When conducting a research study, the participation of human subjects should be voluntary. At no point should a participant be forced to take part in a study (Babbie, 1992). When working with students as subjects, it is empirical to highlight the right to not partake in a research study especially in cases where data collection is conducted in lecture halls. It is the researcher's responsibility to be sensitive of any implied negative consequences that may be perceived to arise from students' non-participation (Babbie, 1992). In the current study, where data were collected during class time provisions were made to avoid any perception of negative implications to non-participation. The voluntariness to partake in the study was outlined verbally and in writing to the students; also the freedom to decline or withdraw once the study has started (Terre Blanche *et al.*, 2006) was stated.

In this study, prior to answering the questionnaires, the participants were informed verbally, in English, about what was expected of them. An informed consent form was attached for participants to sign if they chose to participate. The signing of the informed consent is done so as to protect participants from potentially harmful research being done on them without the participants' knowledge or will to partake in the study (Schuler, 1982). A consent form, Schuler (1982) writes, should also include any potential harm that may arise from taking part in a study so as to make the contract from the consent form valid. The study did not anticipate any harm, except perhaps for the discomfort that may be associated with being labelled in one way or another in South Africa according to previous racial categorisations. This practice continuous for various statistical processes in South African Higher Education Institution and government and the students would have been familiar with it. Participants were also aware of their right to stop their participation at any stage and without having to offer an explanation.

### **3.12.2. Confidentiality and anonymity**

In order to protect the participants interests and wellbeing in participating in a study their rights to having their identity being kept anonymous and the information they provided confidential should be upheld (Babbie, 1992). In this study all the information provided by the participants was kept confidential throughout the study. Components of the questionnaire were not linked to the participants in any way. Participants' identifying information, such as their names, surnames and student numbers were not essential. The only personal information

required from them was their age, gender, and 'race'. In addition the signed consent forms and questionnaire were kept separately by the researcher.

### **3.12.3. Beneficence and non-maleficance**

When conducting research on human subjects it is important to continuously weigh the benefits and costs on the participants and society in general (Goodwin, 2010). There were no direct benefits to the study participants. Society in general may benefit from a proper understanding of lay perceptions of intelligence and their potential impact, by way of the self-fulfilling prophecy, on various processes such as schooling and employment practices. The only direct cost incurred by the participants in this study was loss of class or study time. This was kept to a minimum.

### **3.13. Concluding Comments**

In conclusion, this chapter discussed the research design employed in the study; sampling procedures used to attain participants; participants involved in the study and their brief demographical analysis; the procedure undertaken to collecting the data used and the challenges involved in data collection; the research instrument and its validity and reliability as a research tool. The methodology used to analyse the data was discussed, as were the ethical implications.



## CHAPTER FOUR

### RESULTS

#### 4.1. Introduction

This chapter presents the results obtained from the analysis of the questionnaires completed by the participants. These results are presented according to the students' self-estimates of overall and multiple intelligences and students' estimates of their parents' overall and multiple intelligences, respectively. The analysis includes estimates according to parents' highest qualification as reported by the participating students and comparisons between mother and father ratings. Finally the chapter includes students' qualitative views on intelligence and intelligence testing. An analysis of the best predictors of general intelligence is also included.

#### 4.2. Students' Self-Estimates of Overall and Multiple Intelligences

A multivariate analysis of variance (MANOVA) was performed to investigate gender differences in self-estimates of overall intelligence and multiple intelligences. The dependent variables were overall intelligence, verbal intelligence, spatial intelligence, logical intelligence, body kinetic intelligence, musical intelligence, interpersonal intelligence and intrapersonal intelligence. The independent variable was gender. The following question was being answered by the analysis: Are male students self-estimates of their multiple intelligences higher than female students' self-estimates?

The following null hypotheses were tested:

- *H<sub>0</sub>*: There will be no difference in male and female students' self-ratings;
- *H<sub>1</sub>*: Male students' self-estimations will be higher than those of female students;

The main effect (gender) resulted in no statistically significant differences between male and female students' ratings of their overall and multiple intelligences, ( $F(8,144) = 1.17, p > 0.05$ ). Thus, we accept the null hypothesis, that there is no significant difference in male and female students' self-ratings of overall and multiple intelligences. Table 3 shows the mean

scores of the students' self-estimates of overall and multiple intelligences for both the female and male students.

Table 3  
*Students' self-estimates of overall and multiple intelligences by gender*

| Types of intelligence | Female students |                | Male students |                |
|-----------------------|-----------------|----------------|---------------|----------------|
|                       | Mean            | Std. deviation | Mean          | Std. deviation |
| <b>Overall (IQ)</b>   | 108.44          | 12.627         | 103.84        | 16.132         |
| <b>Verbal</b>         | 104.66          | 16.929         | 102.82        | 20.334         |
| <b>Spatial</b>        | 108.00          | 15.264         | 107.30        | 19.576         |
| <b>Logical</b>        | 100.15          | 18.070         | 102.78        | 21.085         |
| <b>Musical</b>        | 101.30          | 20.563         | 99.07         | 26.534         |
| <b>Body kinetic</b>   | 103.40          | 21.865         | 100.16        | 23.714         |
| <b>Interpersonal</b>  | 115.76          | 18.058         | 110.88        | 19.443         |
| <b>Intrapersonal</b>  | 116.64          | 17.923         | 114.73        | 20.093         |

*Key: overall (IQ) = overall intelligence; verbal=verbal/linguistic intelligence; spatial=spatial intelligence; logical=logical-mathematical intelligence; musical intelligence; body kinetic= bodily-kinetic intelligence; interpersonal=interpersonal intelligence; intrapersonal=intrapersonal intelligence.*

Table 3 depicts minor differences in male and female students' ratings of their own overall and multiple intelligences. These differences are possibly by chance suggesting that male and female university students perceive their levels of overall and multiple intelligences to be similar. Figure 2 shows the mean distribution of mean scores by gender of the participants.

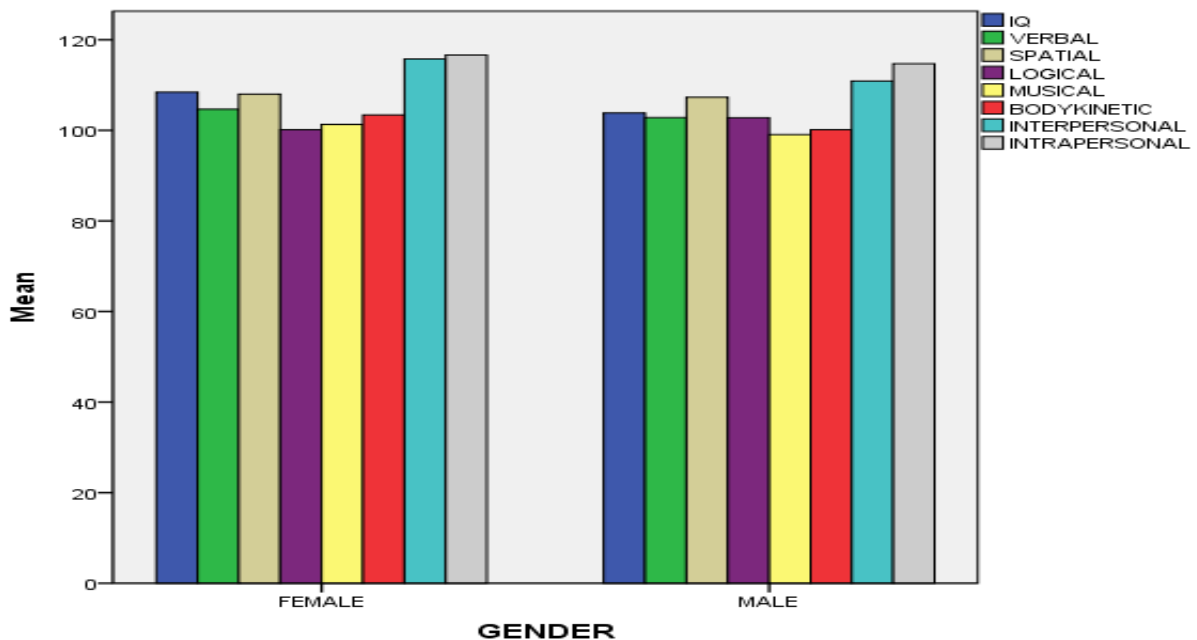


Figure 2: Mean distribution of male and female students' self-ratings.

### 4.3. Inter-Generational Differences in Overall and Multiple Intelligences

To determine any generational differences in the ratings of overall intelligence and multiple intelligences, a series of paired samples t-tests were performed in order to test the following hypotheses:

- HO: There are no differences in the way Black African university students rate their own and their parents' general ('g') and multiple intelligences;
- HI: University students will estimate their general ('g') and multiple intelligences to be higher than their parents'

For overall intelligence there was no significant difference between the participants ( $M = 106.51$ ,  $SD = 14.431$ ), ratings of themselves and those of their fathers ( $M = 107.17$ ,  $SD = 19.758$ ),  $t(128) = -.765$ . There was also no significant difference between the participants' ( $M = 106.37$ ,  $SD = 14.336$ ) ratings of themselves and those of their mothers ( $M = 107.49$ ,  $SD = 18.414$ ),  $t(149) = -.807$ . This suggests that the participants view themselves to be of more or less of equal intellectual capacity as their parents.

The students rated themselves as significantly more intelligent than their fathers on bodily-kinetic, interpersonal, and intrapersonal intelligence, while the fathers were rated significantly higher on verbal intelligence (Table 4). The mothers were not rated significantly more intelligent than the students on any of the types of intelligences, while the students rated themselves as more intelligent than their mothers on logical-mathematical intelligence and bodily-kinetic intelligence (Table 5).

