Sociodemographic Risk Factors for Mild Mental Retardation, Borderline Intellectual Functioning and Specific Learning Disorders in a South African clinic sample.

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COMPULSORY DECLARATION

This work has not been previously submitted in whole, or in part, for the award of any degree. It is my own work. Each significant contribution to, and quotation in, this dissertation from the work, or works, of other people has been attributed, and has been cited and referenced.

Signature:_____ Date:_____

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ABSTRACT

Early identification of children with cognitive disabilities is crucial for effective intervention. Although international research has identified a number of sociodemographic risk factors that are associated with cognitive disability, there is a lack of South African data that could assist with the development of risk profiles that can help with the early identification of children at risk of having a cognitive disability. The aim of this study was to identify sociodemographic factors associated with a heightened risk of being diagnosed with Mild Mental Retardation (MMR), Borderline Intellectual Functioning (BIF), or a Specific Learning Disorder (SLD), in a clinic sample of South African children. An archival analysis was conducted on the case files of 303 children who had attended a Child Guidance Clinic between 2002 and 2009. Of these 303 cases, 26 were diagnosed with MMR, 27 with BIF, and 41 with a SLD. Bivariate analysis was conducted to explore the relationship between the sociodemographic risk factors and each of the cognitive disability outcomes (MMR, BIF and SLDs). Having a mother who has not completed high school, having a father who has not completed high school, and having an unemployed father, were found to be associated with a heightened risk of being diagnosed with MMR. Having a mother who had not completed high school was the only sociodemographic risk factor significantly associated with a heightened risk of being diagnosed with BIF. No significant associations were found between the selected sociodemographic risk factors and the SLD outcome. In light of these findings, further research is needed to expand on the sociodemographic risk factors identified, and in doing so aid with the development of comprehensive risk profiles for cognitive disabilities.

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CHAPTER 1

INTRODUCTION

Research has shown that children who are exposed to multiple sociodemographic risk factors during their early childhood years are at a heightened risk of developing a cognitive disability, including Mild Mental Retardation (MMR), Borderline Intellectual Functioning (BIF) and Specific Learning Disorders (SLDs)(Blair & Scott, 2002). Exposure to a single risk factor does not, in most cases, lead to negative developmental outcomes. However, exposure to multiple risks has been found to have a multiplicative effect, rendering individuals from such backgrounds particularly vulnerable to negative developmental outcomes and cognitive delays (Stanton-Chapman, Chapman, Kaiser & Hancock, 2004).

The finding that exposure to multiple sociodemographic risk factors can have a negative impact on cognitive development is of particular concern for South Africa, where one can predict that 80% of children coming from low socioeconomic status (SES) households would have been exposed to two or more sociodemographic risk factors associated with a heightened risk of developing a cognitive disability (Evans & English, 2002). This is a worrying statistic, as in 2008, 39% of South Africa's population was living below the national poverty line. More worrying still is that this poverty statistic is not evenly distributed. It was found that children were disproportionately represented, with as many as 68% of South Africa's children believed to be living in poverty (The United Nations Children's Fund [UNICEF], *South Africa country profile November 2009,* retrieved on 17 March 2010 from http://www.unicef.org/southafrica/children.htm/SAF-children-profile1109.html).

South Africa has a 98% enrolment rate for primary school, but this figure drops to only 85% for secondary school (Grade 8-12) (The United Nations Children's Fund [UNICEF], *South Africa country profile November 2009,* retrieved on 17 March 2010 from http://www.unicef.org/southafrica/children.htm/SAF-children-profile1109.html). In 2009, of those learners who remained in school and wrote their Senior Certificate exam, only 60.7%

managed to pass (South Africa Web, *South African Matric 2009*, retrieved on 17 March 2010 fromhttp://www.southafricaweb.co.za/articles/south-african-matric2009). Findings have also shown that there are a growing number of South African children who are failing to meet the necessary standards for completing primary school (The United Nations Children's Fund [UNICEF], *South Africa country profile November 2009*, retrieved on 17 March 2010 from http://www.unicef.org/southafrica/children.htm/SAF-children-profile1109.html). Although historical inequities in resources within the South African education system is to some extent responsible for this, some of the academic problems experienced by school going children may be influenced by their exposure to sociodemographic risk factors prior to entering Grade 1. These risk factors include, but are not limited to, a lack of environmental stimulation at home, poverty, and poor quality or no pre-school experiences (Jordan & Levine, 2009; Nihira, Mink & Meyers, 1985; Yeargin-Allsopp, Drews, Decouflé & Murphy, 1995). Due to a lack of financial resources in both families and government, attendance of children in early childhood development initiatives prior to Grade 1 is low (The United Nations Children's Fund [UNICEF], *South Africa country profile November 2009*, retrieved on 17 March 2010 from http://www.unicef.org/southafrica/children.htm/SAF-children-profile1109.html). Academically, many of the children coming from high-risk environments enter Grade 1 functioning well behind their peers and lacking the necessary competencies to cope in the school environment. Many of these learners struggle to ever catch up with their peers and are thus more likely to experience negative school outcomes such as grade retention and school failure (O'Shaughnessy, Lane, Gresham & Beebe-Frankenberger, 2003). It can be speculated that some of these academic shortcomings experienced by South Africa's children may be the result of unidentified cognitive disabilities, including Mild Mental Retardation (MMR), Borderline Intellectual Functioning (BIF) and Specific Learning Disorders (SLDs).

In 2001 the Department of Education in South Africa acknowledged that it had failed to respond to the diverse needs of learners in South Africa, "resulting in massive numbers of drop-outs, push-outs and school failures" (Department of Education, 2001, p.8). In response, the Department of Education adopted *Education White Paper 6* into its educational policy (Department of Education, 2001). The paper highlighted the finding that in South Africa the majority of 'special needs' learners were still be found in mainstream schools with their individual needs largely unsupported. The very limited number of 'Special Schools' in South Africa meant that only a very small percentage of children, usually those from more affluent

backgrounds, were able to access this limited resource. Thus, with *White Paper 6*, the South African government proposed moving towards a more inclusive model of education (Department of Education, 2001). The proposal was that the existing special schools would be improved and strengthened, and would cater for the most severely handicapped learners, as well as act as resource centres for the schools in the local area. As the existing 'Special Schools' can only cater for a small percentage of 'special needs' learners, namely those with severe and profound handicap, mainstream schools would need to accommodate the remaining 'special needs' learners, including those with mild to moderate barriers to learning (Department of Education, 2001). *White Paper 6* outlined how selected mainstream schools would become 'full service schools', implementing full inclusion. To assist these 'full service schools' with the 'special needs' of their learners, *White Paper 6* stated that these schools would need to receive added professional staff, training, as well as professional support from the staff at the existing special schools/resource-centres (Department of Education, 2001).

The Department of Education (2001) acknowledges that the goals outlined in *White Paper 6* are long term goals that will take many years to achieve. However, as we enter 2011, the slow implementation of this policy has resulted in the majority of South Africa's 'special needs' learners, including those with MMR, BIF and SLDs, remaining in mainstream classrooms where their individual needs are largely unsupported. In light of these shortcomings and limited resources available to schools, the need for early identification and intervention is paramount. Early identification and intervention can minimise or even negate the negative impact that exposure to multiple risks can have on cognitive development (O'Shaughnessy, Lane, Gresham & Frankenberger, 2003). In minimising the severity and scope of these cognitive disabilities, children can be guided on more positive developmental trajectories towards improved academic achievement and future employment. In improving these children's developmental trajectories, we can simultaneously reduce the added demands that these learners place on an already strained educational system.

Aims of current study

The current research study aims to identify sociodemographic risk factors associated with MMR, BIF and SLDs, in order to assist with the early identification of these cognitive disabilities. By identifying the children most at risk, early intervention programs can be offered. It is believed that the rate of Mild Mental Retardation and special educational placements among children at sociodemographic risk could be reduced by 50% if early interventions could target the most vulnerable children (Landesman Ramey & Ramey, 2002).

Structure of dissertation

Chapter 2 will review the literature on Mild Mental Retardation, Borderline Intellectual Functioning, and Specific Learning Disorders, with particular attention being given to the sociodemographic risk factors that have been identified internationally as being associated with a heightened vulnerability of being diagnosed with one of these cognitive disabilities. Chapter 3 will describe the methodological approach used by the current research, while Chapter 4 will detail the results of the data analysis. Chapter 5 will provide a discussion of the results in relation to the international literature on MMR, BIF, and SLDs, the strengths and limitations of the current research, and recommendations for future research.

CHAPTER 2

LITERATURE REVIEW

Introduction

This chapter provides an overview of both the international and local literature on Mild Mental Retardation, Borderline Intellectual Functioning and Specific Learning Disorders. The chapter starts with definitions of the three cognitive disabilities under investigation[1], before going on to briefly describe the ecological perspective on development and how exposure to sociodemographic risk factors may negatively impact on a child's cognitive development. This will be followed by a review of the prevalence rates of these three cognitive disabilities, with particular emphasis on the higher prevalence rates found in economically developing nations, such as South Africa, as compared to their more wealthy counterparts. The chapter will go on to review the sociodemographic risk factors that are associated with each of these cognitive disabilities. The high co-morbidity rate between cognitive disabilities and associated conditions and disorders will also be discussed. The chapter will conclude with an outline of the aim of the study, in light of the limited literature and high risk population found in South Africa.

2.1. Defining terms and parameters

2.1.1. Mild Mental Retardation (MMR)

Relating to the level of impairment, Mild Mental Retardation is the least severe of the four degrees of Mental Retardation. An individual who obtains an IQ score of between 50-55 and approximately 70, on a recognised IQ test, may be classified as being Mildly Mentally Retarded (American Psychological Association, 2000; Drews, Yeargin-Allsopp, Decouflé & Murphy, 1995). A score of below 70 on an IQ test can be translated as performing in the lowest 3% for one's age and cultural group (APA, 2000). Mild Mental Retardation is defined

[1] Diagnostically, Borderline Intellectual Functioning (BIF) is not classified as a cognitive disability. However, individuals in the borderline range of intellectual functioning tend to be seriously disadvantaged in mainstream classrooms, and they are generally not considered eligible for special educational resources. As such, their intellectual functioning can be considered a 'disability' (Ferrari, 2009).

as significantly subaverage intellectual functioning that is accompanied by concurrent "significant limitations in adaptive functioning, in at least two of the following skill areas: communication, self-help, home living, social/interpersonal skills, use of community resources, self-direction, functional academic skills, work, leisure, health and safety" (APA, 2000, p.39). To be classified as having MMR, the individual needs to be diagnosed before the age of 18, must obtain an IQ score that falls two standard deviations below the population mean, which translates to obtaining an IQ score of 70 or below, and the individual must also score two standard deviations below the population mean in at least two of the 'adaptive functioning' areas mentioned above (APA, 2000).

Children with Mild Mental Retardation are most commonly only identified at about five years of age, the time they start their formal schooling (APA, 2000; Drews et al., 1995). Before this time most of these children appear to be developing 'normally', and are largely indistinguishable from those children without Mild Mental Retardation (APA, 2000). Once formal schooling has commenced however, children with Mild Mental Retardation generally struggle to cope with the demands of mainstream schooling (APA, 2000). While some of these learners are transferred to special schools, many of these learners remain in mainstream schooling. This is particularly true in a country such as South Africa that has limited special-education resources. In South Africa the majority of learners who would qualify for special educational services remain largely unsupported in mainstream schooling, unable to cope with the curriculum (Pillay & Lochat, 1997).

By adulthood, most of these individuals have been able to obtain adequate social and vocational skills to acquire partial independence. Most people with MMR will however require some degree of supervision and guidance throughout their adult lives (APA, 2000).

2.1.2. Borderline Intellectual Functioning (BIF)

Borderline Intellectual Functioning describes the IQ range of between 71 and 84 (APA, 2000). Unlike MMR, which falls two standard deviations below the norm and falls outside the normal distribution of intelligence, BIF is described as falling one standard deviation

from the norm but still within the normal distribution of intelligence in the population. Although BIF falls within the normal distribution of intelligence many individuals with BIF, due to their lower functioning, are at a heightened vulnerability to experiencing difficulties in school and working life (Fernell & Ek, 2010). Students with BIF have been largely overlooked by educators, and frequently fall in the gap between general and special education (Shaw, 2008). As the 'special needs' of students with BIF are seldom met, they are particularly vulnerable to experiencing school failure, as well as numerous other social, emotional and behavioural difficulties (Shaw, 2008).

2.1.3. Specific Learning Disorders (SLD)

An individual may be diagnosed as having a Specific Learning Disorder if they experience one or more specific cognitive delays that may significantly hinder their learning, but with an otherwise average intelligence (Blair & Scott, 2002). The DSM-IV-TR (APA, 2000) identifies four different Learning Disorders; these are Reading Disorders, Mathematics Disorders, Disorder of Written Expression and Learning Disorders Not Otherwise Specified. People with a SLD possess at least average intelligence, but experience significant deficits in one or more of the above mentioned areas (APA, 2000). In other words, there is a discrepancy of two or more standard deviations between their general IQ score, which falls within at least the average range, and their performance in one or more specific learning areas (APA, 2000). To be diagnosed as having a SLD, the learning difficulty must be shown to significantly interfere with one's academic achievements, or interfere with activities of daily living that require reading, writing or mathematics (APA, 2000). Learning Disorders may persist into adulthood, and individuals with SLD have been found to experience significant difficulties in employment and social adjustment (APA, 2000; Reynolds, Elksnin & Brown, 1996).

2.1.4. Problems associated with terminology, assessment and classification of cognitive disabilities

2.1.4.1. Defining of terms: There is no standardised terminology for the three cognitive disabilities under investigation. For this study, the term Mental Retardation is used, as worldwide this is the most commonly used definition, being used in 76% of the 147 countries

covered in the Atlas study (WHO, 2007). 'Intellectual disability' is the second most commonly used term used to describe this group, followed by 'mental handicap' and 'mental disability'. An individual who is experiencing one or more specific cognitive delays in an otherwise average intelligence, may be described as having either a 'Specific Learning Disorder' or a 'Learning Disorder' (APA, 2000; Karande et al., 2007; Morison & Cosden, 1997). To avoid any confusion between a 'Learning Disorder', which is a specific cognitive delay in an otherwise average intelligence, and a 'Learning Disability', which is a term that is sometimes used to describe any learning problem, the current research has decided to adopt the term 'Specific Learning Disorder'. The term Borderline Intellectual Functioning is the most commonly used term to describe individuals with IQ scores in the borderline range (IQ, 71-84) (Ferrari, 2009). However the terms 'slow learner', 'low average intelligence', and 'below average intelligence' are also sometimes used to describe this group (Fennell & Ek, 2010).

