Exploration of changes in outpatient clinical presentation and diagnosis in children and adolescents at a South African community service and psychological training centre from 1987 to 2009.

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Declaration

I declare that this dissertation is my own unaided work. All citations, references and borrowed ideas have been duly acknowledged. It is being submitted for the degree of Master of Arts (Psychology) in the College of Humanities, University of KwaZulu-Natal, Pietermaritzburg, South Africa. None of the present work has been submitted previously for any degree or examination in any other University.

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Thesis supervisor's approval for submission

As the candidate's supervisor I have approved this thesis/dissertation for submission.

Signed:

_____

Vernon Solomon

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Abstract

Child and adolescent mental health represents a key area of concern and public health relevance. Mental health disorders are one of the most prevalent illnesses affecting young people and contribute significantly to the global burden of disease. Childhood and adolescent mental health problems often persist into adulthood and as such frequently result in lifelong negative consequences. Yet despite the growing concern with regards to the mental health needs of children and adolescents, not much research, both internationally and particularly locally, has focused on the provision of mental health services to children and adolescents. Additionally, little has been published on the changes and trends in diagnostic rates and assessment procedures over time. Only a few international studies have investigated mental health trends in children and adolescents; hence, there is a crucial need for South African data to inform preventative and curative services for children in South Africa. This present study therefore investigated the trends and patterns relating to diagnostic rates and assessment practices in children and adolescents over time at a local South African psychological community service centre in Pietermaritzburg.

The study was a retrospective chart review and the sample consisted of 679 case files from children and adolescents between 3-17 years of age, who had been seen at a local psychological service centre between 1987-1989, 1997-1999 and 2007-2009. The case files were systematically analysed with regards to diagnosis and assessment practices. It was hypothesised that the years of continuous social and political conflict in the Pietermaritzburg area, namely 1987-1989, had a direct impact on the psychological development and well-being of children and adolescents from this area, and that this would be reflected in the case files from the corresponding years.

The research findings with regard to the assessment practices were comparable to the internationally observed trends relating to choice of tests and procedures. In addition, the findings of the current study also showed similar trends with regard to the increasing diagnostic rates for ADD/ADHD, Mood Disorder, and Autism Spectrum Disorders as were observed internationally. Additionally, the reported decreasing diagnostic rates for Mental Retardation and behaviour disorders were also found in this local study. However, the internationally observed increases in Anxiety Disorder diagnoses contrast with the findings of this study, where the results revealed that the rates for Anxiety Disorder and PTSD were considerably higher in the late 1980s and 1990s. This finding supports the initial hypothesis that the violence and social unrest had an effect on children's psychological well-being.

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Abbreviations

WHO	-	World Health Organization
ADD/ADHD	-	Attention Deficit Disorder/Attention Deficit/Hyperactivity Disorder
USA	-	United States of America
ASD	-	Autistic Spectrum Disorder
PTSD	-	Post-Traumatic Stress Disorder
DSM	-	Diagnostic and Statistical Manual of Mental Disorders
TAT/CAT	-	Thematic Apperception Test/Children's Apperception Test
ANC	-	African National Congress
PAC	-	Pan Africanist Congress
UDF	-	United Democratic Front
TRC	-	Truth and Reconciliation Commission
CFC	-	Child and Family Centre
PDD	-	Pervasive Developmental Disorder
WRAT	-	Wide Range Achievement Test
SPSS	-	Statistical Package for the Social Sciences

Terms used

'Children' is sometimes used in the current study to refer to individuals between zero and seventeen years of age.

Chapter 1

<u>Introduction</u>

1.1 The mental health of children and adolescents

Mental health problems in children and adolescents have only recently been recognised as a health priority, despite the fact that they account for a large proportion of the disease burden in children and adolescents worldwide (Patel, Flisher, Hetrick & McGorry, 2007). It is generally acknowledged that there has been a global lack of attention regarding the mental health of children and adolescents even though mental disorders are mostly chronic with considerable negative effects on personal, interpersonal, occupational social and physical health domains (Manion, 2010, WHO 2003). Psychological difficulties have been shown to affect children's and adolescents' abilities to fulfil their potentials; they have been linked to lower educational achievements, violence, substance abuse and poor reproductive and sexual health (Patel et al., 2007). Additionally, recent research has confirmed that most adult mental disorders begin during childhood and adolescence (Bansal & Barman, 2011; Fombonne, 1998; Kleintjes, Lund, Flisher & MHaPP Research Programme Consortium, 2010; Merikangas, Nakamura & Kessler, 2009b; Remschmidt & Belfer, 2005). Yet despite this clinical emphasis on childhood and adolescent roots of adult disorders, until recently most psychopathology and prevalence research has focused on adult populations (Bansal & Barman, 2011; WHO 2003). From the studies that are available, it can be estimated that the overall prevalence of mental disorders among children ranges somewhere between 10% and 20% worldwide (Patel et al., 2007; Remschmidt & Belfer, 2005; WHO, 2003). Especially in developing countries there is still a paucity of research regarding child and adolescent mental health issues. Even though there now is a growing awareness of the importance of child and adolescent mental health, not much research has focused on the changes in diagnostic trends of mental disorders for children and adolescents over time.

1.2 Trends in child and adolescent mental health

Over the past two decades, research has shown that the rates of psychiatric disorders in children and adolescents are continuously increasing (Fombonne, 1998; Harpaz-Rotem & Rosenheck, 2004; Holtmann, et al., 2011). However, only a few studies have focused on the changes in diagnostic trends among children over time. Trends and patterns of diagnostic

rates are useful for the planning of services according to need (Kleintjes et al., 2010). Most research in the child and adolescent mental health domain tends to focus on current prevalence rate and not on changes in prevalence patterns. Some studies do focus on changes in prevalence but only for one specific disorder, such as Autism, for instance (Lord & Bishop, 2010). What is more problematic is that no studies on changes in prevalence of mental disorders in children and adolescents from developing countries, including South Africa, have been published. It is critical to investigate and build an understanding around the issue of diagnostic trends of mental disorders among children and adolescents in developing countries (Cortina, Sodha, Fazel & Ramchandani, 2012).

1.3   South African context

Lund, Boyce, Flisher, Kafaar and Dawes (2009) assert that in South Africa, several legal and policy changes have, since the demise of apartheid, afforded opportunities to improve the mental health service provision for children and adolescents. The new Mental Health Care Act was signed in 2002, and it supports the development of community-based mental health services. Additionally the South African Department of Health issued national policy guidelines on child and adolescent mental health in 2003 (Lund et al., 2009). However, no representative epidemiological studies regarding child and adolescent mental health have been conducted in South Africa as yet. Nonetheless, the estimated prevalence of mental illness for children and adolescents is around 20%, according to Kleintjes at al. (2010). In order to improve the quality of life of affected youth, and to reduce the negative impact mental illness has on their physical, emotional and social development, more focus on child and adolescent mental health is urgently needed. This includes more research on child and adolescent mental health in order to inform the development of services and interventions related to the treatment of mental disorders in young people. This current study attempted to explore the trends for child and adolescent clinical presentation and diagnostic rates over time in a South African context. It also attempted to investigate whether these trends are similar to internationally observed trends and whether South Africa's history of apartheid and political violence, and its current social conditions, has had an influence on these trends and patterns. Additionally, this study also looked at the assessment practices and choice of tests used in child and adolescent assessment in comparison to the internationally reported trends regarding assessment procedures.

1.4   Methodology

The study was a retrospective chart review, using existing data in the form of case files of children who had been seen at a South African psychological service centre between 1987-1989, 1997-1999 and 2007-2009. The case files were analysed by means of content analysis in order to establish trends and patterns in clinical presentation and diagnosis as well as diagnostic practices. Subsequently, the data was coded according to specific categories and quantitative analyses, more specifically; chi-square and log-linear analysis were utilised in order to examine the changes in diagnostic trends and practices over the 20-year time frame.

Chapter 2

Literature Review

2.1   Introduction

The mental health of children and adolescents represents a key area of concern and public health relevance. The WHO report on '*Caring for Children and Adolescents with Mental Disorders*' (2003) highlights the magnitude of the burden of disease related to child and adolescent mental illness. The report asserts that up to 20% of children and adolescents worldwide suffer from a mental disorder, therefore ranking it among the five main contributors to burden of disease in children older than five years (Assis, Avanci, de Vasconcellos, de Oliveira, 2009). Although there now is a growing concern regarding the mental health needs of children and adolescents, little has been published, both internationally and particularly locally, regarding the provision of mental health services to children and changes in clinical presentation and diagnostic trends over time among children. Further studies are needed to clarify whether certain internationally observed changes in clinical presentation and diagnostic rates pertain to a South African context and whether South Africa's history and current social conditions have an influence on clinical presentation and diagnostic patterns in the outpatient diagnosis of children.

2.2   Child and adolescent mental health

Mental disorders account for a large proportion of the disease burden in children and adolescents in all societies. However, the magnitude of mental health problems in children and adolescents has not been recognized sufficiently by many governments and decision-makers (Remschmidt & Belfer, 2005). Nurcombe, Sartorius, Okasha, Remschmidt, and Belfer (2007, in Schmaltz, 2009) published a book called '*Mental health of children and adolescents. An area of global neglect*' which illustrates both the vital importance of child and youth mental health and the fact that there seems to have been a worldwide lack of attention to this topic. Mental health problems in children and adolescents constitute health impairments with major implications such as lifelong mental health consequences, lower compliance with health regimes and a reduction in the capacity of societies to be safe and productive (WHO, 2003).

Epidemiological research has shown indications that children's and adolescents' mental health problems have increased over the recent decades (Fombonne, 1998; Collishaw, Maughan, Goodman & Pickles, 2004; Collishaw, Maughan, Natarajan & Pickles, 2010; Maughan, Collishaw, Meltzer & Goodman, 2008). Mental disorders contribute the largest single category in disability-adjusted life years (DALYs) to the global burden of disease and they account for almost three times the DALYs attributable to cancer and heart disease in children and youth (WHO, 2003; Manion, 2010). Moreover, half of all lifetime cases of mental illness start by age 14 and there is a high degree of continuity between child and adolescent disorders and those in adulthood (Manion, 2010; Flisher & Gevers, 2010). The economic and social burden of mental disorders impacts not only on the individuals, but also on their families, communities and societies (Remschmidt & Belfer, 2005).

Since childhood and adolescent mental health problems often persist into adulthood, and therefore often impact on adult well-being as well as on adult social and occupational functioning (Ravens-Sieberer, Erhardt, Gosch, Wille & The European KIDSCREEN Group, 2008), it is imperative that child and youth mental health should be viewed as a public health priority requiring appropriate resourcing and research (Manion, 2010). The early prevention of mental health problems requires identifying factors that are associated with the development of such problems (Ravens-Sieberer et al., 2008). It is important to identify the risks and burdens to which children and adolescents are exposed and how these affect their mental health.

2.2.1 Child and adolescent mental health in South Africa in context

South Africa's history and current social conditions suggest that the South African population may be, and may have been, at especially high risk of mental disorders (Williams et al., 2008). Dawes (1990, in Williams et al., 2008) proposed that the racialized social policies of apartheid, and the political violence and victimization that grew out of the anti-apartheid struggle, created a context that was conducive to increased risks of mental disorders. Williams et al. (2008) report that even in the post-apartheid era, rates of non-political violence, crime and violence against women remain high. Other factors that might be associated with a high prevalence of emotional distress and psychopathology in South Africa include the harsh economic circumstances (Seedat & Stein, 2000, in Williams et al., 2008) and the high risk of HIV/AIDS (Hughes, Hoyo & Puoane, 2006, in Williams et al., 2008).

Targeted measures for improving mental health in children and adolescents require well-founded information (Ravens-Sieberer, 2008). In 1994, Robertson and Berger (in Dawes and Donald, 1994) indicated the paucity of research regarding child psychopathology in South Africa. However, despite South Africa's progressive mental health legislation (e.g. Mental Health Care Act, 2002) and despite the fact that child and adolescent mental health is considered a priority area on the mental health agenda (Health Systems Trust, 2001), there are, thus far, only a few research studies focusing on child and adolescent mental health in South Africa. This will be discussed further in Section 2.3.4.

The ample evidence of the possible adverse long-term effects of untreated mental health problems in children highlights the importance of clarifying whether the internationally observed changes in clinical presentation and diagnostic trends relate to a South African context and, more importantly, whether South Africa's history of apartheid and political violence and its current social conditions has had an influence on the patterns of clinical presentation and diagnostic rates in the outpatient diagnosis of children.

2.3   Changes in diagnostic trends and practices

2.3.1   A look at international data

Few studies have been conducted that examine the delivery of mental health services to children, and even fewer have looked at the actual trends in clinical presentation or changes in diagnostic patterns over time among children (Harpaz-Rotem & Rosenheck, 2004).

As pointed out above, it appears that the rates of children's and adolescents' mental health problems have risen considerably over the recent decades (Fombonne, 1998; Maughan, et al., 2008). The overall prevalence of mental disorders among children has been investigated in a small number of studies from both developed and developing countries and is estimated to be somewhere between 10-20% (Al-Jawadi & Abdu-Rhman, 2007; WHO, 2003). Rates of mental disorders range from country to country however, and there are no representative psychiatric epidemiological studies of child and adolescent health for African countries such as South Africa, Ghana, Uganda or Zambia (Kleintjes et al., 2010). Only one research review, based on smaller community studies, has assessed psychopathology rates in children across sub-Saharan Africa (Cortina et al., 2012) and this found an overall prevalence rate of 14.3%. Another review of existing studies on mental disorders in the Western Cape has revealed a prevalence rate of 17% for children and adolescents (Kleintjes et al., 2006). Likewise, a

national mental health survey in Israel determined that Israeli adolescents have a prevalence rate of 11.7% for mental disorders (Farbstein et al., 2010). Moreover, a recent study on the prevalence of psychiatric disorders of school-going children in north India found a prevalence rate of 20.2% (Bansal & Barman, 2011).

The Australian national survey of mental health and well-being established that 14% of Australian children and adolescents younger than 18 years were diagnosable with a mental health disorder (Sawyer et al., 2001). Similarly, Manion (2010) reports the prevalence rate for psychopathology in Canadian children and adolescents to range between 14-25%. Additionally, the European KIDSCREEN Study (Ravens-Sieberer et al., 2008) looked at the mental health of children (aged 12-18 years) in 12 different European countries, namely Germany, Spain, Netherlands, Austria, the United Kingdom, France, Switzerland, Hungary, Greece, Czech Republic, Poland and Sweden, using the Strengths and Difficulties Questionnaire (SDQ). They found that the prevalence of mental health problems in general varied considerably across countries, with high prevalence rates being observed for the UK (13.6%), Hungary (9.7%), Czech Republic (13.8%), Greece (12.1%) and France (11.9%) and lower rates being observed for Switzerland (7.4%) and Germany (7.3%). The SDQ however, does combine the measurement of different problem areas such as conduct problems, emotional symptoms, hyperactivity/inattention and peer relationship problems in an overall score, thus making it difficult to report on the differences for these mental health aspects. The study found, however, that low socio-economic status (SES), poor social support, poor parental relationships and parental mental health problems are associated with a higher risk of adolescent mental health problems.

However, none of these studies address the changing patterns in the diagnosis of children and adolescents. All of the above studies focused on prevalence rates and did not investigate trends in the diagnosis of children and adolescents. The few studies that have examined these trends will be discussed in the next section.

2.3.2 Changes in diagnostic trends

Much of the international research on changes in diagnosis among children has concentrated on changes in diagnostic rates for specific disorders such as Autism, ADHD, Bipolar Disorder and Depression (Holtemann, Bölte & Poustka, 2008; Case, Olfson, Marcus & Siegel, 2007; Mandell, Thompson, Weintraub, Destefano & Blank, 2005; Nassar et al., 2009;

Toh, 2006). Specifically, the internationally increasing rates of diagnosis of ADHD and Autism in young children have raised some concern in the past two decades (Mandell et al., 2005; Nassar et al., 2009).

The issues around the recently reported increase in the prevalence of Autism will be discussed in detail in the next section. However, the internationally observed increases in both ADHD and Mood Disorders among children have also drawn increasing attention in the last decade.

Mandell et al. (2005) examined the changes over time in diagnosis rates for ADHD and Autism for children and adolescents at hospital discharge in the USA. They found that the average discharge rates for ADHD increased by 381% between 1989/1991 and 1998/2000. They concluded that this increase in prevalence could be related to changes in diagnostic practices over time, increases in community prevalence and the fact that children and adolescents with developmental disorders are more likely to be hospitalized than other children. They also stressed that the increasing rates of ADHD diagnosis at hospital discharge did not occur in isolation but in the context of an increase in diagnosis rates of several other disorders such as Autism, affective disorders and alcohol- and substance-related disorders.

Taylor (2009) points out that the striking increase in ADHD diagnosis rates in recent years could be due to several factors such as increased popular awareness as well as more pressure from parents seeking treatment for their children. Another reason could be related to commercial pressures from the pharmaceutical industry.

Moreno et al. (2007) report a 40-fold increase in the diagnosis of Bipolar Disorder in the USA in youth (between 0-19 years) from 1994-2003. They concluded that this notable increase could either mean that Bipolar Disorder was historically under-diagnosed in children and adolescents and that this has now been resolved, or that Bipolar Disorder is currently being over-diagnosed in that age group.

Holtmann et al. (2011) found a 68.5% increase between 2000 and 2007 for inpatient admissions in Germany for Bipolar Disorder in individuals up to 19 years. They reasoned that a heightened clinical awareness of mood symptoms in younger individuals and, in part, a reconceptualization of previously diagnosed psychotic disorders in youth might be responsible for the increase.

Another rationalization for the rapid increase of Bipolar Disorder in children and adolescents is suggested to be linked to the increased use of Selective Serotonin Reuptake Inhibitors (SSRIs) in children and adolescents. Several studies have proposed that SSRIs may cause an increased risk of Bipolar Disorder in children (Harpaz-Rotem & Rosenheck, 2004).

In 2004, Harpaz-Rotem and Rosenheck reported one of the few studies looking at changes in diagnostic patterns over time. They identified changes in the diagnostic proportions of specific mental health diagnoses of children and adolescents between the years 1995 and 2000. In this five-year period, they found a dramatic increase in the diagnosis of especially Autism and Bipolar Disorder, but also significant increases for ADHD, depression and anxiety disorders. Although their sample consisted of over 100 000 children and adolescents, they cautioned that it is unclear whether the observed changes reflect changes in diagnostic practices or true changes in the prevalence of mental disorders, as the study was not an epidemiological study, but instead examined changes in diagnostic patterns of a treated population covered by private insurance.

To date, most research regarding child and adolescent mental health has tended to focus on current prevalence rates rather than changes in prevalence patterns over time. Little is known about time trends in child and adolescent mental health and it is not clear what factors affect the prevalence trends of specific disorders across time. No studies on changes in prevalence rates for child and adolescent mental health from developing contexts could be found by the researcher. Moreover, no studies pertaining to changes in clinical presentation and diagnostic trends across time among children in *South Africa* have been published. This indicates a need to understand whether the internationally observed changes in clinical presentation and diagnostic trends relate to a South African context and whether the patterns of clinical presentation and diagnostic rates in the outpatient diagnosis of children have been, and are, influenced by South Africa's history of apartheid and political violence and its current social conditions.

2.3.3 Trends in Autism prevalence

Over the past decade, the increased prevalence rates for Autism and Autism spectrum disorders (ASDs) have generated considerable concern (Coo, et al., 2008). Recent prevalence rates for ASDs are now estimated at about 1 in 110 children in the USA (Lord & Bishop, 2010). However, little is known about the prevalence of ASDs in children in developing

countries (Kauchali, 2008). 'Autism Speaks', one of the world's largest Autism science and advocacy organizations dedicated to funding research into the causes, prevention and treatments for Autism, stress on their website that there remain many unanswered questions about the prevalence of Autism "… in especially developing countries, trends in prevalence over time and what is causing the increase in prevalence." (Autism Epidemiology Network, n.d.).

Ametepee and Chitiyo (2009) emphasize the scarcity of research pertaining to ASDs in Africa in general. The prevalence rates for ASDs in South Africa is not known, although Arieff, Kaur, Gameeldien, van der Merwe and Bajic (2010) report that in 2007 the unofficial estimated number of South African individuals affected with Autism was 270 000. Currently, one epidemiological study exploring the prevalence of Autism in South Africa is being conducted in KwaZulu-Natal by Kauchali (2008). However, as this study is still under way, there are no official prevalence rates or rates for trends in prevalence over time for ASDs in South Africa as of yet.

An exploration of the trends in clinical presentation and diagnostic rates in the outpatient diagnosis of children with ASDs over time, and whether or not these are similar to the international trends, could indeed be useful information with regard to ASD research in Africa.

2.3.4 Child and adolescent mental health trends in South Africa: limited knowledge

The Mental Health and Poverty Project's Phase 1. Country Report (2008) states that South African mental health 12-month prevalence rate for adults is 16.5%. This figure does not include schizophrenia and Bipolar mood disorders, which likely place an additional burden. In addition, the previously mentioned review of existing studies by Kleintjes et al. (2006) has revealed similar proportions (17%) of mental disorders for children and adolescents in the Western Cape. Epidemiological data based on studies in the United States and Europe report a prevalence of mental disorders of 16.3% - 17.8% for children and adolescents between 8-13 years respectively.

Only a few studies specifically regarding child and adolescent mental health in South Africa have been published. Among those is the review by Schoeman, Robertson, Lasisch, Bicha and Westaway (1989), who reported on the psychiatric diagnosis of 808 children and adolescents seen at four different psychiatric units in South Africa. The aim of this study was

to perform an initial exploration into the nature (rather than the prevalence) of psychiatric disorders in black South African children and adolescents. It provided some insight into the types of problems seen in Western biomedical settings.

A small community study (Ensink, Robertson & Parry, 1995, in Milne & Robertson, 1998) of Xhosa-speaking adolescents in an informal settlement in Cape Town found a prevalence rate of 18.8% for psychiatric disorder. The most common disorders were Anxiety, Depressive and Conduct disorders, whereas rates for ADHD and Post-Traumatic Stress Disorder (PTSD) were very low.

Another study that looked at South African child and adolescent psychopathology is the paper by Vogel and Holford (1999), who presented a descriptive account of cases presenting at two child psychiatry clinics in the Johannesburg area. They stressed that further research is necessary in order to gather more data to inform preventative and curative services for South African children.

No representative psychiatric epidemiological studies of children and adolescents have been conducted in South Africa. The best estimates of mental health 12-month prevalence rates for South African children and adolescents are the abovementioned ones developed by Kleintjes et al. (2006). This particular study's estimates are based on an expert consensus group and include consideration of a number of small non-representative epidemiological studies that had previously been conducted in the country. This is the recommended approach in the absence of existing primary epidemiological data (Lund et al., 2009).

Robertson and Berger (1994, in Dawes and Donald, 1994) stressed that the epidemiology of child psychopathology is a fairly new field, even internationally, and that there is a pressing need for additional South African data to inform the planning of services according to need.

2.3.5 Changes in the '*Diagnostic and Statistical Manual of Mental Disorders*' (DSM-III and DSM-IV)

Over the past twenty years, there have been some changes in the diagnosis of mental disorders as a result of the changes from the third edition of the '*Diagnostic and Statistical Manual of Mental Disorders*' (DSM-III, American Psychiatric Association, 1980) published in 1980 to the fourth edition of the DSM (DSM-IV, American Psychiatric Association, 1994) published in 1994 (Seligman, 1999). With regard to the "Disorders Usually First Diagnosed

in Infancy, Childhood, or Adolescence", the main changes concerned the categories of both Communication Disorders and Pervasive Developmental Disorders, which were expanded in the DSM-IV. Expressive Language Disorder, Mixed Receptive-Expressive Language Disorder and Phonological Disorder were added to the Communication Disorder Category. In addition, Rett's Disorder, Childhod Disintegrative Disorder and Asperger's Disorder were added to the Pervasive Developmental Disorders. Certain changes were also made to Attention-Deficit (ADD) and Disruptive Behaviour Disorders. The type of Conduct Disorder is now determined by age (Childhood- or Adolescent-Onset Type) rather than by level of socialisation. The term Inattentive, is now used to characterize ADD that manifest itself without major impulsivity, thus establishing the Inattentive Type as a disorder in itself rather than just a variation. Over and above these changes, several disorders such as Avoidant, Schizoid and Overanxious Disorders of Childhood and Adolescence were eliminated and Identity Disorder was made a condition rather than a disorder. Hence, some of the changes in diagnostic trends can be attributed to these changes in the DSM.