Table 4

*Paired samples t-tests output: Self vs. Fathers*

| <b>Types of intelligences</b> | <b>Mean</b> | <b>Standard Deviation</b> | <b>t</b> | <b>df</b> | <b>Sig. (2-tailed)</b> |
|-------------------------------|-------------|---------------------------|----------|-----------|------------------------|
| <b>Verbal</b>                 | 104.56      | 18.957                    | -2.757   | 132       | .007                   |
| <b>F. verbal</b>              | 109.04      | 20.283                    |          |           |                        |
| <b>Body kinetic</b>           | 102         | 23.664                    | 3.685    | 132       | .000                   |
| <b>F. Body Kinetic</b>        | 94.91       | 25.746                    |          |           |                        |
| <b>Interpersonal</b>          | 113.60      | 19.345                    | 4.883    | 131       | .000                   |
| <b>F. Interpersonal</b>       | 104.63      | 21.290                    |          |           |                        |
| <b>Intrapersonal</b>          | 115.56      | 19.504                    | 2.719    | 132       | .007                   |
| <b>F. Intrapersonal</b>       | 110.35      | 21.939                    |          |           |                        |

*Key: Prefix F. = Father; verbal = verbal/linguistic intelligence; body kinetic = bodily-kinetic intelligence; interpersonal = interpersonal intelligence; intrapersonal = intrapersonal intelligence.*

Table 5

*Paired samples t-test output: Self vs. Mothers*

| <b>Types of Intelligences</b> | <b>Mean</b> | <b>Standard Deviation</b> | <b>t</b> | <b>df</b> | <b>Sig. (2-tailed)</b> |
|-------------------------------|-------------|---------------------------|----------|-----------|------------------------|
| <b>Body Kinetic</b>           | 101.46      | 22.874                    | 2.827    | 155       | .005                   |
| <b>M. Body Kinetic</b>        | 96.70       | 21.973                    |          |           |                        |
| <b>Logical</b>                | 101.38      | 20.044                    | 2.165    | 155       | .032                   |
| <b>M. Logical</b>             | 97.46       | 22.464                    |          |           |                        |

*Key: Prefix M. = Mother; body kinetic= bodily-kinetic intelligence; logical = logical-mathematical intelligence.*

From the analysis above, it appears the perception of generational differences in overall intelligence is not held by these university students. The differences in ratings between both parents and the students are minor and not statistically significant. From this analysis, the null hypothesis is accepted; thus, there is no difference in self-ratings and parents' ratings on overall intelligence. In terms of multiple intelligences there appears to be perceived generational differences on some of the intelligences between students' ratings and those of

their parents. The students' self-ratings were statistically higher than ratings of their mothers on logical and body-kinetic intelligence. Students rated their fathers higher on verbal and interpersonal intelligence, while according themselves (students) higher ratings than their fathers on intrapersonal and body-kinetic intelligence.

#### **4.4. Students' Estimates of their Parents' Intelligences**

The ratings given to the parents were analysed in order to determine differences in their overall and multiple intelligences according to gender of the participants and of the parents, and according to parents' highest qualifications.

##### **4.4.1. Gender-specific estimates**

To establish if the students' ratings of the overall and multiple intelligences of their parents differ according to the gender of the parents as well as the gender of the students, two sets of hypotheses were tested. The first was:

- a. HO1: There will be no differences in the students' ratings of their parents' overall and multiple intelligences that could be attributable to the gender of the parent being rated;
- b. HI1: University students' ratings of their parents' general and multiple intelligences will differ depending on the gender of the parent being rated.

A multivariate analysis was conducted to determine whether there are differences in parents' estimates on overall intelligence and multiple intelligences. There was no interaction effect. The main effect yielded no significant difference in the students ratings of their parents' overall and multiple intelligences that could be attributable to the gender of the parent ( $F_{16,109} = .840, p > 0.005$ ).

The second set of hypotheses that were tested was:

- c. HO2: There will be no differences in male and female students' ratings of their parents' overall and multiple intelligences;
- d. HI2: Male and female students will differ in their ratings of their parents' general and multiple intelligences. Rating their fathers higher than the female students on their parents' overall and multiple intelligences.

MANOVA was conducted to investigate the parents' sex differences in the estimates of overall and multiple intelligences by gender of the participants. There was no significant difference in female and males ratings of their mothers overall and multiple intelligences,  $F(8, 140) = 1.098, p > 0.05$ ;

Table 6

*Female students estimate of their parents multiple intelligences*

| <i>Types of intelligence</i> | <i>Mothers</i> |                       | <i>Fathers</i> |                       |
|------------------------------|----------------|-----------------------|----------------|-----------------------|
|                              | <i>Mean</i>    | <i>Std. Deviation</i> | <i>Mean</i>    | <i>Std. Deviation</i> |
| <i>Overall (IQ)</i>          | 107.25         | 17.583                | 106.72         | 18.481                |
| <i>Verbal</i>                | 105.34         | 19.539                | 108.16         | 19.745                |
| <i>Spatial</i>               | 107.04         | 20.847                | 107.78         | 18.983                |
| <i>Logical</i>               | 99.49          | 19.668                | 104.01         | 23.126                |
| <i>Musical</i>               | 102.28         | 19.791                | 97.74          | 21.177                |
| <i>Body kinetic</i>          | 99.91          | 19.773                | 97.97          | 22.377                |
| <i>Interpersonal</i>         | 110.35         | 20.221                | 103.71         | 29.967                |
| <i>Intrapersonal</i>         | 113.34         | 19.147                | 107.43         | 21.748                |

*Key: overall (IQ) = overall intelligence; verbal=verbal/linguistic intelligence; spatial=spatial intelligence; logical=logical-mathematical intelligence; musical intelligence; body kinetic= bodily-kinetic intelligence; interpersonal=interpersonal intelligence; intrapersonal=intrapersonal intelligence.*

There was also no statistically significant difference in the male and female ratings of their fathers overall and multiple intelligences,  $F(8, 118) = 1.147, p > 0.05$ .

Table 7

*Male students estimate of their parents multiple intelligences*

| <i>Types of intelligence</i> | <i>Mothers</i> |                       | <i>Fathers</i> |                       |
|------------------------------|----------------|-----------------------|----------------|-----------------------|
|                              | <i>Mean</i>    | <i>Std. Deviation</i> | <i>Mean</i>    | <i>Std. Deviation</i> |
| <i>Overall (IQ)</i>          | 106.17         | 20.442                | 109.02         | 21.295                |
| <i>Verbal</i>                | 105.90         | 19.259                | 109.74         | 21.540                |
| <i>Spatial</i>               | 105.16         | 19.212                | 108.17         | 22.561                |
| <i>Logical</i>               | 93.83          | 23.892                | 98.66          | 28.413                |
| <i>Musical</i>               | 96.12          | 22.385                | 93.76          | 27.079                |
| <i>Body kinetic</i>          | 96.74          | 24.576                | 93.03          | 26.167                |
| <i>Interpersonal</i>         | 114.14         | 18.906                | 103.71         | 19.372                |
| <i>Intrapersonal</i>         | 116.62         | 19.147                | 114.45         | 20.588                |

*Key: overall (IQ) = overall intelligence; verbal=verbal/linguistic intelligence; spatial=spatial intelligence; logical=logical-mathematical intelligence; musical intelligence; body kinetic= bodily-kinetic intelligence; interpersonal=interpersonal intelligence; intrapersonal=intrapersonal intelligence.*

Tables 6 and 7 show the mean differences in female and male ratings of the parents' overall and multiple intelligences, respectively. From these tables it can be observed that the ratings

given by both the female and male students are more or less equal and that any differences are due to chance.

#### **4.5. Estimates According to Parents' Highest Qualifications**

The highest qualifications of the parents were classified under two categories, the *Diploma/Degree* category and the *No Diploma/Degree* category. The following question was being answered: What is the relationship between parental level of education and their ratings by the students on the multiple intelligences proposed by Gardner? The question was answered through testing the following hypotheses:

- *HO*: There is no relationship between parental level of education and their ratings by students on multiple intelligences;
- *HI*: Students' ratings of their parents will differ depending on parents' level of education.

MANOVA conducted to investigate how students rated their parents depending on the latter's level of education revealed the following: for mothers, there is a significant difference between mothers in the *Diploma/Degree* category and those in the *No Diploma/Degree* category, ( $F(8, 140) = 3.05, p = 0.05$ ). When the results of the dependent variables were considered separately, the differences were found to be in overall, verbal, logical,-mathematical, spatial, musical, and interpersonal intelligences. The mothers in the *Diploma/Degree* category were on average estimated to be of higher intelligence than those in the *No Diploma/Degree* category on these types of intelligences (Table 8).

Table 8

*Mothers' mean score ratings according to highest qualifications*

| <b>Types of intelligences</b> | <b>No Diploma/Degree</b> |                 | <b>Diploma/Degree</b> |                 |
|-------------------------------|--------------------------|-----------------|-----------------------|-----------------|
|                               | <b>Mean</b>              | <b>Std. Dev</b> | <b>Mean</b>           | <b>Std. Dev</b> |
| <b>Overall</b>                | 101.86                   | 18.478          | 113.47                | 16.600          |
| <b>Verbal</b>                 | 100.97                   | 18.066          | 110.56                | 18.459          |
| <b>Logical</b>                | 90.59                    | 21.345          | 104.03                | 20.451          |
| <b>Spatial</b>                | 101.80                   | 20.407          | 110.29                | 19.549          |
| <b>Musical</b>                | 95.79                    | 22.791          | 103.45                | 17.625          |
| <b>Body kinetic</b>           | 93.70                    | 23.294          | 100.56                | 20.303          |
| <b>Interpersonal</b>          | 107.99                   | 19.159          | 116.12                | 19.019          |
| <b>intrapersonal</b>          | 111.14                   | 19.626          | 118.62                | 18.794          |

*Key: No Diploma/degree refers to the either of the following qualification – uneducated, primary school, high school, or certificate. Diploma/Degree refers to either of the following qualifications – diploma, undergraduate degree, or postgraduate degree. Overall (IQ) = overall intelligence; verbal = verbal/linguistic intelligence; spatial = spatial intelligence; logical = logical-mathematical intelligence; musical intelligence; body kinetic = bodily-kinetic intelligence; interpersonal = interpersonal intelligence; intrapersonal = intrapersonal intelligence.*

For the fathers, there is a statistically significant difference between fathers in the *Diploma/Degree* category and those in the *No Diploma/Degree* category in their estimated ratings of overall and multiple intelligences, ( $F(8, 118) = 1.99, p = 0.005$ ) The results for the dependent variables were considered separately and it was found that the significant differences were between overall, verbal, and logical-mathematical intelligences, with those in the *Diploma/Degree* category having their levels of these intelligences estimated as higher than those in the *No Diploma/Degree* group (Table 9). It is interesting to note that for both mothers and fathers, the differences between those with and without a diploma tended to be in those multiple intelligences that are considered to be most representative of general (overall) intelligence, namely verbal, logical-mathematical and spatial intelligences.