2.1.4.2. Assessment: When assessing cognitive functioning, there is a need to recognize the approximately 5 point measurement error that can occur when assessing IQ (APA, 2000). This measurement error can result in a blurring of the cut-off point between, for example, MMR and BIF. To elaborate further, if an individual obtains a score of 70 on a Wechsler intelligence test, this needs to be interpreted as representing a score of between 65 and 75. In a case where an individual may fall on the cusp between two diagnoses, the individual's adaptive level of functioning should be taken into account to inform the diagnosis.

The DSM-IV-TR (APA, 2000) highlights that intelligence testing procedures need to be sensitive to, and accommodate for, an individual's ethnic, cultural, and linguistic background. However, when assessing IQ, many problems and controversies arise (Van Eerden & De Beer, 2009). First and foremost, "even today, psychologists do not agree on how to define cognitive functioning or intelligence, how to explain exactly the way in which it functions, or how it should be measured" (Van Eerden & De Beer, 2009, p.129). This lack of agreement "complicates efforts to understand the concept of cognitive functioning" while simultaneously making it difficult to "construct procedures and methods to measure intelligence" (Van Eerden & De Beer, 2009, p.129). A second concern with the assessment of IQ within the South African context is that many of the measures used locally have not yet

been fully standardised for all population groups, nor have separate norms been developed (Van Eerden & De Beer, 2009). The SSAIS-R, which is a measure frequently used to assess children's IQs in South Africa, is only reliable and valid for first-language English or Afrikaans speaking children, while the WISC-R, another commonly used measure, has not been standardised for the South African population (Van Eerden & De Beer, 2009).

In South Africa, a country that has a great diversity of languages, a further area of concern has to do with the language of assessment (Kanjee & Foxcroft, 2009). As the majority of South Africa's children from Grade 4 onwards are educated in English, and English is the most commonly used language of instruction at higher education institutions and work, it is assumed that second-language English speakers are proficient in English and that doing assessments in English is acceptable (Kanjee & Foxcroft, 2009). In reality this is not the case. In South Africa, by the end of Grade 12, the majority of second-language English speakers are still not sufficiently proficient in English (Kanjee & Foxcroft, 2009). However, the current reality in South Africa is that there are very few measures that have multiple language versions, and as a result most assessments are still done in English (Kanjee & Foxcroft, 2009). Conducting cognitive assessments in English, with non-proficient second-language English speakers, not only acts as a source of bias against these individuals but also contravenes the standards outlined for fair and ethical assessment (Kanjee & Foxcroft, 2009).

Due to the complexity of assessing cognitive functioning within a multicultural setting such as South Africa, it is advised that a combination of suitable measures be used as this can help minimise potential bias (Kanjee & Foxcroft, 2009). Furthermore, it is stressed that in conducting assessments in multicultural settings there is a great responsibility on the psychologist to administer these measures in a fair, ethical, and non-biased way (Kanjee & Foxcroft, 2009). The implications of these limitations of intellectual assessments in South Africa are that some individuals may erroneously be classified with a cognitive disability, or may be diagnosed with the incorrect cognitive disability.

2.1.4.3. Classification: The classifications of, and diagnostic criteria associated with these three cognitive disabilities are not static. In the past numerous changes have been made to the

diagnostic criteria associated with these cognitive disabilities, as well as how they are classified. According to a draft issue of the DSM V (APA, 2010), we can expect more changes to be made to these diagnoses into the future. One proposed change is to include 'Disorders of Written Expression' and 'Learning Disorder not otherwise Specified' under the new diagnosis of 'Learning Disabilities' (APA, 2010). This highlights the need for both current and future researchers to acknowledge and accommodate for any changes that may have an impact on their study or findings.

Furthermore, there is some evidence that cognitive disabilities are not fixed, stable entities; rather they are subject to change over time, particularly in response to external stimuli (O'Shaughnessy et al., 2003). If these external stimuli can be positive, such as preschool intervention programs, a child can increase their IQ score by up to 10 points (Zigler, 1995). Although cognitive disability diagnoses take into account the individual's level of adaptive functioning (APA, 2000), these diagnoses still rely heavily on IQ scores, which as previously mentioned, are a contested construct internationally and even more so in South Africa (Van Eerden & De Beer, 2009). Nonetheless, research does support the existence of different types of cognitive disabilities, and the hope is that by getting children diagnosed/identified early, they can access early intervention programs and additional academic supports, which can help guide them on a more positive developmental trajectory.

2.2. Sociodemographic risk factors and child development

This study has adopted Bronfenbrenner's (2001) ecological perspective on human development as it takes into account the multiple influences on human development over time. According to Bronfenbrenner's (2001) ecological perspective on development, development does not occur in isolation, rather it is effected by the complex interplay between the child and their environment over time.

Bronfenbrenner (2001) identifies five socially organised contexts/subsystems in which human development occurs. These five subsystems are a child's microsystem, mesosystem, exosystem, macrosystem, and the chronosystem. The microsystem is the child's immediate

environment and is regarded as having the greatest influence on a child's development. This is the face-to-face interactions that the child has with their family, school, and peer group (Bronfenbrenner, 2001). The second level is the mesosystem, which is the relationship between two or more settings pertaining to a child's life (Bronfenbrenner, 2001), for example, the relationship between the child's home and school. Research has shown that strong school-parent connectedness is associated with more positive school outcomes (Brooks, 2006). The third subsystem is the exosystem. The exosystem is the linkage between at least one of the child's microsystems and an external setting. For example, the parent-child relationship (microsystem) may be jeopardised by a parent who is forced to work long hours in a job they dislike (external influence). In South Africa many people are forced to commute long distances from the outlying areas of cities, on public transport, to get to and from their places of employment. In such a scenario where a parent may have to leave the house before six in the morning and only returns around eight in the evening, the parent may not be emotionally or physically available to spend time with their child or children, and hence may struggle to monitor school performance or help with homework. The fourth subsystem is the macrosystem. The macrosystem is the overarching pattern or societal blueprint of a particular culture or subculture, which includes the specific culture's customs, material resources, belief systems, life-styles and environmental hazards (Bronfenbrenner, 2001). This may be seen as the social, political and material reality of the population in question. For example, it is likely that children from countries experiencing political violence/oppression will experience disruptions to their learning and intellectual development. The last level proposed by Bronfrenbrenner (2001) is the chronosystem. This last system accommodates for changes in both the individual and the environment over time, for example the influence that Apartheid and its later fall has had, and continues to have, on a large percentage of South Africa's population. Under Apartheid, the majority of South Africans were systematically denied access to a quality education. This human rights violation can be expected to still have a powerful impact on our newer generation, many of whom were born after the fall of Apartheid. For example, studies have shown that children who come from homes in which the mother has less than twelve years of formal education are at a heightened risk of developing a cognitive disability, including MMR and SLDs (Blair & Scott, 2002; Croen, Grether & Selvin, 2001).

In viewing development as occurring within Bronfenbrenner's (2001) five systems, we are better able to understand the multiple influences on development, as well as the potentially negative effects that exposure to sociodemographic risk factors at any of these levels may have on a child's development.

Fraser (1998, p.3) describes a risk factor as "any influence that increases the probability of onset, digression to a more serious state, or maintenance of a problem condition". These risk factors, as described by Fraser (1998), may be organic or non-organic in nature. An organic risk factor is a risk factor with a bio-medical origin. For example, research has identified premature birth (< 37 weeks), low birth weight (< 2500grams), prenatal asphyxia, and maternal drug/alcohol use during pregnancy, as organic risk factors for cognitive disability (Croen et al., 2001; Murphy, Boyle, Schendel, Decouflé & Yeargin-Allsopp, 1998; Williams & Decouflé, 1999; Yaqoob et al., 2004). In the majority of MMR, BIF and SLD cases, however, there is no known organic cause for the disability, which has led to the argument that environmental/sociodemographic factors must play a role in intellectual development. Sociodemographic risk factors are non-organic risk factors found in the child's environment. An example of a sociodemographic risk factor that may negatively impact on cognitive development is being born to a single mother or a mother with less than twelve years of formal schooling (Leonard et al., 2005; Murphy et al., 1998). Studies have found that these non-organic/sociodemographic risk factors can increase a child's vulnerability to experiencing cognitive delays (Leonard et al., 2005).

Exposure to a single risk factor does not, in most cases, lead to negative developmental outcomes (Brooks, 2006). It has been found, however, that the exposure of a child to multiple risk factors has a multiplicative effect, rendering individuals from high-risk backgrounds vulnerable to experiencing socioemotional, behavioural and academic difficulties (Felner, Favazza, Shim, Brand, Gu & Noonan, 2001). In response to this there is a growing body of international literature that has started to identify the detrimental effects that exposure to multiple sociodemographic risk factors may have on intellectual development. Rutter (1993) and Bernard (2000) found that as many as fifty percent of children coming from high risk backgrounds can be expected to exhibit developmental difficulties that will hinder their school achievement. This is a particularly worrying finding when one considers that a large

percentage of South African children are growing up in environments that expose them to multiple sociodemographic risk factors on their journey towards adulthood.

2.3. Prevalence rates of MMR, BIF and SLDs

2.3.1. Mild Mental Retardation

In high income nations Mental Retardation is estimated to occur in approximately 1 to 3% of the population, with Mild Mental Retardation being the most common form, accounting for between 80 and 85% of all individuals with mental retardation (APA, 2000; Bradley, Thomson & Bryson, 2002; Hawkridge & Keyter, 2002). According to the current classification of MMR, it is estimated that about 2.3% of the population should present with this disorder (Simonoff et al., 2006). With this said, prevalence rates have been found to vary significantly between studies and population groups (Simonoff et al., 2006). For example, in the United States of America, the prevalence rate of MMR is believed to be between 1 and 3% (Bradley et al., 2002), while Stein, Belmont and Durkin (1987) found a prevalence rate of 13.8% in Bangladesh.

Numerous studies, including those of Drews et al. (1995) and Chapman, Scott and Stanton-Chapman (2008), have found that only 20% to 25% of their Mild Mental Retardation (MMR) cases had a known organic/biological aetiology. In the remaining cases, strong associations were found between the child's exposure to sociodemographic risk factors, namely factors associated with coming from a low socioeconomic status (SES), and the presence of MMR (Roeleveld, Zielhuis & Gabreels, 1997). A growing body of international literature has therefore started to identify the detrimental effect that exposure to multiple sociodemographic risk factors can have on intellectual development. Zigler proposes two types of MMR (1995). The first is mental retardation due to organic causes, which includes prenatal, perinatal and postnatal complications/trauma as well as inherited genetic disorders (Murphy et al., 1998; Zigler, 1995). The second type of retardation is Familial or Cultural-familial retardation, which is believed to be the result of psychosocial disadvantage and exposure to sociodemographic risk factors (Zigler, 1995).

The detrimental impact that exposure to sociodemographic risk factors can have on intellectual development can potentially help to explain the significant differences found in the prevalence rates of MMR across population groups. Findings have consistently found that the majority of children who suffer from MMR can be found in the lower socio-economic levels of the population (Hawkridge & Keyter, 2002). Furthermore, findings have shown that the prevalence rates of MMR are higher in low and middle income nations as opposed to high income nations. To highlight this point further, Bashir et al., (2002) found that in their study of 6 to 10 year old children from four economically distinct population groups in Pakistan, the prevalence rates varied greatly according to socio-economic conditions. A prevalence rate of 1.2% was found in the upper-middle class sample, while the prevalence rate in the poor peri-urban slum areas was found to be as high as 10.5% (Bashir et al., 2002). In contrast to more economically developed nations such as Norway and Canada, where the estimated prevalence rates of MMR are 0.35% and 0.34% respectively (Bradley et al., 2002; Stromme & Valvonte, 1998), Bashir et al. (2002) estimate the overall prevalence rate of MMR in Pakistan to be 6.2%. In a separate study, Roeleveld et al. (1997) found that the prevalence rates of MMR, in the 43 countries investigated, varied greatly from 0.39% to 7.93%. Roeleveld et al. (1997) noted that strong associations were found between SES and the prevalence rate of MMR.

Over the past four decades the prevalence rate of MMR in economically developed Western nations has declined significantly. This decline has been partly attributed to improvements in socio-economic conditions, pre and post-natal care and education (Stromme & Valvonte 1998). Although these prevalence statistics are believed to be an underestimation of the true prevalence rates, it does suggest that with improved socio-economic conditions or perhaps with more immediate and effective interventions, low and middle income nations can too start to reduce the prevalence rate of MMR (Bradley et al., 2002).

The prevalence rate of MMR in South Africa is currently unknown. But if we are to compare ourselves to another middle income nation such as Brazil, which has an estimated prevalence rate of 6.1%, then we can predict that the prevalence rate of MMR in South Africa will be well above the average of 1 to 3% of the population found in high income countries (Bashir et al., 2002; Stein et al., 1987).

2.3.2. Borderline Intellectual Functioning

Borderline Intellectual Functioning has received little attention from educators, researchers and policy makers. As noted previously, children with BIF are a largely overlooked sector of the population who frequently struggle in mainstream education, but are rarely eligible for Special Education classes (Fennell & Ek, 2010; Shaw, 2008). There is limited literature on the prevalence rates of BIF, though it is estimated that BIF affects between 7 and 14% of the school going population (Karande, Kanchan & Kulkarni, 2008; Shaw, 2008). According to Christianson et al. (2002), in a less economically developed country such as South Africa, the prevalence rate of BIF would in most likelihood be even higher than that found in a more economically developed country, such as the USA. Thus one can hypothesise that the prevalence rate of BIF in the USA, which is estimated to affect up to 14% of the school going population, should be taken as a conservative estimate of the 'real' or expected prevalence rate of BIF in South Africa.

In light of the limited local and international research on the prevalence rates of BIF, one can only question whether it is perhaps students from this largely unrecognised group that are contributing to the alarmingly high levels of grade retentions, school failures and school drop-outs currently being experienced in South African schools (South Africa Web, *South African Matric 2009,* retrieved on 17 March 2010 from http://www.southafricaweb.co.za/articles/south-african-matric2009; The United Nations Children's Fund [UNICEF], *South Africa country profile November 2009,* retrieved on 17 March 2010 from http://www.unicef.org/southafrica/children.htm/SAF-children-profile1109.html).