Some authors (Bishop, Whitehouse, Watt & Line, 2008, in King & Bearman, 2009; Croen, Grether, Hoogstrate & Selvin, 2002; Shattuck, 2006) have also, for example, attributed the increase in prevalence of Autistic Spectrum Disorders (ASDs) to the reclassification of some children from the mental retardation to the pervasive developmental disorder category. At the same time, however, other studies have found no evidence of this diagnostic substitution (Newschaffer, Falb & Gurney, 2005). In summary, it can be said that the operational definition of Autism has somewhat loosened over time and that this broadened definition is likely to contribute, at least in part, to the increase in prevalence of ASDs (Saracino, Noseworthy, Steinman, Reisinger & Fombonne, 2010).

2.3.6   Changes in psychological testing of children

Although child psychological assessment practices and the choice of tests used for these assessments have not changed much over the past two or three decades, recent studies have reported some notable trends (Cashel, 2002; Kamphaus, Petoskey & Rowe, 2000). Several test-utilisation studies have shown that, since the 1990s, the use of structured observations and behaviour rating scales such as the Conners' Parent/Teacher Rating scales and the Child Behaviour Checklist (CBCL) has become much more prevalent. At the same time, reductions in the utilisation of projective tests such as the Rorschach and the Thematic Apperception Test (TAT) have also become evident (Cashel, 2002; Kamphaus et al., 2000).

Recent articles have revealed that with regard to the most commonly used measures relating to child assessments, overall very little has changed over the past 30 years. The most frequently used instruments were intelligence tests (primarily the Wechsler scales), the Bender Visual Motor Gestalt Test, various achievement measures and human figure drawings. The studies consistently report an increased prevalence of behaviour rating scales and structured observations and a decline in the use of projective tests over the past decade (Cashel, 2002; Kamphaus et al., 2000).

It has to be noted that the few available studies documenting child and adolescent assessment practices over the past 30 years are studies from the USA. No studies concerning child and adolescent assessment practices in South Africa have been published; this illustrates the importance of determining if there are similar trends in South Africa regarding assessment practices and choice of tests used in child and adolescent assessment.

2.4   Social context, conflict and mental health

The WHO report '*Caring for Children and Adolescents with Mental Disorders*' (2003) highlights the importance of considering and understanding the context of the child or adolescent when diagnosing a disorder. The report asserts that mental disorders should not be seen as static diagnostic labels, but rather as dynamic responses to social and environmental stressors (WHO, 2003).

The idea that children face psychological problems because of exposure to violence and poverty is not new. Ladd and Cairns (1996) reported that children "exposed to ethnic and political violence are more likely to develop a variety of difficulties, including mental health disorders, behaviour [sic] problems, sleep disturbances, somatic complaints and altered levels of cognitive functioning and moral reasoning" (p.14).

Several literature reviews on the effects of children's exposure to violence suggest that exposure to violence can be linked to academic and cognitive difficulties, drug use, aggressive behaviour, PTSD, anxiety and depression (Ladd & Cairns, 1996; Lynch, 2003; Margolin & Gordis, 2000). Children may be adversely affected regardless of whether they are victims or witnesses of community and political violence. Past research has documented that exposure to community violence can have enduring consequences on children and their development (Dinan, McCall & Gibson, 2004; Lynch, 2003; Margolin & Gordis, 2000).

Among the issues frequently associated with exposure to community violence are posttraumatic stress symptoms and PTSD (Dinan et al., 2004). A considerable amount of literature has been published on community violence-related PTSD. These studies highlight that these negative effects of exposure to violence tend to be more prevalent among disadvantaged communities (Dinan et al., 2004; Ensink, Robertson, Zissis & Leger, 1997).

Many international studies on the effects of war and violence on children and adolescents emphasise the negative psychological effects related to the exposure to such events. Studies from Israel have shown that the general anxiety levels of fifth and sixth grade Israeli boys and girls nearly double during wartime, compared to peacetime levels (Milgram & Milgram, 1976). An investigation into the prevalence of behavioural and emotional problems among Palestinian children revealed a case incidence of 54.4% in boys and 46.5% in girls (Thabet & Vostanis, 2001). A similar gender distribution in the prevalence of childhood mental disorders was found by Al-Jawadi and Abdu-Rhman (2007) in their study on Iraqi children in Mosul. The results showed a prevalence rate for mental disorders of 40.9% in boys and 33.3% in girls. In a subsequent study, Thabet, Abed and Vostanis (2002) found that in Palestinian children who had experienced direct trauma due to bombardment, 59.3% had severe to very severe PTSD reactions. Qouta, Punamäki and El-Sarraj (2003) also studied the prevalence of PTSD among 121 Palestinian children between the ages of 6 and 16 years living in an area of bombardment. Their findings were similar to Thabet et al. (2002), as they found that 54% of the children suffered from severe, and 33.5% from moderate levels of PTSD reactions.

Studies addressing the association between political violence and mental health outcomes in South Africa are few, but exposure to violence such as street battles and township raids has been found to be related to psychological distress in children and youths (Dawes & Donald, 1994; Straker, Mendelson, Moosa & Tudin, 1996). Those who had experienced these forms of violence often also exhibit symptoms of fear and anxiety.

Thus there is considerable evidence which demonstrates that exposure to community violence, defined as either experiencing, seeing or hearing about violence in one's home, school or neighbourhood, can lead to a variety of difficulties in children and youth (Kliewer & Sullivan, 2008). It has been linked to both the presence of clinical symptoms and to impairments in normal development of children (Lynch, 2003).

However, several studies suggest that the majority of children exposed to community violence do not have, nor do they develop, diagnosable problems (Cairns & Dawes, 1996; Lynch, 2003). There are a number of factors, such as family support and parental monitoring, which might moderate children's responses to community violence (Lynch, 2003). Hence, previous research suggests that children exposed to community violence do not inevitably suffer serious psychological consequences.

The risk for problematic outcomes in development and psychological problems is, however, much higher among children who have been exposed to community violence than those who have not (Ensink et al., 1997; Ladd & Cairns, 1996; Lynch, 2003; Margolin & Gordis, 2004). Moreover, children who are exposed to community violence are often also likely to experience other stressors or risk factors. Amid the factors that are frequently associated with children's exposure to community violence are poverty, overcrowding, scarcity of community resources, inadequate medical care and parental unemployment (Lynch, 2003; Petersen, Swartz, Bhana & Flisher, 2010). All of these contribute their own adversity to children's adaptive development. As Petersen et al. (2010) remind us, it is a fact that "impaired cognitive and socio-emotional development in childhood traps people in a negative cycle of poor educational achievement and [consequently] reduced productivity and wage earning potential" (p.332) which is passed on to the next generation. This highlights the importance of identifying factors that are associated with the development of such problems. It is imperative to identify the risks and burdens to which children and adolescents are exposed and how these affect their mental health, since targeted measures for improving mental health in children and adolescents require well-founded information (Ravens-Sieberer, 2008).

A series of recent research reports on child development in developing countries (Grantham-McGregor et al., 2007; Walker et al., 2007; Engle et al., 2007) has listed exposure to violence as one of the risk factors for adverse outcomes in child development. The research notes that there is a crucial need for new policies and interventions designed to prevent this loss of human potential (Walker et. al, 2007).

2.4.1 Political violence in South Africa (1960s – 1990s)

It is beyond the scope of this paper to document, analyse or even describe in depth the history of political violence in South Africa. What follows is a very brief outline of some of the events prior to the 1994 national elections.

It is generally acknowledged that the apartheid system is considered the largest contributing factor to the political violence that prevailed in South Africa for several decades (Abrahams, 2010). The system of apartheid precipitated significant internal resistance and a series of uprisings and protests, to which the government responded with severe police brutality (du Toit, 1993).

The massacre at Sharpevile in 1960 saw 69 people, who were protesting against pass books, killed by police. In the wake of this incident, a national State of Emergency was declared and detention without trial was introduced. The African National Congress (ANC) and the Pan Africanist Congress (PAC) were banned and their leaders went into exile or were arrested. The resistance went underground and both the ANC and PAC abandoned their commitment to non-violent resistance and turned to armed struggle (du Toit, 1993).

The Soweto uprising in 1976 marked a further increase in the political violence and the beginning of a vehement and sustained anti-apartheid revolt. In 1983, the tri-cameral parliamentary system was introduced which sparked further violence due to the fact that Africans continued to be excluded from representation in the parliament (Abrahams, 2010; du Toit, 1993). This is often referred to as the "African revolt of 1984" and led to the enforcement of a series of States of Emergency in 1985, and from June 1986 to the end of the decade (Aitchison, 1993). From 1985 to 1989 black townships became the focus of the struggle between anti-apartheid organisations and the Botha government and severe political violence was a renowned feature in South Africa in those years. By the end of the 1980s there was a proliferation of sustained political violence especially in the Natal Midlands; some was directed at the government, but a substantial amount was attributable to the power struggle between the United Democratic Front (UDF)/ANC and Inkatha supporters and widespread factional feuds which were "seemingly beyond the control of any political leadership or the forces of public law and order" (du Toit, 1993, p 28).

2.4.2   History of political violence in the Pietermaritzburg area

Pietermaritzburg and its surrounding areas are indelibly associated with the violence that preceded and accompanied South Africa's transition to democracy (Aitchison, 1998). Natal and the Natal Midlands were reputed to be relatively "peaceful" prior to 1986, although by 1984, there was a rise in political tension in the region as the anti-apartheid struggle intensified throughout the country in response to the imposition of the tri-cameral parliamentary system in 1983. There were many precipitating conditions in the townships around Pietermaritzburg that exacerbated these tensions. Factors such as the conflict between Inkatha and the UDF, the rise of vigilante groups associated with Inkatha, housing costs and shortages and the conflict between Inkatha and the trade union movements all contributed to the devastating violence experienced in this region from 1987 to 1989 (Aitchison, 1998).

Much of the violence was labelled as 'black-on-black' violence, with the government at the time posing as a neutral actor. It was later established that the government manipulated the situation by supporting one side or the other depending on when it suited it (Aitchison, 1998). There is also well-documented evidence of direct involvement by the South African Police in support of Inkatha and against those supporting the ANC and its allies (Abrahams, 2010; Aitchison, 1998). It is beyond the scope of this study to analyse and discuss the reasons and causes of the political violence and its political role-players in the Pietermaritzburg area in detail; what must be remembered, however, is the distressing impact it had on the region. The following is a sketch of some of the key events and incidents of political violence and unrest of the Midlands conflict from 1987-1989 and the "pre-election wars" (Aitchison, 1998, p. 10) from 1990-1994.

The year 1987 is generally regarded as "the first year of the Midlands War" (Aitchison, 1998, p. 5). The tension and conflict between the Inkatha vigilantes and the UDF youth organisations intensified in the first months of 1987. Numerous UDF supporters were killed in the Imbali, Edendale and Hammarsdale areas. Between March and August 1987, the number of deaths began to rise, with an average of 14 a month. By September, this escalated into what is by many referred to as a 'war' with 59 dead in that month alone. In total, there were 413 fatalities from political violence and unrest in 1987 (Aitchison, 1990; Aitchison, 1993; Aitchison, 1998).

In January 1988, about 79 people were killed in the Vulindlela area and the political murders continued throughout 1988; with an average death toll of 44 people a month between April

and November, the UDF casualties far exceeded the Inkatha ones. The UDF was steadily being disabled by massive detentions and police actions against gatherings. Schooling was considerably disrupted both by teacher resignations and by pupils being refused entry because they were not Inkatha supporters (Aitchison, 1993). In the latter part of the year, the conflict spread to the more remote rural areas and Aitchison (1993) reports that the total death toll from violence in the Midlands area in 1988 was a staggering 673 people.

Another 724 people died from the violence in 1989 in a period of more localised struggles in the areas of Mpumalanga (near Hammarsdale), Imbali, Ashdown, Vulindlela. Mpophomeni and the rural areas near Wartburg, Camperdown and Richmond.

On the 2nd of February 1990 President F.W. de Klerk announced the lifting of the 30-year ban on a range of political organisations such as the ANC and the imminent release of Nelson Mandela. After his release, Mandela came to Durban on the 25th of February and in his speech to over a hundred thousand people, he urged a cessation of all violence. The events of late March 1990, however revealed that the people of Natal had not taken Mandela's advice (Aitchison, 1998). Between the 25th and the 31st of March massive Inkatha attacks on non-Inkatha areas took place in Vulindlela, Edendale, Ashdown and Imbali and these led to over 200 deaths over the next month. This so-called "Seven Days War" caused widespread displacement and Pietermaritzburg and Edendale had to deal with a large-scale accommodation crisis for the 20 000 refugees over the next year.

After the mid-1990s, the devastating political violence and unrest in the Natal midlands subsided considerably with some peaks relating to particular clashes in certain towns or rural areas but with an overall decline in incidents (although the overall death toll from political violence in the Midlands for the three years of 1990-1992 was still 1 635). With the build up to the national elections, violence began to once again escalate in the latter part of 1993 and early 1994, persisting right up to the 1994 elections in April.

2.4.3   Implications of political violence for mental health outcomes in children

In the wake of the important political and social transformations under way in South Africa in the 1990s, some attention was being paid to the residual effects of apartheid. Adverse conditions that were reinforced under the apartheid regime, such as poverty and community violence, subjected children to multiple daily stressful experiences that could seriously compromise their psychological functioning and development (Barbarin, Richter, de Wet &

Wachtel, 1998). However, there are only very few studies that investigate the effects of political violence on *children* in South Africa, per se.

Dawes, Tredoux and Feinstein (1989, in Dawes & Donald, 1994) studied the effects of political violence on symptom presentation in black children. They interviewed survivors of political attacks from the Cape Town area. They found that 40% of the children (between 2 and 17 years) had symptoms of PTSD. These results were, however, based on reports rather than mental status examinations, so they have to be interpreted cautiously.

Skinner and Swartz (1989) looked at the effects of a parent's detention on 19 preschool children. In this retrospective study, primary caregivers were interviewed reporting on the emotional and behavioural problems the children presented with. A variety of problems such as separation anxiety, fear, as well as physical problems, aggression, secondary enuresis and developmental difficulties were observed. This study was limited by the small sample size and the fact that it relied on caregiver reports.

In 1997, Ensink et al. also reported that the prevalence of psychiatric disorders in South African children exposed to community violence was higher than was expected. The study found that 40% of children (aged 10-16 years) from a high-risk sample in Khayelitsha presented with one or more psychiatric disorders. Even though this study focused more on the impact of continued community violence rather than political violence as such, it is nevertheless a valuable indicator of the psychological effects of violence on children and adolescents.

According to Robertson and Berger (1994, in Dawes and Donald, 1994) and Williams et al. (2004), there are a few more, mainly small, descriptive or un-reviewed community studies relating to the psychological effects of political violence on children in South Africa, but no larger scale investigations regarding this issue have been carried out in this country. Overall, there is little available data on the association between political violence and mental health for both adults and children in South Africa, making heath policy decisions difficult. Lockhat and Van Niekerk (2000) point out that there is a pressing need for "both epidemiological and more qualitative information describing the experiences of children in South Africa" (p. 299).

2.4.4   Social restructuring and the current situation of children in South Africa

After the first multi-racial democratic elections in April 1994, the newly elected ANC under President Nelson Mandela ushered in many social and political reforms aimed at promoting

the development and reorganisation of the country's institutions for future generations (Venn, 2010). In 1995, the government established the Truth and Reconciliation Commission (TRC) under the leadership of Archbishop Desmond Tutu. This brought human rights violations perpetrated under apartheid to justice and the new constitution of 1996 laid the groundwork for democracy (Venn, 2010).

Yet despite South Africa's progressive policies, it has not been easy to meet all the challenges inherited from decades of apartheid regime. In the first decade following the democratic transition, South Africa faced many obstacles which impeded progressive development (Lockhat & Van Niekerk, 2000). The legacy of apartheid had major consequences particularly with respect to the status and well-being of South African children and youth. The new government placed great importance on children's health and status reflecting President Mandela's personal interest in the well-being of children and youths (Lockhat & Van Niekerk, 2000; Venn, 2010). However, the disempowerment and discrimination of the apartheid years had weakened South Africa's social and health systems and the livelihoods of many South Africans were affected by the social transformations. Socio-economic disparity, violence and poverty are still widely entrenched and despite the far-reaching political changes that the country has undergone in the past 17 years, children are currently still facing enormous problems impacting upon their development (Lockhat & Van Niekerk, 2000; Petersen et al., 2010; Venn, 2010).

In a recent book on the well-being of South African children, Dawes, Bray and van der Merwe (2007) report that although enormous strides have been taken by the government to improve the situation of children, more than 50% of children in South Africa live in poverty and significant numbers of children are affected by HIV/AIDS, abuse and violence. The services intended to assist children are stretched beyond their limits and the well-being of children, who incidentally comprise the largest proportion of the South African population, can still be regarded as "fraught with risk" (Lockhat & Van Niekerk, 2000 p. 300).

2.4.5   Population distribution in KwaZulu-Natal

In order to be able to comment on the situation of children in South Africa, and more specifically in KwaZulu-Natal, it is vital to have an idea of the general population distribution in the province. Hence, what follows is a very broad overview of the relevant population statistics for KwaZulu-Natal.

According to Statistics South Africa (2012), 82.8% of the population in KwaZulu-Natal in 1996 were black African, followed by 9.3% Indian, 6.6% white and 1.4 % Coloured. Those numbers changed to 85.2 % for black Africans, 8.3% for Indians, 5% for whites and 1.5 % for Coloureds in 2001. The most recent census in 2011 found the following percentages: 86.8% black Africans, 7.4 % Indians, 4.2% whites and 1.4% Coloureds. The statistics also reveal that in 1996, 46.5% of the population were between 0-19 years old; this figure rose to 53.7% in 2001 (Statistics South Africa, 2006)[1]. Thus, more than half the population in 2001 was under 20 years old.

With respect to education and racial profile, the statistics (Council on Higher Education, 2009) show that the proportion of African students in public higher education as a whole increased from 49% in 1995 to 63% in 2007, whilst the proportion of white students in the student body decreased from 35% in 1995 to 24% in 2007. These statistics are relevant since the CFC is based on the University of KwaZulu-Natal's premises and as such could have experienced similar access issues as the University itself.

2.4.6 Location of the study

This study is located at the Child and Family Centre (CFC), a University-based, psychological community service centre in Pietermaritzburg, KwaZulu-Natal. Since 1977, the CFC has served as an outpatient child and family clinic and a community engagement centre, promoting the healthy socio-psychological development of children, youth and families from all sectors of the Pietermaritzburg population. The CFC provides training opportunities for psychology students as well as functioning as an approved internship setting for intern psychologists.

The Centre has always focused strongly on its service function to the community, emphasizing its commitment to servicing "all [sic] sections of the Pietermaritzburg and Natal Midlands population" ('*History of the CFC*', 1988, p. 2), by establishing many social outreach projects in the "black townships" ('*History of the CFC*', 1988, p. 2) and impoverished peri-urban and rural areas in the Natal Midlands. The Centre realised that the high levels of physical, social and emotional morbidity associated with intense political intolerance and violence in the region have contributed towards the erosion of education, health and welfare services in many communities in the Pietermaritzburg region. Hence,

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[1] Please note that there are no available provincial statistics regarding age distribution for the 2011Census as of yet.

outreach programmes, such as the hospital clinics at Grey's and Edendale hospitals and various school counselling programmes have become a significant feature of the Centre's community-based service undertakings.

It is hypothesized that the years of continuous social conflict and political violence in the Pietermaritzburg area, namely 1987-1989, had a direct impact on children's and adolescents' psychological development and that this will be reflected in the CFC case files of children from the corresponding years.

2.5   Theoretical frameworks

The overarching framework for this research study is developed on the basis of the ecological model of human development (Bronfenbrenner, 1979), using as a premise that development is complex and mediated by biological, psychological, as well as social and environmental variables. The ecological model of human development takes a developmental approach and is closely linked to general systems theory; the basic premise of the model is that the systems (or different settings or levels) of the child's world are all interdependent, so that an event at one level potentially affects systems on another level. Much of the research on exposure to political and community violence has been guided by ecological theory since it provides a framework for understanding how exposure to violence, an environmental stressor, can impact on individual development and well-being (Betancourt & Khan, 2008). Hence, this research has adopted the ecological theory as its overarching framework in which to locate this study with regard to the time period (the 'Midlands War' years) and the potentially influencing environmental effects. The other two premises that are relevant in this research relate to diagnostic theories (or their absence) and theoretical constructs associated with psychological assessment.

2.5.1   Ecological theory

Bronfenbrenner's classic ecological model of child development provides a framework for analysing the interrelated settings and relationships involved in the psychosocial impact of political conflict and violence on children (Betancourt & Khan, 2008). This theory defines key developmental contexts in terms of a "series of nested structures" (Bronfenbrenner, 1979, p.3) that extend beyond a child's immediate environment like the child's family, to include the child's school, community and the social, cultural and political institutions that impact on the child's life.

2.5.1.1 Ecological model of human development

In Bronfenbrenner's model, the individual is the centre of a system which consists of five layers, each representing different aspects of the environment. Each of the layers is considered to have a significant impact on the development of the child:

- **Microsystem:** The first and innermost layer of a child's social ecology is called the *microsystem*. It represents the immediate setting in which a child lives and the social relationships, activities and roles he or she experiences on a regular basis. Bronfenbrenner (1979) regards the individual as an active force, exerting an influence on the people around him or her and on the relationships he or she has with others. Thus, the child is not viewed as a passive recipient of other people's attention and actions. Accordingly, within the microsystem, development is understood in terms of complex, interacting relationships (Keenan, 2002).

- **Mesosystem:** The second layer of Bronfenbrenner's model is called the *mesosystem*. The mesosystem represents the relationships and interactions between and among two or more settings of relevance to the developing child. It can be viewed as a linkage of different contexts in which the child develops. To put it differently: a mesosytem is basically a connection between two or more microsystems.

- **Exosystem**: The *exosystem* refers to settings in which the child does not directly participate but that can affect his or her development indirectly. Exosystems are the broad social settings and institutions that provide support to both children and adults in terms of the demographic characteristics of communities, the availability of resources and formal and informal social supports. This might include government structures, major economic and cultural, societal institutions and more informal concepts like neighbourhood.

- **Macrosystem:** The *macrosystem* is not a specific environmental context but rather encompasses the larger cultural context including the beliefs, customs, values, and the historical and political aspects of the social ecology (Betancourt & Khan, 2008). Cultural influences affect many aspects of a person's life and have a powerful effect on children's development. Thus the overarching ideologies, customs and laws that constitute the macrosystem touch all other aspects of the social ecology.

- **Chronosystem:** Bronfenbrenner added the *chronosystem* at a later stage in the theoretical development of his ecological theory (Donald, Dawes & Louw, 2000). The chronosystem reflects the notion that development occurs within historical and

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cultural time and it envelops the other systems. It involves all aspects of time and how they impact on development. Development is influenced by the historical events and features of the period during which it is occurring.

Bronfenbrenner's framework has helped to acknowledge developmental contexts of children as vital influences in the formation of their psychological capacities. It draws attention to the way different settings and sources of influence impact on children's development at different key points in their lives. However, Bronfenbrenner's theory is not exclusively about contextual influences on development but also on context-individual interactions and how the developing child and the environment can influence each other.