Table 9

Fathers' mean score ratings according to highest qualifications

| <i>Types of intelligences</i> | <i>No Diploma/Degree</i> |                 | <i>Diploma/Degree</i> |                 |
|-------------------------------|--------------------------|-----------------|-----------------------|-----------------|
|                               | <i>Mean</i>              | <i>Std. Dev</i> | <i>Mean</i>           | <i>Std. Dev</i> |
| <i>Overall</i>                | 103.07                   | 18.903          | 113.40                | 19.498          |
| <i>Verbal</i>                 | 105.48                   | 20.059          | 113.05                | 20.468          |
| <i>Logical</i>                | 96.94                    | 22.288          | 107.17                | 28.360          |
| <i>Spatial</i>                | 106.06                   | 21.063          | 109.95                | 19.943          |
| <i>Musical</i>                | 94.84                    | 23.764          | 97.75                 | 24.501          |
| <i>Body kinetic</i>           | 94.55                    | 23.683          | 96.88                 | 28.305          |
| <i>Interpersonal</i>          | 104.66                   | 20.917          | 104.82                | 20.455          |
| <i>Intrapersonal</i>          | 109.16                   | 21.539          | 112.48                | 21.198          |

*Key: No Diploma/degree refers to the either of the following qualification – uneducated, primary school, high school, or certificate. Diploma/Degree refers to either of the following qualifications – diploma, undergraduate degree, or postgraduate degree. Overall (IQ) = overall intelligence; verbal=verbal/linguistic intelligence; spatial=spatial intelligence; logical=logical-mathematical intelligence; musical intelligence; body kinetic= bodily-kinetic intelligence; interpersonal=interpersonal intelligence; intrapersonal=intrapersonal intelligence.*

#### 4.6. Students' Views on Intelligence and IQ Testing

As part of the questionnaire there were six 'yes' or 'no' questions that were asked to participants regarding their input and views on issues related to intelligence and intelligence testing. These questions read as follows:

1. *Have you ever taken an intelligence test?*
2. *Do you believe they measure intelligence fairly well?*
3. *Do you believe males are on average more intelligent than females?*
4. *Do you believe intelligence is primarily inherited?*
5. *Do you believe IQ test are useful in educational settings?*
6. *Do you believe some races are more intelligent than others?*

These questions were analysed using the Chi-square test for independence. The relationship between gender and each question was explored. The assumption of Chi-squared concerning the minimum expected cell frequency has not been violated for all analyses reported below.

#### 4.6.1. Question 1: Have you ever taken an intelligence test?

A Chi-square test for independence, with Yates Continuity Correction indicated no statistically significant association between gender and the question *have you ever taken an intelligence test?* The Pearson's Chi-squared was valued at  $\chi^2 (1, N= 157) = .366, p = .54, \phi = .06$ . A small percentage of the participants had taken an intelligence test before, 31.3% of the females answered 'yes' and 68.7% answered 'no'. For the males 25.7% answered 'yes' and 74.3% answered 'no'.

Table 10

*Students' intelligence (IQ) test taking experience*

| <i>Gender</i>  | <i>Taken IQ test</i> |           |              |
|----------------|----------------------|-----------|--------------|
|                | <i>Yes</i>           | <i>No</i> | <i>Total</i> |
| <i>Females</i> | 26                   | 57        | 83           |
| <i>Males</i>   | 19                   | 55        | 74           |
|                |                      |           | 157          |

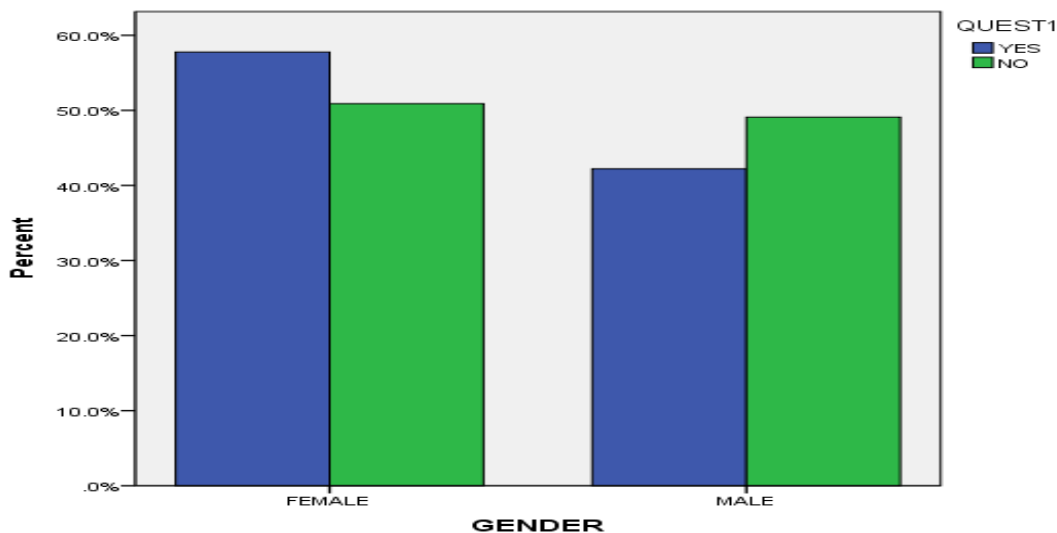


Figure 3: A graph of students' responses to whether they have taken an IQ test.

#### 4.6.2. Question 2: Do you believe that intelligence tests measure intelligence fairly well?

The Chi-squared test indicated a statistically insignificant association between gender and the question *do you believe that they measure intelligence fairly well?* The Pearson's Chi-squared was valued at  $\chi^2 (1, N = 154) = 1.072, p = .30, \phi = -.097$ . Among the female participants

37% answered ‘yes’ and 63% answered ‘no’. 52.7% of the males answered ‘yes’ and 47.3% answered ‘no’. Although a small percentage of the participants have taken an intelligence test before (females =31.3%; males = 25.7%) a particularly large percentage seem to think intelligence tests as a fair measure of intelligence.

Table 11

*Students’ responses on the fair measurement of intelligence*

| <i>Gender</i>  | <i>Measure intelligence fairly</i> |           |              |
|----------------|------------------------------------|-----------|--------------|
|                | <i>Yes</i>                         | <i>No</i> | <i>Total</i> |
| <i>Females</i> | 30                                 | 51        | 81           |
| <i>Males</i>   | 34                                 | 39        | 75           |
|                |                                    |           | 154          |

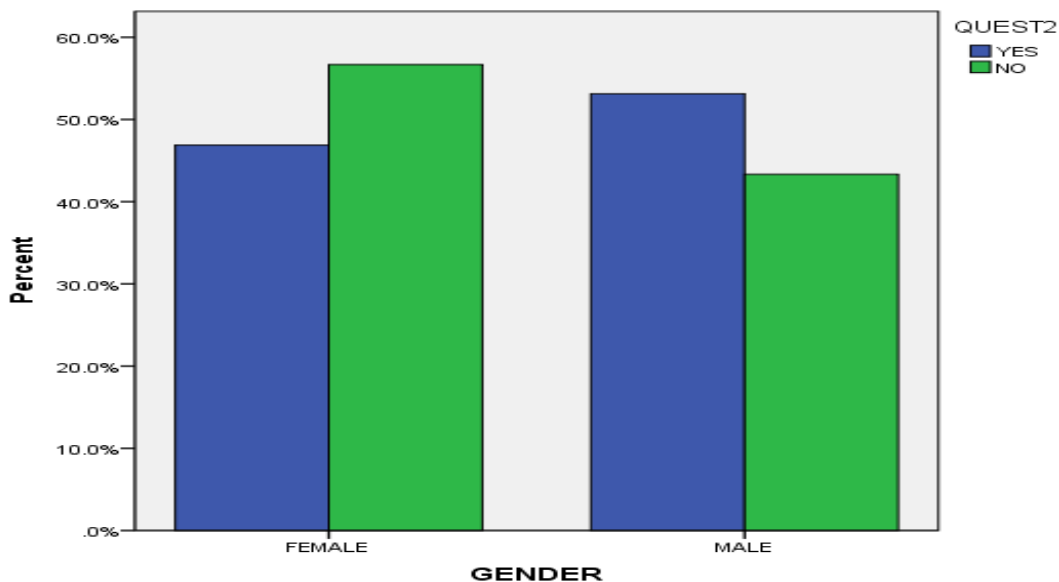


Figure 4: Graph of students’ responses to the fair measurement of intelligence.

#### 4.6.3. Question 3: Do you believe males are on average more intelligent than females?

The Chi-squared test indicated a statistically significant association between gender and the question *do you believe males are on average more intelligent than females?* The Pearson’s Chi-squared was valued at  $\chi^2 (1, N=156) = 36.857, p = .00, \phi = -.500$ . A small percentage of females agreed that males are on average more intelligent than females , 7.3% answered ‘yes’

while 92.7% answered ‘no’. For the males there appears to be a different view with 52.7% answering ‘yes’ and 47.3% answering ‘no’.