2.3.3. Specific Learning Disorders

Specific Learning Disorders are estimated to be present in about 5 to 10% of the school going population, with SLD placements in the USA having tripled over the last few decades (Hawkridge & Keyter, 2002; Karande et al., 2007; Margai & Henry, 2003). Studies have shown that there is an inherited genetic component to SLDs (APA, 2000). However, it has also been shown that children who are exposed to risk factors associated with coming from low socioeconomic backgrounds are at a heightened risk of manifesting with a SLD (Blair &

Scott, 2002; Jordan & Levine, 2009; Karande et al., 2007). The genetic component is believed to account for between 30% and 45% of all SLDs, while the remaining cases have no known organic cause (Karande et al., 2007; Reynolds et al., 1996). Research conducted in Florida by Blair and Scott (2002) found that 30% of SLDs found in boys, and 39% of SLDs found in girls, could be attributed to coming from a low socioeconomic background. Males are more likely to be diagnosed with a SLD than females, with males making up 60 to 80% of all diagnosed Reading Disorder cases (APA, 2000). These gender differences found in the diagnosis of SLDs are believed to be in part due to referral bias. Males are more likely to exhibit disruptive behaviours associated with having a SLD than their female counterparts, and are hence more likely to be identified and referred by the school or other body (APA, 2000). When more stringent criteria are used for identification and assessment, prevalence rates have been found to be more evenly distributed across the two genders (APA, 2000).

The prevalence rates for each of the four sub-types of learning disorders are difficult to establish, as many studies have looked at the prevalence rates of Learning Disorders in general, and have not separated them into their individual categories. With this said, Reading Disorders and Disorders of Written Expression are believed to be the most common SLDs (Hawkridge & Keyter, 2002). In the USA, it has been estimated that Reading Disorders are present in between 4 and 11% of the population, while the prevalence rate of Disorders of Written Expression has been estimated to be between 3-10% of the school going population (APA, 2000; Hawkridge & Keyter, 2002; Katusic, Colligan, Barbares, Schaid & Jacobsen, 2001). Mathematics disorder, which is the least common SLD, is believed to affect about 5% of the school going population (Hawkridge & Keyter, 2002). Mathematics disorders and Disorders of Written Expression most commonly occur in combination with a Reading Disorder, and it is relatively uncommon for either of these two disorders to be found in the absence of a Reading Disorder (APA, 2000).

In the USA the number of SLD diagnoses in children has increased by nearly 50% over the past three decades placing an enormous financial strain on the government as the cost of running a ‘special education’ class is more than double that needed to run a mainstream class (Blair & Scott, 2002; Margai & Henry, 2003). This rapid rise in the number of SLD

diagnoses can be attributed to improved identification measures, but also the incorrect classification of some 'low achievers' as having a SLD.

2.3.4. MMR, BIF and SLDs in South Africa.

There is very limited literature on the prevalence rates of cognitive disabilities in South Africa. One study conducted by Christianson et al. (2002) looked at the prevalence rate of Mild Intellectual Disability in a sample of 2-9 year olds in rural South Africa. They defined Mild Intellectual Disability as being an IQ score of between 56-80, which for the purpose of the current study incorporates both MMR and BIF. A prevalence rate of 2.91% was found. The authors warn that due to a lack of measurement sensitivity, some children may not have been identified even though they may have been Mildly Intellectually Disabled. In light of this, Christianson et al. (2002) believe that their findings are likely to be an underestimation of the true or expected prevalence rate, and should thus be taken as the minimum observed frequency. Christianson et al. (2002) identified an organic aetiology in only 19.5% of their Mildly Intellectually Disabled sample. They propose that exposure to sociodemographic risk factors may account for many of the cases of intellectual disability with an unknown aetiology.

In South Africa, in addition to an absence of standardised norms for non-English speaking children, there has also been a lack of special services and adequately trained professionals to conduct cognitive assessments (Pillay & Lochat, 1997). About a decade ago, the Department of Education (2001) acknowledged this lack of services, and proposed a total overhaul of this system whereby teachers, parents and lecturers should assist with the identification and assessment of these children. However, to date, very little training or progress has been made in this regard, even though most special-needs schools still require psychometric assessments for admission. This lack of assessment services has resulted in a large percentage of South Africa's children who could be classified as having a cognitive disability remaining undiagnosed and unsupported in their academic lives (Pillay & Lochat, 1997). The very limited literature on the prevalence rates of MMR, BIF and SLDs in South Africa, together with the lack of facilities/services to cater for these children, results in the true prevalence rate of these three cognitive disabilities remaining largely unknown. In reviewing the

literature, Abosi (2007) makes the rough estimate that 20% of children in any African classroom will experience learning difficulties that will hamper their academic achievement. In light of South Africa's high risk population, one can predict that the prevalence rates of these three cognitive disabilities will be similarly high.

2.4 Sociodemographic risk factors for cognitive disabilities

Over the past few decades there has been an increasing interest in the contexts in which children live and function, and the impact that these environments can have on cognitive functioning (Keogh et al., 1997). Numerous studies have found that the majority of cognitive disabilities within the milder range, including MMR, BIF and SLD, have no know organic origin (Blair & Scott, 2002; Chapman et al., 2008; Drews et al., 1995). In those cases with no known organic aetiology, strong associations have been found between a child's exposure to non-organic social and environmental risk factors and the later development of a cognitive disability (Croen et al., 2001).

2.4.1. Sociodemographic risk factors for Mild Mental Retardation

As previously mentioned, in only 20-25% of all cases of MMR is there a known organic cause (Murphy et al., 1998). In those cases where there is no known organic cause, MMR is believed to be, at least in part, the result of the child's exposure to sociodemographic risk factors (Chapman et al., 2008; Drews et al., 1995). Chapman et al. (2008) state that even when there is a medical aetiology for a learning disability, sociodemographic and environmental factors will still influence how the learning disability is manifested. Over the past three decades there has been an increasing amount of research aimed at identifying the sociodemographic risk factors that are believed to be associated with a heightened risk of developing MMR. In reviewing the international literature on the risk factors associated with MMR, several risk factors have been identified.

Studies have consistently found that children who are born to a mother with less than 12 years of formal education (in South Africa that would be the equivalent of a Matric), are at a

heightened risk of developing MMR (Croen et al., 2001; Drews et al., 1995; Yaqoob et al., 2004). One can hypothesise that in a competitive job market, such as can be found in South Africa, a mother with less than 12 years of formal education is more likely to be unemployed or of a low SES. The detrimental impact that low SES and poverty can have on a child's cognitive development is well documented, with numerous studies identifying low SES as a risk factor for MMR (Croen et al., 2001; Leonard et al., 2005; Yeargin-Allsopp, Drews, Decouflé & Murphy, 1995). Low SES is commonly regarded as the single greatest risk factor to a child's intellectual development (Roeleveld et al., 1997; West, 2007). Leonard et al. (2005) found that children who were born to mothers that were in the most socially disadvantaged 10% of their sample were five times more likely to present with MMR than those children from the top 10%. Drews et al. (1995) found that MMR rarely occurs in children from high socioeconomic backgrounds, unless there is an underlying organic cause. Among other factors, children coming from low SES backgrounds can be expected to have received limited pre and post-natal care, as well as having had poor access to learning resources and quality education, thus potentially jeopardising their positive intellectual development (Yeargin-Allsopp et al., 1995). Poverty also heightens a child's risk of malnutrition, parental mental health problems, erratic parenting, abuse/neglect, and overcrowding, all of which are believed to negatively impact on intellectual development (Margai & Henry, 2003; Stanton-Chapman et al., 2004).

Higher birth order is a further identified sociodemographic risk factor for MMR (Drews et al., 1995). There are mixed findings as to which child is at risk. Drews et al. (1995) found that the third or later born children were more vulnerable to having MMR, while Leonard et al. (2005) found this risk only to be present in the fourth or later born children. In the research of Croen et al. (2001), this heightened risk of developing MMR was found to be present in as early as the second born child. One can hypothesise that later born children may not receive adequate stimulation, as their parents' material and emotional resources have to be divided between the siblings. Males have consistently been found to present more commonly with MMR than females, hence being 'male' has been identified as a potential risk factor for MMR (Croen et al., 2001; Murphy et al., 1998; Williams & Decouflé, 1999). Drews et al. (1995) however warn that the higher prevalence rates of MMR found in males may be due to bias in testing and referral patterns.

Studies that have looked at maternal age as a sociodemographic risk factor for MMR have had varied findings. While Drews et al. (1995) found older maternal age to be a risk factor for severe mental retardation, no correlation was found between maternal age and MMR. Croen et al. (2001) however identified that having a mother who was 30 years old or older at the time of birth, was a risk factor for MMR. On the other end of the spectrum, Leonard et al. (2005) identified being born to a mother who is under 20 years of age as a risk factor for MMR. One may speculate that some of this variation may be explained by a potential correlation between maternal age and another variable. For example, there is a high possibility that there is a correlation between 'older mothers' and 'high birth order', or conversely 'teenage mothers' and 'low maternal education', as the pregnancy may have interrupted their schooling.

A further potential sociodemographic risk factor for MMR is having an absent father. Williams and Decouflé (1999) found that having an absent father was twice as common in their MMR sample, as compared to the control group. Leonard et al. (2005) identified having a single mother, which included mothers who were never married or had been separated, widowed or divorced, as a further risk factor for MMR. One can speculate that single mothers, who may not be receiving any support from a partner, may have less available emotional and material resources, and as a result may struggle to meet all of the developmental needs of the child. Leonard et al. (2005) also identified having a father in a low job classification, or having an unemployed father, as additional risk factors for MMR. With paternal employment status being used a SES indicator, a child of an unemployed father, or a father in a low job classification, is more likely to be classified as coming from a low SES, which has consistently been found to negatively impact on cognitive development (Croen et al., 2001; Leonard et al., 2005).

The possible link between trauma exposure and learning/cognitive disabilities (Pynoos, Steinberg & Goenjian, 1996; Sinason, 2001) is very worrying for a country such as South Africa, which is considered one of the most violent countries in the world. In South Africa, one national prevalence study found that nearly 75% of the adult population had experienced

a traumatic event in their lifetime, with 55.6% reporting multiple traumas (Williams et al., 2007). Children in South Africa are exposed to, amongst other factors, high levels of rape, witnessing of intimate partner violence, and abuse and neglect (Seedat, Van Niekerk, Jewkes, Suffla & Ratele, 2009). Furthermore, both child and parental mental health problems such as anxiety and depression, which may manifest as a result of trauma exposure, can further exacerbate the child's ability to learn and/or the parent's ability to adequately care for the child (Pynoos, et al., 1996; Williams et al., 2007).

2.4.2. Sociodemographic risk factors for Borderline Intellectual Functioning

Few studies have investigated the sociodemographic risk factors associated with BIF. Nihira et al. (1985) found strong associations between both low SES and poor quality parenting, and the presence of BIF. Nihira et al. (1985) identified a lack of educationally relevant stimuli and opportunities being given to the child, low expectations and aspirations for the child, and a poor psychosocial climate in the home, as being the most influential qualities of poor parenting that can negatively influence cognitive development. Fenning, Baker, Baker and Crnic's study (2007) found that the mothers of children with BIF had lower levels of education than the mothers of typically developing children; thus forwarding low maternal education levels as a risk factor for BIF. Fenning et al. (2007) to found that the mothers of the children with BIF were lower in maternal involvement and display less positive and sensitive parenting styles than the mothers of typically developing children, which they conclude heighten the risk of children with BIF developing emotional, behavioural and social difficulties.

Although not looking exclusively at BIF, Sameroff, Seifer, Baldwin, and Baldwin (1993) identified the following social and familial risk factors for cognitive delays, including BIF: maternal mental health problems, maternal anxiety, authoritarian child rearing attitudes, poor mother-child interactions, low maternal education, head of house being in semi-skilled/unskilled occupation, minority ethnic status, absent father, large family size, and having experienced several stressful life events in the previous year.

2.4.3. Sociodemographic risk factors for Specific Learning Disorders

There appears to be a strong similarity between the risk factors identified as being associated with a child's development of a SLD, and those associated with MMR. In the research of Karande et al. (2007) they identified an organic cause (including prenatal complications and genetic inheritance) in 40% of their SLD sample, but in the remaining 60% of the sample no known organic cause was identified. A child's exposure to sociodemographic risk factors has been proposed as a potential explanation that can help account for some of those SLD cases with no known organic cause (Blair & Scott, 2002).

As with MMR, low SES has also been identified as one of the most negatively influential risk factors associated SLDs (Blair & Scott, 2002; Jordan & Levine, 2009). Jordan and Levine (2009) highlight how poverty can negatively impact on a child's home and school environment, as well as on the learning opportunities that they are exposed to. Blair and Scott (2002) found that low maternal education levels, that is less than 12 years of schooling, is a risk factor for a SLD, while Jordan and Levine (2009) found that both low paternal and maternal education levels were associated with an increased risk of developing a SLD. Again, low parental education levels may be linked to poorer employment opportunities and a lower SES, and/or a lack of educationally relevant stimuli and opportunities being made available to the child (Nihira et al., 1985). Jordan and Levine (2009) found that low-income parents spend less time reading to and teaching their children than do middle-income parents, thus limiting the learning opportunities the child is exposed to.

Blair and Scott (2002) also identified being 'male' as a risk factor for SLD, with boys being more than twice as likely than girls to get a Learning Disability placement. As was the case with MMR, the higher prevalence rate of SLDs found in males may be partly due to referral and testing bias, as opposed to organic factors inherent to being 'male' (Drews et al., 1995). Morrison and Cosden (1997) state that the majority of research into SLD has been done on males, as males are overrepresented in the SLD categories. In the reading disorder category, males make up between 60% and 80% of this group (APA, 2000).

As with MMR, being born to an unmarried mother and/or currently living in a single parent home have both been identified as risk factors for a heightened risk of being diagnosed with a SLD (Blair & Scott, 2002; Stanton-Chapman et al., 2002). In Stanton-Chapman et al.'s (2002) work on Specific Language Impairments, which are believed to be strongly associated with the later development of Reading Disorders, they identified high birth order (third or later born children) as a risk factor for a Specific Language Impairment and the later development of a Reading Disorder (Reynolds et al., 1996).

Findings have shown that there is a strong genetic component to SLDs (Hawkridge & Keyter, 2002; Reynolds et al., 1996; Stanton-Chapman et al., 2002). However, as the aetiology of SLD are multifactorial, researchers are hesitant/unable to determine the independent contribution of this genetic predisposition in predicting a SLD outcome (Hawkridge & Keyter, 2002). Reynolds et al. (1996), however, estimate that the transmission rate of Specific Reading Disorders, from parents to their children, is between 35%-45%. Regardless of the aetiology of the SLD, it has been shown that these children's exposure to, or protection from, sociodemographic risk factors will influence how or if the SLD will be manifested (Reynolds et al., 1996). With early identification and intervention the severity of a SLD can be moderated, and in doing so one can also minimise/negate the likelihood that secondary emotional and behavioural difficulties will develop (O'Shaughnessy et al., 2003; Reynolds et al., 1996).