It is important to stress here that Bronfenbrenner considerably revised and extended his original version of his theory continuously until he died in 2005. This research study, however, is drawing on the above-mentioned major set of concepts of his classic ecological theory as a way of illustrating how an environmental stressor, such as political violence, might impact on children's and adolescents' psychological development and well-being. It is hypothesized that the years of exposure to continuous social conflict and political violence in the Pietermaritzburg area directly impacted on children's and adolescent's psychological development and that this will be reflected in the case files of children seen at the CFC from the corresponding years.

2.5.1.2 Ecological approaches to development

The psychological development of children involves both qualitative and quantitative psychological change associated with the passage of time and age (Keenan, 2002). Much of human development has been shown to be universal, but much of it is also emergent and subject to cultural and historical influences (Dawes & Donald, 1994). Numerous theories attempting to explain how people change over time have been outlined in past psychological literature. Many of these theories assume a largely universal, de-contextualised model of child development. Ecological approaches, however, argue that the study of the child "in and as part of the social context is crucial for our understanding of children's functioning and development" (Dawes & Donald, 1994, p. 9).

Studies developed within an ecological framework point to a complex set of interactions between the developing child and the family, school and community contexts that surround it (Donald et al., 2000). This approach maintains that an account of psychological development

requires the conceptualisation of the relationship between the various components and levels of functioning of the individual (intra-individual factors) and his or her environment (inter-individual and contextual factors) (Dawes & Donald, 1994).

This broad framework of ecological development is especially useful when considering development in adverse circumstances since it acts as a reminder to be cautious about the conclusions drawn regarding the short- and long-term consequences of adversity for development. Obviously, there is a range of life circumstances that pose risks to development and that influence developmental outcomes, with social unrest and political violence being only one of those circumstances. Nevertheless, given that according to Bronfenbrenner's theory, the ability of parents to care for their children is embedded in and influenced by "stresses and supports emanating from other settings" (1979, p.7), this study hopes to find some indication that the social unrest and political violence of the late 1980s had some impact on the psychological well-being of children in the Pietermaritzburg area who were seen at the CFC.

2.5.2   Diagnostic categorisation

Over the past 30 years, the DSM system, beginning with the Diagnostic and Statistical Manual of Mental Disorders III (DSM-III, American Psychiatric Association, 1994) has become the widely (in westernised settings at least) accepted primary 'manual' regarding research, clinical assessment, diagnosis and treatment in psychopathology (Kim & Ahn, 2002). Thus the domain of mental disorders has, since 1980, been guided by this atheoretical system. The American Psychological Association established these atheoretical guidelines as a solution to the central debate regarding the lack of a single universally acknowledged pathogenesis for most mental disorders (Cloud, 2012; Kim & Ahn, 2002; Regier, 2003).

The current DSM-IV diagnostic criteria sets are based on characteristic symptom patterns and observable signs, such as psychomotor retardation or changes in mental status, with particular duration and exclusion criteria, which clinicians could agree on, regardless of their theoretical orientation, (Regier, 2003). Disorders are presented in the form of checklists of symptoms without "an organizing theory that describes the fundamental principles underlying the taxonomy" (Follette & Houts, 1996, in Kim & Ahn, 2002, p. 451). The introduction of the DSM-IV states that the "DSM-III introduced a number of important methodological innovations, including explicit diagnostic criteria […] and a descriptive approach that

attempted to be neutral with respect to theories of etiology" (American Psychiatric Association, 1994, p xvii). The same approach was subsequently continued in the fourth edition of the DSM (Kim & Ahn, 2002). The criteria sets in the DSM-IV are based on an extensive analysis of available research, and have received substantial international consensus by experts (Regier, 2003). These evidence-based diagnostic criteria can be tested for their reliability and can be modified if statistically more significant criteria are observed. This took place with reference to some diagnostic criteria in the last revision (DSM-IV-TR) in 2000 and is due to happen again with the publication of the new edition DSM-5 (due to be published in 2013).

Thus it can be concluded that the DSM diagnostic criteria sets are not based on underlying causal theories, but rather on clusters of symptoms that have been internationally agreed on by clinicians and which are supported by research. This study will employ the DSM-IV diagnostic criteria for mental disorders in children and adolescents based on similar criteria used in several epidemiological and smaller research studies into the prevalence of mental disorders among children and adolescents (Herman et al., 2009; Kessler et al., 2005; Merikangas et al., 2009a; Merikangas, Nakamura & Kessler, 2009b, Vogel & Hollford, 1999).

2.5.3   Role of theory in psychological tests and assessment

According to Foxcroft and Roodt (2005), a psychological test or assessment measure is an objective and standardised measure of a sample of an individual's behavioural and/or mental characteristics. Assessment measures are required to be both valid and reliable with regard to their intended purpose. They are generally developed to test specific domains of functioning, such as intellectual ability, personality, interests and emotional status and are interpreted according to norms based on a statistical representative sample of the population for whom the test is intended. Moreover, assessment measures are usually constructed for a specific population or context and, as such, a test's appropriateness for a certain population, does not automatically mean that it is appropriate for another population from a different context or culture (Foxcroft & Roodt, 2005).

It is difficult to report on the specific theoretical constructs associated with psychological assessment. Every psychological test or assessment measure is developed for a different intended purpose and, as such, based on different theoretical contexts and constructs. It is,

however, apparent that the utility of any psychological assessment measure is limited by the quality of the theoretical and measurement models that it serves (McFall, 2005). Therefore, it is meaningless to discuss the reliability and validity of a specific test or measurement apart from its specific intended purpose and theoretical context.

It goes beyond the scope of this study to discuss the theoretical context of the 60 child and adolescent assessment measures that were found to have been used at the CFC during the 20 years in question. It can be mentioned, however, that all 60 assessment measures were standardized measures, often with slightly modified versions for a South African population (for example the WAIS-III). Although the majority of measures were international tests, a moderate number of South African measures, especially intellectual and career assessment measures, were found to have been used over the 20 year period.

2.6   Rationale, aims and goals for the study

2.6.1   Rationale

The lack of research on South African children's mental health was conveyed earlier in this chapter. Robertson and Berger (in Dawes & Donald, 1994) proclaimed already in 1994 that:

> "no authoritative data are available on the nature and prevalence of psychopathology in South African children, or on differences between children from different backgrounds who have been exposed to very different life experiences. Although data on the nature and prevalence of child pathology would reflect only one aspect of the emotional development and functioning of South African children, it would nevertheless serve as a marker of mental health in the family, the community and the nation." (p.170)

Other authors (Lockhat & Van Niekerk, 2000; Lund et al., 2009; Williams et al., 2004) have also stressed that there still is a pressing need for both more epidemiological and more in-depth, qualitative information regarding the mental health of children in South Africa. Further research is necessary in order to gather more data to inform preventative and curative services for South African children since measures aimed at improving the mental health in children and adolescents require well-founded information (Ravens-Sieberer, 2008).

Yet, despite South Africa's progressive mental health legislation (Mental Health Care Act 2002) and notwithstanding the fact that child and adolescent mental health is considered a

priority area on the mental health agenda (Health Systems Trust: Mental Health Services Research Review, Final report, 2000), so far only very few research studies focus on child and adolescent mental health in South Africa. It is clear that South Africa lags behind many other areas of the world in terms of including children in research (Dawes, et al., 2007).

Moreover, nothing has been published in South Africa regarding the provision of mental health services to children and changes in clinical presentation and diagnostic trends over time among children. The extensive evidence of the possible adverse long-term effects of untreated mental health problems in children underlines the importance of clarifying whether the internationally observed changes in clinical presentation and diagnostic trends are also present in a South African context and more importantly, whether South Africa's history of apartheid and political violence and its current social conditions has had and has an influence on the patterns of clinical presentation and diagnostic rates in the outpatient diagnosis of children at a local psychological community service centre.

2.6.2   Aims and goals

Although there is a growing concern over the mental health needs of children, little research has been done internationally to specifically investigate the provision of mental health services to children and changes in clinical presentation and diagnostic trends over time among children. To the researcher's knowledge, no studies of this kind have been conducted in South Africa. This research aims to fill this gap, by exploring the changes in outpatient clinical presentation and diagnosis in children and adolescents at a South African community service and psychological training centre over two important historical time periods in South African and local history (1987-1989 and 1997-1999) compared to the recent years (2007-2009).[2]

This study will therefore represent an exploratory attempt to expand our current knowledge regarding the trends for child and adolescent diagnostic rates and changes in clinical presentation over time in a South African context. This will assist in building towards an improved understanding of whether or not these trends are similar to the internationally observed trends and whether South Africa's history of apartheid and political violence, and

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[2] Please note that the specific aims and research questions will be spelled out in detail in the next chapter.

its current social conditions has had and has an influence on these patterns. This information could indeed be useful for the purposes of planning and service provision.

However, the emphasis of this study is not solely on quantitative statistics, although these will form a considerable part of the research, but also on improving our understanding of some of the factors that influence trends and patterns in clinical presentation and diagnosis in a South African context.

Chapter 3

<u>Research Design and Methodology</u>

3.1 Introduction

Research into the provision of mental health services to children and changes in clinical presentation and diagnostic trends over time among children in South Africa, potentially provides important information on whether the internationally observed trends in clinical presentation and diagnosis relate to a South African context. This research also endeavours to investigate whether South Africa's history of apartheid and political violence in the Pietermaritzburg area, has had an influence on the patterns of clinical presentation and diagnostic rates in the outpatient diagnosis of children at a psychological community centre in Pietermaritzburg. The methodology used for this research will be presented in this chapter. This will include a discussion around the quantitative aspects of the research and data analysis, retrospective chart review research, the aims and questions asked by the researcher, the research design, ethical issues and research procedures. Additionally there is a section dedicated to the coding and categorizing of data in this study as this is a vital element of validity in this research study

3.2 Research aims

The fundamental aim of this research study was to gather information on the changes in outpatient child assessment practices and clinical presentation and diagnosis in children and adolescents at a South African community service and psychological training centre over two important historical time periods in South African and local history (1987-1989 and 1997-1999) compared to the recent years (2007-2009). This aim can be further broken down into three sections:

1) To observe the trends for child and adolescent diagnostic rates and changes in clinical presentation over time in a South African context, and to compare these to the internationally observed trends in diagnostic rates and clinical presentation.

2) To explore whether South Africa's history of apartheid and political violence, and its current social conditions has had and has an influence on these patterns.

3) To investigate if South Africa follows a similar pattern regarding the assessment practices and choice of tests used in child and adolescent assessment as has been observed internationally.

3.3   Research questions

The study therefore asked the following research questions:

1) Has there been a change in the clinical presentation and diagnosis in children at a South African psychological community service centre between 1987-1989, 1997-1999 and 2007-2009?

2) How do these changes or trends compare to the internationally observed trends in diagnostic patterns over time among children?

3) Are there historical trends in the frequency and classification of child and adolescent mental health problems? Do diagnostic trends vary with historical time periods (for example: Are there noticeable trends during and after the "Midlands War" years?)?

4) Have the diagnostic assessment procedures and practices for children at a South African psychological community service centre changed over a twenty year time span?

5) Is this similar to the international trends in diagnostic assessment practices and choice of tests used in child and adolescent assessment?

3.4   Research design

A research design is a strategic plan for collecting and analyzing data with the purpose of answering the researcher's questions. In a good research design, the theory, data gathering, analysis and the interpretation of results are fully integrated (Holsti, 1969). This study employed an empirical research design, using existing data. The primary units of analysis were the individual case files from the sampled years. Content analysis was used to systematically examine the case files for trends and patterns in clinical presentation and diagnosis as well as diagnostic practices. The data was coded according to specific categories and a quantitative analysis (as discussed in Section 3.7 below) examined the changes in clinical presentation and diagnostic trends and practices over the three time periods. A stratified (according to race), random sample of existing CFC case files of children between the ages of 3 and 17 years from the corresponding years was examined and analysed. Hence

this study utilised a longitudinal, retrospective chart review design (Neuman, 1997; Worster & Haines, 2004).

The specific time frames were chosen in order to correspond with the 'Midlands War' years (1987-1989) and the turbulent time following the democratic transition and the new constitution in 1996 (1997-1999), compared to recent years (2007-2009). It was chosen to maintain a ten-year time interval; rather than looking at 1994-1996 in the 1990s, for example; in order to be able to make structured comparisons between the three different decades. Time constraints played another significant role in the decision making process for the three time intervals. Initially it was anticipated that the researcher would look at the last five years of each decade (e.g. 1985-1989), but the volume of case files meant that this had to be considerably reduced.

3.4.1   Quantitative research approach and retrospective chart review

Within the quantitative research techniques there are several methodologically related but rather different techniques. Neuman (1997) lists four "main techniques" (p. 30) for quantitative research approaches namely: experiments, surveys, content analysis and existing statistics (also called 'secondary analysis') research. In this study, a content analysis of individual case files was conducted in order to explore and describe the changes in clinical presentation and diagnostic trends and practices in the outpatient diagnosis of children at a psychological community centre in Pietermaritzburg.

A positivistic paradigm was adopted by the researcher in order to generate an explorative and descriptive account of the diagnostic trends and practices observed over time among children in a South African context. These descriptive statistics will be useful in understanding whether the internationally observed trends and increases regarding child and adolescent mental health also apply to the uniquely South African setting. This study design required a retrospective review of the case files of children from the corresponding years.

Retrospective 'chart reviews' as they are often called in health research (Hess, 2004) require the analysis of existing data that were originally recorded for reasons other than research. Investigations using retrospective health record reviews have been reported to comprise 25% of all scientific articles published in peer-reviewed, emergency medical journals. However, retrospective record studies are often undervalued and therefore underutilised in psychological and psychiatric research (Gearing, Irfan, Barber & Ickowicz, 2006).

Retrospective health record reviews allow us to adopt research questions that are impractical to address with prospective studies or that cannot be answered in prospective trials. For instance, it is generally more practical to address studies looking at patterns of disease or behaviour over prolonged periods in a retrospective fashion rather than prospectively. Also, research questions involving the effects of harmful exposures or the occurrence of rare events, to which people cannot be randomised, can only be addressed retrospectively (Worster & Haines, 2004).

Gearing et al. (2006) developed a methodology aimed specifically at conducting retrospective chart review research in psychiatry. The methodology in this study is based on the guidelines put forward by both Worster and Haines (2004) and Gearing et al. (2006) and adheres to the following principles:

- A clear research formulation.

- A thorough literature review pertinent to the area of interest.

- A straightforward and uncomplicated design for the data abstraction instrument.

- Clear guidelines regarding the data abstraction process.

- Thoroughly carried out data abstraction with carefully selected data abstractors (taking into account a number of considerations, such as *who* can have access to the data files and a minimum of two abstractors), where inter-rater reliability for both the abstraction instrument and the data abstractors has been established.

- A carefully planned sampling process.

- Ethics approval from an institutional review board.

3.5   Ethical considerations

This study examined existing case files of children between the ages of 3 and 17 years who were seen at the CFC, for trends and patterns in clinical presentation, diagnosis and diagnostic practices. Although the CFC is a psychological training centre that forms part of the University of KwaZulu-Natal and the current CFC consent form indicates that the client understands that "aspects of [their] case may be used for teaching and research purposes with Master's students", it is not clear whether or not such a consent form existed in the 1980s and

1990s. This implies that the case files will be accessed without *explicit* consent by the participants. This poses ethical concerns around informed consent and confidentiality of personal data.

Numerous ethical and legal debates prevail around the topic of accessing patient-identifiable data for research purposes without explicit patient consent. Much epidemiological, health and social science research would essentially be impossible to conduct if informed consent had to be obtained for every case. Moreover, the process of obtaining post hoc consent has been widely criticised since it is often yields biased samples, and is impractical, unattainable and prohibitively costly in terms of both time and money (Hayes, Cook & Jones, 2007; Iversen, Liddell, Fear, Hotopf & Wessely, 2006). Hayes et al. (2007), Pullmann, Buehler & Felt (2009) and Lo (2009) indicate that it may not always be necessary to obtain patient consent when wanting to use patient-identifiable data for research purposes. They suggest that providing the research demonstrates compliance with the Data Protection Act (DPA, 1998), the common law duty of confidentiality, and depending on the degree of anonymisation of data, the stringent consent requirements for research using patient data should and could be waived.

Likewise, the Health Professions Council of South Africa's (HPCSA) *Guidelines for Good Practice in the Healthcare Professions* (2008) stipulate that "where research projects depend upon using identifiable information or samples, and it is not practicable to contact patients to seek their consent, the data should be anonymised and this should be drawn to the attention of a research ethics committee" (section 9.1.3, p. 8, booklet 10).

As evident above, it is generally agreed upon that the protection of individual privacy and confidentiality with regard to patient-identifiable data is vital. Anonymising data is one way of maintaining confidentiality. This would imply that the research data is recorded in such a manner that the participants cannot be identified. For instance, a researcher reviewing medical records could record the data for subjects 001, 002, etc. with no link between the numbers and the identities of the subjects. This research study also recorded the data in this manner, with no key to determine who, for example, subject 001 is.

Another important aspect regarding confidentiality is the matter of *who* reviews the patient-identifiable data. The Data Protection Act (DPA, 1998) stipulates that only a health professional or a person who owes a duty of confidentiality that is equivalent to that which

would arise if the person were a health professional can process patient-identifiable data. The researcher in this study is a post-intern psychologist who completed part of her internship at the CFC and as such, is well aware of and bound by the standards of competence, care and conduct set by the Health Professions Council of South Africa. Equally, the qualified psychologist who acted as a second reviewer, establishing inter-rater reliability, was guided by the same principles and furthermore was also a previous CFC Intern. No other persons, besides the researcher and the second reviewer, had access to the case files.

All the data was recorded at the CFC premises. The data is stored on computerized files, that are password protected, and any hardcopies are kept in locked cabinets with limited access. Only the researcher and the project supervisor have access to the data files. Any reports, such as journal articles, conference presentations and the thesis report, which might be published, will not include any information that would make it possible to identify a study subject.

Prior to submitting the research proposal, permission to conduct this study was obtained from the director of the CFC and the CFC committee (Appendix A). The University of KwaZulu-Natal's Humanities and Social Sciences Research Ethics Committee also granted full approval to conduct the research study.

3.6 Data gathering

The data gathering process proved quite a challenge to the researcher, as the files had been disorganized by another research project and had to be sorted out before this research study could even commence. Moreover, much of the data presented with some inherent problems regarding missing data, such as no recordings of the gender, race or age of the child who had been seen at the CFC. Hence, this meant that before the researcher could start planning the sampling process, each file from the relevant nine years (1987-1989, 1997-1999, 2007-2009) had to be examined to determine whether or not it was in fact eligible to be included in the sample or not. All this meant that the data-gathering process was a rather lengthy and at times frustrating procedure.

3.6.1 Accessing and sorting the CFC case files

The permission to access the CFC files in order to conduct the study was obtained from the Director of the CFC (Appendix A). The archived files are stored in an access-controlled room on the University of KwaZulu-Natal premises. The files were supposed to be stored in three year intervals and according to alphabetical order in various filing cabinets. However, this

was not the case. A previous, unrelated research study that had been conducted on the files meant that 90% of the files had been completely mixed up, both with regards to which year they were from and their alphabetical order. Additionally, they had not been put back into the cabinets, but had been left in piles on the floor. It has to be mentioned here that the CFC opened in 1977; consequently the researcher had to sort the majority of the files from 33 years of activity. The process of sorting all the files back into year categories took the researcher and one additional helper (also a previous CFC intern) over two months. This was such a time-consuming process because each file had to be opened and scrutinized in order to find out from which year it dated, since the files are not marked on the outside. Sometimes, especially with the files prior to 1995, this meant going through every piece of paper in the file before the date could be established. Hence, this process proved to be rather challenging at times, as several files could not actually be dated properly and had to be placed in a separate drawer. These 'undated' files could consequently also not be included in the sample for this study.

There were a large number of missing or conflicting data in the case files from the relevant nine years of interest. Often the age, gender or race of the client had not been recorded. Every so often, there were also too few data in the files to establish why the client had been seen or what assessments had been conducted. When possible, the researcher tried to establish the gender or age of the child, through the names or the date of birth recorded in the file. However, this was generally not possible with regards to race, other than in the few files from the 1980s that included photographs of the clients. In the end, only those files for which the missing data could be determined unambiguously were considered eligible to be included in the sample for this research study.

3.6.2 Selection of the sample

After scrutinizing all of the 1309 relevant case files from the years of interest, 969 files were deemed eligible to be included in the sample for this study. Of the 340 files that were excluded, 190 were left out because the client was 18 years old or over, and since this research looked at the provision of mental health services for children and adolescents, they were not considered appropriate. The remainder of 150 files had to be excluded because of missing or too little available data.

Of the 969 relevant case files, a sample of 70% was drawn to be included in the study. The sample was reduced to 70% (= 679 case files) due to time constraints as the analysis of each file took between 10-15 minutes. The files were stratified according to race and then randomly sampled within each stratum for each of the nine relevant years to insure representativeness of all the race groups in the sample. The demographic characteristics of the sample of the 679 relevant case files appear in Table 1 below and will be discussed in detail in Chapter 5.

Table 1: Demographics of sample

	Total number of cases in sample	Gender		Age Group			Race			
		male	Female	3-8yrs	9-12yrs	13-17yrs	Black	Indian	White	Coloured
1987	84	58	26	25	36	23	5	5	72	2
1988	84	50	34	35	27	22	8	5	68	3
1989	81	44	37	33	32	16	11	6	60	4
1997	90	56	34	37	23	30	30	11	47	2
1998	86	55	31	42	28	16	22	18	41	5
1999	63	45	18	18	26	19	16	15	26	6
2007	41	28	13	19	11	11	15	9	16	1
2008	61	35	26	23	16	22	27	7	23	4
2009	89	54	35	38	28	23	47	15	25	2
Total	679	425	254	270	227	182	181	91	378	29
	100%	62.6%	37.4%	39.8%	33.4%	26.8%	26.7%	13.4%	56.67%	4.27%

3.6.3   Measures used

3.6.3.1. Data Abstraction Form

A one page data abstraction instrument (Appendix B) was designed by the researcher in collaboration with the qualified psychologist who acted as the second reviewer establishing inter-rater reliability. This involved the researcher and the co-rater independently reviewing the data in the case files and constructing a set of features that constituted a coding checklist. These codes were based on a combination of theoretical concepts from the research literature (based on the DSM system as discussed in the previous chapter) and a thorough understanding of the prevalence of the various presenting problems/diagnostic categories and the many diagnostic measures or procedures used at the community centre. After that, the researchers compared notes and resolved any differences on their initial checklists, developing a consolidated checklist (or abstraction form). The researchers then independently coded the data and checked the reliability of the coding using Cohen's Kappa. This process is reported in detail in the data analysis section of this chapter.

3.7   Data analysis

Data analysis was carried out using content analysis and the Statistical Program for Social Sciences (SPSS version 15 for Windows). The results are reported in detail in Chapter Five.

3.7.1   Content analysis

Krippendorf (1980) defines content analysis as "a research technique for making replicable and valid inferences from data to their context" (p. 21). In content analysis, a researcher uses objective and systematic counting and recording procedures to produce a quantitative description of the symbolic content within data. Content analysis is often described as a useful tool for examining trends and patterns in documents over time (Holsti, 1969). Since this was exactly what the researcher had set out to do in this study, content analysis was chosen as the best method for analysing, exploring and describing time trends in the outpatient clinical presentation and diagnostic rates and diagnostic and assessment procedures in the case files of children from a South African community service and psychological training centre.

Content analysis does not just examine the manifest content of data, but often also looks for the latent or underlying, implicit meaning in the content of text (Krippendorf, 1980). This was a useful research technique to employ when investigating the diagnosis of children seen

at the CFC over the nine years in question. Even though the diagnosis or presenting problem and the diagnostic procedures used were often present as manifest content in the case files, this was not always the case. Frequently the researcher and co-rater had to draw inferences by systematically identifying specified characteristics relating to diagnostic categories or procedures within the text.