Table 12

*Students’ responses to gender differences in intelligence*

| <i>Gender</i>  | <i>Males more intelligent than females</i> |           |              |
|----------------|--|-----------|--------------|
|                | <i>Yes</i>                                 | <i>No</i> | <i>Total</i> |
| <i>Females</i> | 6  | 76        | 82           |
| <i>Males</i>   | 39   | 35        | 74           |
|                |  |           | 156          |

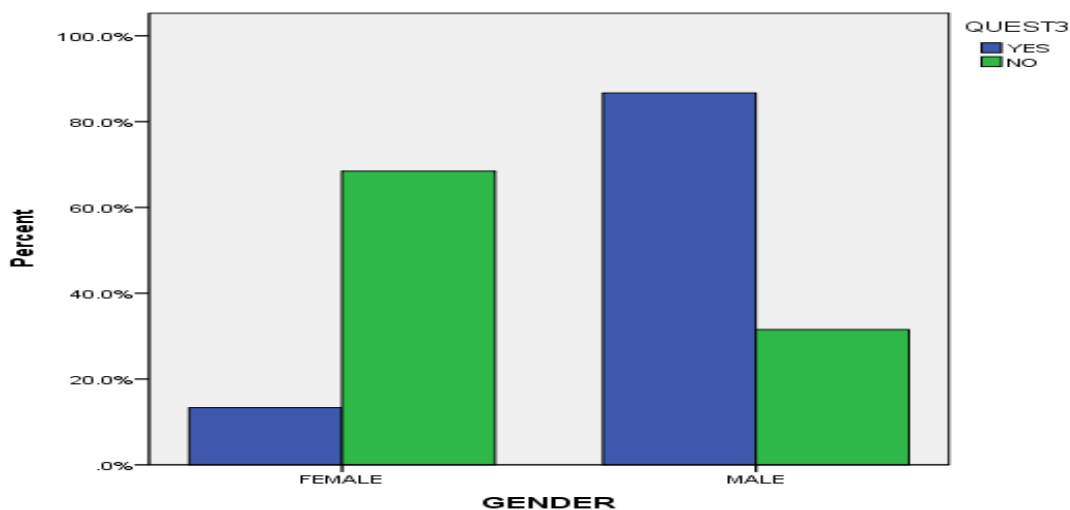


Figure 5: A graph of students’ responses to gender differences in intelligence.

#### 4.6.4. Question 4: Do you believe intelligence is primarily inherited?

Chi-squared test of independence, with Yates Continuity Correction indicated a statistically significant association between gender and the question *do you believe intelligence is primarily inherited?* The Pearson’s Chi-squared was valued at  $\chi^2 (1, N = 157) = .00, p = .01, \phi = -.001$ . Both the females and males appear to be in consensus with the view that intelligence is primarily inherited; 67.5% of the females answered ‘yes’ and 32.5% answered ‘no’, while 67.6% of the males answered ‘yes’ and 32.4% answered ‘no’.

Table 13

*Students' responses to the inheritance of intelligence*

| <i>Gender</i>  | <i>Intelligence Primarily Inherited</i> |           |              |
|----------------|---|-----------|--------------|
|                | <i>Yes</i>                              | <i>No</i> | <i>Total</i> |
| <i>Females</i> | 56                                      | 27        | 83           |
| <i>Males</i>   | 50                                      | 24        | 74           |
|                |   |           | 157          |

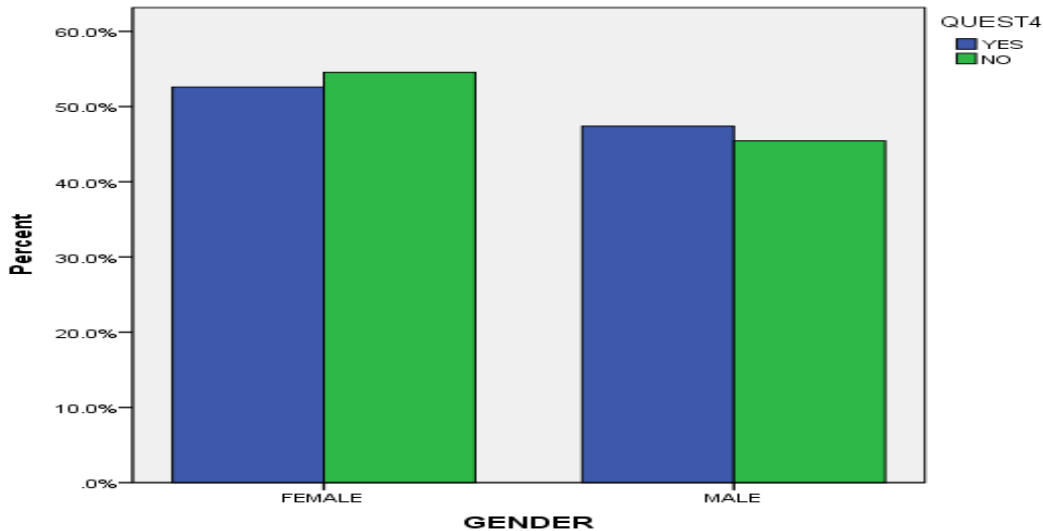


Figure 6: A graph of students' response to the inheritance of intelligence.

#### 4.6.5. Question 5: Do you believe IQ tests are useful in educational settings?

The Chi-squared test of independence indicated a statistically insignificant association between gender and the question *do you believe IQ tests are useful in educational settings?* The Pearson's Chi-squared was valued at  $\chi^2(1, N = 156) = .158, p = .691, \phi = .045$ . The females and males appear to have similar views on the usefulness of intelligence tests in educational settings; 68.7% of the females answered 'yes' and 31.3% answered 'no', while 64.4% of the males answered 'yes' and 35.6% answered 'no'.

Table 14

*Students' responses to the usefulness of IQ tests in school*

| <i>Gender</i>  | <i>IQ tests useful in educational settings</i> |           |              |
|----------------|--|-----------|--------------|
|                | <i>Yes</i>                                     | <i>No</i> | <i>Total</i> |
| <i>Females</i> | 57   | 26        | 83           |
| <i>Males</i>   | 47   | 26        | 73           |
|                |  |           | 156          |

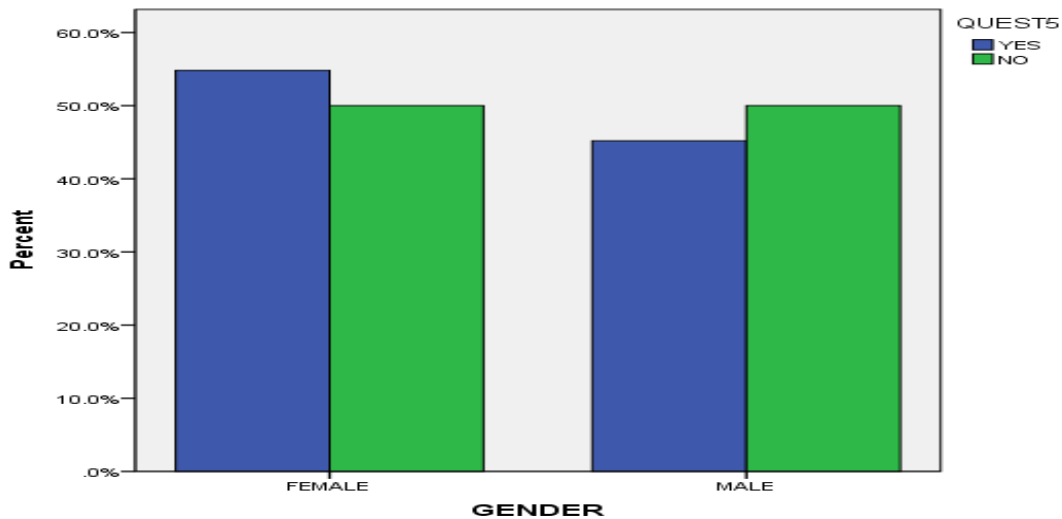


Figure 7: A graph of the students' responses to the usefulness of IQ tests in schools.

#### 4.6.6. Question 6: Do you believe some races are more intelligent than others?

Chi-squared test with Yates Continuity Correction indicated no significant association between gender and the question *do you believe some races are more intelligent than others?* The Pearson's Chi-squared was valued at  $\chi^2 (1, N = 157) = .148, p = .70, \phi = -.046$ . The participants also seem to share similar views on racial differences in intellect. About 20.5% of the females answered 'yes' and 79.5% answered 'no'. On the other hand, 24.3% of the males answered 'yes' and 75.7% answered 'no'.

Table 15

*Students' responses to race differences in intelligence*

| <i>Gender</i>  | <i>Some races more intelligent</i> |           |              |
|----------------|------------------------------------|-----------|--------------|
|                | <i>Yes</i>                         | <i>No</i> | <i>Total</i> |
| <i>Females</i> | 17                                 | 66        | 83           |
| <i>Males</i>   | 18                                 | 56        | 74           |
|                |                                    |           | 157          |

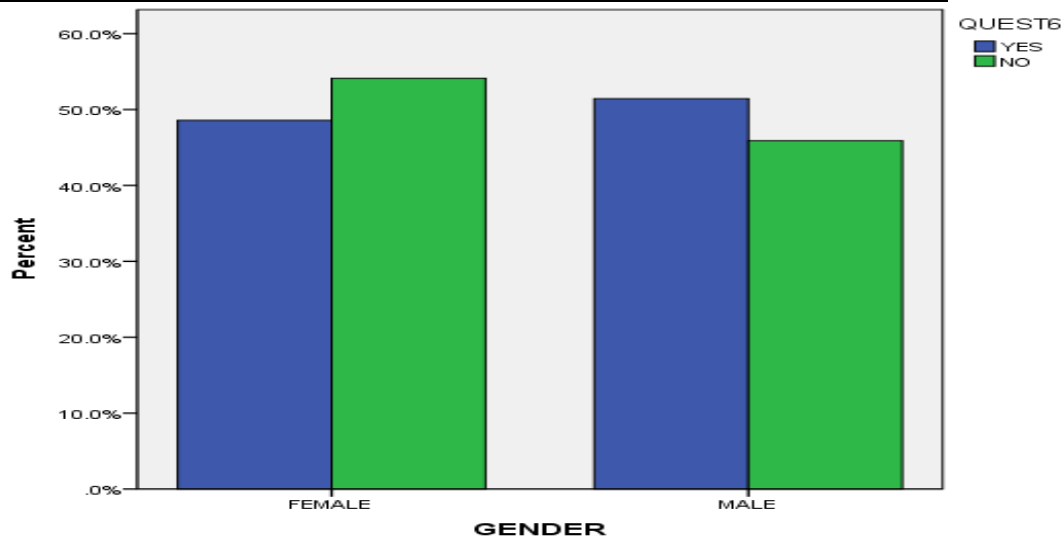


Figure 8: A graph of the students' responses to race differences in intelligence.

#### 4.7. Best Predictors of Overall Intelligence

Multiple regression analysis was done to determine which of the seven types of intelligences (verbal intelligence, spatial intelligence, logical-mathematical intelligence, musical intelligence, bodily kinetic intelligence, interpersonal intelligence and intrapersonal intelligence) were the best predictors of overall intelligence were.