2.4.4. Limitations of previous research

Much of the literature on the sociodemographic risk factors associated with a heightened vulnerability to developing a cognitive disability has come from studies that identified the associated risk factors from information contained within birth certificates (Croen et al., 2001; Drews et al., 1995; Williams & Decouflé, 1999; Yeargin-Allsopp et al., 1995). Studies that have used such a design may be somewhat limited due to the nature of their data. The first limitation with such a design is the limited amount of demographic information that is captured on birth certificates, thus restricting the number of variables that can be investigated. The second potential limitation comes with the timing of the data capturing. As the data were captured at the time of the child's birth, such studies have had to make inferences about the

child's early life experiences; from the time of the child's birth to the time that the child was diagnosed with a cognitive disability, which is usually in their early years of formal schooling. Making such inferences can be problematic as they do not account for any changes that may have occurred in the child's life circumstances over these early years.

Other studies, such as those of Karande et al. (2008), Karande et al. (2007), and Kumaraswamy et al. (1991), were retrospective in nature, and used the detailed case files of children who had been seen and assessed at clinics as their data source. Using case files as opposed to birth certificates as the data source avoids some of the potential difficulties mentioned earlier, for example having to make inferences about the child's early life. However, clinic samples may have limited generalisability to the non-clinical population (that is, children with cognitive disabilities who are not referred for clinical assistance).

A further potential limitation can come with the likely prediction that there will be a high inter-correlation between some of the variables under investigation. Thus, to identify the independent contributions of these different risk factors towards predicting a cognitive disability outcome, one needs to enter these variables simultaneously into a regression analysis. In the research of Croen et al. (2001), Drews et al. (1995), Williams and Decouflé (1999) and Yeargin-Allsopp et al. (1995) that used birth certificates as their data source, logistical regression analysis was used to identify the independent contribution of each variable. In the studies that used case files as their data source (Karande et al., 2008; Karande et al., 2007; Kumaraswamy et al., 1991), the relative contribution of the individual risk factors has generally not been considered, possibly due to the small number of children in these clinic samples. Having a small sample, such as is commonly the case with clinic samples, limits the predictive power of logistical regression analysis. Therefore, the unique contribution of the various risk factors in predicting a cognitive disability outcome is not yet well understood.

The majority of research that has investigated the sociodemographic risk factors associated with cognitive disability has come from Europe, North America, and Australia, with very limited research coming from economically developing countries. To the researcher's

knowledge, no previous research has been conducted to identify the sociodemographic risk factors associated with MMR, BIF or SLDs, within the South African context.

2.5. Associated Features and Disorders

It has been found that people with cognitive disabilities are more likely to develop an additional disorder, over and above their cognitive disability diagnosis, than their non-cognitively handicapped counterparts (APA, 2000). People with cognitive disabilities are also more likely than the general population to experience social and employment difficulties, and frequently present as demoralised and low in self-esteem (APA, 2000).

2.5.1. MMR

As previously noted, people with MMR usually develop social and communication skills during the preschool years, and are largely indistinguishable from children without MMR until a later age (APA, 2000). Individuals with MMR are most commonly only identified in the early years of formal schooling, as it becomes evident that they are unable to cope with the demands of mainstream schooling. Children with MMR require specialist educational services, and with the correct support can reach an academic level of about Grade 6 by their late teens (APA, 2000). In South Africa, there is a severe lack of personnel and services to conduct scholastic assessments, as well as a lack of facilities to cater for children with scholastic difficulties. As a result, the majority of children with MMR receive little or no remedial support/interventions in mainstream schooling, where they experience repeated grade retentions and failure (Pillay & Lochat, 1997). People with MMR place a significant financial and emotional strain on families, schools and governments, as they require specialist services and support (Bradley et al., 2002). In the Netherlands, Mental Retardation is the single highest source of health care cost, accounting for 8.1% of the total health care budget (Bradley et al., 2002). Although people with MMR can acquire minimal independence, they may still require additional supervision, assistance and guidance throughout their adult lives (APA, 2000).

A further concern is the high vulnerability of individuals with MMR to developing mental disorders and/or behavioural problems (Koskentausta, Livanainen & Almqvist, 2002). It is estimated that individuals with MMR are three to four times more likely to have a mental disorder than the general population (APA, 2000). The mental disorders most commonly associated with Mental Retardation include: Attention-Deficit/Hyper-activity Disorder, Mood Disorders, Pervasive Developmental Disorders, and Mental Disorders due to a General Medical Condition (APA, 2000). Koskentausta et al. (2002) found that 29% of the children in their study, who had a MMR diagnosis, had an accompanying psychiatric disorder. In a study on children with Intellectual Disabilities attending special schools in Cape Town, Molteno, Molteno, Fischilescu and Dawes (2001) found a co-morbidity rate of 21% between MMR and an accompanying psychopathology. Gillberg, Persson, Grufman and Themner (1986) looked at the prevalence rates of the individual psychiatric disorders and found that 10% of their MMR sample had an emotional disorder, 12% had a conduct disorder, 11% had ADHD, 4% a psychosomatic disorder, and 14% exhibited psychotic behaviour.

Individuals with MMR are, generally speaking, low in social-adaptive behaviour (Koskentausta et al., 2002), which can limit their coping skills in daily life and can lead to higher levels of depression and loneliness (Heiman & Margalit, 1998). It can also lead to the development of a poor self-image, repeated experiences of failure, and 'learned helplessness' (Dykens, 2000). Dykens (2000) also describes people with Mental Retardation as being particularly vulnerable to exploitation, physical and sexual abuse, peer rejection, and their disability being seen as a social stigma by their community. Over and above the support and guidance individuals with MMR require, the additional impairments associated with MMR place even higher demands on the individual, the family, schools and governments.

2.5.2. BIF

As already noted, children with BIF are largely overlooked by educators and policy makers and frequently fall in the gap between special and general education, resulting in their individual academic needs being seldom met (Shaw, 2008). Children with BIF require additional individualised educational supports. However, in a country such as South Africa, where in 2009 there was an average of 30.6 learners per educator, teachers may be unable to

provide the individual support that these learners require (EMIS report, *School realities* 2009, retrieved 26 July 2010 from http:www.education.gov.za/emis/emisweb/flyer/School Realties (EMIS) 2009.pdf; Karande et al., 2008).

Due to the lack of attention that this group has received, learners with BIF are particularly prone to experiencing frustration at their repeated failure to cope in mainstream schooling. As a result, children with BIF frequently experience a lack of academic motivation and have an unfavourable view towards schooling in general (Shaw, 2008). Children with BIF become particularly vulnerable to experiencing grade retention, school dropout, school failure, suspensions, expulsions, deviant behaviours and future under and unemployment (Shaw, 2008). Karande et al. (2008) and Shaw (2008) both found high levels of school failures, grade retentions and school dropouts within the BIF samples they investigated, with Karande et al. (2008) finding that 83.6% of their BIF sample from Pakistan had failed in at least one examination, and 61. 8% had experienced grade retentions.

A further concern is that people with BIF also display disproportionately high levels of teen pregnancies, incarcerations, substance abuse, mental health and behavioural problems and loss of self-esteem (Fernell & Ek, 2010; Karande et al., 2008; Shaw, 2008). In Karande et al.'s study (2008) of 55 children with BIF, 52% presented with an accompanying behavioural problem. These difficulties outlined above highlight the potential challenge that individuals with undiagnosed BIF may pose to teachers, schools, and the broader society if they fail to receive adequate educational support.

2.5.3. SLD

Findings have shown that as many as 40% of learners with a SLD drop out of school, and of the remaining 60%, only half get diplomas (Reynolds et al., 1996). A worrying statistic for South Africa, a country in which a large percentage of its population would be regarded as 'poor', is that compared to their non-poor counterparts children living in poverty are at a far greater risk of school failure, are 1.5 times more likely to be diagnosed with a SLD, and are twice as likely to repeat a grade or drop out of school (Duncan & Brook-Gunn, 2001, cited in

Jordan & Levine, 2009). A further concern is the estimate that 50% of juvenile delinquents (Morrison & Cosden, 1997), and 50% of the children diagnosed as being 'emotionally disturbed' (Reynolds et al., 1996), have a SLD.

Children with a SLD are more prone to frustration, demoralisation, low self-esteem and deficits in social skills (APA, 2000). The school dropout rate for children with SLDs is estimated to be around 40%, one and a half times above the average found in the general population (APA, 2000; Reynolds et al., 1996). Individuals with a SLD are also more likely to present with Conduct Disorder, Oppositional Defiant Disorder, Attention-Deficit/Hyperactivity Disorder, Major Depressive Disorder, and Dysthymic Disorder than the general population (APA, 2000; Karande et al., 2007).

2.6. Conclusion

A significant percentage of South Africa's children are growing up in environments that expose them to multiple risk factors on their journey towards adulthood. While exposure of a child to a single risk factor does not, in most cases, lead to negative developmental outcomes (Brooks, 2006), exposure to multiple risk factors has been found to have a multiplicative effect, rendering individuals from such backgrounds vulnerable to developing socioemotional, behavioural and academic difficulties (Felner et al., 2001). Despite the presence of multiple risk factors in many of South Africa's children's lives, there is almost no literature on the prevalence rates of MMR, BIF and SLDs in South Africa. However, in reviewing the literature and taking into account the low SES of much of South Africa's population, one can predict that, relative to economically developed countries, the prevalence rates of these three learning disorders will be high. The predicted high prevalence rates of MMR, BIF and SLDs in South Africa, within the context of an under-resourced educational system and limited educational support for special needs learners, can potentially help explain the high levels of grade retentions, failures and drop-outs currently being experienced across South Africa.

Internationally, there has been a growing interest amongst researchers to try and identify the sociodemographic risk factors associated with the increased vulnerability of developing a cognitive disability. International studies have identified numerous sociodemographic risk factors, including being born to a mother with less than 12 years of education, coming from a low SES, high birth order, being born to a mother under twenty years of age, being born to a single mother, having an absent father, maternal mental health problems, and coming from an overcrowded home/large family size (Blair & Scott, 2002; Croen et al., 2001; Jordan & Levine, 2009; Leonard et al., 2005; Sameroff et al., 1993; Yeargin-Allsopp et al., 1995; Williams & Decouflé, 1999). In South Africa however, where a large percentage of children can be expected to be exposed to multiple sociodemographic risk factors during their developmental years, and where school performance is worryingly low, limited literature on the sociodemographic risk factors associated with MMR, BIF or SLDs could be found.

The need for early identification and intervention has been stressed in much of the literature (O' Shaughnessy et al., 2003; Stanton-Chapman et al., 2002). Leonard et al. (2005) propose that if early interventions could target those most at need, MMR and special educational placements could be reduced by 50%. The rationale behind early identification and intervention is the consistent finding that early interventions are more successful and cost-effective than later interventions (O' Shaughnessy et al., 2003). Early interventions have been found to moderate the severity of the disability, as well as minimise the manifestation of secondary emotional and behavioural problems (Reynolds et al., 1996). This ability to minimise the manifestation of secondary difficulties is particularly important for cognitive disabilities, which have a high co-morbidity with emotional and behavioural difficulties (O' Shaughnessy et al., 2003; Reynolds et al., 1996; Shaw, 2008). Too frequently children with MMR, BIF and SLD are not identified early enough in their lives, thus limiting the effectiveness of later interventions (Drews et al., 1995). The literature stresses that if these vulnerable children are not identified early, any learning and/or behavioural difficulty that they may possess is likely to increase in severity and scope (O' Shaughnessy et al., 2003).

The aim of the current research is to identify the sociodemographic risk factors associated with MMR, BIF, and SLDs, within a clinic sample of South African children. Identifying the sociodemographic risk factors associated with each of these cognitive disabilities can help

with the early identification of South African children who may have, or be at a heightened risk of developing, a cognitive disability. In a country such as South Africa that has limited educational resources and a high number of children struggling to meet the demands of mainstream schooling (including Grade 1), the need for early identification and intervention is essential. The hope is that the identified sociodemographic risk factors can inform government, schools, and intervention agencies about which children are most at risk, and in doing so enable them to develop early assessment and monitoring strategies for these individuals. By beginning to identify the at-risk population, this research hopes to inform future research, as well as early intervention programs that can help minimise or negate the negative impact that the exposure to multiple sociodemographic risk factors can have on a child's cognitive development, within the South African context.

CHAPTER 3

METHODOLOGY

3.1. Research aims

The current research aims to identify the sociodemographic risk factors associated with Mild Mental Retardation, Borderline Intellectual Functioning, and Specific Learning Disorders, for a clinic sample of South African children. The clinic sample for this study comprised of a control group (no cognitive disability), and those cases of cognitive disability (MMR, BIF, SLDs) with no known or suspected organic origin. The aim is to contribute to the very limited South African literature on cognitive disabilities, with the hope that the identification of sociodemographic risk factors can help with the eventual development of risk profiles that can be used to assist with the early identification of, and intervention for, those most vulnerable children.

3.2. Study design

This study adopted an archival, retrospective design. The data for this study were gathered from the case files of children who had been the clients of trainee Clinical Psychologists at a Child Guidance Clinic in Cape Town between 2002 and 2009.

The detailed case files were able to provide a rich source of data, detailing the child's life experiences from in-utero, up until the time that the child was diagnosed with a cognitive disability. As the case files include information surrounding both the child's birth and the child's early life experiences, the researcher was able to explore a larger number of variables (risk factors) than those previously mentioned studies that used only birth certificates as their data source (Croen et al., 2001; Drews et al., 1995; Williams & Decouflé, 1999). Other studies that have used case files as their data source include the research of Kumaraswamy et al. (1991) and Karande et al. (2008). In Kumaraswamy et al.'s research (1991), which was aimed at developing risk profiles for the four different levels of mental retardation, case files of children who had been seen and assessed at a Child Guidance Clinic in India were analysed. The current research has adopted a similar methodology in its aim to identify the

risk factors associated with each of the three learning disorders under investigation (MMR, BIF, and SLDs).