Potential problems associated with content analysis relate to the complexity of language, particularly with regards to the difficulties of recording non-verbal communications, the need for standardized categories, the problem of drawing inferences and the role of theoretical constructs in the analysis (Krippendorf, 1980). Hence, it is important that the existing literature and/or theory, in some way support the conclusions that are drawn from the content analysis.

3.7.2 Coding the data

Holsti (1969) describes coding as "the process whereby raw data are systematically transformed and aggregated into units which permit precise description of relevant content characteristics" (p. 94). The researcher's assumptions about the data and the inferences that he/she expects to draw from them is conveyed in the coding method. Additionally, according to Holsti (1969), the decisions about the methods of coding should be guided by the researcher's hypothesis and theory and it is important that the researcher is aware of this, since these premises form part of his/her research design. Holsti (1969) points out that:

> A central problem in any research design is selection and definition of categories, the "pigeonholes" into which content units are to be classified. Content analysis stands or falls by its categories… categories should *reflect the purpose of the research*, be *exhaustive*, be *mutually exclusive*, *independent* and be derived from a *single classification principle* (p. 95).

Weber (1990) identified two approaches to coding data when engaging in a content analysis. With *emergent coding*, the categories are established after a preliminary examination of the data, whereas a researcher using *a priori coding* would utilize categories that are established prior to the data analysis. In this research, *emergent coding* was employed. This was used to identify the incidence of the different presenting problems/diagnostic categories and the many diagnostic measures or procedures used at the community centre.

Because the content of the case files from the corresponding years was unknown to the researcher, it was necessary that the material was reviewed prior to data analysis. As described above, this entailed that the researcher and a co-rater independently reviewed the material and developed a set of attributes (based on prevalence and the relevant literature in this area) which formed an initial coding document. Subsequently, the researchers compared notes, reconciled any differences on their initial coding documents, and used a consolidated abstraction form to independently code the data which was then checked for acceptable inter-rater reliability by calculating Cohen's Kappa.

Much of the data gathered by the abstraction form consisted of nominal data that was not open to any debate (such as the gender and race of the client). Likewise, the age of the client was recorded as belonging to one of three age groups (3-8years, 9-12 years and 13-17 years), hence making it an ordinal qualitative variable that did not require any form of specialised coding. However, the data pertaining to the diagnostic categories or presenting problems and the diagnostic practices had, as discussed in the previous chapter, to be coded according to categories that had been extracted from the literature on this vast area of research. Taking into account the prevalence of the various presenting problems/diagnostic categories at the community centre, that had become apparent during the emergent coding process, and that had been derived from the literature concerning diagnostic criteria, the coding scheme for this category was based on several epidemiological studies and smaller research studies into the prevalence of mental disorders among children and adolescents. Based on this, it employed the DSM-IV diagnostic criteria for mental disorders in children and adolescents (Herman et al., 2009; Kessler et al., 2005; Merikangas et al., 2009a; Merikangas et al., 2009b, Vogel & Holford, 1999).

Since not all the files contained a proper DSM Axis I diagnosis, or for that matter a definite presenting problem, the researcher and the co-rater had to use their professional judgement in establishing a diagnostic category for each file. Along with the data abstraction form, the researcher had developed a detailed 'manual' (Appendix B) regarding the abstraction of the diagnostic categories or presenting problems and the diagnostic practices. It included a thorough description of how to allocate a diagnostic code, what to do when there was more than one possible diagnosis or no diagnosis at all and how to assign the codes for the many different diagnostic procedures and practices. Hence, the diagnostic codes allocated by the

researcher and co-rater, who are both trained as psychologists, should be regarded as the overall 'diagnosis' for each case file.

The diagnostic procedures and practices used in the assessment of children and adolescents were grouped according to their domain of concern (such as cognitive, projective, educational, etc., assessment measures). The abstraction manual contained a comprehensive list of different assessment measures and the group category code to which each of them belonged.

3.7.3   Validity and reliability of data collection method

It is difficult to comment on the reliability and validity of retrospective data obtained through chart reviews. One obvious difficulty with the use of information from clients' case records is that there is generally no way of telling how reliable and accurate they are. Not all the relevant information may have been recorded, there might be conflicting data and there were also issues regarding illegibility.

Thus while retrospective record review researchers can rarely comment on the reliability of the original data, it is possible to measure the degree of inter-rater reliability in the abstracted data (Worster & Haines, 2004). The onus is on the researcher to demonstrate that the data were abstracted reliably and in an unbiased manner.

Since the correct coding and categorizing of the data is a vital element of validity in this research study, much attention was paid to whether or not the data abstraction form was actually measuring what it was intended to measure, namely diagnostic categories and diagnostic procedures. To begin with, both the researcher and the co-rater independently designed an initial abstraction form incorporating what they felt were the relevant features relating to diagnostic categories and procedures. Next, after reconciling any differences that showed up, they combined their documents. Based on the researcher's and the co-rater's training as psychologists, the extensive literature research with regard to diagnostic criteria and procedures and the fact that these variables predominantly (but certainly not always) manifested very obviously in the individual case files, the researcher was satisfied that the categories on this abstraction form accurately covered the content in the files.

In view of that and to facilitate the recording of data, the abstraction form was therefore structured according to the appropriately coded categories for each variable as well as a category for undetermined variables. Using a consolidated abstraction form the researcher

and co-rater independently coded the data and checked the reliability of the coding using Cohen's Kappa. Cohen's Kappa was used to report on inter-rater reliability since it is widely considered as "the measure of choice" with regards to inter-rater reliability in content analysis research (Lombard, 2010).

The Cohen's Kappa value was 0.822, which indicates an adequate level of agreement between the two raters. Worster and Haines (2004) recommend that researchers strive to achieve a minimum kappa value of 0.6 in order to have an acceptable level of inter-rater reliability. Since the level of reliability was acceptable, the coding was then applied on a large-scale basis (Holsti, 1969; Krippendorff, 1980; Stemler, 2001).

Table 2: Cohen's Kappa results for inter-rater reliability

	Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Measure of Agreement Kappa	.822	.081	10.761	.000

3.7.4 Organizing the data

Since the data obtained through the data collection process constituted what is commonly known as 'messy' data (Milliken & Johnson, 1992) given that it did not originate from a planned experiment, but was collected from existing case files, which were originally recorded for reasons other than research, it had to be organized in order to be interpretable. This called for a thorough exploration into the descriptive properties of the data in order to present the data in a more meaningful way that would allow simpler interpretation of the data. The descriptive statistics also provide a summary of the data that facilitates comparisons with other comparable data.

The data was analyzed separately with regard to the clinical presentation or diagnostic rates and the diagnostic procedures, as it was felt that these are two different areas of concern and given the number of variables, it would have been extremely confusing if analysed simultaneously. (Please also refer to Table 3 in Appendix C for a description of all 70 variables and their categories.)

3.7.5. Statistical procedures

Chi-square analysis was utilised to explore the data for statistically significant associations between the variables relating to the clinical presentation or diagnosis. Additionally, a log-linear analysis was conducted in order to describe the pattern of the relationships between these various categorical variables. Regarding the data on the different psychological assessment measures, a Friedman (non-parametric) test for comparing related samples was conducted. The ranked prevalence of test usage for each time period was used to test for significant differences between the three time periods.

Chapter 4

<u>Analysis of Results</u>

4.1   Introduction

This chapter aims to outline the major research findings of this study. This will include a description of the demographic characteristics of the sample, a detailed summary of the descriptive statistics and a summary of the inferential statistical analysis, as guided by the research questions and the exploratory nature of this study. The data obtained through the data collection process constituted what is commonly known as 'messy' data (Milliken & Johnson, 1992) since it did not originate from a planned experiment, but rather was collected from existing 'real world' case files of children that were originally recorded for reasons other than research. This necessitated a thorough exploration into the descriptive properties of the data in order to present the data in a more meaningful way that would allow simpler interpretation of the data. It should also be noted, that a vast number of statistical tests were conducted on the data; this consequently increases the likelihood that some of the significant results could have occurred simply by chance. However, since the focus of this study was exploratory, often the explanations behind the results are more valuable than the exact quantitative representations.   The researcher again wants to point out the fact that the quantitative results of this study should only be considered as **trends** evident in a small psychological community centre, rather than accurate measurements of any epidemiological prevalence data relating to child and adolescent mental health in South Africa.

4.2   Description of the sample

As mentioned in the previous chapter, a sample of 70% (N = 679) of the relevant case files from the CFC was drawn to be included in the study. The files were stratified according to race and then randomly sampled within each stratum for each of the nine relevant years to ensure representativeness of all the race groups in the sample.

4.2.1   Demographics of the sample

The demographic characteristics of the sample appear in Figure 1, Figure 2 and Figure 3. As is evident from Figure 1, white children and adolescents comprised the majority of cases by

far in the 1987-1989 cluster, with by very few black, Indian and Coloured cases. In the 1997-1999 cluster, the distribution follows a similar pattern although there are noticeably fewer white and more black and Indian cases, while the number of Coloured children and adolescents seen at the CFC remains very low. From 2007-2009, however, the distribution changed with regard to the white and black cases, as there were more black than white children and adolescents seen at the centre in those years, while the distribution of Indian and Coloured cases remained similar to that of the previous decade, in that there were still very few Coloured cases but about 18% of cases were Indian.
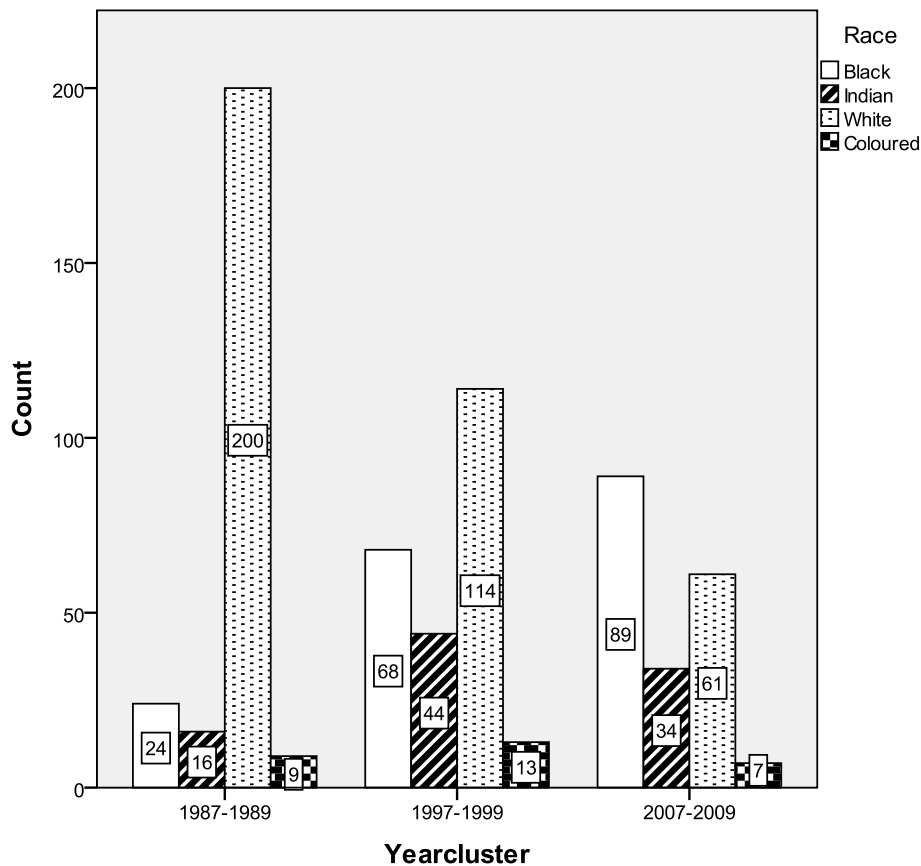
Figure 1: Racial composition per year-cluster

Figure 2 illustrates that the gender distribution remained consistent over the three decades in that there were always more males than females seen at the CFC, and the ratio of male to female cases per year-cluster was approximately 3:2.
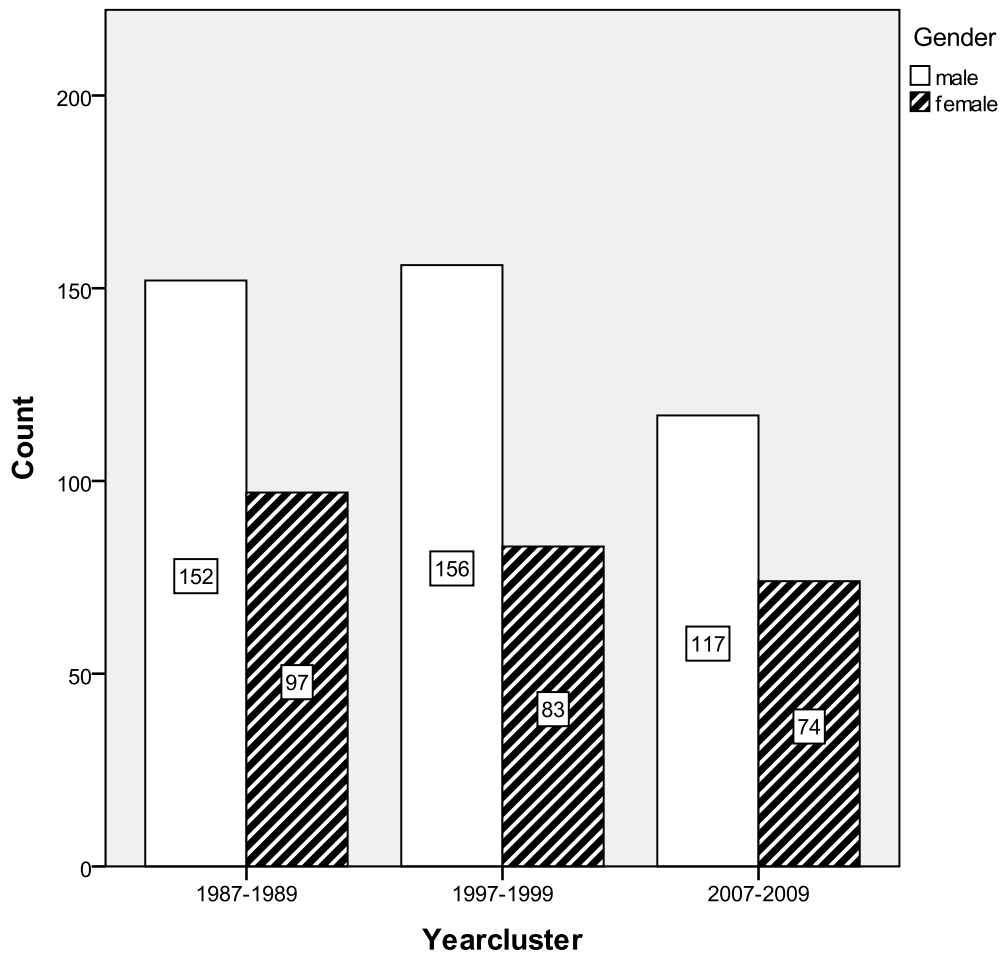
Figure 2: Gender distribution per year-cluster

As shown in Figure 3, most of the children seen at the centre in the years in question, belonged to the two younger age groups (3 to 8 years and 9 to 12 years of age), with fewer 13 to 17-year olds seen especially in the 1980s and 1990s.

Since the age group, gender and racial distributions remained fairly consistent over each three-year period in each decade, it was decided to analyse the data according to year-cluster rather than separate years as this made the data a lot less confusing and more easily interpretable. Additionally, it meant that there were fewer empty cells when it came to the inferential statistical analysis, which in turn made more forms of analysis possible.
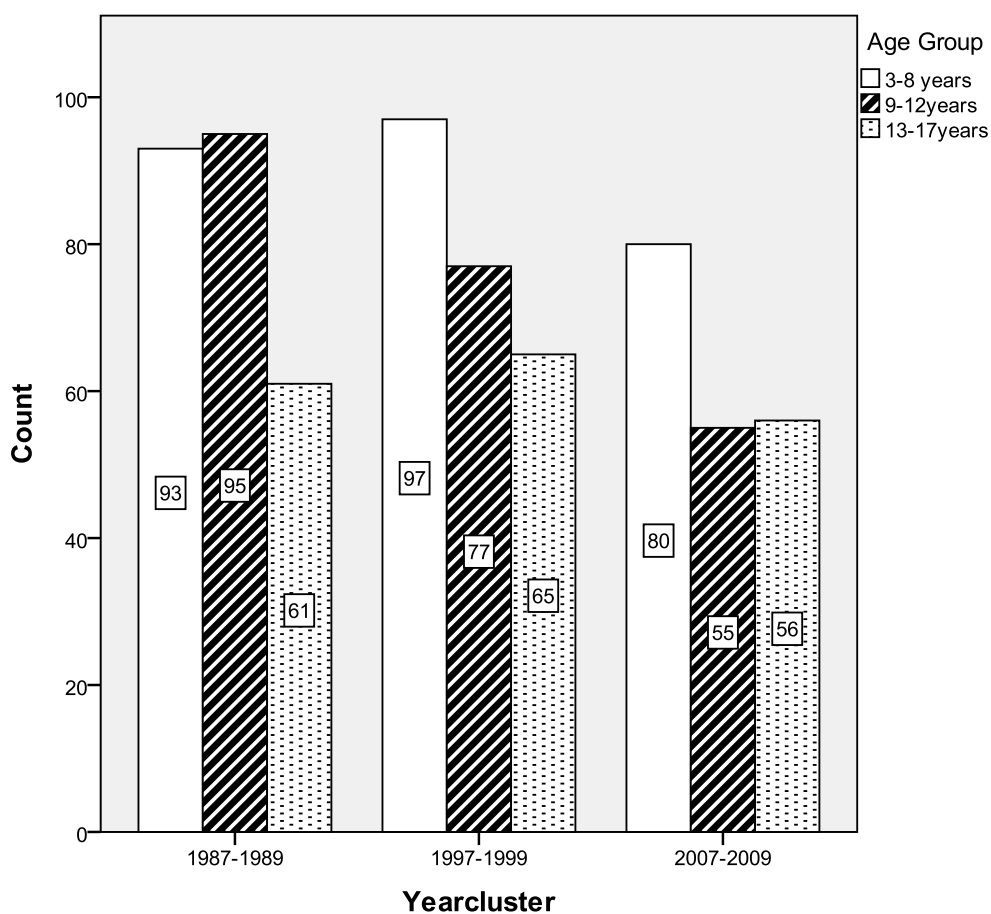
Figure 3: Age group by year-cluster

4.3   Descriptive statistics

The quantity of data obtained through the data abstraction process called for an in-depth exploration into the properties of the data. This was done via descriptive statistics, which also provide a compelling summary of the data that facilitates comparisons with other similar data. Since several of the research questions in this study focus on whether or not certain trends found in this research are comparable to internationally observed trends, this form of data analysis was used exhaustively. The data was analyzed separately with regard to the diagnostic rates and the diagnostic procedures, in order to make it less confusing given the number of variables. (Please also refer to Table 3 in Appendix C for a description of all 70 variables and their categories.)

4.3.1 Changes in diagnosis over three decades

One of the key aims of this exploratory research was to determine the trends for child and adolescent diagnostic rates and their changes over time. Figure 4 reveals that there was considerable variability in the diagnosis of children over the three decades.
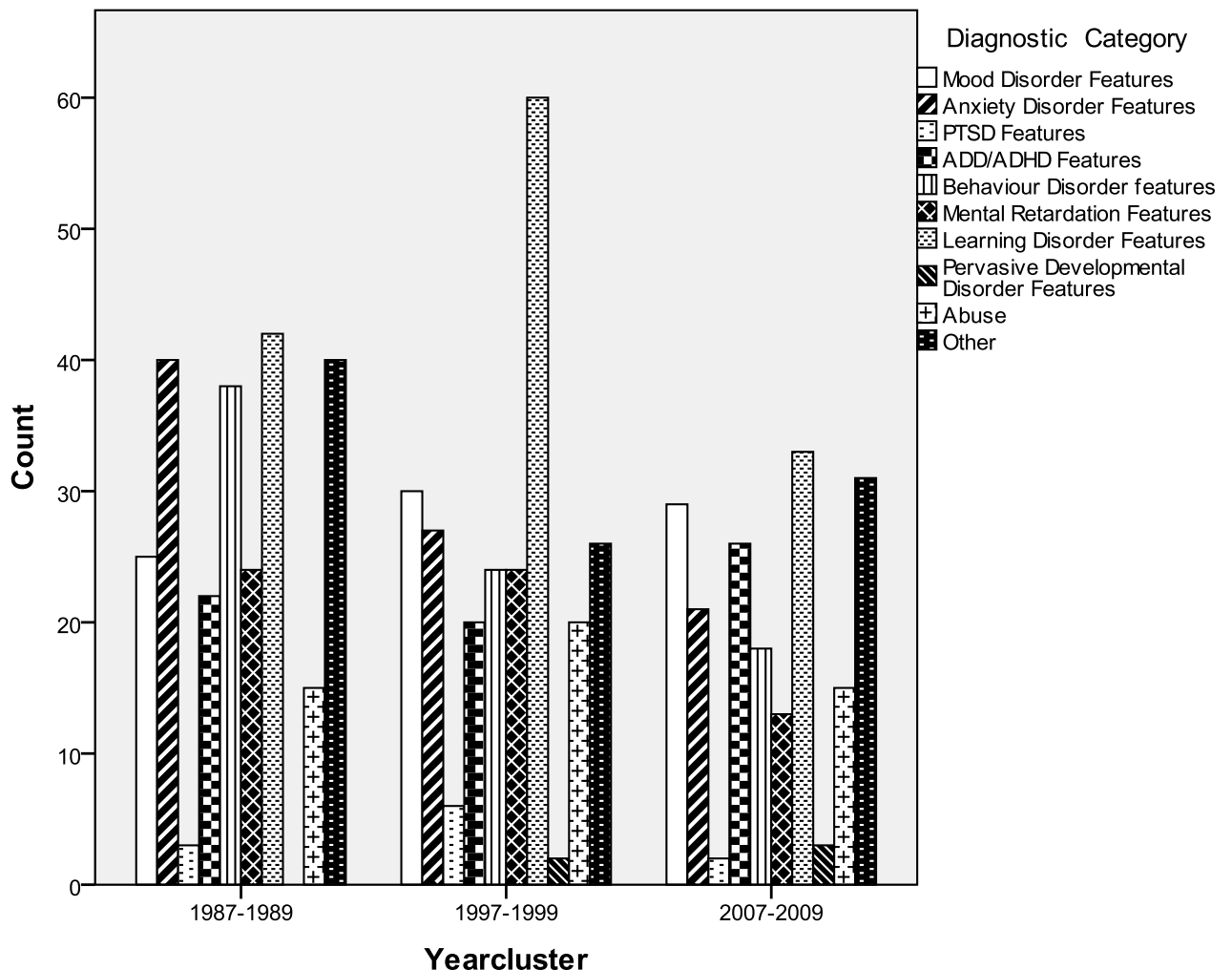
Figure 4: Diagnostic category (collapsed) by year-cluster

While the proportion of cases of Mood Disorder features in the 1987-1989 cluster constituted 10% (n = 249) of the sample, it rose to 12.6% (n = 239) in the 1997-1998 cluster and 15.2% (n = 191) in the 2007-2009 cluster. The proportion of Anxiety Disorder features decreased from 16.1% (n = 249) in 1987-1989, to 11.3% (n = 239) in 1997-1999 and 11% (n = 191) in 2007-2009. In 1987-1987, very few cases of PTSD (1.2%, n = 249) were found among the sample, whilst this proportion rose slightly to 2.5% (n = 239). In 1997-1999 it fell to only 1% (n = 191) in the 2007-2009 cluster.

ADD/ADHD feature proportions in the sample increased notably over the 20-year period from 8.8% (n = 249) in 1987-1989 to 13.6% (n = 191) in 2007-2009, with a smaller proportion of children (8.4%, n = 239) being diagnosed with ADD/ADHD in the 1997-1999 cluster. The decrease in the diagnostic proportions of Behaviour Disorder features reveal that considerably more children were diagnosed as oppositional in 1987-1989 (15.3%, n = 249), compared to 1997-1999 (10%, n = 239) and 2007-2009 (9.4%, n = 191). The proportion of cases with Mental Retardation features follows a similar pattern in that it was 9.6% (n = 249) in 1987-1989, which increased slightly to 10% (n = 239) in 1997-1999 and then decreased to 6.8 % (n = 191) in 2007-2009.