##### 4.7.1. Best predictors of overall intelligence: self

Verbal intelligence, bodily kinetic intelligence, intrapersonal intelligence and spatial intelligence were the best predictors of overall intelligence respectively. It is important to note that verbal intelligence ( $\beta=.323$ ;  $p=.000$ ), bodily kinetic intelligence ( $\beta=.237$ ;  $p=.001$ ) and intrapersonal intelligences ( $\beta=.173$ ;  $p=.03$ ) make a statistically significant unique contribution to the prediction of overall intelligence (Table 16).

Table 16

*Best predictors of overall intelligence for self-estimates*

| <i>Types of intelligences</i> | <i>Beta</i> | <i>t</i> | <i>Sig.</i> |
|-------------------------------|-------------|----------|-------------|
| <i>Verbal</i>                 | .323        | 4.259    | .000        |
| <i>Body kinetic</i>           | .237        | 3.263    | .001        |
| <i>intrapersonal</i>          | .173        | 2.137    | .034        |

*Key: verbal=verbal/linguistic intelligence; body kinetic = bodily kinetic intelligence; intrapersonal=intrapersonal intelligence.*

#### 4.7.2. Best predictors of overall intelligence: fathers

Multiple regression analysis indicated that interpersonal intelligence ( $\beta = .306$ ;  $p = .000$ ), verbal intelligence ( $\beta = .282$ ;  $p = .000$ ) and logical intelligence ( $\beta = .182$ ;  $p = .026$ ) were the best predictors of overall intelligence ('g') for the ratings of the fathers (Table 17).

Table 17

*Best predictor of overall intelligence for fathers*

| <i>Types of Intelligences</i> | <i>Beta</i> | <i>t</i> | <i>Sig.</i> |
|-------------------------------|-------------|----------|-------------|
| <i>F. Verbal</i>              | .292        | 3.664    | .000        |
| <i>F. Logical</i>             | .182        | 2.261    | .026        |
| <i>F. intrapersonal</i>       | .306        | 4.107    | .000        |

*Key: Prefix F. = Father; verbal=verbal/linguistic intelligence; logical=logical-mathematical intelligence; intrapersonal=intrapersonal intelligence.*

#### 4.7.3. Best predictors of overall intelligence: mothers

Verbal intelligence ( $\beta = .554$ ;  $p = .000$ ) and bodily-kinetic intelligence ( $\beta = .171$ ;  $p = .036$ ) were the best predictors of overall intelligence for the mothers (Table 18).



Table 18

*Best predictor of overall intelligence for mothers*

| <i>Types of Intelligences</i> | <i>beta</i> | <i>t</i> | <i>Sig.</i> |
|-------------------------------|-------------|----------|-------------|
| <i>M. Verbal</i>              | .554        | 6.518    | .000        |
| <i>M. Body kinetic</i>        | .171        | 2.114    | .036        |

*Key: M = Mother; verbal = verbal/linguistic intelligence; logical = logical-mathematical intelligence.*

#### **4.8. Concluding Remarks**

The chapter presented the study findings. There was no significant difference between male and female self-ratings on overall and multiple intelligences. Results on the intergenerational differences in IQ ratings were mixed. Students rated themselves the highest on some types of intelligences, while other types were awarded to either their mother or the father. There was no clear pattern of intergenerational differences in overall and multiple intelligences.

Estimates on parents' overall and multiple intelligences show that male and female students did not rate their parents' intelligences according to their gender. Differences were also not found on those types of intelligences traditionally associated with females and males in the parents' ratings. Both male and female participating students rated parents with at least a diploma higher than those parents without a diploma or tertiary level qualification, suggesting the relationship between (perceived) intelligence and level of education. Participants thought that intelligence tests were useful in educational settings, although only a small percentage had taken an intelligence test. Males agreed that on average males were more intelligent than females, while females disagreed with this statement. A great majority of the participants believed that intelligence is primarily inherited. Participants did not believe that some races were more intelligent than others.

The best predictors of overall intelligence were verbal, bodily-kinetic and intrapersonal intelligence (self-estimates); verbal, logical and intrapersonal intelligence (fathers); and verbal and bodily-kinetic intelligence (mothers). The following chapter discusses the study findings.

## CHAPTER 5

### DISCUSSION

The current chapter provides a discussion of the results. The discussion accounts for the findings of this study in terms of the literature pertaining to previous studies on estimates of overall and multiple intelligences. The chapter begins with a discussion on the students' estimates of their own overall and multiple intelligences. This is followed by a discussion on the inter-generational differences in estimates of overall and multiple intelligences, the participants' estimates of their parents' multiple intelligences, the association between level of education and estimates of intelligence, and finally, participants' views on the heritability and other dimensions of intelligence.

#### **5.1. Students' Self-Estimates of Overall and Multiple Intelligences**

Although psychologists do agree that there are no actual significant differences in *overall intelligence* between males and females, lay persons seem to think there are differences in IQ levels as seen in previous studies on self-ratings of intelligence (Rammstedt & Rammsayer, 2000; Rammstedt & Rammsayer, 2002). In studies that compare gender differences in overall and multiple intelligences in lay persons, commonly university students, there appears to be certain trends related to these perceived differences. These trends were first noted by Hogan in 1978 in the first study of self-estimates of intelligence on psychology students (Rammstedt & Rammsayer, 2000), and later by other researchers (Beloff, 1992; Furnham & Baguma, 1999; Furnham, Clark, & Bailey, 1999; Furnham, Hosoe, & Tang, 2002; Furnham, Reeves, and Budhani, 2002; Furnham, Tang, Lester, O'Connor & Montgomery, 2002; Neto & Furnham, 2006). In general, (1) males tend to estimate their overall intelligence to be higher than females'; and (2) self-estimates on multiple intelligences are domain specific. Males tend to rate themselves higher on certain types of intelligences and females tend to rate themselves higher on other types of intelligences.

Generally, there is a trend of males rating themselves significantly higher than females on *overall intelligence* (Hogan, 1978 as cited by Rammstedt & Rammsayer, 2000; Furnham, Hosoe, & Tang, 2002; Furnham, Tang, Lester, O'Connor & Montgomery, 2002). Hogan

(1978 as cited by Furnham *et al.*, 2002), suggests that it may be due to women perceiving themselves to be less intelligent than males in order to receive social rewards. Furnham *et al.* (2002) also contends in addition to Hogan's hypothesis that in the raising of girls there is an emphasis on humility and modesty which results in women with "...poor intellectual self-image relative to men" (Furnham *et al.*, 2002, p. 25). Contrary to popular findings on self-estimates of intelligence the current study found no significant difference in female and male ratings on overall and multiple intelligences. These results were unexpected considering the trend that has been noted over the years, in which gender differences on self-estimates of overall intelligence have been found with males estimating themselves as significantly more intelligent than females (Rammstedt & Rammsayer, 2000). There are two possible factors that may account for these current results. Firstly, Beloff (1992, as cited by Rammstedt & Rammsayer, 2000) suggests that self-estimates of intelligence are influenced mostly by "...common gender stereotypes..." (Rammstedt & Rammsayer, 2000, p. 870) and gender-role orientation which may be due to minor gender differences that become exacerbated by society by choosing to ignore "...intra-gender..." (Rammstedt & Rammsayer, 2000, p. 870) differences and focus on "...inter-gender differences" (Rammstedt & Rammsayer, 2000, p. 870). Commonly, females are stereotyped to be less intelligent than males. Thus it would be expected for males to have higher estimates of their own overall intelligence than females.

For the current study the noted absence of gender differences may be attributed to a shift in stereotypes about female intellectual abilities. The sample of this study appears to be a unique one that maybe influenced by the values of the South African constitution which is founded on, amongst other values, the value of non-sexism (ss 1, act no. 108 of 1996). This value encourages viewing males and females as of equal capability, and this may be extended to include intellectual abilities too. As university students, the sample population may have been sensitized to the importance of gender equality, thus influencing their perceptions on their intellectual capabilities. The South African constitution further encourages the "... [Promotion of] respect for gender equality... and attainment of gender equality" (ss 187(1), act no. 108 of 1996, p. 1331). The students may have found themselves to be in situations whereby exercising gender equality towards themselves or others may be to their benefit. Thus exposure to situations such as the university environment could have sensitized the study sample to the discourses on gender equality.

The National Gender Policy Framework defines gender equality as "... a situation where women and men have equal conditions for realizing their full human rights and potential"

(Office on the Status of Women, 2000, p. xvii). The policy addresses the need for women to be viewed as equal to men and also encourages affording both women and men the same opportunities. By taking into account "...women's existing subordinate positions within social relations..." (Office on the Status of Women, 2000, p. xvii) the policy aims to restructure society so as to eradicate male domination and uplift women from their subordinate roles (Office on the Status of Women, 2000).

In South Africa, females are beginning to be considered as capable as their male counterparts in a variety of skills or roles that were often male stereotyped. Gender equality is encouraged further in South Africa by programs such as "Take a Girl Child to Work Day" established by the South African company, Cell C. A project of this nature promotes the recognition of female capabilities and also aims at changing stereotypes about the incapability of females in so called 'highly intellectually engaging' tasks or roles and/or careers. With such projects aimed at uplifting young females one may begin to understand young South African females changing views of their own intellectual capacities, and possibly assuming their IQ scores to be equivalent or higher than their male counterparts. The previously noted humility in female self-estimates in other studies may not be extended to the current study sample.

Studies that tend to yield no significant differences in gender differences of overall and multiple intelligences, are those concerned with the parents' estimates of their children's overall and multiple intelligences (Furnham & Mkhize, 2003; Furnham, Rakow, & Mak, 2002; and Persaram, 2006). In these three studies, similar cultural views of the participants have been found to attribute to the absence in gender differences in the ratings given to the children (Persaram, 2006). The collectivist ideology of African and Asian cultures emphasizes social cohesion, whereas western cultures value competitiveness as part of their individualistic ideology (Persaram, 2006) which also focuses on individual differences. Due to these differing cultural views, an association has been made with the differences in the parents' estimates of their children's intelligences in these two cultures. The study done on the Chinese by Furnham, Rakow, and Mak (2002) suggests that socialization plays an important role in shaping children's conceptions of what constitutes intelligent behaviour. Similarly Furnham and Mkhize (2003) contend that conceptions of and beliefs about intelligence held by mothers are "...communicated directly and indirectly..." (p. 93) to their children. The sharing of the parents' views, conceptions, and perceptions of intelligence with their children may result in the influence of the children's beliefs and conceptions of their

own intelligence. Thus the findings of the current study of no gender differences in intelligence may well be due to parental influences.