3.3. Sample

The sample for this study was comprised of the case files of 303 children, gathered over an eight year period (between 2002 and 2009) by trainee Clinical Psychologists at the University of Cape Town's Child Guidance Clinic. Of the final sample (303 cases), 94 were identified as having a non-organic cognitive disability (31% of the total sample) and 209 as having no identified cognitive disability (69% of total sample). Of these 94 non-organic cognitive disability cases, 26 (27.7%) were diagnosed with Mild Mental Retardation, 27 (28.7%) with Borderline Intellectual Functioning, and 41 (43.6%) with a Specific Learning Disorder diagnosis. The 209 cases of no identified cognitive disability acted as the control group for this study against which the sociodemographic characteristics of each of the three cognitive disability samples under study (MMR, BIF and SLDs) were compared.

Exclusion criteria: Before any cases were excluded, there were 380 cases in the 2002-2009 sampling frame. The focus of the current research is on cognitive disabilities of a non-organic aetiology, thus the more severe cognitive disabilities (that is, moderate, severe and profound mental retardation and Autism), which are most commonly organic in nature, were removed from the sample (Murphy et al., 1998). According to these criteria, three cases of Moderate Mental Retardation and one case of Autism were excluded from the analysis. In addition, 45 incomplete files were excluded from the analysis due to lack of sufficient data.

After excluding the above cases, the remaining number of cases was 331. Of these 331 cases, 122 were identified as having a cognitive disability diagnosis, of which 40 were diagnosed with Mild Mental Retardation, 35 with Borderline Intellectual Functioning, and 47 had a Specific Learning Disorder diagnosis. As previously mentioned, the focus of the current research is on the sociodemographic risk factors associated with MMR, BIF, and SLDs. Thus those cognitive disability cases with a known/suspected organic aetiology were removed from the sample. This resulted in the exclusion of 28 cases of cognitive disability with a

known/suspected organic aetiology, including 14 cases of MMR (35% of the MMR sample), 8 cases of BIF (22.9% of the BIF sample), and 6 SLD cases (12.8% of the SLD sample).

3.4. Setting

The study was conducted at the University of Cape Town Child Guidance Clinic in Cape Town, South Africa. The Child Guidance Clinic is a postgraduate teaching unit that trains clinical psychology masters students, while acting as a working public service clinic for children and families. The data used for this study were therefore gathered by trainee clinical psychologists who were seeing these clients as part of their masters training. All trainee psychologists training at this facility are supervised on all aspects of case work by senior clinical psychologists.

3.5. Data collection

The information contained within the case files was coded by the researcher according to the variables listed below. The selection of sociodemographic risk factors (independent variables) was guided by the international literature on MMR, BIF and SLDs, as well as anecdotal observations of staff at the Child Guidance Clinic.

Table 3.5.1. Dependent variables

	Coding	Source of data
MMR	0=Absent 1=Present	Front cover of file
BIF	0=Absent 1=Present	Front cover of file
SLD	0=Absent 1=Present	Front cover of file

Table 3.5.2. Independent variables/Sociodemographic risk factors

	Coding	Source of data
Gender of child	0=Male 1=Female	Referral card
Mother completed high school	0=No 1=Yes	Clinical history (parents)
Father completed high school	0=No 1=Yes	Clinical history (parents)
Single mother at birth	0=No 1=Yes	Clinical history (Developmental history)
Single parent (current)	0=No 1=Yes	Clinical history (parents/family functioning/genogram)
Coming from a multiple fathered home Siblings in household have different biological fathers.	0=No 1=Yes	Clinical history (parents/family functioning/genogram)
Mother unemployed	0=No 1=Yes	Clinical history (parents/family functioning)
Father unemployed	0=No 1=Yes	Clinical history (parents/family functioning)
Child trauma exposure Trauma defined according to criterion A for Post Traumatic Stress Disorder (APA, 2000).	0=No 1=Yes	Clinical history (Traumatic circumstances)
Maternal trauma exposure Trauma defined according to criterion A for Post Traumatic Stress Disorder (APA, 2000).	0=No 1=Yes	Clinical history (Traumatic circumstances)
Maternal psychiatric diagnosis At any time, from the time of the child's birth to present	0=No 1=Yes	Clinical history (parents/family psychiatric history)
Birth order of child	1st, 2nd, 3rd, 4th, 5th, etc.	Clinical History/genogram
Household income	1= R0-R4000 2=R4000+	Fee structure sheet
Mother's age at child's birth	Age in full years (e.g. 29 years old)	Clinical history (Developmental history)
Child's age at referral	Age in full years (e.g. 9 years old)	Referral card
Number of people living in the house	1, 2, 3, 4, 5, etc	Clinical history (family functioning/composition of household/genogram)

For descriptive purposes, the presence or absence of the associated disorders of ADHD, depression, conduct disorder/oppositional defiant disorder, anxiety disorder and adjustment disorder, were also coded. This data was obtained from the multi-axial diagnosis on the front cover of the client's files.

The current research, as in the research of Williams and Decouflé (1999) and Leonard et al. (2005), found that there were much missing data regarding fathers. In reviewing the literature, the high rate of missing data for fathers appears to be a common phenomenon, and has resulted in there being only limited investigation into the paternal characteristics that may increase a child's vulnerability to developing a cognitive disability.

3.6. Data Analysis

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 18.0.

First, descriptive data for the sample were examined, using frequencies, percentages, and means. This was done in order to describe the sociodemographic characteristics of the sample.

The relationships between the cognitive disability outcomes (MMR, BIF, and SLDs) and each of the independent variables (sociodemographic risk factors) were analysed using bivariate analysis. The current research acknowledges that it conducted multiple significance tests (45), and thus needs to apply stricter significance levels to reduce the likelihood of a type II error. Significance levels were adjusted according to Bonferroni's correction. The categorical variables were analysed using chi-square tests with α adjusted to 0.0011, while the continuous variables were analysed using Kruskal-Wallis and Mann-Whitney tests with α adjusted to 0.01.

3.7. Ethical Considerations

All clients who come to the Child Guidance Clinic for psychological assistance are asked to sign an agreement that allows the University of Cape Town to use all information regarding their cases, except their names or other identifying details, for research purposes. It is via this agreement that informed consent and access to the information contained within these case files was obtained. In accordance with this agreement, during the course of this research no case files left the premises of the Child Guidance Clinic. To guarantee anonymity and confidentiality, all names and case file numbers were excluded from this report.

Permission from the University of Cape Town Psychology Department's ethics committee was obtained, prior to starting the current research.

CHAPTER 4

RESULTS

The results will be presented in two sections: 1) Sociodemographic characteristics of the sample and 2) bivariate analysis of the association between the sociodemographic risk factors and each of the cognitive disabilities under investigation.

4.1. Sociodemographic characteristics of sample

Of the 303 case files included in this study, 94 cases (31% of total sample) were identified as having a cognitive disability with no known organic cause. Of these 94 cognitive disability cases, 26 (27.7%) were identified as having a MMR diagnosis, 27 (28.7%) a BIF diagnosis, and 41 (43.6%) a SLD diagnosis. The control group used by the current research was made up of the remaining 209 cases (69% of total sample), in which no cognitive disability was identified. Of the 303 cases included in this study, 181 were identified as being male (59.7%) and 122 as female (40.3%). The sample ranged from 3 to 18 years of age, with a mean age of 9 years and 5 months (SD= 3.2).

English was the most commonly reported preferred language in the sample, with 232 individuals (76.6%) indicating this as their preference. Combined English/Xhosa was the second most commonly recorded language preference, as reported by 27 individuals, or 8.9% of the sample. Afrikaans was the preferred language of 18 individuals (5.9%), English/Afrikaans of 12 individuals (4%), and Xhosa of 11 individuals (3.6%). Combined English/Afrikaans/Xhosa was the preference of only one individual (0.3%), as was the case with combined Xhosa/Afrikaans (0.3%), and Sotho/Xhosa (0.3%).

The sociodemographic characteristics of the sample are presented in Tables 4.1.1 (categorical variables) and 4.1.2 (continuous variables). The prevalence of associated disorders in the MMR, BIF, SLD and non-cognitively handicapped samples are presented in Table 4.1.3. (although the associated disorders will not be considered as risk factors, they provide important descriptive data about the sample).

Table 4.1.1. Sociodemographic characteristics of the sample (categorical variables)

	MMR N=26 *n* (%)	BIF N=27 *n* (%)	SLD N=41 *n* (%)	No Cognitive disability N=209 *n* (%)	Total N=303 *n* (%)
Gender					
Male	16 (61.5)	17 (63.0)	27 (65.9)	121 (57.9)	181 (59.7)
Female	10 (38.5)	10 (37.0)	14 (34.1)	88 (42.1)	122 (40.3)
Mother completed high school					
No	20 (87.0)	17 (70.8)	18 (47.4)	59 (31.2)	160 (58.4)
Yes	3 (13.0)	7 (29.2)	20 (52.6)	130 (68.8)	114 (41.6)
Father completed high school					
No	18 (90.0)	11 (57.9)	25 (69.4)	71 (43.0)	125 (52.1)
Yes	2 (10.0)	8 (42.1)	11 (30.6)	94 (57.0)	115 (47.9)
Single mother at birth					
No	23 (88.5)	23 (85.2)	35 (85.4)	174 (84.1)	255 (84.7)
Yes	3 (11.5)	4 (14.8)	6 (14.6)	33 (15.9)	46 (15.3)
Single parent currently					
No	13 (50.0)	19 (73.1)	23 (57.5)	108 (52.2)	163 (54.5)
Yes	13 (50.0)	7 (26.9)	17 (42.5)	99 (47.8)	136 (45.5)
Multiple fathered home					
No	18 (69.2)	23 (85.2)	33 (80.5)	169 (81.6)	243 (80.7)
Yes	8 (30.8)	4 (14.8)	8 (19.5)	38 (18.4)	58 (19.3)
Mother Unemployed					
No	15 (62.5)	20 (80.0)	28 (73.7)	158 (79.8)	221 (77.5)
Yes	9 (37.5)	5 (20.0)	10 (26.3)	40 (20.2)	64 (22.5)
Father Unemployed					
No	10 (50.0)	17 (81.0)	31 (91.2)	152 (88.4)	210 (85.0)
Yes	10 (50.0)	4 (19.0)	3 (8.8)	20 (11.6)	37 (15.0)
Child trauma exposure					
No	15 (57.7)	21 (77.8)	31 (75.6)	158 (76.3)	225 (74.8)
Yes	11 (42.3)	6 (22.2)	10 (24.4)	49 (23.7)	76 (25.2)
Maternal trauma exposure					
No	15 (57.7)	22 (81.5)	36 (87.8)	147 (70.3)	220 (72.6)
Yes	11 (42.3)	5 (18.5)	5 (12.2)	62 (29.7)	83 (27.4)
Maternal psychiatric diagnosis					
No	22 (84.6)	21 (77.8)	35 (85.4)	176 (84.2)	254 (83.8)
Yes	4 (15.4)	6 (22.2)	6 (14.6)	33 (15.8)	49 (16.2)
Birth order					
1st	14 (53.9)	12 (44.4)	25 (61.0)	117 (56.5)	168 (55.8)
2nd	6 (23.1)	10 (37.0)	7 (17.1)	60 (29.0)	83 (27.6)
3rd or later born	6 (23.1)	5 (18.5)	9 (22.0)	30 (14.5)	50 (16.5)
Household Income					
R0-R4000	18 (69.2)	16 (61.5)	23 (56.1)	117 (56.0)	174 (57.6)
R4000+	8 (30.8)	10 (38.5)	18(43.9)	92 (44.0)	128 (42.4)
Language preference.					
-Eng one of preferences	19 (73.1)	26 (96.3)	37 (90.2)	190 (90.9)	272 (89.8)
-Eng not one of Preferences	7 (26.9)	1 (3.7)	4 (9.8)	19 (9.1)	31 (10.2)
Mo. age at child's birth					
<20	4 (16.0)	2 (9.5)	2 (5.6)	4 (2.4)	12 (4.8)
20-29	15 (60.0)	6 (28.6)	26 (72.2)	101 (60.1)	148 (59.2)
30+	6 (24.0)	13 (61.9)	8 (22.2)	63 (37.5)	90 (36.0)

*Please note: when 'n' does not add up to the total number of people in each category (e.g. 26 people in MMR category), this is due to missing/unreported data.

The total sample was made up of 181 males (59.7%) and 122 females (40.3%) with a higher frequency of males, as compared to females, being observed across all three cognitive disability groups. Of the MMR sample, 61.5% (*n*=16) were identified as being male, while in the BIF sample 63% (*n*=17), and the SLD sample 65.9% (*n*=27), were identified as male.

Of the total sample of 303 cases, 160 cases (58.4%) were identified as having a mother who had not completed high school, with higher frequencies of mothers not having completed high school being observed in the MMR and BIF categories, 87% (*n*=20) and 70.8% (*n*=17) respectively. Having a father who had not completed high school was recorded in 52.1% of the total sample (*n*=125), with higher frequencies being observed in the MMR (90%) and SLD (69.4%) samples.

Of the total sample, 15.3% (*n*=46) were born to single mothers, with similar frequencies being observed across all cognitive disability groups (MMR 11.5%, BIF 14.8%, SLDs 14.6%). Currently living in a single parent home was observed in a 45.5% of the total sample (*n*=136), with a lower observed frequency (26.9%, *n*=7) of single parenthood being observed in the BIF category. Limited variation was observed in the 'multiple fathered home' variable, with 19.3% (*n*=58) of the total sample reporting that they lived in a multiple fathered home.

Of the total sample, 22.5% (*n*=64) had a mother who was currently unemployed, with slightly higher rates of maternal unemployment being observed in the MMR category (37.5%, *n*=9). Having an unemployed father was observed in 15% of the total sample (*n*=37), with a higher observed frequency of paternal unemployment being observed in the MMR category (50%, *n*=9).

In the total sample, 76 children, or 25.2% had been exposed to at least one significant traumatic event in their lifetime. Compared to the frequency of child trauma exposure observed in the BIF (22.2%), SLD (24.4%), and no cognitive disability (23.7%) samples, higher rates of child trauma exposure were recorded in the MMR sample (42.3%). Maternal trauma exposure in the total sample was also found to be high, with 27.4% (*n*=83) of mothers

having reported being exposed to at least one traumatic event. Slightly elevated rates of maternal trauma exposure were observed in the MMR sample, with 42.3% of mothers (*n*=11) reporting having been exposed to at least one significant life trauma. Lower frequencies of maternal trauma exposure were found in the SLD category, with only 12.2% of the sample (*n*=5) reporting having been exposed to a significant traumatic life event. A psychiatric diagnosis was found in 16.2% of all mothers (*n*=49), with similar prevalence rates being observed across all of the cognitive disability groups.