In all three decades, cases of Learning Disorder features constituted the largest part of the proportion of the sample (19.9%, n = 679), with 16.9% (n = 249) of all cases in 1987-1989 and a substantial 25.1% (n = 239) of cases in 1997-1999, falling to 17.3 % (n = 191) in 2007-2009. The proportion of cases of Pervasive Developmental Disorder (or ASD) features was 0% (n = 249) in 1987-1989, but increased to 0.8% (n = 239) in 1997-1999 and 1.6% (n = 191) in 2007-2009. Finally 'Other' disorder proportions were 16.1% (n =249) in 1987-1989, 10.9% (n =239) in 1997-1999 and 16.2% (n = 191) in 2007-2009.[3] (Please also see Table 4 in Appendix C.)

4.3.2   Changes in psychological assessment practices over three decades

When looking at trends and changes in psychological assessment and choice of tests over time, there were 60 different categories of psychological tests coded by the researcher. These categories included an 'other' category (which included all those psychological measures that were used only once in the sample over the twenty-year period). The very first category was 'clinical interview', which of course is not a psychological test as such but forms a vital part of the psychological assessment process and was therefore considered an important element. A considerable number of changes in test usage over time are evident when examining Table 5, Table 6 and Table 7 (Appendix C) depicting the top 34-35 instruments and procedures for

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[3] Please note that the 'other' category encompasses the 9 additional categories (namely: Tic Disorder features, Communication Disorder features, Sleep Disorder features, Eating Disorders features, Personality Disorder features, Sexual/Gender Identity Disorder features, substance related problems, volunteer subject and school readiness assessment) on the abstraction form that had to be merged in order to make the data analysis possible. Elimination Disorder features were merged with Anxiety Disorder features.

each of the three year-clusters. Although the instruments ranked in the top ten remained fairly consistent over the three decades there are noticeable changes further down the ranks. Clinical interviews were the most frequently used assessment procedure throughout the three time periods. Other instruments that were ranked in the top ten over all three year-clusters were the Kinetic Family Drawing (KFD) test, the Human-Figure-Drawing (HFD) test, the Bender Visual Motor Gestalt test, Draw-A-Person, the Thematic Apperception Test (TAT or CAT for the Children's Apperception Test) and the Bene-Anthony Family Relations Test.

Despite a great deal of consistency in assessment practices and test usage over the three decades, there were some obvious differences. One noticeable change in the two latter year-clusters when compared to the 1987-1989 sample is the increased use of structured school observations in the assessment of children and adolescents. School observations increased from rank 36 during 1987-1989 to rank 14 during 1997-1999 and finally rank 12 in 2007-2009. This difference in popularity of structured school observations is even more evident when looking at the increased percentages per year-cluster in Table 8 (Appendix C). The proportion of school observations in 1987-1989 was 0.3% (n = 1336), in 1997-1999 this rose to 1.5% (n = 1005) and finally to 3.2% (n = 1051) during 2007-2009.

The Rorschach Inkblot test which was ranked at 26.5 and 25.5 in 1987-1989 and 1997-1999 respectively is completely absent in the 2007-2009 ranking. This constitutes a considerable change from the earlier decades where it was a rather frequently used instrument for older children (> 11 years) and adolescents. Another projective assessment instrument, the Incomplete (or Unfinished) Sentences Test, however, appears to have become more popular in the later decades as it is ranked at 13 in 2007-2009, compared to rank 19.5 in 1997-1999 and rank 26.5 in 1987-1989. Yet, overall, the prevalence of projective assessment measures in the sample has declined to some extent over the past twenty years, from 11.5 % (n = 1107) in 1987-1989, to 9.5% (n = 814) in 1997-1999 and 8.5% (n = 882) in 2007-2009 (Table 9, below).

Table 9: Type of assessment by year-cluster cross-tabulation

Type of Assessment		Year-cluster			
		1987-1989	1997-1999	2007-2009	Total
Projective Assessments	Count	127	77	75	279
	% within Type	45.5%	27.6%	26.9%	100.0%
	% within Year-cluster	11.5%	9.5%	8.5%	10.0%
Psychometric/cognitive Assessments	Count	259	203	221	683
	% within Type	37.9%	29.7%	32.4%	100.0%
	% within Year-cluster	23.4%	24.9%	25.1%	24.4%
Educational/Achievement measures	Count	66	70	44	180
	% within Type	36.7%	38.9%	24.4%	100.0%
	% within Year-cluster	6.0%	8.6%	5.0%	6.4%
Career Assessment Measures	Count	4	13	16	33
	% within Type	12.1%	39.4%	48.5%	100.0%
	% within Year-cluster	0.4%	1.6%	1.8%	1.2%
Personality Assessment Measures	Count	7	3	13	23
	% within Type	30.4%	13.0%	56.5%	100.0%
	% within Year-cluster	0.6%	0.4%	1.5%	0.8%
Emotional Assesment Measures	Count	54	61	63	178
	% within Type	30.3%	34.3%	35.4%	100.0%
	% within Year-cluster	4.9%	7.5%	7.1%	6.4%
Drawings	Count	311	221	250	782
	% within Type	39.8%	28.3%	32.0%	100.0%
	% within Year-cluster	28.1%	27.1%	28.3%	27.9%
Parent/Teacher Rating Scales	Count	25	9	15	49
	% within Type	51.0%	18.4%	30.6%	100.0%
	% within Year-cluster	2.3%	1.1%	1.7%	1.7%
Neuropsychological Assessment Measures	Count	33	18	23	74
	% within Type	44.6%	24.3%	31.1%	100.0%
	% within Year-cluster	3.0%	2.2%	2.6%	2.6%
Visual Perceptual Assessment Measures	Count	147	90	88	325
	% within Type	45.2%	27.7%	27.1%	100.0%
	% within Year-cluster	13.3%	11.1%	10.0%	11.6%
Structured Observations	Count	23	27	46	96
	% within Type	24.0%	28.1%	47.9%	100.0%
	% within Year-cluster	2.1%	3.3%	5.2%	3.4%
Other	Count	51	22	28	101
	% within Type	50.5%	21.8%	27.7%	100.0%
	% within Year-cluster	4.6%	2.7%	3.2%	3.6%
Total	Count	1107	814	884	2803
	% within Type	39.5%	29.0%	31.5%	100.0%
	% within Year-cluster	100.0%	100.0%	100.0%	100.0%

Although very little has changed in the sample with regard to the usage of psychometric or cognitive assessment measures in general (Table 9, above), the usage of South African measures such as the SSAIS (Senior South African Individual Scale) has declined somewhat from 5.3% (n = 1336) in 1987-1989 to 1.2% (n = 1051) in 2007-2009 in favour of the usage of overseas measures such as the WISC (Wechsler Intelligence Scale for Children), the WAIS (Wechsler Adult Intelligence Scale), and the Ravens Progressive Matrices (both Standard and Coloured) (Table 8, Appendix C). Another noteworthy trend in the sample is the increase in usage of the WRAT (Wide Range Achievement Test) from 0.4% (n = 1336) in 1987-1989 to 3.3% (n = 1051) during 2007-2009 (Table 8, Appendix C). However, the

overall usage of educational and achievement measures has remained fairly stable over the three time periods (Table 9, above).

Table 9 (above) also reveals that there were considerably more career assessment measures used in 2007-2009 (1.8%, n = 882) than in the previous decades, especially the 1980s (0.4%, n = 1107). This goes hand-in-hand with the personality assessment measures proportions, which also increased from 0.6% (n = 1107) in 1987-1989 to 1.5% (n = 882) in 2007-2009. The proportions and popularity of projective drawing tests remained relatively stable over the three decades (28.1%, 27.1% and 28.3% respectively); however, the House-Tree-Person drawing test became a lot more popular in 2007-2009. It was ranked in the top 10 (rank = 5) for the first time in the 2007-2009 cluster, and had a significantly increased proportion of usage with 7.7% (n = 1051) when compared to the 1990s (1.3%, n = 1005) and the 1980s (1.9%, n = 1336) (Table 8, Appendix C).

There was no significant increase or decrease in the usage of the Conner's Parent and Teacher rating scales over the three time periods in the sample. Similarly, neuropsychological assessment measures were used more or less to the same extent in all three decades (Table 9, above). The usage of Visual Perceptual and Motor Assessment measures became slightly less prevalent over the years, with 13.3% (n = 1107) in 1987-1989, 11.1% (n = 814) in 1997-1999 and 10% (n = 882) in 2007-2009. Likewise most 'Other' tests were used during 1987-1989 (50.5%, n = 1107), and their usage decreased to 21.8% (n = 814) in 1997-1999 and 27.7% (n = 882) in 2007-2009.

4.4   Inferential statistics

It should first be noted that various statistical tests were conducted on the data, yet often the frequency statistics collected from the 679 case files did not satisfy all the assumptions necessary for appropriate statistical analysis. Due to the many different categories and the limited sample size, the researcher frequently had to analyse what Howell (2002, p. 672) refers to as "sparse matrices", which are contingency tables with a large number of empty cells. Whilst every effort was made to combine categories or to collapse across variables when possible in order to make statistical analysis feasible, this could not always be achieved. Hence, the researcher is aware of the fact that had the sample been (considerably) bigger, further statistical models of analysis, such as, for example, logistic regression, ordinal regression and correspondence analysis could have been employed. As it stands, however,

chi-square analysis was utilised to explore the data for statistically significant associations between the variables of 'diagnostic categories', 'year-clusters', 'race', 'age group', 'gender' and 'grouped number of tests'. Additionally, a log-linear analysis was conducted on the above-mentioned variables to describe the pattern of the relationship between these various categorical variables. With regard to the data on the different psychological assessment measures, a Friedman (non-parametric) test for comparing related samples was conducted. The ranked prevalence of test usage for each year-cluster was used to test for significant differences between the three year-clusters.

4.4.1 Are there significant differences in diagnosis across the three decades?

As demonstrated in section 4.3.1, there was considerable variability with regard to the diagnosis of children over the three decades. The Pearson chi-square test found a marginally significant association between 'diagnostic category' and 'year-cluster' in the sample (x^2= 28.769, df = 18, p = 0.051). However the likelihood ratio test (G^2), which according to Christensen (1990) and Agresti (1990), is better suited for the analysis of higher dimensional tables (this being a 3 x 10 table), found a statistically significant association between the two variables (G^2=29.737, df = 18, p = 0.040) (Table 10, Appendix C).

An analysis of the adjusted residuals (Table 11, below) shows that, at the 5% level, in the year-cluster 2007-2009 there is a significantly higher likelihood of an ADD/ADHD features diagnosis than expected. The adjusted residuals also illustrate that in the 1987-1989 year-cluster, a diagnosis of Behaviour Disorder features is significantly more likely than expected and in the 1997-1999 year-cluster a diagnosis of Learning Disorder features is significantly more likely than expected. The adjusted residuals do not reach significance for any of the other diagnostic categories.

More chi-square tests were conducted on the associations between 'diagnostic category' and the other variables of 'race', 'age group', 'gender', 'year-cluster' and 'grouped number of tests'. A significant association was found between 'diagnostic category' and both 'age-group' (x^2= 80.560, df = 18, p = 0.000) and 'gender' (x^2= 48.849, df = 9, p = 0.000). An analysis of the adjusted residuals with regard to age group (Table 12, Appendix C) reveals

Table 11: Diagnostic category by year-cluster crosstabulation

*Adjusted residuals which are significant at the 5% level of significance are in bold type

			Yearcluster			
			1987-1989	1997-1999	2007-2009	Total
Diagnostic Category	Mood Disorder Features	Count	25	30	29	84
		Adjusted Residual	-1.4	.1	1.4	
	Anxiety Disorder Features	Count	40	27	21	88
		Adjusted Residual	1.8	-1.0	-1.0	
	PTSD Features	Count	3	6	2	11
		Adjusted Residual	-.7	1.4	-.7	
	ADD/ADHD Features	Count	22	20	26	68
		Adjusted Residual	-.8	-1.1	**2.0**	
	Behaviour Disorder features	Count	38	24	18	80
		Adjusted Residual	**2.1**	-1.0	-1.2	
	Mental Retardation Features	Count	24	24	13	61
		Adjusted Residual	.5	.7	-1.2	
	Learning Disorder Features	Count	42	60	33	135
		Adjusted Residual	-1.5	**2.5**	-1.1	
	PervasiveDevelopmental Disorder Features	Count	0	2	3	5
		Adjusted Residual	-1.7	.2	1.6	
	Abuse	Count	15	20	15	50
		Adjusted Residual	-1.0	.7	.3	
	Other	Count	40	26	31	97
		Adjusted Residual	1.0	-1.9	.9	
Total		Count	249	239	191	679

that, at the 5% level, the 13-17 year age group is significantly more likely than expected to be diagnosed with Mood Disorder features, whereas the three to eight year-olds are significantly less likely than expected to be diagnosed in that diagnostic category. In addition, the nine to twelve year age group is significantly more likely than expected to be diagnosed with Anxiety Disorder features, whereas the 13-17 year age group is significantly less likely than expected to receive such a diagnosis. Moreover the three to eight year age group is significantly more likely than expected to receive a diagnosis of ADD/ADHD while the 13-17 year-olds are significantly less likely than expected to do so, they (13-17 year-olds) are,

however, significantly more likely than expected to be diagnosed with Behaviour Disorder features.

The adjusted residual values with regard to gender (Table 13, Appendix C) show that, at the 5% level, significantly more males than females are likely to be diagnosed with ADD/ADHD features. Likewise, significantly more males than females are likely to be diagnosed with Learning Disorder features, whereas significantly more females than males are likely to have been the victim of some form of abuse.

Although the chi-square analysis also found a significant association (x^2 = 97.378, df = 27, p = 0.000) between the 'diagnostic category' and 'race' variables, interpretations should only be made cautiously as the 'rule of thumb' assumption (Lachenicht, 2002) is violated considerably (35% of cells have an expected count of less than 5). In order to overcome this problem the researcher combined the 'race' category values Indian and Coloured into one value (hence, instead of four values, the race variable was reduced to three values: Black, White and Indian/Coloured). When a chi-square analysis was conducted on the association between the 'diagnostic category' and the 'collapsed race' variables, all the assumptions were met (only 16.7% cells had a expected count of less than 5) and a significant association (x^2 = 82.475, df = 18, p = 0.000) could be observed. The adjusted residual values of the sample (Table 14, Appendix C) reveal several significant associations at the 5% level; white children and adolescents are significantly more likely than expected to be diagnosed with Anxiety Disorder features compared to Indian and Coloured children and adolescents, whereas black children and adolescents are significantly less likely than expected to receive an Anxiety diagnosis. Similarly, white children and adolescents are significantly more likely to receive a Behaviour Disorder diagnosis than children and adolescents from the other race groups. In addition, black children and adolescents are significantly more likely than expected to receive a Learning Disorder and mental retardation diagnosis, whereas white children and adolescents are significantly less likely than expected to do so.

4.4.3 Are race and year-cluster significantly associated?

When a chi-square test was run on the contingency table between 'year-cluster' and 'race', a significant association (x^2 = 122.271, df = 6, p = 0.000) was noted. An analysis of the adjusted residuals (Table 15, Appendix C) suggests that there are strong associations between the year-clusters and the number of children and adolescents from each race group who were

seen in each of the year-clusters. As was already mentioned when the demographics of the sample were discussed, there was a significant amount of variability with regards to the different race groups seen in the three time periods. The adjusted residuals indicate that at the 5% level, white children and adolescents were significantly more likely than expected to be seen at the CFC during the 1987-1989 year-cluster, whereas both black and Indian youngsters were significantly less likely to be seen during that time period. In contrast, in the 1997-1999 year-cluster, significantly fewer than expected white children were seen, whereas significantly more than expected Indian children and adolescents were seen at the Centre. A similar trend continues in the 2007-2009 year-cluster, where significantly more than expected black children and adolescents came to the CFC and significantly fewer than expected white children and adolescents were seen at the centre in those years.

4.4.4   Are year-cluster and number of tests significantly associated?

A chi-square analysis on the 'grouped number of tests'[4] and 'year-cluster' variables revealed another significant association (x^2= 31.543, df = 8, p = 0.000). The analysis of the adjusted residuals (Table16, Appendix C) illustrates that in the 1987-1989 year-cluster, there were significantly fewer than expected cases in which no assessment measures were utilised, but significantly more than expected cases in which five to eight assessment measures were employed. On the other hand, in the 1997-1999 year-cluster there were significantly fewer than expected cases in which nine to eleven assessment tools were used compared to significantly more than expected cases in which none or only one to four assessment measures were used. Moreover, in the 2007-2009 year-cluster, on significantly more occasions than expected were nine to eleven assessment tools employed.

4.4.5   Log-linear analysis to evaluate the role of various factors for trends in diagnosis.

Several other chi-square tests were conducted on the above-mentioned variables. However, no other statistically significant associations between any two variables were found through the chi-square analysis process. Thus there was no significant association between for example: 'gender' and 'race', 'gender' and 'number of tests', 'gender' and 'age group', 'race' and 'number of tests', 'age group' and 'number of tests', 'diagnostic category' and 'number

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[4] Please note the 'number of tests' variable was included in order to establish assessment rigour. It was hypothesised that there might be a relationship between certain diagnoses and the number of assessment measures used in the diagnostic process. However, no significant association between diagnosis and number of measures was found. What did transpire however, was that the number of measures used seemed to vary according to decade.

of tests' or 'race' and 'age group' to name most. It has to be noted that there actually were significant associations between some of the above variables, but in those cases the assumptions where completely violated and these cases were therefore deemed inappropriate for further interpretation. As a result of the numerous associations that were confirmed, however, it was decided to also analyse the data by means of log-linear analysis in order to evaluate the roles and interactions of the various variables for trends in the diagnosis of children and adolescents.

In a log-linear model, a multidimensional contingency table is analysed in order to trace higher-order interactions between variables (Gosh & Bhattacherjee, 2009). In this study, the analysis was primarily aimed at investigating the statistical associations of certain variables of interest, thus the log-linear model serves as a statistical representation of the contingency table in order to calculate the relative importance of various variables.

One of the main interests of this study was to determine if time period, race, age and/or gender influence the trends in diagnosis for children and adolescents seen at the CFC.[5] The chi-square tests have already revealed that there are significant associations with regard to 'diagnostic category' and the above-mentioned variables; hence, a log-linear analysis can help answer the question as to which variables are related, or better, which variables interact with each other in a multidimensional model. Thus, the complete log-linear analysis model of the data would include the following five variables: 'diagnostic category' (10), 'year-cluster' (3), 'age group' (3), 'race collapsed' (3) and 'gender' (2). However, due to the small sample size (n = 679), this '10 x 3 x 3 x 3 x 2' table completely violated all the assumptions of log-linear analysis as most of the expected frequencies were below 1 and for some cross-tabulations the expected frequencies were below 5 in nearly 95% of the cells. Hence, it was necessary to run smaller log-linear analyses with fewer variables; however, even when the researcher attempted to run much smaller log-linear analyses with 'diagnostic category', 'year-cluster' and only one of the remaining variables ('age group', 'race collapsed' and 'gender') the assumptions were still being violated. Consequently, the only solution to this problem was to combine categories or to collapse across variables in order to increase the expected frequencies (Howell, 2002). Therefore, it was decided to combine some of the

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[5] Please note that the variable 'grouped number of tests' is not included in the log-linear analysis as it was merely a variable that was added for additional information with regard to the utilisation of assessment measures. It is not believed to affect the diagnostic trends of children and adolescents, also the chi-square test for 'diagnostic category' and 'grouped number of tests' severely violated the assumptions of the x^2 test (46% of cells had an expected count of less than 5).

categories. For instance, the 'race collapsed' variable, which originally comprised three values ('white', 'Indian and Coloured' and 'black') was dichotomised into 'white' and 'black'. Additionally the 'age group' variable was also dichotomised (into '3-10year olds' and '11-17years olds'). Moreover, the 'diagnostic category' variable was moderated to just nine instead of ten values (combining the very infrequently used PTSD Features value with the Anxiety Disorder Features value). Please refer to Table 17 (below) for a tabular description of this process.

Table 17: Collapsed variables for log-linear analysis

 *changes are in bold type

Original Variable and Values		Moderated Variable and Values	
Race Collapsed	1=black 2= Indian and Coloured 3=White	Race2Way	1= black(**includes Indian & Coloureds**) 2= white
Gender	1=male 2=female	Gender (no change)	1= male 2=female
Year-cluster	1= 1987-1989 2=1997-1999 3=2007-2009	Year-cluster (no change)	1= 1987-1989 2= 1997-1999 3= 2007-2009
Age Group	1= 3-8yrs 2= 9-12yrs 3= 13-17yrs	Age 2Way	1= 3-10 years 2=11-17 years
Diagnostic Category	1= Mood Disorder Features 2= Anxiety Disorder Features 3=PTSD Features 4=ADD/ADHD Features 5=Behaviour Disorder Features 6= Mental Retardation Features 7= Learning Disorder Features 8= Pervasive Developmental Disorder Features 9= Abuse 10=Other	Diagnostic Cat9Collapsed	1= Mood Disorder Features 2= Anxiety Disorder Features **including PTSD** 3=ADD/ADHD Features 4=Behaviour Disorder Features 5= Mental Retardation Features 6= Learning Disorder Features 7= Pervasive Developmental Disorder Features 8=Abuse 9= Other

Nonetheless, the limited sample size (n=679) suggests that the log-linear analysis conducted on the moderated variables should only be interpreted with extreme caution, as it still violates the assumptions for the expected cell frequencies (48.1% of cells have an expected value of less than 5), which could lead to very low power. Howell (2002) also points out that with small sample sizes, the power to reject a false H_0 increases considerably. For this reason and in consultation with an expert in the field of statistics for the social sciences (L. Lachenicht, Personal Communication, 16 October 2012), it was chosen to collapse the data across another variable (Gender) in order to minimise the risk of utterly violating the assumptions. Since we already know that 'gender' and 'diagnostic category' are associated with regard to just three diagnostic categories (ADD/ADHD, Learning Disorder and Abuse, see discussion in section 4.4.2), and since the chi-square tests did not find any other significant associations between 'gender' and any of the other variables, this variable was chosen as the best one to collapse in order to increase the expected cell frequencies (please also see Tables 18, 19 and 20 in Appendix C, partial associations of three log-linear analyses, which determine that gender did not manifest in an interaction with the other independent variables, namely 'year-cluster', 'race' and 'age', under investigation). Thus the final log-linear analysis was conducted with the following combination of four variables: 'diagnostic category', 'year-cluster', 'race' and 'age'. 'Race' and 'age' each have two levels, whereas 'year-cluster has 3 levels and 'diagnostic category' has nine levels. It still slightly violates the assumptions, (22.9% of cells having an expected value of less than 5), but is a much improved model when compared to the five variable analysis discussed earlier.

4.4.5.1 K-way effects

Log-linear analysis commences by including a table of all possible effects; this is also referred to as a 'saturated model'. The reason for starting with the saturated model is that this model includes all lower-order interactions and the main effects, and one can then look at which levels of interaction are needed in the model and which interaction terms can be dropped from the model (Howell, 2002). Thus, a K-way effect is created to determine if the main, two-way, three-way or higher-order effects account for the frequencies.