Methodology could also account for the absence of gender differences in the current study. Commonly, research on estimated IQ scores shows that in cases where researchers have asked participants (lay persons) to provide direct estimates on overall intelligence only, without including other types of intelligences too (e.g. verbal, interpersonal, or musical intelligences), intelligence is likely to be viewed as “masculine” (Petrides, Furnham, & Martin, 2004, p. 152) in such instances the participants are likely to “...neglect specific intelligence facets in which women tend to outperform men...” (Petrides, Furnham, & Martin, 2004, p. 152) such as in verbal intelligence. In such cases male participants’ self-estimates on their overall intelligence may be superior to that of females. In contrast, cases where estimates of overall and multiple intelligences are required (as in the current study), the gender differences “...are likely to diminish...” (Petrides, Furnham, & Martin, 2004, p. 152) as noted in this study too. The diminished sex differences may then result in females perceiving themselves as being of equal standards or higher than their male counterparts. The second trend noted by researchers on self-estimates of multiple intelligences is that there are those particular types of multiple intelligences that are often associated with higher ratings for females and those associated with higher ratings for males. Furnham *et al.* (2002) provide a summary of the general findings of most studies on self-estimates of intelligence. With regards to males they are often found to give themselves or other males superior ratings primarily on *logical-mathematical intelligence*, and *spatial intelligence*. On the other hand females have been shown to ascribe to themselves superior ratings on the verbal dimensions of intelligence (*verbal, interpersonal and intrapersonal intelligences*) (Furnham, Hosoe, & Tang, 2002).

Like with overall intelligence, gender specific differences in multiple intelligence are believed to be accounted for by “...stereotypic gender roles...” (Rammstedt & Rammsayer, 2002, p. 371) or sex typing. Sex typing, according to the gender schematic theory is derived from gender-schematic processing (Rammstedt & Rammsayer, 2002). This process entails the individual’s ability to encode and organize information about the self and others in relation to cultural definitions of “...maleness and femaleness” (Rammstedt & Rammsayer, 2002, p. 371). From this theory Beloff (1992 as cited by Rammstedt & Rammsayer, 2002) developed a hypothesis that “...males’ higher self-estimates in mathematical, spatial, and

reasoning abilities stem from stereotypic gender roles, that claim superior abilities in these domains for males than for females” (Rammstedt & Rammsayer, 2002, p. 371). This hypothesis has since been supported by many studies (Furnham & Baguma, 1999; Furnham, Clark, & Bailey, 1999; Furnham, Tang, O’Connor & Montgomery, 2002); most of these studies show consistencies in gender differences on ratings on logical-mathematical intelligence, verbal intelligence, and spatial intelligence (Bennett, 2000; Rammstedt & Rammsayer, 2000; Furnham *et al*, 1999 as cited by Rammstedt & Rammsayer, 2002; and Swami, Furnham, & Kannan, 2006).

The current study forms part of the exception to the expected male hubris and female humility. The results yielded no significant difference in male and female ratings on multiple intelligences. This appears to be an uncommon occurrence in studies of this nature (for example, Furnham, Hosoe & Tang, 2002; Swami, Furnham & Kannan, 2006).

A few factors could account for the fact that there are no significant differences in the male and female ratings of multiple intelligences. Such results would seem expected considering the population of the sample was university students who might have some knowledge about intelligence and intelligence testing. Thus the students may feel the pressure to be politically correct within the university context and acknowledge equal gender capabilities. Referring to the results on participants’ views on intelligence and intelligence testing (to be discussed in more detail later), the majority of the participants (70%) in the current study believe that there are no gender differences in intellectual abilities. Lay people are assumed to be relatively informed about intelligence due to the long standing interest shown in the topic (Furnham, 2000); this then suggests that laypersons have reasonable insight on the topic and their own intellectual abilities (Furnham, 2000). The nature of the sample used may also affect their responses due to certain characteristics that they may possess. It has been shown that gender stereotyping is influenced by level of education; sex role stereotyping diminishes with higher levels of education. The students in the sample represent a homogenous, well-educated sample whom, according to Swato and McCauley, (1984, as cited by Rammstedt & Rammsayer, 2002) are less likely to perceive gender inequality in their estimates of intelligence.

## **5.2. Inter-Generational Differences in Overall and Multiple Intelligences**

Research on generational differences of estimates of intelligence have reported on intelligences score increasing with every new generation, that is, the children will be estimated or estimate themselves to be smarter than their parents, and the parents smarter than the grandparents (Swami, Furnham & Kannan, 2006). A clear generational trend is often observed, showing the previous generation to be less intelligent than the current generation being studied (Furnham& Chamorro-Premuzic, 2005).

In studies where the parents are giving estimates of intelligence (e.g. Furnham, 2000; Furnham & Mkhize, 2003; Furnham, Mkhize, & Mndaweni, 2004; Furnham, Reeves, Budhani, 2002), the results appeared to be twofold: firstly, the parents perceived their children to be more intelligent than themselves (Furnham, 2000; Furnham & Mkhize, 2003). In some instances the age of the parent had an effect on this perception, older parents perceived their children as being much brighter than them compared to the younger parents (Furnham, Mkhize, & Mndaweni, 2004). Secondly, male children tend to be seen as more intelligent than female children on numerous types of intelligences. These studies also showed a generational pattern in which the younger generation is more intelligent than their parents, confirming the Flynn effect (1984).

The current results show an interesting pattern, firstly, with overall intelligence, where the generational differences are often noted in studies (e.g. Swami, Furnham & Kannan, 2006). The participants' ratings of their overall intelligence in the current study did not differ significantly from the way they rated their parents. Neither did the gender of the parents make a difference in how they were rated by the participants. These ratings could well be influenced by the students' underlying belief that intelligence is primarily inherited. A majority of the students (67.5%), when asked whether they believe intelligence is primarily inherited? They answered "yes". Thus the students perceive their overall intelligence to be equivalent to their parents, as they (possibly) believe they have inherited it from their parents.

## **5.3. Students' Estimates of their Parents Intelligences**

In the research of estimates of intelligence, especially when investigating gender differences, it has become important to also investigate the estimates given to parents of the participants. This is to allow researchers to determine whether the gender differences found on self-

estimates of intelligence can be generalized to include the estimates of others (Petrides, Furnham, Martin, 2004). Previous research has suggested that "...male-favouring difference extends to estimates of relatives with fathers and sons being perceived as more intelligent than mothers and daughters, respectively" (Petrides, Furnham, Martin, 2004, p. 151). These findings indicate that there may be strong male stereotyped bias when estimating males levels of intelligence, and possibly more so when male on male estimations are being conducted.

### **5.3.1. Gender specific estimates of intelligence**

The results of this study reflected no significant differences in male or female ratings of their parents' overall intelligence. The ratings given to mothers and fathers did not differ according to their gender and that of the students. The absence of differences in ratings of parents overall intelligence according to students and parents gender suggests that the gender of the students and parents does not influence ratings given to parents. For multiple intelligences, students rated themselves higher than their fathers on bodily-kinetic, interpersonal and intrapersonal intelligence and the fathers high on verbal intelligence. The students rated themselves as more intelligence than their mothers on logical-mathematical and bodily-kinetic intelligences.

These results are unexpected as often in studies of a similar nature gender seems to influence ratings on overall and multiple intelligences. For instance where ratings of parents' overall and multiple intelligences are concerned, "...nearly all subjects... [ascribe] higher IQs to their fathers than to their mothers" (Rammstedt & Rammsayer, 2000, p. 870). More often ratings of fathers' *verbal, spatial, and logical intelligences* are rated higher than the mothers. These three types of intelligences are often closely approximated with the concept of general intelligence (Swami, Furnham, & Zilkha, 2009), thus, suggesting an underlying belief of superior intelligence in the fathers' level of intelligence.

It also appears that gender stereotyping has not influenced the ratings given to the parents, similar to the self-ratings (as noted above). Gender stereotypes are informed by sex-roles, any perceived shift in sex-role or devaluing of any sex-roles may result in the rejection or devaluing of certain gender stereotypes. Sex-roles are known to influence ones self-conception, yet in university students it seems at this point of an individual's life sex-roles are not of great influence. Thus it becomes easier for females to reject negatively valued stereotypes about themselves (Rosenkrantz, Vogel, Bee, Broverman, & Broverman, 1968),



considering in general females are less influenced by stereotypes (Flerx, Filder, & Rogers, 1976).

The mothers were not rated significantly higher on those types of intelligences traditionally associated with females (the verbal factors: interpersonal and intrapersonal intelligences and cultural factors: musical and body-kinetic intelligences (Furnham, Hosoe, & Tang, 2002). The mothers were expected to be rated higher than the fathers on these factors, as these types of intelligences are stereotyped to be of the female domain (Furnham, Hosoe, & Tang, 2002). Stereotypes about female qualities are often communal and display a selfless character of an individual concerned with others, and aspires to be in harmonious relations with others (Eagly & Steffen, 1984). These qualities are similar in nature to being intellectually superior in interpersonal and intrapersonal intelligence as they are concerned with relationships one has with others and oneself.

For *overall intelligence*, there was no statistically significant difference in the ratings given to the fathers and mothers. This was unexpected since other studies of a similar nature have shown that lay people perceive their "...fathers to be more intelligent than their mothers..." (Swami, Furnham, & Zilkha, 2009 p. 529), the same pattern has been found with grandparents and siblings, the "...grandfathers more intelligent than [the] grandmothers, and [the] brothers more intelligent than [the] sisters" (Swami, Furnham, & Zilkha, 2009 p. 529). On the other hand, for multiple intelligences the fathers were also not estimated to be significantly more intelligent on male-associated types of intelligences, which are *verbal*, *spatial* and *logical intelligence*. This may be due to the uniqueness of this sample or even different conceptions of intelligence as a shared activity, something that happens between people, as opposed to a property of individuals. The possible influence of communal conceptions of the self on estimates of multiple intelligences, is yet to be investigated.