With regards to birth order, there was limited observed variation in the frequencies across the dependent variables, with 55.8% of the total sample being first born (*n*=168), 27.6% being second born (*n*=83), and 16.5% being third or later born (*n*=50). A household income of less than R4000 was identified in 57.6% of the sample (*n*=83), with the remaining 42.4% of households (*n*=128) having a combined income of over R4000. Out of the total of 303 cases included in this study, 272 individuals (89.8%) expressed that English was their preferred language, or one of their language preferences. Compared to the total sample (10.2%, *n*=31), a higher observed frequency of children who did not feel that English was one of their language preferences was observed in the MMR sample, with 26.9% of this sample reporting this (*n*=7).

Of the total sample, 12 children (4.8% of sample) were born to mothers under the age of 20 years old, 148 children (59.2%) were born to mothers between the ages of 20 and 29, while 90 children (36%) were born to mothers who were thirty years old or older. Compared to the total sample (4.8%), a slightly elevated rate of being born to a mother under twenty years of age was observed in the MMR sample (16%). A higher frequency of being born to a mother who was thirty years old or older at the time of the child's birth was observed in the BIF sample; 61.9% (*n*=13) compared to the 36% (*n*=90) found in the total sample.

Table 4.1.2. Sociodemographic characteristics of the sample (continuous variables)

	MMR N=26 Mean (SD)	BIF N=27 Mean (SD)	SLD N=41 Mean (SD)	No cognitive disability N=209 Mean (SD)	Total N=303 Mean (SD)
Mother's age at child's birth (in years)	*n*=25 25.12 (6.0)	*n*=21 30.14 (7.2)	*n*=36 26.14 (5.1)	*n*=168 28.05 (5.6)	*n*=250 27.66 (5.8)
Child's age at first appointment (in years)	*n*=26 10.38 (3.1)	*n*=26 9.54 (3.3)	*n*=41 9.49 (2.5)	*n*=209 9.28 (3.27)	*n*=302 9.42 (3.2)
Number of people living in the house	*n*=25 4.84 (2.0)	*n*=27 5.07 (2.8)	*n*=41 4.54 (1.7)	*n*=208 4.27 (1.6)	*n*=301 4.43 (1.8)

The mean age of the mothers at the time of the child's birth was 27.66 years old (SD=5.8), with a minimum age of 16 years, and a maximum age of 49 years (median=27 years). Slight variation was observed between the dependent variables, with the mean age of mothers in the MMR sample being 25.12 years old, BIF 30.14 years, SLDs 26.14 years, and no cognitive disability 28.05 years.

The mean age of the children at the time of their first appointment at the Child Guidance Clinic was 9.42 years. Children with MMR were, on average, found to have been first seen by the clinic at a later age (10.38 years) than those children with BIF (9.54 years), SLDs (9.49 years), or no cognitive disability (9.28 years). Although this will not be considered as a sociodemographic risk factor for cognitive disability, it is an important descriptive statistic as it indicates the stage of schooling at which a child with cognitive disability is referred for assessment.

The mean number of people living in the same house as the child did not vary much between the cognitive disability groups. Within the total sample, the mean number of people living in the house was 4.43 (SD=1.8; range 2 to 15), indicating that overcrowding is not a common feature of the households of children in the sample under study.

Table 4.1.3. Associated disorders

	MMR	BIF	SLD	No cognitive disability	Total
	N=26 *n* (%)	N=27 *n* (%)	N=41 *n* (%)	N=209 *n* (%)	N=303 *n* (%)
ADHD					
Yes	5 (19.2)	7 (25.9)	9 (22.0)	26 (12.4)	47 (15.5)
No	21 (80.8)	20 (74.1)	32 (78.0)	183 (87.6)	256 (84.5)
Depression					
Yes	3 (11.5)	0	2 (4.9)	23 (11.0)	28 (9.2)
No	23 (88.5)	27 (100)	39 (95.1)	186 (89.0)	275 (90.8)
Conduct disorder/Oppositional defiant disorder					
Yes	2 (7.7)	2 (7.4)	4 (9.8)	17 (8.1)	25 (8.3)
No	24 (92.3)	25 (92.6)	37 (90.2)	192 (91.9)	278 (91.7)
Anxiety disorder					
Yes	1 (3.8)	2 (7.4)	3 (7.3)	28 (13.4)	34 (11.2)
No	25 (96.2)	25 (92.6)	38 (92.7)	181 (86.6)	269 (88.8)
Adjustment disorder					
Yes	1 (3.8)	2 (7.4)	1 (2.4)	14 (6.7)	18 (5.9)
No	25 (96.2)	25 (92.6)	40 (97.6)	195 (93.3)	285 (94.1)

ADHD was the most common disorder found in the clinic sample, with 15.5% of the total sample (*n*=47) having been diagnosed with this disorder. Compared to the no cognitive disability sample (12.4%, *n*=26), slightly elevated rates of ADHD were observed in the MMR (19.2%, *n*=5), BIF (25.9%, *n*=7), and SLD (22%, *n*=9) samples. Depression was diagnosed in 9.2% of the total sample (*n*=28), conduct disorder/oppositional defiant disorder in 8.3% of the sample (*n*=25), anxiety disorder in 11.2% (*n*=34), and adjustment disorder in 5.9% of the total sample (*n*=18).

4.2. Bivariate analysis

The relationship between the sociodemographic risk factors and the cognitive disability outcomes (MMR, BIF, and SLDs) will be examined in this section.

Tables 4.2.1, 4.2.2 and 4.2.3 present the Chi-square comparisons between each of the cognitive disability outcomes (MMR, BIF and SLDs respectively) and the categorical sociodemographic risk factors.

Table 4.2.1. Associations between categorical sociodemographic risk factors and MMR

	MMR N=26 *n (%)*	No Cognitive disability N=209 *n (%)*	χ^2	*df*	*Phi*	*p*	*OR*
Gender							
Male	16 (61.5)	121 (57.9)	0.13	1	0.02	0.722	-
Female	10 (38.5)	88 (42.1)					
Mother completed high school							
No	20 (87.0)	59 (31.2)	27.25	1	0.36	0.000	14.69
Yes	3 (13.0)	130 (68.8)					
Father completed high school							
No	18 (90.0)	71 (43.0)	15.76	1	0.29	0.000	11.92
Yes	2 (10.0)	94 (57.0)					
Single mother at birth							
No	23 (88.5)	174 (84.1)	0.34	1	0.04	0.558	-
Yes	3 (11.5)	33 (15.9)					
Single parent current							
No	13 (50.0)	108 (52.2)	0.04	1	0.01	0.834	-
Yes	13 (50.0)	99 (47.8)					
Multiple fathered home							
No	18 (69.2)	169 (81.6)	2.25	1	0.10	0.134	-
Yes	8 (30.8)	38 (18.4)					
Mother Unemployed							
No	15 (62.5)	158 (79.8)	3.72	1	0.13	0.054	-
Yes	9 (37.5)	40 (20.2)					
Father Unemployed							
No	10 (50.0)	152 (88.4)	20.01	1	0.32	0.000	7.60
Yes	10 (50.0)	20 (11.6)					
Child trauma exposure							
No	15 (57.7)	158 (76.3)	4.20	1	0.13	0.041	2.36
Yes	11 (42.3)	49 (23.7)					
Maternal trauma exposure							
No	15 (57.7)	147 (70.3)	1.73	1	0.09	0.189	-
Yes	11 (42.3)	62 (29.7)					
Maternal psychiatric diagnosis							
No	22 (84.6)	176 (84.2)	0.003	1	0.00	0.957	-
Yes	4 (15.4)	33 (15.8)					
Birth order							
1st	14 (53.9)	117 (56.5)	1.42	2	0.08*	0.493	-
2nd	6 (23.1)	60 (29.0)					
3rd or later born	6 (23.1)	30 (14.5)					
Household Income							
R0-R4000	18 (69.2)	117 (56.0)	1.66	1	0.08	0.198	-
R4000+	8 (30.8)	92 (44.0)					
Language preference.							
-Eng one of preferences	19 (73.1)	190 (90.9)	7.47	1	0.18	0.006	3.68
-Eng not one of Preferences	7 (26.9)	19 (9.1)					

Significance level set at 0.001 (After Bonferoni's correction)

* Reporting Cramer's V

Please note: Odds Ratios are only reported when statistical significance was observed at $p<0.05$

There was a significant association between maternal educational attainment (not having completed high school) and the presence of MMR (χ^2 (1) =27.25, p=0.000). Based on the odds ratio, children of mothers with less than twelve years of formal education are 14.69 times more likely to have MMR than a child whose mother had completed high school. In the MMR group, 87% of mothers (n=20) had not completed high school, compared to 31.2% (n=59) in the no cognitive disability sample. Growing up with a father who had not completed high school was also found to be significantly associated with the presence of MMR (χ^2 (1) =15.76, p=0.000). According to the odds ratio, children who have fathers with less than twelve years of formal schooling are 11.92 times more likely to present with MMR than a child whose father had completed high school. With regards to paternal education level, 90% of the MMR sample (n=18) had fathers who had not completed high school, compared to 43% of fathers (n=71) in the no cognitive disability sample. Paternal unemployment also found to be significantly associated with the presence of MMR (χ^2 (1) =20.01, p=0.001). The odds ratio suggests that children with unemployed fathers are 7.60 times more likely to present with MMR than children with employed fathers. In the no cognitive disability category 11.6% of the fathers (n=20) were unemployed, compared to 50% of fathers (n=10) in the MMR sample.

Child trauma exposure, and not expressing English as a language preference, were both found to be significantly associated with a heightened vulnerability of being diagnosed with MMR at p<0.05. However, after Bonferroni's correction, where stricter significance levels were applied (p=0.001) due to the large number of tests performed and the possibility of a type II error, both of these variables were no longer found to be statistically significant. Before Bonferroni's correction, there was a significant association found between a child's exposure to trauma and MMR (χ^2 (1) =4.20, p=0.041). Based on the odds ratio, children who have been exposed to trauma are 2.36 times more likely to have MMR than a child who has not been exposed to trauma. English not being one of the preferred languages of the child was also found to be significantly associated with MMR at p<0.05 (χ^2 (1) =7.47, p=0.006), but not after Bonferroni's correction. The odds ratio suggests that someone who does not regard English as one of their language preferences is 3.68 times more likely to be diagnosed with MMR than a child who does consider English as one of their language preferences. In the

MMR sample, 26.9% (*n*=7) expressed that English was not one of their preferred languages, compared to 9.1% of the no cognitive disability sample (*n*=19).

The sociodemographic risk factors that were not found to be significantly associated with MMR included the gender of the child, being born to a single mother, currently living in a single parent household, coming from a multiple fathered home, maternal trauma exposure, maternal psychiatric diagnosis, birth order and household income. Having an unemployed mother was a further variable that was not found to be statistically associated with MMR, however this variable did tend towards significance at $p<0.05$ (χ^2 (1) =3.72, p=0.054), and in a larger sample may have reached significance.

Table 4.2.2. Associations between categorical sociodemographic risk factors and BIF

	BIF N=27 *n (%)*	No Cognitive disability N=209 *n (%)*	χ^2	*df*	*Phi*	*P*	*OR*
Gender							
Male	17 (63.0)	121 (57.9)	0.62	1	0.03	0.615	-
Female	10 (37.0)	88 (42.1)					
Mother completed high school							
No	17 (70.8)	59 (31.2)	14.56	1	0.26	0.000	5.35
Yes	7 (29.2)	130 (68.8)					
Father completed high school							
No	11 (57.9)	71 (43.0)	1.52	1	0.09	0.217	-
Yes	8 (42.1)	94 (57.0)					
Single mother at birth							
No	23 (85.2)	174 (84.1)	0.02	1	0.01	0.880	-
Yes	4 (14.8)	33 (15.9)					
Single parent current							
No	19 (73.1)	108 (52.2)	4.07	1	0.13	0.044	0.40
Yes	7 (26.9)	99 (47.8)					
Multiple fathered home							
No	23 (85.2)	169 (81.6)	0.20	1	0.03	0.652	-
Yes	4 (14.8)	38 (18.4)					
Mother Unemployed							
No	20 (80.0)	158 (79.8)	0.01	1	0.00	0.981	-
Yes	5 (20.0)	40 (20.2)					
Father Unemployed							
No	17 (81.0)	152 (88.4)	0.95	1	0.07	0.331	-
Yes	4 (19.0)	20 (11.6)					
Child trauma exposure							
No	21 (77.8)	158 (76.3)	0.03	1	0.01	0.867	-
Yes	6 (22.2)	49 (23.7)					
Maternal trauma exposure							
No	22 (81.5)	147 (70.3)	1.46	1	0.08	0.227	-
Yes	5 (18.5)	62 (29.7)					
Maternal psychiatric diagnosis							
No	21 (77.8)	176 (84.2)	0.72	1	0.06	0.397	-
Yes	6 (22.2)	33 (15.8)					
Birth order							
1st	12 (44.4)	117 (56.5)	1.41	2	0.08*	0.495	-
2nd	10 (37.0)	60 (29.0)					
3rd or later born	5 (18.5)	30 (14.5)					
Household Income							
R0-R4000	16 (61.5)	117 (56.0)	0.29	1	0.04	0.590	-
R4000+	10 (38.5)	92 (44.0)					
Language preference.							
-Eng one of preferences	26 (96.3)	190 (90.9)	0.89	1	0.06	0.344	-
-Eng not one of Preferences	1 (3.7)	19 (9.1)					

Significance level set at 0.001 (After Bonferoni's correction)

* Reporting Cramer's V

One variable was identified by the current research as being significantly associated with a heightened risk of being diagnosed with BIF. There was a significant association between the child's mother not having completed high school and the presence of BIF (χ^2 (1) =14.56, p=0.000). In the BIF sample, 70.8% of mothers (n=17) had not completed high school, compared to 31.2% of mothers (n=59) in the no cognitive disability group. According to the odds ratio, children who grow up with mothers with less than twelve years of formal education are 5.35 times more likely to present with BIF than a child whose mother had completed high school.

Currently living in a single parent household was found to be significantly associated with BIF at p<0.05 (χ^2 (1) =4.07, p=0.044), but significance was not observed after Bonferroni's correction. This association was found to be in the opposite direction to what the literature suggests one would find. Children who are currently living in a single parent household were found to be, according to the odds-ratio, 0.4 times less likely to present with BIF than a child from a two parent family structure. Of the BIF sample, 26.9% (n=7) were found to be currently living in a single parent household, compared to 47.8% (n=99) of the no cognitive disability sample.