Table 21 (below) illustrates the significance of the associations of the four variables under investigation and tests the complexity of the required model. The first line asks whether a model that includes main effects (or one-way effects) and any higher-order effects is sufficient in explaining the variations in the observed cell frequencies. This G^2 (558.739) is

significant beyond the 0.000 level, which indicates that a simple main effects model is not adequate. The second line tells us whether removing the two-way effects (i.e. 'diagnostic category'*'year-cluster', 'diagnostic category'*'race', 'diagnostic category'*'age', 'year-cluster'*'race', 'year-cluster'*'age', 'race'*'age') and any higher-order effects will significantly affect the fit of the model. This is also significant (G^2 = 348.743, df= 95, p= 0.000) implying that removing the two-way and any higher order effects would have a significantly negative effect on the model. The next line tests whether removing the three-way interactions and any higher-order effects will significantly affect the fit of the model. This is not significant (p= 0.082) indicating that if we removed the three-way effects and higher-order effects it would not affect the fit of the model significantly. The final line asks whether removing the four-way effect (the highest-order effect in this model) would significantly affect the fit of the model, which given that fact that it is not significant (p = 0.978) is clearly not the case.

Table 21: K-way and higher-order effects

*Significant effects at the 5% level of significance are in bold type

	K	Df	Likelihood Ratio		Pearson		Number of Iterations
			Chi-Square	Sig.	Chi-Square	Sig.	
K-way and Higher-Order Effects[a]	1	107	**558.739**	**.000**	542.084	.000	0
	2	95	**348.743**	**.000**	341.647	.000	2
	3	58	73.530	.082	72.248	.099	5
	4	16	6.742	.978	6.626	.980	5
K-way Effects[b]	1	12	**209.996**	**.000**	200.437	.000	0
	2	37	**275.214**	**.000**	269.398	.000	0
	3	42	**66.788**	**.009**	65.623	.011	0
	4	16	6.742	.978	6.626	.980	0

The next section of the table conveys similar information, without including the higher-order effects, however. Hence, the first row tests whether removing the main effects has a significant effect on the fit of the model, the second row tests the effect of removing the two-way interactions and the third row the effect of removing the three-way interactions, etc. However, in this third row, there is now a significant G^2 = 66.788 with a probability of 0.009, which indicates that removing some of the three-way interactions would significantly reduce the fit of the model. The last line confirms that the four-way (or highest-order) effect is not a

significant predictor of the data and can therefore be removed from the data without a significant effect on the fit of the model.

4.4.5.2 Partial associations and backward elimination statistics

When looking at Table 22 (below), it becomes apparent which of the three-way and two-way interactions significantly affect the model. This 'partial associations' table illustrates which effects are significant and which are not. The only three-way interaction which is just significant (p=0.050) is the 'diagnostic category'*'race'*'age' [DRA] interaction. As was already indicated in the 'K-way and higher-order effects' table, several of the two-way interactions namely: 'diagnostic category'*'year-cluster' [DY], 'diagnostic category'*'race'

Table 22: Partial associations

*Significant effects at the 5% level of significance are in bold type

Effect	Df	Partial Chi-Square	Sig.	Number of Iterations
DiagnosticCat9collapsed*Yearcluster*Race2way	16	25.744	.058	5
DiagnosticCat9collapsed*Yearcluster*Age2way	16	8.399	.936	4
DiagnosticCat9collapsed*Race2way*Age2way	**8**	**15.488**	**.050**	3
Yearcluster*Race2way*Age2way	2	5.710	.058	5
DiagnosticCat9collapsed*Yearcluster	**16**	**37.779**	**.002**	3
DiagnosticCat9collapsed*Race2way	**8**	**65.541**	**.000**	3
Yearcluster*Race2way	**2**	**127.291**	**.000**	2
DiagnosticCat9collapsed*Age2way	**8**	**65.330**	**.000**	5
Yearcluster*Age2way	2	.008	.996	5
Race2way*Age2way	1	.007	.932	5
DiagnosticCat9collapsed	**8**	**178.757**	**.000**	2
Yearcluster	**2**	**8.722**	**.013**	2
Race2way	**1**	**7.438**	**.006**	2
Age2way	**1**	**15.079**	**.000**	2

[DR], 'diagnostic category'*'age' [DA] and 'year-cluster'*'race' [YA] have highly significant interactions. Similarly, the main effects are highly significant, although that merely indicates that significantly different quantities of data were collected for each of the nine different diagnostic categories, two age groups, three year-clusters and the two race groups.

The 'backward elimination' table (Table 23, Appendix D) is the final step in trying to generate the best unsaturated model to fit the data (Christensen, 1990). As is evident from

Table 23, this process commences with the highest-order effects, and through a process of elimination, ascertains how the removal of certain interactions improves the model by narrowing down which effects are able to generate a model that best fits the cell frequencies. Each time one of the interactions is deleted, a likelihood ratio test is conducted to determine to what extent that particular interaction would contribute to the final model. If this G^2 value is low, then the effect does not account for the cell frequencies in the contingency table and is dropped from the model. Table 23 reveals that with regard to the data for this research, the backward elimination process determined that the best model to explain the frequencies included the three-way interactions: 'diagnostic category'*'race'*'age' [DRA] and 'year-cluster'*'race'*'age' [YRA] plus one two-way interaction of 'diagnostic category'*'year-cluster' [DY] with a likelihood ratio of $G^2 = 41.012$ (df=48, p = 0.752). This means that the final model retains all the main effects, one two-way and two three-way interactions. SPSS evaluates this final model with the likelihood ratio statistic (Table 24, Appendix D) and one hopes to find a non-significant test value which would denote that the expected values generated by the final model are not significantly different from the actual observed data. In this case the result is not significant (p=0.752) indicating that the generated model is a good fit of the data.

The backward elimination process and the partial associations statistics are both methods of illustrating which model best accounts for the frequencies in the contingency table (Howell, 2002). Therefore, either of these two procedures and the models they arrived at can be used as a final model. In this study, however, the two methods arrived at slightly different final models. The partial associations table concluded that the best model contains the three-way interaction: 'diagnostic category'*'race'*'age' [DRA] and the four two-way interactions: 'diagnostic category'*'year-cluster' [DY], 'diagnostic category'*'race' [DR], 'year-cluster'*'race' [YR] and 'diagnostic category'*'age' [DA]. The backward elimination process also decided that the three-way interaction of 'diagnostic category'*'race'*'age' [DRA] must be retained in the final model; additionally however, it also required another three-way interaction of 'year-cluster'*'race'*'age' [YRA] and one two-way interaction of 'diagnostic category'*'year-cluster' [DY]. When looking at it in detail, these two models are actually very similar in that the backward elimination contains all the interactions suggested in the partial associations process plus an additional three-way interaction between 'year-cluster'*'race'*'age' [YRA] and, as a subset of that interaction, an additional two-way interaction of 'year-cluster'*'age' [YA]. Other than that, the two final models are identical.

Consequently, the best model chosen to reveal anything about the factors that influence trends in the diagnosis of children over a twenty-year period should be the comprehensive final model from the backward elimination process. However, the three-way interaction of 'year-cluster'*'race'*'age' [YRA] and the two subset two-way interactions of 'year-cluster'*'race' [YR] and 'year-cluster'*'age' [YA] do not reveal anything about the interaction with diagnostic category trends which this research was trying to establish. These interactions will, however, be retained in the model because they contribute significantly to the final model; in addition the interpretation of some these interactions will be included in the discussion since these interactions affect some of the 'diagnostic category' effects. Howell (2002) also advocates that a variable may be kept in the model even if the interpretations of its effects are not of primary interest. Therefore the general log-linear analysis that was run (see Appendix D) incorporated the main effects of 'diagnostic category' [D], 'year-cluster' [Y], 'race' [R] and 'age' [A] and tested the interactions of the two-way effects of 'diagnostic category'*'year-cluster' [DY] and the three-way interactions of 'diagnostic cate-gory'*'race'*'age' [DRA] and year-cluster'*'race'*'age' [YRA]. The result (G^2 = 41.012, df = 48, p = 0.752) indicates that the model seems to adequately represent the data (Table 25, Appendix D). The model also suggests that combinations of 'race' and 'age' are independent of 'year-cluster' with regard to the 'diagnostic categories' and that given 'diagnostic category', 'year-cluster' is independent of race and age. It is important to note here that the model is merely a description of the data and not a statement of causation (Christensen, 1990). It does not make any sense to imagine that trends in diagnostic categories cause the relative frequencies of 'race' and 'age' to be independent of the frequencies of 'year-cluster'.

4.4.5.3 Residuals and odds ratio

On its own, the model does not tell us anything about the relationship between 'diagnostic category', 'race' and 'age' or about the relationship between 'diagnostic category' and 'year-cluster'. In order to see how well the model fits the data on a cell-by-cell basis one has to examine the residuals for each cell (Table 26, Appendix D). The largest difference between the observed and the expected cell counts is about 3.3 (raw residual), which given the number of cases in this particular cell, represents an adequate fit. When looking at the adjusted residual scatter-plot (Figure 5, Appendix D), it becomes evident that there is no obvious pattern between the adjusted residuals and the counts. The observed and expected counts fall about a diagonal line. Table 26 is an extremely complicated table and quite difficult to study.

An easier way to study the 'diagnostic category', 'race' and 'age' relationship can be achieved by collapsing over the 'year-cluster' factor (Christensen, 1990). This is displayed in Table 27 (below) and it is evident that Mood Disorders are more prevalent in the 11-17 year age group for both the white and black groups. Anxiety Disorders are more likely in the white group but the rate for Anxiety Disorders is higher in the younger age group for both race categories. Similarly the rates for ADD/ADHD, Learning Disorders and Abuse are higher for the 3-10 year olds in both race groups.

Table 27: 'Diagnostic category', 'race', 'age' marginal table

	Black		White		
	3-10 years	11-17 years	3-10 years	11-17 years	Totals
Mood Disorder Features	7	26	19	32	84
Anxiety Disorder Features + PTSD Features	24	7	41	27	99
ADD/ADHD Features	21	4	33	10	68
Behaviour Disorder Features	6	21	23	30	80
Mental Retardation Features	32	17	5	7	61
Learning Disorder Features	43	30	43	19	135
Pervasive Developmental Disorder Features	4	0	1	0	5
Abuse	16	3	17	14	50
Other	24	19	31	23	97
Totals	177	127	213	162	679

Behaviour Disorders are more likely in the white race group although the rate of Behaviour Disorders is higher for the 11-17-year-olds in both race groups. Mental Retardation appears

much more prevalent in the black group with more young children being diagnosed in this group. However, no clear age pattern is evident for white children with regard to Mental Retardation. Pervasive Developmental Disorder Features are only found in the younger age group for both race categories.

Table 28 (below) examines the relationships between 'year-clusters', 'race' and 'age'. It is immediately evident that considerably more whites compared to blacks were seen in the 1987-1989 year-cluster, and that those seen were to a large extent from the younger age group for both race groups. On the other hand, noticeably more black cases compared to white cases were handled in the 2007-2009 year-cluster, again with an age spread favouring the younger group for white children and adolescents, but a much more even age distribution for black children and adolescents. The middle year-cluster, 1997-1999, reveals a more or less equal spread amongst racial groups but there were markedly more young children seen amongst the black group, whereas there was a more even age distribution amongst the white group.

Table 28: 'Year-cluster', 'race', 'age' marginal table

		1987-1989	1997-1999	2007-2009	Totals
Black	**3-10 years**	32	79	66	177
	11-17 years	17	46	64	127
White	**3-10 years**	109	59	45	213
	11-17 years	91	55	16	162
	Totals	249	239	191	679

To examine the relationship between 'diagnostic category' and 'year-cluster', we can collapse over 'race' and 'age' and study the marginal table (Table 29, below). This table is very similar to Table 10 which examined the adjusted residuals relating to the chi-square analysis. It is apparent that some diagnostic categories, such as Mood Disorder Features and Abuse, are distributed quite evenly across the three time periods, while other diagnostic categories, such as Pervasive Developmental Disorder and ADD/ADHD Features, seem to increase in the later year-cluster (relative to the number of cases in each year-cluster). At the same time, some diagnostic categories, such as Anxiety and Behaviour Disorder Features and Mental Retardation, turn out to be less prevalent over the years.

Table 29: 'Year-cluster', 'diagnostic category' marginal table

	1987-1989	1997-1999	2007-2009	Totals
Mood Disorder Features	25	30	29	84
Anxiety Disorder Features + PTSD Features	43	33	23	99
ADD/ADHD Features	22	20	26	68
Behaviour Disorder Features	38	24	18	80
Mental Retardation Features	24	24	13	61
Learning Disorder Features	42	60	33	135
Pervasive Developmental Disorder Features	0	2	3	5
Abuse	15	20	15	50
Other	40	26	31	97
Totals	249	239	191	679

All of these aspects can be investigated further using odds ratios. For instance, in the category of ADD/ADHD features, the odds of being white and 11-17 years old (as opposed to being white and 3-10 years old) are 10/33 = 0.30. Correspondingly the odds of being 11-17 years old and black are 4/21 = 0.19. Thus the odds ratio of being white and 11-17 years old to being black and 11-17 years old in the ADD/ADHD Features Category is 0.30/0.19 = 1.5. In other words, someone is about one-and-one-half times as likely to be white if they are 11-17 years old than being black in this category. However, calculating odds ratios for all the different facets of the marginal tables is not going to add much relevant detail to the interpretation of the relationships between the different factors in question. The main focus of this research was to determine if certain factors, such as time period, race, age or gender, and their potential interactions influence the trends in diagnosis for children and adolescents seen at the CFC. As such, this study is not specifically interested in the relative incidences and odds

ratios of, for instance, race and age per disorder category, but rather in the trends in diagnosis and their interaction with race, age and time period. Furthermore, because there are more than two categories in the main variable of interest (i.e. 'diagnostic category' with nine categories), it is not clear which sets of odds to calculate.[6] The key relationships with regard to the 'diagnostic category', 'race' and 'age' and 'year-cluster' marginal tables have already been conveyed throughout the analysis of Table 27, Table 28 and Table 29.

4.4.6 Looking for differences in usage of assessment measures over three decades

With reference to the data on the different psychological assessment measures, a Friedman test (non-parametric) for the comparison of related samples was conducted (Table 30, below). The ranked prevalence of test usage for each measure per year-cluster was used to test for significant differences between the three year-clusters. There was a statistically significant difference in the ranking of assessment measures depending on the year-cluster (x^2= 8.442, df = 2, p = 0.015). Thus one or two of the year-clusters display consistently higher rankings (i.e. usage of certain tests) than the others.

Table 30: Friedman test statistic

N	60
Chi-Square	8.442
Df	2
Asymp. Sig.	**.015**

In order to examine where the differences occur, a post-hoc test on the different combinations of year-clusters was run. The post-hoc analysis with the Wilcoxon Signed-Rank Test was conducted with a Bonferroni correction applied, resulting in a significance level set at *p* < 0.017 (Table 31, Appendix E). There were no significant differences between the 2007/2009 and the 1997/1999 year-clusters (Z = - 0.593, *p* = 0.553) or between the 2007/2009 and the 1987/1989 year-clusters (Z = -2.075, *p* = 0.038) with regard to the ranking of assessment procedures. There was, however, a statistically significant difference in the ranking of assessment measures between the 1997/1999 and the 1987/1989 year-cluster (Z = -2.788, *p* = 0.005). Thus, it can be concluded that there was a statistically significant higher ranking (i.e.

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[6] Please note that although it can be argued that 'diagnostic category' is viewed as the main response (or dependent) variable in this study, it was chosen not to run a 'Logit log-linear analysis' as this requires the relationships or structures between the explanatory (or independent) variables not to be of interest or to be taken into account (Christensen, 1990). As this is not the case in this particular study, 'Logit' models were deemed unsuitable

in terms of usage) of assessment measures in the 1987-1989 year-cluster when compared to the other year-clusters.

4.5   Summary of results

The current chapter aimed to provide a thorough presentation of the results; the demographic characteristics of the sample and statistical analysis were discussed in detail. The descriptive statistical analysis looked at the changes in diagnosis and psychological assessment practices over the three decades, and revealed substantial variability with regard to the diagnosis of children and adolescents over the twenty-year time span. Additionally, although there was a great deal of consistency in assessment practices over the three decades, it was established that there also were a considerable number of evident changes in the usage of certain instruments over time.

The inferential statistical analysis looked at the statistically significant associations and patterns of relationships between the many categorical variables. Both chi-square analysis and log-linear analysis were utilised to describe these associations and their pattern of relationships in detail. Several significant associations between variables were established through the chi-square analysis; the log-linear analysis thoroughly investigated these associations in order to determine the relative importance of the various variables. Key relationships between 'diagnostic category', 'race', 'age' and 'year-cluster' were determined through this analysis. Finally, a Friedman test for the comparison of related samples was conducted in order to ascertain whether or not there was a difference in the usage of assessment measures over the three decades.

Chapter 5

<u>Discussion</u>

5.1   Introduction

The key aim of this exploratory research was to determine the trends for child and adolescent diagnostic rates and assessment practices at a South African psychological community centre over a 20-year time period, in order to examine whether or not these trends are comparable to the internationally observed trends for both diagnostic patterns and diagnostic assessment practices over time. Kleintjes et al. (2010) stress strongly that the field of child and adolescent mental health is a largely neglected area within the mental health domain, especially in African countries including South Africa. They call for more focus on research to improve child and adolescent mental health services, so as to reduce the negative impact of mental illness on childhood development and later adult life. There is a pressing need for further South African data to inform the planning of preventative and curative services for children and adolescents. This research therefore sought to be primarily exploratory, and to investigate the trends and patterns of child and adolescent mental health problems and the usage of assessment measures in a community setting in South Africa. These two aspects were examined via statistical analysis and will be compared to the international trends described earlier. Additionally, the relationships uncovered through the statistical analysis will be discussed in detail with regard to the meanings behind these relationships.

5.2   Demographics

As indicated in Chapter Four, the sample was drawn randomly from existing CFC case files of children and adolescents between the ages of 3 and 17 from the years 1987-1989, 1997-1999 and 2007-2009. The case files were categorised according to age group, gender, race group, year-cluster, diagnostic category, the number of tests conducted and the various assessment measures. Although four racial groups were represented in the sample, 55.7% of the overall sample were white children and adolescents, whilst 26.7% were black children and adolescents. Indian (13.4%) and Coloured (4.3%) children and adolescents were therefore relatively under-represented but more or less in line with their proportion of the population in KwaZulu-Natal. The small proportion of Indian and Coloured children was

considered too small for comparison purposes and was therefore collapsed into one variable for the chi-square analysis. The racial groups had to be further reduced to just two variables for the log-linear analysis. Similarly, the analysis also necessitated that the three age groups namely: three to eight years (middle childhood), nine to twelve years (pre-adolescence) and 13 to 17 years (adolescence) had to be dichotomised to three to ten years (younger children) and 11 to 17 years (older children/adolescents) for the log-linear analysis. Due to the exploratory nature of this study, however, the collapsing over certain variables was not considered a serious shortcoming, since it allowed a great deal of useful information about the trends and patterns in the diagnosis of children and adolescents to be obtained.

5.3   Discussion of the findings

5.3.1   Changes in the pattern of mental disorder diagnoses over the three decades

As illustrated in the previous chapter, there was evidently considerable variability in the sample with regard to the diagnosis of children and adolescents over the three time periods. There was a substantial increase of 52% (or 5.2 percentage points) between the 1987-1989 and the 2007-2009 year-cluster in the number of Mood Disorder cases that were diagnosed at the CFC. Similarly the number of ADD/ADHD cases increased by 54.5% (or 4.8 percentage points) over the twenty year period from 1987-1989 until 2007-2009 (this increase was especially noticeable between the 1997-1999 and 2007-2009 year-clusters). Additionally there was a rise of 1.6 percentage points for Pervasive Developmental Disorder (PDD) features from the end of the 1980s to 2007-2009 which translates to a 50% increase in the number of PDD cases between 1997-1999 and 2007-2009 alone. In contrast, there was a decrease of 29.2% (or 2.8 percentage points) in the number of children and adolescents diagnosed with Mental Retardation features between the 1987-1989 and the 2007-2009 year-clusters and also an overall decrease of 31.7% (5.1 percentage points) and 16.7% (0.2 percentage points) respectively, for Anxiety Disorder and PTSD features in that time period. Furthermore, Behaviour Disorder features also showed a 38.6% (or 5.9 percentage points) decrease in the number of children and adolescents diagnosed between the late 1980s and the 2007-2009 year-cluster, with the main decrease taking place between the late 1980s and the 1997-1999 year-clusters. Additionally both Learning Disorder features and Abuse showed slight increases of 2.4% and 31% respectively.

Thus, this study produced results which parallel the findings of previous research in this field, in that the overall trends in diagnostic patterns among children seen at the CFC over time are very similar to the international trends reported by Harpaz-Rotem and Rosenheck (2004), Mandell et al. (2005) and Moreno et al. (2007), to name a few. A discussion of the changes in diagnostic rates for certain disorders, their significant associations and how they compare to internationally observed trends will be provided in more detail below.

5.3.2 The changes in ADD/ADHD diagnosis over three decades

Although the increase in percentages reported in this study related to ADD/ADHD features (54.5%) is not as profound as the one (381%) reported by Mandell et al. (2005), it nevertheless represents a significant trend. Interestingly, Mandell et al. (2005) also found that the diagnosis rates of ADHD were highest among children under twelve years of age, this supports the findings in this study, in that children between three to eight years of aged were significantly more likely than expected to receive an ADD/ADHD diagnosis. This study also found that significantly more males than females were likely to be diagnosed with ADD/ADHD features. These results are consistent with most previous research findings on gender-specific rates of ADHD diagnoses (Lesesne, Visser & White, 2003; Robison, Skaer, Sclar & Galin, 2002).

From the above, it is clear that the findings in this study suggest that the overall patterns of ADHD diagnoses at the CFC are very similar to the ones that were observed in the USA. A steady increase in diagnostic rates for ADD/ADHD over the twenty-year time period can be observed along with higher rates for boys and children younger than 12 years of age. One possible explanation for the high rates of diagnosis before the age of 12 years has been put forward by Mandell et al. (2005). They believe that the transitions into primary school and/or middle/secondary school are associated with the increased rates of diagnosis. Additionally, the changes in diagnostic practice, such as the addition of the Inattentive Type of ADD/ADHD to the DSM-IV and the increased popular awareness of the disorder, as discussed in Chapter Two, are all possible explanations for the overall increase of ADD/ADHD diagnostic rates.

5.3.3 Changes in Mood Disorder diagnosis over the three decades

From 1987/1989 to 2007/2009 there was a 52% increase in Mood Disorder cases diagnosed at the CFC. It has to be noted here that this study did not distinguish between Depressive and

Bipolar Disorders since this would have made the statistical analysis impossible due to the limited sample size. However, from the analysis of the data abstraction forms, it became clear to the researcher that Bipolar Disorder in children and adolescents seen at the CFC was extremely rare and only diagnosed in a handful of cases in the sample. Most of the Mood Disorder category in this sample therefore pertains to Depression and Dysthymic Disorders. Once again, previous international research supports the increases in Mood Disorder diagnoses. A German study by Holtmann et al. (2011) found a 219.6% increase for inpatient admissions for Depressive Disorder in children and adolescents aged between 0 and 19 years between 2000 and 2007. At the same time, they also established a 68.5% increase for inpatient admissions for Bipolar Disorder in adolescents aged 15 to 19 years. during that time period. Yet again, the results from the present study are markedly lower than the international increases in Mood and Bipolar Disorders. This could, however, be due to the small sample size but nonetheless the current findings still represent a considerable increase in the rates of Mood Disorder diagnosis.

The results in this study also show that adolescents aged 13 to 17 years are significantly more likely than expected to be diagnosed with Mood Disorder features, while three to eight year olds are significantly less likely to receive such a diagnosis. This is in line with the findings of Harpaz-Rotem and Rosenheck (2004), who also observed increases in the diagnosis of Mood and Bipolar Disorders especially among adolescents aged 13 to18 years.