### **5.3.2. Estimates according to highest qualifications**

In previous studies that were concerned with self-estimates of individuals and the association with their levels of education, large differences have been found (Swami, Furnham, & Zilkha, 2009). For example, African participants with limited Western education estimated their level of intelligence to be relatively high, while in Asia low scores were given by the well educated people (Swami, Furnham, & Zilkha, 2009). The current study focuses on the estimates of

others level of intelligences based on their education. The more educated persons are expected to be rated as more intelligent.

Estimates of parental multiple intelligences according to highest qualifications were done under two categories, *Diploma/ Degree* category and *No Diplomas/Degree* category. For the mothers, a statistically significant difference was found between the *Diploma/Degree* and *No Diploma/Degree* categories for overall, verbal, logical, spatial, musical, and interpersonal intelligence. The mothers in the *Diploma/Degree* category were rated higher on these types of intelligences. For the fathers, a significant difference was found between the two categories, with the highest ratings on overall, verbal, and logical intelligence being given to the *Diploma/Degree* category. These above findings were expected since traditionally females are often rated the highest on musical and interpersonal intelligences (e.g. Rammstedt & Rammsayer, 2000); and the males on overall, verbal and logical intelligences. Thus education is not a factor on those types of intelligences. Interestingly enough, education appears to influence the way the mothers were rated on the traditionally “male” attributes of intelligence, namely overall, verbal, logical and spatial intelligences (Ceci, 1991).

In this sample, females with a better level of (Western) education were rated better than those who did not, suggesting the link between formal education and conceptions of intelligence. Also fathers in the ‘*Diploma/Degree*’ category were rated higher, further supporting the link between formal Western education and perceptions of intelligence. Most interestingly, it is on those dimensions of multiple intelligences associated with overall or general intelligence, namely verbal, logical-mathematical, and spatial intelligence, that the educated parents were accorded higher ratings. Ceci (ibid) suggests that “...schooling exerts substantial influence on IQ formation and maintenance” (p.703); that is the highest level of schooling completed has a powerful influence on one’s intellectual levels; it is most likely to improve one’s level of intelligence. Although it is not conclusive that schooling is the cause of increases in IQ levels, “...schooling appears to convey an advantage on IQ...” (Ceci, 1991, p.705), yet it is also possible that some other variable like genetics is responsible for the effect, rather than schooling alone (Ceci, 1991). On the other hand, the poor rating of parents with lower education could be accounted for by the fact that they have been deprived access to education which, in modern day society, has become the benchmark of intelligence (partly because of the social, economic and other benefits it confers) (Akoojee & Nkomo, 2007; Motala, Dietiens, Carrim, Kgobe, Moyo, & Rembe, 2007).

#### 5.4. Students' Views on Intelligence and IQ Testing

Results on the views of students on intelligence and intelligence testing reflect very interesting findings. Firstly a small percentage of the participants have ever completed an intelligence test (28%), and just under half (41.6%) of participants think that intelligence is measured fairly well. It is interesting that although only a handful of students view intelligence tests as accurate; a large number of them (66.7%) think that they are useful in educational settings. The level of agreement on the usefulness of intelligence tests could be as a result of the participants being university students that may be more aware of the history and uses of IQ tests (Furnham & Baguma, 1999). Although there may be awareness on the usefulness of the tests there is skepticism about its validity, which could be well-founded given that most intelligence tests in use in South Africa have never been validated for Black African populations.

Over half of the sample population (67.5%) believes that intelligence is primarily inherited; while a large number of them does not believe that some races are more intelligent than others (77.7%). There is also consensus on rejecting the gender based stereotype of intelligence that is males are more intelligent than females, with 71.2% believing that males are not smarter than females. It is interesting to note that 92.7% of the females responded "no" to the question *do you believe males are on average more intelligent than females?* On the other hand, only 47.3% of the males disagreed. A strong negative response by the females could possibly be due to the high loading of gender bias in the question which resulted in evoking strong feelings of disagreement by the female participants. The male response rate possibly suggests that African males believe in IQ superiority as was found in the study conducted by Furnham and Baguma (1999) where 56.9% of the African males believed in gender differences. These consistencies in male's responses to the agreement of male intellectual superiority could be accounted for by males the positive stereotype being tested in the question. Regarding males as intelligent is a commonly held stereotype which reflects males in a positive manner and therefore is easily accepted by them (Flerx, Fidler, & Rogers, 1976). On the question about race differences, the group reflects the view that there are no racial differences in intelligence, with 77.7% of the sample responding "no" to the question *do you believe some races are more intelligent than others?* A large number of the participants are in consensus, this is expected since the population of the study are all from the same racial group.

## 5.5. Best Predictors of Overall Intelligence

In previous studies where multiple intelligences were regressed into overall intelligence, logical-mathematical, spatial and verbal intelligence tended to be the significant predictors of overall intelligence (Furnham & Chamorro-Premuzic, 2005; Swami, Furnham, & Kannan, 2006; Swami, Furnham, & Zilkha, 2009).

In the current study regression analysis of self-estimates of multiple intelligences into overall intelligence revealed that verbal intelligence, bodily-kinetic intelligence and intrapersonal intelligences as making a statistically significant unique contribution to the prediction of overall intelligence. Two types of intelligences were found to be statistically significant in the prediction of overall intelligence for estimates on the mothers. These were verbal intelligence and bodily kinetic intelligence. Analysis on the fathers' ratings revealed that intrapersonal intelligence, verbal intelligence, and logical intelligence contributed the most to intelligence.

It is interesting to note that in this study of Africans there is less consistency with the findings of European studies with regards to determining the best predictor of overall intelligence.

This is not unlikely as Furnham and Chamorro-Premuzic, (2005) do note that African populations are often found to be the exception when determining the best predictor of overall intelligence. This could possibly be accounted for by the differing concepts and definitions of general intelligence by Africans when compared to Western continents (Furnham & Akande, 2004). According to Gardner (1983), as cited by Furnham, and Akande (2004) an African perspective of intelligence is "...akin to social intelligence..." (p. 291), thus the more focal characteristics refer to "social skills, mature reflection and world wisdom" (Furnham, Ndlovu, & Mkhize, 2009, p. 166) instead of "...problem-solving ability and knowledge accumulation" (Furnham, Ndlovu, & Mkhize, 2009, p. 166) as seen in the Western conceptualisations of intelligence. The types of intelligences that have been considered to be best predictors of overall intelligence are all of a social nature or related to advanced social skills, with the exception of logical-mathematical intelligence (fathers' best predictors). This was expected of the population of the study, considering they are all Africans. For self, mothers and fathers there is a consistency of verbal intelligence as being one of the best predictors of general intelligence. This may suggest that the conception of general intelligence is more literary and emotive (Furnham & Chamorro-Premuzic, 2005) for the study population. It is interesting to note that bodily-kinetic intelligence is often thought to be unrelated to general intelligence (Furnham & Chamorro-Premuzic, 2005), yet for this

study sample it is of relevance. This type of intelligence is considered to be a cultural factor of general intelligence, which is often seen as a female domain. Hence, bodily-kinetic intelligence is deemed as the best predictor of the mothers overall intelligence and the self, because most of the participants in the study are female.

## 5.6. Concluding Comments

This chapter entailed a discussion on the results obtained from the data. The self-ratings showed inconsistencies with other research of a similar nature; no significant differences were found in the ratings by the male and female participants. This absence of differences was thought to be accounted for by either a shift in gender stereotyping, or gender roles in the society in which the participants were sampled. This may have also been due to the participants' own beliefs in gender differences on intelligence and multiple intelligences. This was followed by a discussion on inter-generational differences in intelligence. The students rated themselves equally to their parents in terms of overall intelligence, there was also no difference found between the rating given to the mothers and fathers. This was accounted for by the participants' beliefs on intelligence being primarily genetic. Although fathers were estimated to be more intelligent than the mothers on verbal and logical intelligence, it is difficult to assume that this suggests superior overall intellectual ability of the fathers as the ratings may have been influenced by the knowledge that the fathers are more educated than the mothers and that lay persons often believe that there is a positive correlation between education and intelligence. The mothers were awarded superior intelligence on female specific types of intelligences, interpersonal and intrapersonal intelligence.

The estimates of parents' estimates of intelligence were done according to the gender of the participants. There were no significant differences in the male and female ratings of their parents overall and multiple intelligences. However, ratings of parents level of intelligence according to their highest qualifications, yielded significant results. The more educated parents, the *Diploma/Degree* group was found to be more intelligent than the *No Diploma/Degree* group. This was thought to be accounted for by the belief that more educated individuals are perceived as being more intelligent than the less educated persons.

The views on intelligence and intelligence testing of the participants were interesting and were mainly accounted for by their educational background, the emotional effect raised by the structuring of a question, and gender stereotyping in the African culture.

Finally, the best predictors for overall intelligence of the self-ratings were verbal, body kinetic and intrapersonal intelligences. While the best predictor for overall intelligence of the mothers were verbal and body kinetic intelligences and for the fathers it was verbal, logical, intrapersonal intelligences.

The findings of this study reflected a few similarities and numerous differences when compared to other studies of a similar nature. These differences could be an indication of a shift in lay person's perceptions of intelligence, overall intelligence, multiple intelligences, and intelligence testing. These differences could also suggest that not all findings of previous studies in the West may be generalizable to African populations. These differences also raise the possibility of new research questions and further research in the domain of estimates of intelligence of the self and others.

## CHAPTER 6

### CONCLUSION

The study aimed at investigating lay person's perceptions of intelligence. The subjects were students (lay persons), their perceptions were studied through the estimations they gave to themselves and their parents on general intelligence and seven types of Gardner's (1983) multiple intelligences. The participants of the study were African university students from the University of Kwa-Zulu Natal, Pietermaritzburg campus. The study was motivated by need to investigate students' perceptions of their parents' intellectual abilities within the South African context since literature was available on the parents (Furnham, Mkhize, & Mndaweni, 2004; Furnham, Ndlovu, Mkhize, 2009); other studies focused on the mothers perceptions of their children's intellectual capabilities (Furnham & Mkhize, 2003 ). The main variables that were of interest alongside overall intelligence and multiple intelligences were gender, inter-generational gap and highest qualifications (effect of education on perceived intelligence). The chapter summarises the study findings. The implications for future research are highlighted. The study limitations are discussed.