The variables that were not significantly associated with BIF included the gender of the child, having a father who had not completed high school, being born to a single mother, currently living in a single parent household, coming from a multiple fathered home, having an unemployed mother, having an unemployed father, child trauma exposure, maternal trauma exposure, maternal psychiatric diagnosis, birth order of the child, household income and the language preference of the child.

Table 4.2.3. Associations between categorical sociodemographic risk factors and SLD

	SLD N=41 *n (%)*	No Cognitive disability N=209 *n (%)*	χ^2	*df*	*Phi*	*P*	*OR*
Gender							
Male	27 (65.9)	121 (57.9)	0.34	1	0.06	0.343	-
Female	14 (34.1)	88 (42.1)					
Mother completed high school							
No	18 (47.4)	59 (31.2)	3.68	1	0.13	0.055	-
Yes	20 (52.6)	130 (68.8)					
Father completed high school							
No	25 (69.4)	71 (43.0)	8.26	1	0.20	0.004	3.00
Yes	11 (30.6)	94 (57.0)					
Single mother at birth							
No	35 (85.4)	174 (84.1)	0.04	1	0.01	0.834	-
Yes	6 (14.6)	33 (15.9)					
Single parent current							
No	23 (57.5)	108 (52.2)	0.38	1	0.04	0.537	-
Yes	17 (42.5)	99 (47.8)					
Multiple fathered home							
No	33 (80.5)	169 (81.6)	0.03	1	0.01	0.862	-
Yes	8 (19.5)	38 (18.4)					
Mother Unemployed							
No	28 (73.7)	158 (79.8)	0.71	1	0.06	0.398	-
Yes	10 (26.3)	40 (20.2)					
Father Unemployed							
No	31 (91.2)	152 (88.4)	0.23	1	0.03	0.635	-
Yes	3 (8.8)	20 (11.6)					
Child trauma exposure							
No	31 (75.6)	158 (76.3)	0.01	1	0.01	0.921	-
Yes	10 (24.4)	49 (23.7)					
Maternal trauma exposure							
No	36 (87.8)	147 (70.3)	5.33	1	0.15	0.021	0.31
Yes	5 (12.2)	62 (29.7)					
Maternal psychiatric diagnosis							
No	35 (85.4)	176 (84.2)	0.04	1	0.01	0.852	-
Yes	6 (14.6)	33 (15.8)					
Birth order							
1st	25 (61.0)	117 (56.5)	3.13	2	0.11*	0.209	-
2nd	7 (17.1)	60 (29.0)					
3rd or later born	9 (22.0)	30 (14.5)					
Household Income							
R0-R4000	23 (56.1)	117 (56.0)	0.00	1	0.00	0.989	-
R4000+	18(43.9)	92 (44.0)					
Language preference.							
-Eng one of preferences	37 (90.2)	190 (90.9)	0.02	1	0.01	0.893	-
-Eng not one of Preferences	4 (9.8)	19 (9.1)					

Significance level set at 0.001

* Reporting Cramer's V

Having a father who did not complete high school was found to be significantly associated with the SLD outcome at $p<0.05$ (χ^2 (1) =8.26, p=0.004), but not after significance levels were adjusted according to Bonferroni's correction. Based on the odds ratio, children with fathers with less than twelve years of formal education are 3.01 times more likely to present with a SLD than a child of a father who had completed high school. Compared to the no cognitive disability sample, in which 43% of fathers (n=71) had not completed high school, 69.4% of fathers (n=25) in the SLD sample had not completed high school.

Maternal trauma exposure was a further variable that was found to be significantly associated with the SLD outcome at $p<0.05$ (χ^2 (1) =5.33, p=0.021), but not after Bonferroni's correction was applied. This association was however found to be in the opposite direction to what one would have expected to find in reviewing the literature. The odds ratio in the current research suggests that a child whose mother has been exposed to trauma is 0.31 times less likely to have a SLD diagnosis than a child whose mother has not been exposed to trauma. In the SLD sample, 12.2% of mothers (n=5) had been exposed to trauma, compared to 29.7% of mothers (n=62) in the no cognitive disability sample.

The variables; gender, mother not completing high school, being born to a single mother, currently living in a single parent household, coming from a multiple fathered home, having an unemployed mother, having an unemployed father, child trauma exposure, maternal trauma exposure, maternal psychiatric diagnosis, birth order, household income and the language preference of the child were all found to not be significantly associated with SLDs.

4.2.4. Associations between continuous sociodemographic risk factors and MMR, BIF, and SLDs

Kruskal-Wallis and Mann-Whitney tests were performed on the continuous variables of 'maternal age at the time of the child's birth', and 'number of people living in the same house as the child'.

A Kruskal-Wallis test was performed to evaluate whether the distribution of maternal age at the time of the child's birth was the same across the cognitive disability groups. A significant result from the Kruskal-Wallis test was obtained (χ^2 (3) =12.13, p=0.007). The Kruskal-Wallis test was followed up by multiple comparisons in order to identify where these differences in distribution across the cognitive disability groups lay. The distribution of maternal age in MMR was found to differ significantly from the distribution of maternal age in BIF. The mean age of mothers in the MMR sample (mean=25.12, SD=6.0) was found to be significantly lower than the mean age of mothers in the BIF sample (mean=30.14, SD=7.2). With significance levels adjusted to 0.01, according to Bonferroni's correction, no other pairs showed a significant difference.

The Kruskal-Wallis test used to compare the distribution of the number of people living in the household, across the cognitive disability outcomes, did not produce a significant result (χ^2 (3) =4.06, p=0.255).

4.3. Conclusion

The sociodemographic risk factors identified by the current research as being significantly associated with a heightened risk of being diagnosed with MMR included having a mother who had not completed high school, having a father who had not completed high school and having an unemployed father. The children of mothers who had not completed high school were found to be 14.69 times more likely to present with MMR than the children whose mothers had completed high school, while the children of fathers who had not completed high school were found to be 11.92 times more likely to be diagnosed with MMR than the children whose father had completed twelve years of formal education. In the current research, children with unemployed fathers were found to be 7.60 times more likely to be diagnosed with MMR than children with employed fathers.

Having a mother who had not completed high school was the only sociodemographic risk factor identified by the current research as being significantly associated with a heightened risk of being diagnosed with BIF. The children of mothers who had not completed high school were found to be 5.35 times more likely to have BIF than the children of mothers who had completed high school.

The current research did not identify any significant associations between the selected sociodemographic risk factors and a heightened risk of being diagnosed with a SLD.

CHAPTER 5

DISCUSSION AND CONCLUSION

The chapter will start with a summary and discussion of the findings of the current research. Mild Mental Retardation, Borderline Intellectual Functioning, and Specific Learning Disorders will be discussed separately, linking the findings of the current research to previous international literature. The chapter will conclude with a section on the strengths and limitations of the current study and recommendations for future research.

5.1. Mild Mental Retardation

The current research found a significant association between having a diagnosis of MMR and the sociodemographic risk factors of growing up with a mother who has not completed high school and growing up with a father who has not completed high school. Having an unemployed father was also identified as a significant risk factor for MMR. Childhood trauma exposure, and English not being one of the child's language preferences, were both identified as significant risk factors for MMR at $p<0.05$, but this significance fell away after stricter significance levels were applied.

A low level of maternal education has consistently been identified as one of the most negatively influential sociodemographic risk factors associated with MMR (Chapman et al., 2008; Croen et al., 2001; Drews et al., 1995; Yaqoob et al., 2004). The current research supports these findings, with a low level of maternal education being found to be the variable most strongly associated with an MMR diagnosis. Children whose mothers had not completed high school were found to be 14 times more likely to have MMR than children whose mothers had completed high school. This strongly suggests that, as has been found internationally, having a mother who has not completed high school is a sociodemographic risk factor for MMR within the South African context. It is proposed that mothers who have not completed high school may lack knowledge of child development and parenting skills, or may themselves have a cognitive disability, which may hinder their ability to adequately care

for and cognitively stimulate their child (Stanton-Chapman et al., 2004). A further potential explanation for these significant findings may be as a result of the positive association between low levels of maternal education and low SES, which has consistently been identified as a risk factor for MMR (Croen et al., 2001; Leonard et al., 2005; Yeargin-Allsopp et al., 1995). Lastly, if the mother of the child has a cognitive disability herself, then the child may have had a genetic vulnerability.

To the researcher's knowledge, few previous studies have looked specifically at low paternal education levels as a risk factor for MMR. The reasons for this are probably twofold. Firstly, paternal education levels are most often not recorded on birth certificates, which have been used extensively to identify the sociodemographic risk factors associated with MMR (Drews et al., 1995; Yeargin-Allsopp et al., 1995; Williams & Decouflé, 1999) Secondly, previous studies have found that even when clinic samples are used, details surrounding the fathers of the children are frequently absent (Leonard et al., 2005; Williams & Decouflé, 1999). The current research was able to capture the educational level of 240 of the possible 303 fathers, and found a significant association between having a father who had not completed high school and being diagnosed with MMR. It was found that 90% of the MMR sample had a father who had not completed high school, and that the children of fathers who had not completed high school were nearly twelve times more likely to present with MMR than the children of fathers who had completed high school. One potential explanation for these significant findings may be that fathers who have not completed high school are more likely to be unemployed or in a low job classification, thus limiting the financial and material resources available to the child and family (Leonard et al., 2005). Alternatively, the child may have had a genetic vulnerability.

Parental employment status and/or low job classification has also previously been found to be associated with MMR (Reoleveld et al., 1997). Research has found that children who have one/both parents unemployed or in a low job classification (e.g. manual labourer) are at a heightened risk of presenting with MMR (Leonard et al., 2005; Roeleveld et al., 1997). With regards to paternal employment status, as was found by Leonard et al. (2005), the current research identified having an unemployed father as being associated with a seven-fold increase in risk of presenting with MMR. The sociodemographic risk factor of having an

unemployed mother (p=0.054), though tending towards significance was not found to be significantly associated with MMR. One reason for the lack of observed significance may be due to the small MMR sample size available for this study.

The above mentioned risk factors are all linked to the socio-economic environments in which children grow up. Research has shown that children from low SES backgrounds are at a heightened vulnerability to, amongst other factors, erratic parenting, parental mental health problems, lower educational stimulation, lack of material resources, and overcrowding in the home and abuse/neglect, all of which have been found to have a negative impact on cognitive development (Margai & Henry, 2003; Stanton-Chapman et al., 2004; Yeargin-Allsopp et al., 1995).

Of the MMR sample, 69.2% came from households with a combined household income of less than R4000, compared to the 30.8% who came from homes with a combined income of over R4000. These findings support those of Bashir et al. (2002), Drews et al. (1995), and Roeleveld et al. (1997) who found that children with MMR are more heavily weighted in the lower income sectors of society. However, no significant associations were found between MMR and household income in this study. One reason that significance may not have been observed was perhaps due to the use of a clinic sample as the control group (which may not be representative of the non-cognitively handicapped population). A second potential explanation may be the inaccuracy of the income measure used by the current research. At the Child Guidance Clinic where this study was conducted, the fees are based on a sliding scale relating to family income. Knowing the fee structure, some families may underreport their family income in order to receive reduced fees, which would reduce the validity of this scale and mask the true influence that low income may have had on the cognitive disability sample. As a result, parental education and employment status may be better indicators of SES in this study than reported household income.

In South Africa, a country with alarmingly high rates of trauma, the link between childhood trauma exposure and MMR is a concern (Sinason, 2001; Williams et al., 2007). Trauma exposure can result in mental health problems such as anxiety and depression which in

themselves can hinder a child's ability to learn and/or a parent's ability to care for the child (Pynoos et al., 1996; Williams et al., 2007). Before stricter significance levels were applied, the current research identified a significant association between a child's exposure to trauma and the presence of MMR, with the children in this study who had been exposed to trauma being found to be more than twice as likely to present with MMR than a child who had not been exposed to trauma. Though not found to be significant after stricter significance levels were applied, the findings suggest that childhood trauma exposure may be positively associated with a heightened risk of presenting with MMR. However, further research is required to explain this further. With regard to maternal trauma exposure and maternal psychiatric diagnosis (as reported in the case files), no significant associations were found between either of these variables and MMR.

Previous research has looked at race as a sociodemographic risk factor for MMR (Murphy et al., 1998; Yeargin-Allsopp et al., 1995), however, few previous studies have looked at language preference. Yeargin-Allsopp et al. (1995) warn that many IQ tests may be biased against racial minorities and non-English speaking children, and thus may place these individuals at a heightened vulnerability of being diagnosed with MMR. The current research found that children who did not consider English to be one of their language preferences were at a significantly heightened vulnerability of being diagnosed with MMR. However, when Bonferroni's correction was applied and stricter significance levels were used, significance was no longer observed. These findings call for further South African research investigating the relationship between language preference and a heightened risk of being diagnosed with MMR. In interpreting language preference as a risk factor for MMR one needs to be cautious, in light of the threats to the validity and reliability of IQ test scores from non-English speaking individuals (Yeargin-Allsopp et al., 1995).

Males have commonly been found to present more frequently with MMR than females (Croen et al., 2001; Murphy et al., 1998; Williams & Decouflé, 1999). The current research yielded similar findings, with 61.5% of the children with MMR being identified as male. However, the gender distribution across the MMR group (males=61.5%, females=38.5%) did not significantly differ from the gender distribution found in the no cognitive disability sample (males=57.9%, females=42.1%). Thus, being 'male' was not found by the current

research to be significantly associated with a heightened vulnerability of being diagnosed with MMR.

High birth order has also been identified as a sociodemographic risk factor for MMR (Drews et al., 1995). In the work of Drews et al. (1995), third or later born children were identified as being more vulnerable to developing MMR, while Croen et al. (2001) found this heightened risk to be present in as early as the second born child. The present study did not identify any significant associations between second born children and MMR, or third or later born children and MMR.

Being a single mother at the time of the child's birth and/or currently being a single parent have both been identified as sociodemographic risk factors for MMR (Blair & Scott, 2002; Leonard et al., 2005). Neither of these two variables, nor coming from a multiple fathered home, were found to be significantly associated with the presence of MMR in this study. Sameroff et al. (1993) identified large family size as a risk factor for cognitive delays. The current research found no significant association between household size and a heightened vulnerability of being diagnosed with MMR, although the average household size in this sample was relatively low.