Thus, the findings in the current study in relation to Mood Disorders are consistent with previous international research in this field and confirm that the South African sample appears to follow international trends regarding increasing diagnostic rates of Mood Disorder and their age distribution (Holtmann et al., 2011). A common suggestion for the cause of the increasing rates of Mood Disorder in adolescents especially is that the increasing rates of parental divorce and separation might play a role (Collishaw, Maughan, Natarajan & Pickles, 2010). Another possible explanation relates to the transition into secondary school (high school) and the more demanding educational expectations and stress (Nuffield Foundation, 2004). Saluja et al. (2004) suggest an association between increased bullying, which is becoming more common, and increasing depressive symptoms in adolescents. According to a recent study by Anderson (2010), it is clear that bullying amongst boys and girls is also rife in South Africa. The issue with regard to bullying has been further complicated by the history of apartheid in this country and racist verbal abuse is also very frequent. Anderson (2010) found

that many adolescents became depressed when they were being bullied, hence Saluja's theory might also apply to the South African context.

Holtmann et al. (2011) speculate that the increases in Bipolar Disorder could be a consequence of environmental changes, such as the greater use of stimulants and antidepressants, which might lead to an earlier onset of Bipolar Disorder. Another suggestion relates to the increased awareness of Bipolar Disorder in youth by clinicians. Williams et al. (2008) suggest that the South African population in general face an increased risk of mental disorders such as Mood Disorders, due to the country's current social conditions such as the high crime-rate, the high risk of HIV/AIDS, the harsh economic circumstances for the majority of the population and masked racism. However, most of these hypotheses are thus far untested and at present there is insufficient evidence to draw any firm conclusions about the causes of increased Mood Disorder in adolescents.

5.3.4   Changes in Anxiety Disorder and PTSD diagnosis over three decades

The results of this study revealed a slight decrease of 31.7% for the diagnosis of Anxiety Disorder between the late 1980s and 2000-2009. It is somewhat surprising that no increase was noted for this condition, since South Africa's current social conditions such as crime and harsh economic circumstances are often associated with a high prevalence of Anxiety Disorders (Kleintjes et al., 2006; Williams et al., 2008) in children, adolescents and adults.

The observed decrease in this study could be related to the fact that the years of continuous social conflict and political violence in the Pietermaritzburg area, in the late 1980s, had a direct impact on children's and adolescent's psychological development and that this is reflected by the higher rates of Anxiety Disorder for those years. This hypothesis is to a certain extent, corroborated by the decrease of 16.7% in diagnostic rates for PTSD between 1987-1989 and 2007-2009. Although there also was a substantial increase of 108.3 % in the PTSD diagnostic rate between 1987-1989 and 1997-1999 year-clusters, which again could indicate that the devastating violence of the early to mid-1990s in the Natal Midlands and Pietermaritzburg area had a profound effect on the children and adolescents from this area.

However, the fact that the chi-square analysis revealed that significantly more white rather than black children and adolescents are likely to be diagnosed with Anxiety Disorder features, and since it is generally accepted that it is more likely black children who have borne the brunt of the exposure to violence and unrest (Dawes, 1994), this also does not

support the above hypothesis. On the other hand, as Dawes (1994, in Dawes & Donald, 1994) points out, it is also important to remember that many white children did experience the violence and unrest of the 1980s and 1990s, albeit in less direct ways. Dawes (1994) advocates that it is therefore equally important that white children's and adolescents' experiences are investigated and understood. Hence, a possible explanation for the higher rate in Anxiety Disorder and PTSD diagnoses of mainly white children and adolescents at the CFC in the 1980s and 1990s could be that white youngsters in the Pietermaritzburg area experienced the unrest and violence in an indirect way, through exposure to the media and adult conversations, for instance, and were therefore more likely to exhibit anxiety features than children and adolescents in the recent years.

Overall, the decrease in the diagnosis of both Anxiety Disorder and PTSD features at the CFC over the twenty years in question differs from the internationally observed trends of increased diagnostic rates for Anxiety and stable rates for PTSD. Harpaz-Rotem and Rosenheck (2004) found an average increase of 37.1% in Anxiety-related diagnosis for seven-to-18-year-olds between 1995 and 2000. Meanwhile, the rates for PTSD-related diagnosis during the same time frame remained fairly stable in that particular study. Collishaw et al. (2010) also found increasing rates for Anxiety and Depression between 1986 and 2006; however, they did not distinguish between the two disorders which makes it difficult to determine whether there was an increase in diagnostic rates for Depression, for Anxiety or for both disorders.

5.3.5 Changes in Mental Retardation and Pervasive Developmental Disorder diagnosis over three decades

Several studies have found a decrease in the diagnostic rates for Mental Retardation over the past two decades (Croen et al., 2002; Nassar et al., 2009). The general trend in this study, where a decrease of 29.2% in the number of children and adolescents diagnosed with Mental Retardation features between the 1987-1989 and the 2007-2009 year-clusters was observed, seems to support these international findings.

Interestingly, the results also indicate that black children and adolescents were significantly more likely than expected to receive a Mental Retardation diagnosis, whereas white children were significantly less likely than expected to do so. These findings seem to be consistent with other research from developing countries which found that black children show higher rates of Mental Retardation than white children (Robertson & Berger, 1994, in Dawes &

Donald; Donald, 1994, in Dawes & Donald). This indicates a relationship between Mental Retardation and poor socio-economic conditions, poor nutrition and associated diseases in early childhood (Nikapota, 1991, in Dawes & Donald, 1994). The same argument can be made for the significantly higher than expected rate of black children and adolescents in the Learning Disorder category; again these results could be attributed to poor socio-economic conditions and few opportunities and proper knowledge regarding appropriate stimulation. Another rationale for the high rate of both Mental Retardation and Learning Disorders in black children could be related to assessment issues. Especially in the 1980s and 1990s, there were few assessment measures that were adapted to the South African multicultural and multilingual context (Foxcroft & Roodt, 2005), hence both language and culture may well have impacted on the performance of black children.

The findings of the current study regarding the diagnostic rates for Pervasive Developmental Disorder (PDD) or ASDs are consistent with the international research by Coo et al. (2008), Harpaz-Rotem and Rosenheck (2004) and Nassar et al. (2009). There were no PDD diagnoses in the 1987-1989 year-cluster, whatsoever, whereas the rate of PDD diagnoses showed a 50% increase in the number of cases between 1997-1999 and 2007-2009 alone. While these findings support the increases observed in other research, they are noticeably lower than the findings of a 358% increase from 1989 until 2000 reported by Mandell et al. (2005) and the 100% increase between 1995 and 2000 reported by Harpaz-Rotem and Rosenheck (2004). This could again be due to the fairly small sample size and the therefore very limited number of children with these conditions seen at the CFC.

As mentioned before, some authors (Bishop, Whitehouse, Watt & Line, 2008, in King & Bearman, 2009; Croen, Grether, Hoogstrate & Selvin, 2002, in Coo et al., 2008; Shattuck, 2006) have assigned the increase in prevalence of ASDs to the reclassification of children from the Mental Retardation to the PDD category. While some of the increases in PDD rates might be explained by this diagnostic substitution, international consensus maintains that a substantial proportion of the increase in PDDs cannot be explained by this factor alone (Coo et al., 2008).

5.3.6 Changes in Behaviour Disorder diagnosis over three decades

This study found a 38.6% decrease in the number of children diagnosed with Behaviour Disorder features between the late 1980s and the 2007-2009 year-cluster. This is consistent with the findings of Harpaz-Rotem and Rosenheck (2004) who also reported a decrease of 34% and 10.3% between 1995 and 2000 for Oppositional Defiance Disorder and Conduct Disorder, respectively. Again, the current study did not distinguish between the two Disorders due to the limited sample size.

The results of this study also indicate that 13-to-17-year-olds were significantly more likely than expected to be diagnosed with Behaviour Disorder features. This corroborates the findings of Harpaz-Rotem and Rosenheck (2004) who also found that rates of Conduct and Oppositional Defiance Disorder were highest among adolescents between 13 and 18 years of age. Additionally, the current study also found that white children and adolescents were significantly more likely to receive a Behaviour Disorder diagnosis than children and adolescents from the other race groups. This finding is interesting; however, no other studies investigating the prevalence of Conduct or Oppositional Defiance Disorder across the different race groups in South Africa could be found by the researcher, and hence comparisons to other studies are difficult. One possible explanation for the significantly higher rate of white children as opposed to black children with Behaviour Disorder diagnoses is given by Nikapota, (1991, in Dawes & Donald 1994) who was writing on child psychiatry in developing countries: "…but conduct disorders rarely present. Difficult behaviour is not perceived as requiring help or treatment but rather as a situation requiring advice or discipline." (p.163). Thus, the reasons for the difference in presentation of Behaviour Disorders across different race groups, might be due to distinct cultural perceptions of what constitutes a disorder and what does not.

5.3.7 Additional noteworthy trends and patterns observed in the data

5.3.7.1 Gender distribution

One unanticipated finding in this study was that significantly more boys than girls were seen at the CFC throughout the three year-clusters. Although it is generally acknowledged that the overall rates of psychiatric disorders are almost identical for men and women, there are striking gender differences found in the patterns of mental illness (WHO, 2000). Thus previous research has found that, in general, women are more likely to seek treatment for mental health problems than men. Also, women predominate in disorders such as Depression,

Anxiety and somatic complaints, whereas men are more likely to be diagnosed with Antisocial Personality Disorder and Substance Abuse Disorder than women (WHO, 2000).

With regard to research on gender differences in mental health for children and adolescents there are conflicting results. In their investigations into the mental health of children in 12 European countries, Ravens-Sieberer, et al. (2008) found higher overall prevalence rates for females than for males. Several other studies, such as the one by Bansal & Barman (2011) from India and the one by Collishaw et al. (2004) from the UK, found no significant differences between the male and female distribution with regards to mental health problems. Yet "The mental health of children and adolescents in Great Britain" survey (Meltzer, Gatward, Goodman & Ford, 2000) found a higher rate of mental disorders for boys rather than girls, consistent with Harpaz-Rotem and Rosenheck (2004) who also reported higher rates for males over females. Hence, the current study supports the findings by the British national survey and by Harpaz-Rotem and Rosenheck (2004) regarding the considerable higher rate of boys seen for mental health problems.

The assumption that females seek help at much higher rates than males is clearly not given in this study; however, it has to be remembered that children do not generally refer themselves but are rather referred via parents, caregivers or teachers, and therefore this premise does not apply in this case. However, one could argue that it is usually mothers who act as the main referral agent. It also has to also be remembered that this current study does not constitute prevalence data as such, unlike some of the above studies, but rather prevalence data in a treatment sample and is therefore influenced by many additional factors.

5.3.7.2 Quantity of measures used in different year-clusters

The findings with regard to the number of assessment measures conducted were surprising, since it had been anticipated that a relationship between the assessment rigour and certain disorders would be found. However, the variable 'number of tests' only showed a significant association with regard to the year-cluster. Overall, it seems that in the 1997-1999 year-cluster significantly fewer than expected assessment measures were used, especially compared to the two other time periods. This could be related to the fact that in the 1990s, the racial composition of clients seen at the CFC changed dramatically and there might have been reluctance on the part of supervisors and instructors to use assessment measures which were not adapted or standardised for the multicultural South African society, as they may have

worried about 'culture fairness' in assessment (Foxcroft & Roodt, 2005). Therefore, the number of tests utilised during these years could have been less for those reasons, as only very few assessment measures were adapted to the South African multicultural and multilingual context at that time (Foxcroft & Roodt, 2005).

5.3.7.3 Non-significant associations

Interestingly, no statistically significant associations between for example the 'gender' and 'race', 'gender' and 'number of tests' and 'gender' and 'age group' variables were found, indicating that the age of the children, their race and the number of assessments they went through were not significantly related to their gender in this sample. Furthermore, there was also no significant association between the children's race group and the number of assessments they were subjected to or between their race group and their age, or for that matter, between their age and the number of assessments conducted. The 'diagnostic category' and 'number of tests' variables were statistically significant but violated the assumptions too much to be deemed suitable for interpretation (56.7% of cells have an expected count of less than 5 and the minimum expected count was 0.01). It can therefore be concluded that due to the small sample size, there were no further significant associations. Had the sample been considerably bigger, however (with fewer counts of zero), there would most probably have been several more significant associations.

5.3.7.4 Race distribution in the 1987-1989 year-cluster compared to the other year-clusters

In addition the findings of this study regarding the variability of the different race groups seen at the CFC in the different decades, especially the fact that during the late 1980s significantly fewer than expected black and Indian children and adolescents were seen, is an indication of the political and social situation in South Africa at large. As is evident from the population distribution discussed in Chapter Two, the race distribution in KwaZulu-Natal in 1996 (no official data for 1987-1989 could be found by the researcher) was: 82.8% black African, 9.3% Indian/Asian, 6.6% white and 1.4% Coloured. Hence, the race distribution of the children and adolescents seen at the CFC: 80.3% white, 9.6% black, 6.4% Indian and 3.6% Coloureds, does not at all reflect the distribution of race in the general population. Moreover, it has to be remembered that the CFC is located on premises of the University of KwaZulu-Natal and as such would most likely have experienced similar access issues in terms of race as the University itself (Woodrooffe, 2011), despite its outreach mission. The findings in relation to racial distribution of children and adolescents seen at the CFC in the

late 1980s can be regarded as an obvious artefact of apartheid and possibly also an indictment on the CFC's mission to serve the 'underserved', which it clearly did not achieve during that time period.

5.3.7.5 A note of caution

It has to be pointed out again that the current study is *not* a prevalence study and that caution must be exercised to not over-interpret the data. While the observed data does give an indication of the fluctuations in the CFC's catchment populations and institutions, it also points towards the different referral patterns and agents to the CFC. For instance, the Child Advocacy Centre (CAC), a project affiliated to the Department of Child Welfare which deals with child abuse and rape victims, has over the past ten years frequently used the CFC as a referral institution. Similarly, the hospital clinic at Grey's Hospital in Pietermaritzburg, which one morning per week offers the services of CFC interns to children referred by social workers and paediatricians and the various school projects, constitute referral bases to the CFC which did not exist prior to the mid-1990s (CFC - Annual report, 2005). All of these factors alongside the new 'nonracial' (Woodrooffe, 2011) South African society play a role in the changes relating to the racial distribution and prevalence of mental disorders of the clients seen at the CFC.

5.3.8 Relationships between the different diagnostic categories, year-clusters, race and age groups

The results of this study did show that the diagnostic categories for mental disorders and the 'race' and 'age' categories interacted with each other. It is interesting to note that Mood Disorder is fairly equally prevalent (in terms of numbers of cases seen) for both racial groupings and that the age spread (more 11-17 year olds) for both groups also remained consistent. This indicates that Mood Disorders are equally distributed between different race groups in the sample. This finding is consistent with that of Van Zyl (1990, in Dawes & Donald, 1994) who found a prevalence rate for depression of 25% for Coloured and 21% for white children.

As mentioned in Section 6.3.4, white children and adolescents had considerably higher rates of Anxiety Disorder than the black race group. The interaction between disorders, age and race highlights the fact that Anxiety Disorders also seems to be more prevalent in the younger age group (three to ten years) for both racial groups. This differs from the previous findings

by Harpaz-Rotem and Rosenheck (2004) who observed higher rates of anxiety for the adolescent age group (13-18 years) compared to younger children (0-12 years).

One highly speculative possible explanation for the fact that the younger age group showed higher rates of anxiety could be that younger children are perhaps more sensitive in picking up insecurities and anxiety related to the turbulent political times in their parents and caregivers. Coupled with the fact that they are intellectually not quite able to understand the situation and have perhaps even been exposed to some forms of violence (be it directly or indirectly, eg. through the media), this could possibly explain the higher rates of anxiety in the younger children

Similarly the rates for ADD/ADHD, abuse and Learning Disorders are higher for three-to-ten-year-olds in both race groups. These findings are less surprising since ADD/ADHD and Learning Disorders are generally more frequently diagnosed in younger children (Mandell et al., 2005) and the rates of sexual abuse for instance, are generally also higher for younger children (Levett, 1993, in Dawes & Donald, 1994). Likewise, the rates for Mental Retardation and PDDs appear mostly higher for the younger age groups across both race groups as well. This is in line with previous research regarding the early diagnosis of these disorders in general (Nassar et al., 2009).

5.3.9   The changes in psychological assessment over three decades

Surveys on the usage of psychological assessment measures appear regularly in the research literature; however, the majority of these test utilisation studies focus primarily on procedures for adults rather than children and adolescents (Cashel, 2002; Kamphaus et al., 2000). The few studies, which incidentally are all from the USA, that have focused on child and adolescent assessment, report overall little change in both the assessment practices and choice of tests over the past two or three decades. However, a few noteworthy trends regarding child and adolescent assessment practices have been reported recently (Cashel, 2002; Kamphaus et al., 2000). The findings from the current study seem to be consistent with the findings from the USA studies in that a similar increase (from rank 36 to rank 12 over the 20 years) in the use of structured observations (especially school observations) as noted by both Cashel (2002) and Kamphaus et al. (2000) is observed in this study. Additionally, the American studies report a decrease in popularity of the Rorschach Inkblot test, which also accords with the current findings since this test was not used at all in the most recent time period. Overall,

the results from this study with regard to test utilisation are very similar to the international findings in that several of the instruments that were ranked in the top ten in the three year-clusters namely: the Bender Visual Motor Gestalt test, the Draw-A-Person test, the TAT, the KFD and the WISC, were also in the top ten in the overseas studies.

However, a few noteworthy differences from the research from the USA were also revealed, for example, the previous research indicated a significant increase in usage of behaviour rating scales such as the Conner's Parent/Teacher Rating Scales. Yet no such increase was observed in the current study; rather, the usage of the Conner's Rating Scales remained consistent over the three time periods in question. In addition, Kamphaus et al. (2000) report a decrease in usage of the WRAT, whereas the current study found a considerable increase in its usage from 0.4% to 3.3% (this equals a 72.5% increase) over the twenty-year time period.

It has to be noted, however, that the CFC is a psychological training institution, and as a result of this, it is likely that only those tests which have been 'taught' and suggested to the Masters students and interns, who at any given time are working at the centre, will be utilised. The researcher herself was trained at this institution in recent years, and was, for instance, not instructed in the use of the Rorschach Inkblot test. Thus, test utilisation is strongly linked to the preferred assessment measures by lecturers and professors who are instructing and supervising the trainee-psychologists at the Centre. This would explain the variability in rankings between the 1980s, 1990s and the recent years with regard to the WISC, for example. The WISC was ranked ninth in the 1987-1989 and eighth in the 2007-2009 year-cluster; however, in between, in the 1997-1999 year-cluster it dropped to rank 34. This would seem to suggest that during the late 1990s, students were not being instructed with regard to the use of the otherwise very popular WISC. Similarly the Raven's Coloured Progressive Matrices test, the Junior South African Individual Scale (JSAIS) and the HTP showed wide variability between their rankings in the different year-clusters. It is possible, as suggested above, that this variability is due to preferential bias on the part of the instructors rather than popularity of assessment measures in South Africa in general. Conversely, these preferences might be informed by several factors such as the changes in the racial composition of the clients seen at the CFC, established reliability and validity for the South African setting and issues relating to applicability in the multicultural South African context. Hence, one reason for the WISC's unpopularity in the 1990s could very likely be the fact that many more black children were seen at the Centre during that time period, and since the

WISC is standardised for mainly white populations, the supervisors may have deemed it culturally more acceptable to use other assessment measures such as the JSAIS or the Raven's Progressive Matrices for black children.

5.4   Major findings from the current study

The current study seems to support many of the internationally observed diagnostic trends with regard to children's and adolescents' mental health problems. The internationally observed increases with regard to the diagnosis of ADD/ADHD, Mood Disorder and PDDs are also demonstrated in the results of this study. Additionally, the decreases in the diagnostic rates of Mental Retardation and Behaviour Disorders described in the existing literature are equally observed in this sample from a South African psychological community service centre. However, the internationally described increases in Anxiety Disorder Diagnoses could not be corroborated by the findings of this study. On the contrary, the results of the study indicated that the rates for both Anxiety Disorder and PTSD appeared to be higher in the late 1980s and 1990s than in the recent years. This supports the initial hypothesis that the continuous social conflict and political violence in the Pietermaritzburg area between the late 1980s and mid-1990s had an impact on children's and adolescents' psychological well-being. However, it was expected that this increase in the rates of Anxiety Disorder would be mainly observed in the black population, who undoubtedly were exposed to the majority of the unrest and violence. This was, however, not the case, probably due to the fact that only very few black children and adolescents were seen at the CFC in the late 1980s, thus most of the high rates of Anxiety Disorder belonged to white children in the sample. It is nevertheless important to remember that white children were very likely also exposed to some of the unrest and social conflict, even if it was mainly indirectly, and that this could possibly be the reason for the high observed rates of anxiety-related disorders.

The findings from this study also reveal that the usage of psychological assessment measures is very similar to the trends found in the international research literature regarding this topic. The only differences were, firstly, that the current study did not come across any increases in the usage of behaviour rating scales such as the Conners Parent/Teacher Rating Scale and, secondly, that although an international decrease in the usage of the WRAT was reported, the current study found a 72.5% increase in its usage at the CFC over the past twenty years. These differences are possibly due to preferential bias regarding certain assessment measures on the part of the supervisors and instructors of the students and interns working at the CFC,

as well as availability and suitability of the different assessment instruments for a South African setting.

The very few black children and adolescents seen at the centre in the late 1980s can very likely be regarded as an artefact of the apartheid system and possibly also a failure on the part of the CFC to "serve <u>all</u> sections [*sic*] of the Pietermaritzburg and Natal Midlands population" (*History of the CFC*, 1988, p. 2).

5.5   Limitations of the current study

The present study is subject to some information bias as a result of using material from case files that were recorded for clinical use rather than for research purposes. Hence, some of the information could have been misinterpreted or even overlooked. Due to different individual coding practices by past interns and Masters students, the reliability of the data in the original case files might be low and the validity is unknown. The analysis was also restricted to the files located in the CFC archives; hence, files from the outreach programmes of the CFC, such as hospital clinics and schools could not be accessed. This may have led to lower overall rates for both mental disorders and racial distributions.

Additionally, the data abstraction form only allowed for one single diagnosis. No co-morbid conditions were recorded. It is also important to bear in mind that the current study only looked at nine years of a time interval spanning twenty years. This may have led to missing important trends, for example, directly after the 'Midlands War' years in the early to mid-1990s, as there could be some latency expected with regard to clinical presentation. It is also unclear how representative the study is for the entire population as it is not an epidemiological study, but rather a small exploratory study relating to changes and trends in a local psychological community and training centre in KwaZulu-Natal. It also has to be taken into consideration that many statistical tests were conducted on the data; this also increases the risk of the researcher making errors in either accepting or rejecting the null hypothesis. This study was also limited, given that the obtained data set enabled the researcher to describe diagnostic trends over time, but it was beyond the scope of the study to examine the causes of the observed changes in detail.

5.6   Suggestions for further research

Although this study is considered a very useful investigation into the changes in outpatient child and adolescent assessment practices and into the trends in the diagnosis of children and

adolescents at a South African community and psychological training centre over twenty years, further studies need to be conducted using larger samples and possibly also consecutive years rather than ten-year intervals. Even though the results from this study are both useful and meaningful at a local level, they can also be used to inform and guide future research that should be conducted on a larger, potentially national scale. Further longitudinal epidemiological research is needed to examine more closely the changes in rates of mental illnesses among children and adolescents in South Africa. Kleintjes et al. (2006) also stress the need for more methodologically sound prevalence studies in South Africa. Such studies should be conducted at regular intervals in order to follow the changes in prevalence of mental disorders among children and adolescents (Harpaz-Rotem & Rosenheck, 2004). However, since such studies would cost a tremendous amount of money, it would be more appropriate to conduct some further comparative South African studies in order to determine whether or not the changes observed in this study apply to other local psychological service institutions.

Chapter 6

<u>Conclusion</u>

Child and adolescent mental health is of considerable public health relevance due to the increasingly high prevalence of mental illness in children and adolescents and the lifelong negative consequences it often generates. Yet the importance of child and adolescent mental health and well-being has only recently begun to be acknowledged as a health priority both internationally and locally. In South Africa, the history and legacy of apartheid and our country's current social conditions indicate that our population may be at particularly high risk for developing mental disorders. The very fact that mental illness impacts not only on the affected individuals but also on their families, communities and societies highlights the importance of early detection, treatment and prevention of mental disorders. This necessitates research into the burden and patterns of mental health disorders in young people. It has to be investigated whether the trends and patterns for mental illness in South Africa differ from those observed in other parts of the world in order to inform both preventative and curative services for South African children and adolescents.