#### **6.1. Conclusions on the Research Questions**

The research questions investigated in the current study were influence by previous research on estimates of lay persons overall and multiple intelligences. Gender differences were investigated amongst the participants and the results showed that there were no significant differences in male and female ratings of overall and multiple intelligences. This absence of gender differences was argued to be due to the nature of the population sample. The participants were taken from a university population which may be sensitized to equal gender abilities, thus the expected male hubris and female humility influence diminishes.

The generational differences were also investigated. Overall, intergenerational differences between the students (participants) and their parents were not statistically significant. When comparing parents' ratings, it became apparent that the participants of the study viewed their parents as being of equal intellectual capacity. There were no significant differences in the mothers and fathers ratings on overall and multiple intelligences. When considering the

multiple intelligences ratings individually, the mothers were not rated statistically significantly on any types of intelligences. These results were unexpected as previous studies have shown higher estimates for younger females on those types of intelligences traditionally associated with females, that is, interpersonal, intrapersonal, musical, and body-kinetic intelligences. Instead, the students rated themselves statistically higher than their mothers on logical-mathematical and bodily-kinetic intelligence. For the fathers, the results were similar to the mothers, unexpected. Traditionally younger males are often rated highly on overall, verbal, logical/mathematical, and spatial intelligences. Parents with superior formal education were rated higher than those with a lower level of education and this was more so for overall, verbal, logical-mathematical, spatial, musical and interpersonal intelligences for the mothers, while the differences emanated from overall, verbal and logical-mathematical intelligences for the fathers. The most consistent predictors of overall intelligence were verbal, intrapersonal, bodily-kinetic and logical-mathematical intelligence.

## **6.2. Implications for Future Research**

This study researched gender differences in the participants own level of intelligence and that of their parents. Differences according to age and parents level of education were also of concern.

It would be interesting to conduct research on lay persons in which they are required to rate their parents' overall and multiple intelligences, whilst considering their occupations or estimated levels of income based on their occupations. One's occupation and income tends to reflect the individuals highest level of education attained. The higher the education attained, it is most likely that the individual will pursue a more prestigious career thus receiving a high income. Since the more educated an individual is, the higher their level of intelligence is believed to be, and higher income or higher status job may be an indication of higher levels of education than it may possibly be concluded that highly paid individuals are also highly intelligent. This investigation may be conducted cross-racially as there are major differences in the financial income of South Africans, and for the older generations, educational attainment levels also differ, and this has implications on occupational pursuits. Research investigating the relationship between multiple intelligences and construal's of the self (a communal versus an individualistic orientation) would also be useful. Qualitative research



into the meanings of intelligence in traditional African contexts would shed insight to the importance of the social dimensions of intelligence.

### **6.3. Limitations of the Study**

The study was conducted on university students, thus the results obtained may not be generalized to the South African population but rather may be observed as interesting characteristics of the population sample. The study also focused on one racial group instead of including the other three races found in the university or South Africa, this also further limits generalizing the results to the University community or the South African community at large. The study relied only on a quantitative survey. A qualitative study of intelligence in a different cultural context such as is likely to yield a much more nuanced understanding of intelligence.

### **6.4. Concluding Remarks**

The studying of lay person's perceptions of intelligence is broad as it involves taking into consideration numerous social factors such as race, culture, gender, age, and education levels. Studies of this nature have been conducted globally and the findings have been known to be commonly similar with some exceptions observed. Countries of Western culture appear to show consistencies in their ratings, while countries in the East and in Africa reflect somewhat different results from those observed in Western countries. The results of the current study were not reflective of common western findings. The results appear to reflect a unique perception of intelligence by the Black community in South Africa.

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Appendix 1

**School of Psychology**  
**P/Bag X01 Scottsville**  
**PIETERMARITZBURG, 3209**  
**South Africa**  
**Phone: +27 33 2605166**



Re: Consent to participate in research study

Dear: Participant

My name is Boithatelo Mokoena and I am currently studying Clinical Psychology masters at the University of KwaZulu-Natal, Pietermaritzburg campus. As part of my degree requirements I need to conduct a research study or thesis. My research study is supervised by Prof. Nhlanhla Mkhize, the head of the School of Psychology and lecturer at the University of KwaZulu-Natal. This present letter to you is to obtain a written consent for your participation in the research.

The study is on self-estimates of general intelligence and multiple intelligences. The aim of the study is to understand lay people's conception of intelligence. The concept of multiple intelligence was developed by Gardner (1983) based on the understanding that the human minds' cognitive processes assist the development of different mental abilities at different levels, therefore when one is engaging in different tasks different cognitive processes are involved. Furthermore the theory of multiple intelligences emphasises that different cultures value different conceptions of intelligence because of the different environments in which the cultures exist. The different forms of intelligences that Gardner refers to are seven in total, namely: *verbal* (ability to use language and words in writing or speaking); *logical-mathematical* (ability to reason using numbers); *spatial* (ability to manipulate objects in space and to find one's way in the surrounding environments, e.g. reading maps; ability to think in three dimensions); *bodily-kinetic* (ability to control fine and gross bodily movements, e.g. athletes); *musical* (ability to perceive and create musical forms, ability to perceive pitch and rhythm, etc.); *interpersonal* (ability to understand other people's feelings/moods); *intrapersonal intelligence* (ability to understand oneself; self-knowledge).

Participation in the study will require you to complete a questionnaire in which you will be expected to estimate your own general intelligence and the seven types of intelligences mentioned above. You will also be required to do the same for both your parents. The questionnaire is anonymous and the contents of the questionnaire will be kept confidential and will only be available for viewing by my supervisor and myself. The results of the study will be published as a master's dissertation in the first instance, and possibly a conference or journal paper later. Results will be presented in summary form without any personally relevant details.

If at any point in the research process you feel the need to withdraw from the study you may do so and you will not be penalised for your actions. If you consent to participation in the study it must be of your own free will and desire to do so. No benefits will accrue directly to you by virtue of participating in the study; it is however envisaged that the study will contribute to the general body of knowledge concerning people's views on intelligence and hence the study could have a bearing on parenting and teaching practices. While the study does not pose any foreseeable risks to you, should you have any personal discomfort as a result of participating in the study, please bring this immediately to me or my supervisor's attention (phone numbers below) so that we will make arrangements for you to consult with a student counsellor at the Student Counselling Centre.

If you have any questions about anything that has been said about the study or written in this letter please ask me. It is extremely important that you understand everything you have been told before you give your consent to participate in the study.

If you would like further information about the research study please do not hesitate to contact either myself or my supervisor.

Contact Details:

Prof. N. Mkhize

Tel: 033-260 5963 (O)

E-mail: mkhize@ukzn.ac.za

Boithatelo Mokoena

Tel: 033-260 6619

E-mail: 205504334@ukzn.ac.za

Thank you kindly for your time. If you wish to participate in the study please read and sign the attached page.

Consent form

I \_\_\_\_\_ (full names of participant)

Herby confirm that I understand the contents and the nature of this study and I agree to participate. I understand that I am participating freely and without being forced to do so. I also understand that I can withdraw from this interview at any point should I wish to continue and that my name will remain confidential.

-----  
Signature of participant

-----  
date

Appendix 2

**MULTIPLE INTELLIGENCES STUDY**

**Part I: Biographical Information**

**Please fill-in the following information about yourself and your parents:**

**Yourself**

**Age:** \_\_\_\_\_

**Gender:**      female              male

**Race:**          African              Coloured              Indian              White

**Year of study:**      1<sup>st</sup>                      2<sup>nd</sup>                      3<sup>rd</sup>              Honours              Masters              PhD

**Mother**

**Age:**

**Race:**          African              Coloured              Indian              White

**Highest qualification:** \_\_\_\_\_

**Occupation:** \_\_\_\_\_

**Father**

**Age:** \_\_\_\_\_

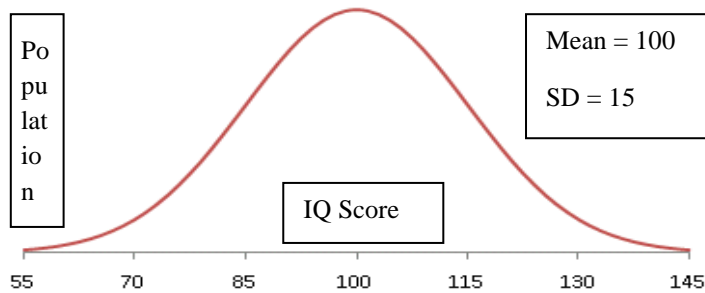
**Race:**          African              Coloured              Indian              White

**Highest qualification:** \_\_\_\_\_

**Occupation:** \_\_\_\_\_

## HOW INTELLIGENT ARE YOU?

Intelligence tests attempt to measure intelligence. The average or mean score on these tests is 100. Most of the population (about two-thirds of people) score between 85 and 115. Very bright people score around 130 and scores have been known to go over 145, while borderline retardation is a score of 70. The following graph shows the typical distribution of scores.



But there are different types of intelligence. We want to estimate your overall IQ and your score on seven basic types of intelligence. We want you to estimate each score for yourself and your parents. Please provide the following information about yourself and your parents:

Please fill-in your estimates

|  | ESTIMATES |        |        |
|--|-----------|--------|--------|
|  | YOU       | MOTHER | FATHER |
| Overall intelligence   |           |        |        |
| Verbal or linguistic intelligence (ability to use words)   |           |        |        |
| Logical or mathematical intelligence (ability to reason logically, solve number problems)            |           |        |        |
| Spatial intelligence (ability to find your way around the environment, and form mental images)       |           |        |        |
| Musical intelligence (ability to perceive and create pitch and rhythm patterns)                      |           |        |        |
| Body-kinetic intelligence (ability to carry out motor movement e.g. being a surgeon or dancer)       |           |        |        |
| Interpersonal intelligence (ability to understand other people)                                      |           |        |        |
| Intrapersonal intelligence (ability to understand yourself and develop a sense of your own identity) |           |        |        |

Have you ever taken an intelligence test?.....YES NO

Do you believe they measure intelligence fairly well?.....YES NO

Do you believe males are on average more intelligent than females?.....YES NO

Do you believe intelligence is primarily inherited?.....YES NO

Do you believe IQ test are useful in educational settings?.....YES NO

Do you believe some races are more intelligent than others?.....YES NO