Numerous studies have looked at maternal age as a sociodemographic risk factor for MMR (Croen et al., 2001; Drews et al., 1995; Leonard et al., 2005). Croen et al. (2001) identified being born to a mother over 30 years of age as a risk factor for MMR, Leonard et al. (2005) identified being born to a mother under twenty years of age as a risk factor for MMR, while Drews et al. (1995) found no significant association between MMR and maternal age. As was found by Drews et al. (1995), the current research did not find any significant associations between maternal age and MMR. Maternal age did however tend towards significance, and compared to the no cognitive disability sample, a higher frequency of children born to mothers under twenty years of age was observed in the MMR sample (16% of MMR sample, compared to 4.8% of no cognitive disability sample). Further research with larger samples is required to explore this in the South African context.

5.2. Borderline Intellectual Functioning

In the research of Fenning et al. (2007), a low level of maternal education was identified as a sociodemographic risk factor for BIF. In the present study, having a mother who has not completed high school was the only sociodemographic factor found to be significantly associated with an increased risk of being diagnosed with BIF. According to the odds ratio, children of mothers who have not completed high school were 5.35 times more likely to present with BIF than a child of a mother who had completed high school. Nihira et al. (1985) propose that mothers with less than twelve years of formal education are more likely to occupy a low SES, which may impact on the availability of educationally relevant stimuli and opportunities for the child. Jordan and Levine (2009) found that children from low socioeconomic backgrounds, who had poor quality home and preschool experiences, entered formal schooling functioning below their middleclass peers and at a heightened risk of being diagnosed with a cognitive disability. A further possible explanation could be that some of the mothers who did not complete high school may have a cognitive disability, which in turn could have resulted in their children having a genetic vulnerability.

Currently living in a single parent household was found to significantly associated with BIF at $p<0.05$, but not when the significance level was adjusted to $p<0.001$. Interestingly, this association was found to be in the opposite direction to what one would have expected from reviewing the literature. Before adjusting the significance level, the current research found a significant association between currently living in a single parent household, and a decreased risk of presenting with BIF. These findings contradict those of Sameroff et al. (1993) and Leonard et al. (2005), who both identified growing up in a single parent household as a risk factor for cognitive delays. The current research had only a small available BIF sample ($n=27$) which may help explain this unexpected finding. A further potential explanation for this finding may be that in a single parent household there may be a more positive psychosocial climate than in a household where the parents are experiencing marital difficulties and turmoil. A poor psychosocial climate, family chaos, and high stress levels have all been found to have a negatively influence on cognitive development (Deater-Deckard et al., 2009; Nihira et al., 1985). In light of this unexpected finding, further research with a larger sample size would need to be conducted to identify the true influence that

currently living in a single parent household may have on Borderline Intellectual Functioning.

With limited research having been conducted on BIF, very few sociodemographic risk factors associated with a heightened risk of presenting with BIF have been explored in the international literature. The current research expanded on the exploration of potential risk factors associated with BIF by including in the analysis those risk factors identified in the literature as being associated with MMR and SLDs. Furthermore, some of the risk factors identified by Sameroff et al. (1993) as being associated with cognitive delays were also investigated (maternal mental health problems, low maternal education, parental employment status, having an absent father, large family size, and having experienced several stressful life events). Besides having a mother who did not complete twelve years of formal schooling, no other variables investigated were significantly associated with an increased risk of presenting with BIF. This may be due to the small available BIF sample size, or to the control group (no cognitive disability sample) coming from a clinic sample and not the general population.

5.3. Specific Learning Disorders

With the significance levels adjusted to 0.001, none of the sociodemographic risk factors investigated were found to be significantly associated with SLDs. Before significance levels were adjusted however, growing up with a father who has not completed high school was the only sociodemographic risk factor identified as being significantly associated with a heightened risk of presenting with a SLD. Unexpected results were found with regards to maternal trauma exposure, with the mothers of children in the SLD sample having experienced significantly less trauma (12.2%) than the mothers of children in the no cognitive disability group (29.7%).

Growing up with a father who had not completed high school was found by the current research to tend towards significance at the stricter level of Bonferroni's correction (p=0.0044), suggesting that low paternal education levels may be associated with a heightened risk of being diagnosed with a SLD. Having a father with less than twelve years

of formal education was identified by Jordan and Levin (2009) as a sociodemographic risk factor associated with a heightened risk of developing a SLD. The current research supports this finding, and identified that children born to fathers who have not completed high school were three times more likely to be diagnosed with a SLD than a child of a father who had completed high school. Blair and Scott (2002) and Jordan and Levine (2009) both identified having a mother with less than twelve years of formal schooling as a risk factor for SLD. In the present study the sociodemographic factor of having a mother who had not completed high school tended towards significance at $p<0.05$ ($p=0.055$), however statistical significance was not observed.

Low SES was identified by Blair and Scott (2002) and Jordan and Levine (2009) as being one of the most powerful risk factors associated with the manifestation of a SLD. Though having a father who has not completed high school tended towards significance, none of the other SES indicators investigated in the current research, including maternal education level, maternal and parental employment status, and household income, were found to be significantly associated with a heightened risk of presenting with a SLD.

Maternal trauma exposure was identified by the present research as being significantly associated with SLDs at $p<0.05$, but not at $p<0.001$. Though not significant, the association between maternal trauma exposure and SLDs was found to be in the opposite direction to what one would have expected in reviewing the literature on cognitive disabilities (Sameroff et al., 1993; Sinason, 2001). The current research found that children with SLDs were significantly less likely to have a mother who had been exposed to trauma, compared to the no cognitive disability sample. One can speculate that perhaps there was an unidentified third variable at play that could help account for these unexpected findings. A further explanation may be that due to the small SLD sample size available for this study, the sample may not have been a good representation of the SLD population. Further research with a larger sample size is needed to investigate the independent contribution that maternal trauma exposure has on a child's vulnerability to being diagnosed with a SLD.

No other sociodemographic risk factors, including being born to a single mother, growing up in a single parent household (Blair & Scott, 2002; Stanton-Chapman et al., 2002), high birth order (Reynolds et al., 1996), coming from a multiple fathered home, number of people living in the house, child trauma exposure, maternal psychiatric diagnosis, or language preference, were found by the current research to be significantly associated with a heightened risk of being diagnosed with a SLD.

One potential explanation for the limited observed significance between the sociodemographic risk factors investigated and a heightened risk of being diagnosed with a SLD may be due to some of the SLD cases included in this research having an unidentified organic aetiology. Research has shown that there is a strong genetic component to SLD, with the transmission rate of reading disorders from parents to children believed to be between 35% and 45% (Reynolds et al., 1996). Stanton-Chapman et al. (2002) warn that in interpreting low parental education levels, one needs to consider that some parents who did not complete high school may have had an unidentified SLD themselves, which is a genetic/organic risk factor for SLDs. The current findings that 69.4% of fathers and 47.4% of mothers within the SLD sample had not completed high school, may suggest that some of the parents of the SLD sample may have had an undiagnosed SLD that may have hindered their school success. In the current research, if the parents of the SLD sample had not received a clinical SLD diagnosis, the researcher was unable to confirm the child's case as having a known/suspected organic (genetic) aetiology, and thus did not remove these cases from the analysis. If cases with an 'unidentified' genetic aetiology were included in the analysis, they may have masked any significant associations between the sociodemographic risk factors investigated and those cases of SLDs with no genuine organic aetiology. A further potential explanation for the lack of observed significance may have resulted from the use of a clinic sample as the control group. Clinic samples may not be representative of the general population with no cognitive disability, thus potentially masking some of the influence that the sociodemographic risk factors investigated could have had on the SLD sample.

5.4. Strengths of current research

To the researcher's knowledge, this is the first South African study that has looked at the sociodemographic risk factors associated with MMR, BIF or SLDs. The study identified having a mother who had not completed high school, having a father who had not completed high school, and having an unemployed father, as sociodemographic risk factors associated with a heightened risk of being diagnosed with MMR. The research has also flagged being exposed to childhood trauma, and not having English as one of your language preferences, as further potential risk factors for receiving an MMR diagnosis, in need of further research. The hope is that this basic risk profile of the sociodemographic risk factors associated with MMR can be used towards the early identification of vulnerable children. Through early identification and intervention, these vulnerable individuals can be assisted on more positive developmental trajectories. This research has also flagged several variables that bear further investigation as possible risk factors for BIF and SLDs. The current research acknowledges that the basic risk profile developed for MMR may be representative of a large proportion of South Africa's children; not all of which will develop a cognitive disability. This highlights the need for further research to refine the current research's risk profile and in doing so increase its predictive power and its practical use as an early screening instrument.

A strength of the current research was the use of case files, as opposed to birth certificates, as the data source. The case files provided detailed, up to date information on numerous aspects of the child's life, thus allowing for a larger number of variables to be investigated than could be done in previous research that used birth certificates as their data source. Studies that have used birth certificates as their data source have had to make inferences about the child's early life, have not been able to account for any changes in the child's life circumstances, and have not been able to investigate experiences in the child's early years (such as childhood trauma exposure). The use of case files has also enabled the researcher to explore a limited number of variables pertaining to the fathers of the children. Leonard et al. (2005) and Williams and Decouflé (1999) commented on how frequently information pertaining to fathers are either missing or not collected, thus limiting exploration into the influence of paternal characteristics on childhood development.

5.5. Limitations of current research

The current research was limited by the small sample size and the quality of some of the data contained in the case files. In having a small sample one runs the risk that the sample may not be representative of the population under investigation. With regards to the latter, there was some missing data, particularly surrounding paternal characteristics. Due to the high expected inter-correlation between some of the variable investigated, the researcher would have liked to enter the variables into a regression analysis to determine the unique influence of each variable. However, as a result of the small sample size as well as some missing data, logistical/loglinear regression analysis was not used as the predictive power that these models could offer did not add to the study.

In looking at the three cognitive disabilities separately, this study conducted many significance tests; 45 in total. However, in order to answer the research question, which was to identify the risk factors associated with each of the cognitive disabilities separately, these tests needed to be performed. In acknowledging this, the current research applied Bonferroni's correction, thus applying stricter significance levels. It is warned, however, that Bonferroni's correction tends to be too strict, particularly when many significance tests are performed (Field, 2005). These potentially overly strict significance levels used by the current research may have prevented some of the sociodemographic risk factors associated with a heightened vulnerability of developing a cognitive disability from being identified as significant.

As mentioned previously, the present research used a clinic sample as the control group (no cognitive disability sample). Using a clinic sample may cause some of the influence of the selected sociodemographic risk factors to be masked, as one can expect a control group from a clinic sample to have experienced more sociodemographic risk factors than the general population. Thus the control group may not be representative of the general population of people with no cognitive disabilities.

Lastly, as discussed in Chapter 2, the use of IQ tests within the South African context is a contentious issue. In reviewing the language preferences of the sample, one can conclude that many of the children included in this study were diagnosed using IQ tests that were not conducted in their first language and/or fully standardised against a relevant population group. Some questions therefore remain about the accuracy of the MMR, BIF and SLD diagnoses received by the children in this sample, possibly compounded further by the fact that the intellectual assessments were conducted by trainee psychologists (albeit under supervision of experienced clinicians). However, with no available alternatives, the IQ tests used to diagnose the cognitive disability sample are regarded as the most appropriate measure of intelligence currently available in South Africa.

5.6. Recommendations for future research

Future research would benefit from having a larger number of MMR, BIF, and SLD cases to investigate. Firstly, a larger sample would in most likelihood be more representative of the population groups under investigation. Secondly, a larger sample would allow for the unique contributions of the individual sociodemographic risk factors to be investigated. As clinic samples are frequently small, one could perhaps aim towards doing a meta analysis, combining the findings of several clinic studies that have looked at the sociodemographic risk factors associated with cognitive disabilities. Further studies in other clinic settings are therefore urgently recommended.

The hope is that future research can expand on the sociodemographic risk factors identified by the current research, and in doing so help to develop comprehensive risk profiles for each of these cognitive disabilities. Comprehensive risk profiles for MMR, BIF, and SLDs are urgently required, as South Africa's vulnerable children need to be identified early for interventions to be most effective (O' Shaughnessy et al., 2003; Stanton-Chapman et al., 2002). The current research found that the average age at which the cognitive disability sample were identified, and referred to the Child Guidance Clinic for assessment, was 10.38 years for MMR, 9.54 years for BIF, and 9.28 years for SLDs. When one considers that pre-school interventions are regarded as being the most effective, and that children who have not learnt to read by Grade 3 (9 years old) will continue to have reading difficulties throughout

their schooling and later life, this late age of referral is worrying indeed (O'Shaughnessy et al., 2003). These findings highlight the need for early screening techniques to be developed, as at present South Africa's vulnerable children are being identified far too late to enable effective remediation and support. In light of South Africa's limited resources these recommendations may be difficult to implement, as at present there are limited early screening and remediation programs available, including in schools. A particular combination of risk factors in a child's life (rather than any one factor on its own) may serve as an indication of the need for careful screening and monitoring of that child's educational needs.

5.7. Summary and Conclusion

In the current research, 35% of the initial MMR sample of forty individuals had a known/suspected organic aetiology for their cognitive disability, and were thus removed from the later analysis. This is a slightly higher percentage than found in the research of Drews et al. (1995) and Chapman et al., (2008), who found that between 20% and 25% of the Mild Mental Retardation (MMR) cases in their research had a known/suspected organic aetiology. In the remaining 26 cases of MMR, with no known/suspected organic aetiology, significant associations were found between the sociodemographic risk factors of having a mother who had not completed high school, having a father who had not completed high school, and having an unemployed father. Though not found to be significant, the current research identified being exposed to childhood trauma, and English not being one of the child's language preferences, as two potential sociodemographic risk factors associated with MMR, in need of further research.

The current research found that having a mother who had not completed high school was the only sociodemographic risk factor identified as being significantly associated with a heightened risk of being diagnosed with BIF. No sociodemographic risk factors were found to be associated with a heightened risk of presenting with a SLD. However, having a father who had not completed high school tended towards significance and is a sociodemographic risk factor potentially associated with SLDs that is in need of further investigation.

The current research was able to develop a basic risk profile for MMR, and has identified low maternal education levels as a sociodemographic risk factor for BIF. This is the first time that the sociodemographic risk factors associated with MMR, BIF and SLDs have been researched in South Africa. The hope is that these identified sociodemographic risk factors can be built on by future research and in doing so comprehensive risk profiles for each of these cognitive disabilities can be developed and used to assist with the early identification of children who may be at risk of having MMR, BIF or a SLD. With early identification and intervention, the severity and scope of a cognitive disability can be minimised or even negated, thus guiding these vulnerable children towards more positive developmental outcomes.

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