This study was an explorative, retrospective chart review analysis of 679 case files of children and adolescents from a University based community service and psychological training centre in Pietermaritzburg, KwaZulu-Natal from two important historical time periods in South African and local history (1987-1989 and 1997-1999) compared to the recent years (2007-2009). In conducting the study, it was hoped to ascertain whether the diagnostic rates for the children and adolescents seen at the local service centre over the twenty-year time span, differed from the internationally observed rates. It was hypothesised that the years of social conflict and political violence in the Pietermaritzburg area (namely 1987-1989) would have had an impact on children's and adolescents' psychological development and that this would be reflected in the case files of the children seen during those years. Additionally, the study also looked at the psychological assessment practices and measures used at the centre in order to determine whether there had been any changes in the assessment procedures used over the twenty years and whether these changes would be similar to internationally observed changes regarding assessment practices for children and

adolescents. The findings of this study revealed that both the internationally observed increases in the diagnostic rates for ADD/ADHD, Mood Disorder and PDDs, and decreases in the diagnostic rates of Mental Retardation and Behaviour Disorders were confirmed in this current research. However, the internationally portrayed increases in Anxiety Disorder diagnoses contrasted with the findings of this study. Quite the opposite was found. The results of the study revealed that the rates for both Anxiety Disorder and PTSD were considerably higher, especially for young white children, in the late 1980s and 1990s when compared to the recent years. This finding supports the initial hypothesis that the political violence and social unrest in the area around Pietermaritzburg during that time period could have affected the psychological well-being of children. The fact that it appeared to be surprisingly mainly white children who were affected, may be linked to both the apartheid system at the time and the reality of the community service centre's inability to serve the marginalised and under-resourced sections of the population at that time.

In addition, statistically significant relationships were found to exist between different diagnostic categories, the three different time periods and a number of variables of interest, including race and age groups. The results relating to the psychological assessment procedures used across the twenty-year time span were comparable to the internationally observed trends except for one or two variations relating to specific test instruments, namely the Conners Parent and Teacher Rating Scales, which were used less at the local setting and the Wide Range Achievement Test (WRAT) which was used more frequently than observed internationally.

In conclusion, the current research has attempted to make a useful contribution to the existing sparse body of literature on child and adolescent mental health trends in South Africa. In the face of increasing prevalence of mental disorders among children and adolescents worldwide, it is hoped that this exploration will add some insight into the situation in South Africa, even if at a localized level, pointing towards improving the services for children and adolescents with mental health problems. Finally, it is also anticipated that this study will emphasize the need for further research on the patterns and trends in childhood mental health diagnosis on a larger, perhaps even national scale, since mental health service planning should be based on systematic localized analyses of the overall need for mental health services in a given region.

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Appendix A

07 November 2011

Christina Mitchell

17 Barron Road

Hillcrest

3610

Dear Christina

Permission to access Child and Family Centre files for research purposes

Your letter requesting consent to access the Child and Family Centre files for your research towards your master's degree refers. The matter has been discussed at the CFC committee meeting and you are hereby granted permission to access the files and clients details relevant to your project entitled: **Exploration of changed in outpatient clinical presentation and diagnosis in children and adolescents at a South African community service and psychological training centre from 1987 to 2009.**

This permission is granted subject to the following conditions:
   a) You sign a confidentiality agreement whereby you agree to keep confidential the information you will have access to and that no direct reference is made to client information in your thesis or in any subsequent publications.
   b) If a person known to your emerges as a potential subject for your research, you will delegate the extraction of information and allocation of a pseudonym to a research assistant/ your supervisor.

Yours faithfully

Bev Killian (PhD)

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Appendix B

Appendix B - Data Abstraction Form for CFC Case files

1. **Abstractor Code**: ☐☐	2. **File Code**: ☐☐☐☐☐

3. **Year:**

☐ 1987 ☐ 1989 ☐ 1997 ☐ 1999 ☐ 2007 ☐ 2009
☐ 1988 ☐ 1998 ☐ 2008

4. **Sex:** ☐ male ☐ female

5. **Age:**

_____ Years   **Age Group**: ☐ 4-8 years ☐ 9-12 years ☐ 13-17 years

6. **Race:** ☐ Black ☐ Indian ☐ White ☐ Coloured

6. **Diagnostic Categories/ Clinical presentation: (tick only one - the 'main' complaint/diagnosis)**

☐ Mood Disorder features(depression, dysthymia, bipolar)
☐ Anxiety features (generalized, Panic, Phobias)
☐ PTSD features
☐ ADD/ADHD features
☐ Behaviour Disorder features (conduct disorder, ODD)
☐ Elimination Disorder features (Enuresis, Encopresis)
☐ Tic Disorder features
☐ Mental retardation features
☐ Learning Disorder features
☐ Pervasive Developmental Disorder features (Autism, Aspergers, etc.)
☐ Communication Disorder features
☐ Sleep/ Sleepwalking Disorder features
☐ Eating Disorder features
☐ Personality Disorder features
☐ Sexual/ Gender Identity Disorder features
☐ Abuse (sexual, physical, emotional)
☐ Substance related problems
☐ Schizophrenia /psychotic
☐ Volunteer Assessment
☐ School Readiness Assessment
☐ other, specify _____

_____

7. **Diagnostic procedures/practices: (tick all that are relevant)**

☐ clinical interview
☐ projective assessment measures (Rorschach, TAT/CAT)
☐ psychometric/ cognitive assessment measures (WISC, SSAIS, DAP etc)
☐ educational/ achievement assessment measures (WRAT, NARA etc)
☐ career assessment measures
☐ personality assessment measures
☐ emotional assessment measures (Bene Anthony etc.)
☐ drawings (KFD, HTP, HFD)
☐ Parent & teacher rating scales (ex. Conner's)
☐ neuropsychological assessment measures (NEPSY etc)
☐ Visual perceptual/motor measures (Bender Gestalt etc.)
☐ Structured observation (school, play etc.)
☐ other, specify_____

Please specify which measures were used:
_____
_____
_____

Manual on the abstraction of diagnostic categories/presenting problems and diagnostic practices

1. How to assign a diagnostic category:

   There are in total 21 categories (the categories are self-explanatory and have been discussed during the design stage of the abstraction form; please refer to the actual abstraction form for the list of 21) to which a case file can be assigned. Mostly it is fairly obvious from the *case report* which the appropriate category is. However, for those files that do not contain any reports, you have to go through all the notes and assessments in order to establish which the most appropriate category would be. Sometimes it is not possible to determine the final diagnosis and only the *presenting problem* (PP) will be presented. In those cases, please go through the whole file in order to determine whether or not the assessments conducted pertain to the presenting problem (PP) or if anywhere in the notes any diagnosis is mentioned. If no further mention of a diagnosis is found and the assessments are in congruence with the PP, use the PP as the "diagnosis". (For ex. PP = learning disorder features, assessments on cognitive and scholastic abilities, and from assessments it is clear that child has a problem with mathematical tasks…= learning disorder as final diagnosis).

   Also, sometimes there are *more than two possible diagnoses* mentioned in the file; again you will have to go through the file in detail and determine from the assessment results and the notes which is the most appropriate one. In cases where both seem to apply (co-morbidity), choose the one which presents as the main complaint (most impairment for child's functioning), since **only one** category can be ticked on the abstraction form!

   Please also note that if you come across a **specific** Mood Disorder such as Bipolar Disorder or Major Depressive disorder, could you please write it down behind your selection, just in case the data will be used differently than anticipated. The same goes for Anxiety disorders (panic, obsessive compulsive, etc.) and any other more specific diagnoses you may come across!

2. How to assign a category to the assessment procedures/practices:

   There are 12 categories for the specific procedures and practices (tick all that are relevant!), and the measures belonging to each category are listed below. Please note

that over and above ticking all the relevant categories it is also necessary to *list each and every one* of the measures used in the area provided.

- <u>Clinical Interview</u>: Please tick every time this was obviously conducted according to case file. It is expected that most files would include this category!

- <u>Projective Assessment Measures</u>: These include the Rorschach, the TAT/CAT and the Incomplete Sentences + any other you come across.

- <u>Psychometric/Cognitive Assessment Measures</u>: These include the WISC, NSAIS, SSAIS, SSAIS-Z, WAIS, JSAIS, McCarthy Scales, South African Individual Scales, the ISISA (Indv. Scale for Indian South Africans), the Black Individual Scale, Ravens CPM and SPM and the DAP (Draw a Person Test, please note only include in this category when used as cognitive assessment; when used as projective drawing it is the HFD and must be recorded under Drawings!) + any other you come across.

- <u>Educational/Achievement Assessment Measures:</u> includes the WRAT, NARA, Burt Reading Test, Schonell Spelling Test, Gapadol Reading Comprehension Test, MacMillan Reading Analysis, Boder Test of Reading and Spelling, Watts-Vernon Reading Test and the Vernon Spelling Test + any other you come across.

- <u>Drawings:</u> Include the HTP (House Tree Person), the KFD (Kinetic Family Drawing test), HFD (Human Figure Drawing) and the KSD (Kinetic School Drawing), + any other you come across.

- <u>Career Assessment Measures</u>: SDS (Self-Directed Search), CDQ (Career Development Questionnaire), Brown Holtzman Survey of Study Habits, Strong Campbell Interest Inventory, Work Values Inventory + any other you come across.

- <u>Personality Assessment Measures</u>: Keirsey Temperament Sorter, Myers-Briggs, NEO-PI-R, HSPQ (High School Personality Questionnaire), MCMI and MMPI + any other you come across.

- <u>Emotional Assessment Measures</u>: Bene-Anthony Family Relations Test + any other you come across.

- <u>Parent/Teacher Rating Scales</u>: Conners' Parent and Conners' Teacher Rating Scale + any other you come across.

- Neuropsychological Assessment Measures: NEPSY, Rey Complex Figure, Draw a Bicycle, Quick Neurological Screening Test, RAVLT/CAVLT, Trailmaking test, + any other you come across.

- Visual Perceptual/Motor Assessment Measures; Benton Visual Retention Test, Bender Gestalt Test, Beery Visual Motor Integration Test, VADS, Symbol Digits, Purdue Pegboard + any other you come across.

- Structured Observations: School Observation and Play Observation.

- Other: any that do not fit into above mentioned categories!

Appendix C

Table 3. Description of the variables on the basis of their categories

Variables	No. of categories	Names and values of categories
Gender	2	1=male 2=female
Age	Continuous Variable	Range from 3-17 years
AgeGroup	3	1= 3-8yrs 2= 9-12yrs 3= 13-17yrs
Race	4	1=Black 2=Indian 3=White 4=Coloured
Race collapsed	3	1=Black 2=Indian and Coloured 3=White
Diagnostic Cat	10	1= Mood Disorder Features 2= Anxiety Disorder Features 3=PTSD Features 4=ADD/ADHD Features 5=Behaviour Disorder Features 6= Mental Retardation Features 7= Learning Disorder Features 8=Pervasive Developmental Disorder Features 9= Abuse 10=Other
YearGroup	9	1=1987 2=1988 3=1989 4=1997 5=1998 6=1999 7=2007 8=2008 9=2009
YearCluster	3	1= 1987-1989 2=1997-1999 3=2007-2009
Number of tests	Continuous Variable	Range from 0-14

Grouped Number of Tests	5	1= no tests
		2=1-4 tests
		3=5-8 tests
		4= 9-11 tests
		5= 12-14 tests
Type of Assessment	12	1=Projective Assessments
		2=Psychometric/Cognitive Assessments
		3= Educational/Achievement Measures
		4= Career Assessment Measures
		5=Personality Assessment Measures
		6= Emotional Assessment Measures
		7= Drawings
		8= Parent/Teacher Rating Scales
		9=Neuropsychological Assessment Measures
		10= Visual Perceptual/Motor Assessment Measures
		11=Structured Observations
		12=Other
Clinical Interview	2	0=no
		1=yes
Rorschach	2	0=no
		1=yes
TAT/CAT	2	0=no
		1=yes
Incomplete sentences	2	0=no
		1=yes
WISC	2	0=no
		1=yes
NSAIS	2	0=no
		1=yes
SSAIS	2	0=no
		1=yes
SSAISZ	2	0=no
		1=yes
WAIS	2	0=no
		1=yes
JSAIS	2	0=no
		1=yes
McCarthyScales	2	0=no
		1=yes
IndividualscaleSA	2	0=no
		1=yes
ISISA	2	0=no

		1=yes
Blacksindividualscale	2	0=no 1=yes
RavensSPM	2	0=no 1=yes
RavensCPM	2	0=no 1=yes
DAP	2	0=no 1=yes
WRAT	2	0=no 1=yes
NARA	2	0=no 1=yes
BURT	2	0=no 1=yes
Schonell	2	0=no 1=yes
Gapadol reading comprehension	2	0=no 1=yes
MacMillan Reading	2	0=no 1=yes
Boder test of reading and spelling patterns	2	0=no 1=yes
WattsVernon reading test	2	0=no 1=yes
SDS	2	0=no 1=yes
CDQ	2	0=no 1=yes
Brown Holtzman Survey of study habits and attitudes	2	0=no 1=yes
Keirsey	2	0=no 1=yes
Myers-Briggs	2	0=no 1=yes
NEOPIR	2	0=no 1=yes
Work Values Inventory	2	0=no 1=yes
HSPQ	2	0=no 1=yes
Bene-Anthony	2	0=no 1=yes

KFD	2	0=no 1=yes
HTP	2	0=no 1=yes
HFD	2	0=no 1=yes
KSD	2	0=no 1=yes
Conners Parents	2	0=no 1=yes
Conners Teacher	2	0=no 1=yes
NEPSY	2	0=no 1=yes
REY Complex Fig	2	0=no 1=yes
Draw a Bic	2	0=no 1=yes
Quick Neuro Screen	2	0=no 1=yes
RAVLT	2	0=no 1=yes
Trailmaking	2	0=no 1=yes
BentonVisualRetentionTest	2	0=no 1=yes
Bender Gestalt	2	0=no 1=yes
Beery Dev.TestofVisualmotorintegration	2	0=no 1=yes
VADS	2	0=no 1=yes
SymbolDigitsModalitiestest	2	0=no 1=yes
Purdue Pegboard	2	0=no 1=yes
School Ob	2	0=no 1=yes
Play Ob	2	0=no 1=yes
Vinelands social maturity scale	2	0=no 1=yes
MCMI	2	0=no

		1=yes
MMPI	2	0=no 1=yes
IPAT Anxietyscale	2	0=no 1=yes
Piers Harries Self-concept scale	2	0=no 1=yes
Other	2	0=no 1=yes

Table 4: Cross-tabulation (percentages) of diagnostic category and year-cluster

			Yearcluster			
			1987-1989	1997-1999	2007-2009	Total
Diagnostic Category	Mood Disorder Features	Count	25	30	29	84
		% within Diagnostic Cat	29.8%	35.7%	34.5%	100.0%
		% within Yearcluster	10.0%	12.6%	15.2%	12.4%
	Anxiety Disorder Features	Count	40	27	21	88
		% within Diagnostic Cat	45.5%	30.7%	23.9%	100.0%
		% within Yearcluster	16.1%	11.3%	11.0%	13.0%
	PTSD Features	Count	3	6	2	11
		% within Diagnostic Cat	27.3%	54.5%	18.2%	100.0%
		% within Yearcluster	1.2%	2.5%	1.0%	1.6%
	ADD/ADHD Features	Count	22	20	26	68
		% within Diagnostic Cat	32.4%	29.4%	38.2%	100.0%
		% within Yearcluster	8.8%	8.4%	13.6%	10.0%
	Behaviour Disorder features	Count	38	24	18	80
		% within Diagnostic Cat	47.5%	30.0%	22.5%	100.0%
		% within Yearcluster	15.3%	10.0%	9.4%	11.8%
	Mental Retardation Features	Count	24	24	13	61
		% within Diagnostic Cat	39.3%	39.3%	21.3%	100.0%
		% within Yearcluster	9.6%	10.0%	6.8%	9.0%
	Learning Disorder Features	Count	42	60	33	135
		% within Diagnostic Cat	31.1%	44.4%	24.4%	100.0%
		% within Yearcluster	16.9%	25.1%	17.3%	19.9%
	Pervasive Developmental Disorder Features	Count	0	2	3	5
		% within Diagnostic Cat	.0%	40.0%	60.0%	100.0%
		% within Yearcluster	.0%	.8%	1.6%	.7%
	Abuse	Count	15	20	15	50
		% within Diagnostic Cat	30.0%	40.0%	30.0%	100.0%
		% within Yearcluster	6.0%	8.4%	7.9%	7.4%
	Other	Count	40	26	31	97
		% within Diagnostic Cat	41.2%	26.8%	32.0%	100.0%
		% within Yearcluster	16.1%	10.9%	16.2%	14.3%
Total		Count	249	239	191	679
		% within Diagnostic Cat	36.7%	35.2%	28.1%	100.0%
		% within Yearcluster	100.0%	100.0%	100.0%	100.0%

Table 5: Top 35 assessment instruments and procedures for 1987-1989.

Tests	Rank	Tests	Rank
Clinical Interview	1	McCarthy Scales	20
KFD	2	Rey Complex Figure	20
HFD	3	Vineland Social Maturity Scale	20
TAT/CAT	4	JSAIS	22
Bender Gestalt Test	5	Ravens CPM	23
SSAIS	6	Rorschach Inkblot Test	26.5
DAP	7	Incomplete Sentences Test	26.5
Bene-Anthony Fam. Rel.	8	ISISA (Individual Scale for Indian...)	26.5
WISC	9	MacMillan Reading Analysis	26.5
"Other"	10	Conners Parent Rating Scale	26.5
HTP	11	Draw a Bicycle	26.5
NARA	12	Black Individual Scale	32.5
Play Observation	13	Ravens SPM	32.5
NSAIS	15	WRAT	32.5
Schonell Spelling Test	15	Boder Test of Reading and Spelling	32.5
Beery VMI Test	15	Quick Neurological Screening Test	32.5
Conners Teacher Rating Scale	17.5	Trailmaking test	32.5
VADS	17.5	School Observation	36

Table 6: Top 34 assessment instruments and procedures for 1997-1999.

Tests	Rank	Tests	Rank
Clinical Interview	1	Incomplete Sentences Test	19.5
KFD	2	Play Observation	19.5
HFD	3	VADS	21
Bender Gestalt Test	4	Conners Teacher Rating Scale	22
SSAIS	5	Watts/Vernon Reading & Spelling	23.5
Bene-Anthony Fam. Rel.	6	Vineland Social Maturity Scale	23.5
TAT/CAT	7	Rorschach Inkblot Test	25.5
DAP	8	Rey Complex Figure	25.5
Burt Reading Test	9	Symbol Digits Modalities Test	27
JSAIS	10	SDS	29.5
McCarthy Scales	11	CDQ	29.5
Ravens CPM	12	RAVLT/CAVLT	29.5
Schonell Spelling Test	13	Trailmaking test	29.5
School Observation	14	Beery VMI Test	32
NARA	15.5	WISC	34
"Other"	15.5	Work Values Inventory	34
SSAIS-Z	17.5	Purdue Pegboard	34
HTP	17.5		

Table 7: Top 35 assessment instruments and procedures for 2007-2009.

Tests	Rank	Tests	Rank
Clinical Interview	1	RAVLT/CAVLT	18.5
KFD	2	Conners Teacher Rating Scale	20
DAP	3.5	NARA	21
Bender Gestalt Test	3.5	Ravens SPM	23
HTP	5	Vineland Social Maturity Scale	23
Bene-Anthony Fam. Rel.	6	Piers-Harris Self-Concept Scale	23
TAT/CAT	7	NSAIS	26.5
WISC	8	Work Values Inventory	26.5
Ravens CPM	9.5	Conners Parent Rating Scale	26.5
HFD	9.5	Trailmaking test	26.5
WRAT	11	WAIS	30
School Observation	12	SDS	30
Incomplete Sentences Test	13	CDQ	30
"Other"	14	Keirsey Temperament Sorter	32.5
SSAIS	15	NEPSY	32.5
McCarthy Scales	16.5	NEO-PI-R	35
Play Observation	16.5	Beery VMI Test	35
JSAIS	18.5	MCMI	35

Table 8: Test * Year-Cluster cross-tabulation with percentages

			YearCluster			
			1987-1989	1997-1999	2007-2009	Total
Test	Clinical Interview	Count	229	191	169	589
		% within YearCluster	17.1%	19.0%	16.1%	17.4%
	Rorschach	Count	9	7	0	16
		% within YearCluster	.7%	.7%	.0%	.5%
	TAT/CAT	Count	109	58	60	227
		% within YearCluster	8.2%	5.8%	5.7%	6.7%
	Incomplete Sentences	Count	9	12	15	36
		% within YearCluster	.7%	1.2%	1.4%	1.1%
	WISC	Count	45	2	43	90
		% within YearCluster	3.4%	.2%	4.1%	2.7%
	NSAIS	Count	17	0	6	23
		% within YearCluster	1.3%	.0%	.6%	.7%
	SSAIS	Count	71	65	13	149
		% within YearCluster	5.3%	6.5%	1.2%	4.4%
	SSAIS-Z	Count	0	13	0	13
		% within YearCluster	.0%	1.3%	.0%	.4%
	WAIS	Count	1	0	5	6
		% within YearCluster	.1%	.0%	.5%	.2%
	JSAIS	Count	12	27	10	49
		% within YearCluster	.9%	2.7%	1.0%	1.4%
	McCarthy Scales	Count	13	23	12	48
		% within YearCluster	1.0%	2.3%	1.1%	1.4%
	Individual SA Scale	Count	3	0	0	3
		% within YearCluster	.2%	.0%	.0%	.1%
	ISISA (Indiv. Scale for Indian South Africans)	Count	9	0	0	9
		% within YearCluster	.7%	.0%	.0%	.3%
	Black Individual Scale SA	Count	6	0	0	6
		% within YearCluster	.4%	.0%	.0%	.2%
	Ravens SPM	Count	5	1	7	13
		% within YearCluster	.4%	.1%	.7%	.4%
	Raven's CPM	Count	11	20	42	73
		% within YearCluster	.8%	2.0%	4.0%	2.2%
	DAP	Count	66	52	83	201
		% within YearCluster	4.9%	5.2%	7.9%	5.9%
	WRAT	Count	6	0	35	41
		% within YearCluster	.4%	.0%	3.3%	1.2%
	NARA	Count	21	14	8	43
		% within YearCluster	1.6%	1.4%	.8%	1.3%
	Burt Reading Test	Count	3	30	1	34
		% within YearCluster	.2%	3.0%	.1%	1.0%
	Schonell Spelling Test	Count	17	18	0	35
		% within YearCluster	1.3%	1.8%	.0%	1.0%
	Gapadol Reading Comprehension Test	Count	3	0	0	3
		% within YearCluster	.2%	.0%	.0%	.1%
	MacMillan Reading Analysis	Count	10	0	0	10
		% within YearCluster	.7%	.0%	.0%	.3%
	Boder test of reading and spelling	Count	6	0	0	6
		% within YearCluster	.4%	.0%	.0%	.2%
	Watts-Vernon reading test/ Vernon Word Spelling test	Count	0	8	0	8
		% within YearCluster	.0%	.8%	.0%	.2%

SDS	Count	1	5	5	11
	% within YearCluster	.1%	.5%	.5%	.3%
CDQ	Count	0	5	5	10
	% within YearCluster	.0%	.5%	.5%	.3%
Brown-Holtzman Survey of study habits and attitudes	Count	3	1	0	4
	% within YearCluster	.2%	.1%	.0%	.1%
Keirsey Temperament Sorter	Count	0	1	4	5
	% within YearCluster	.0%	.1%	.4%	.1%
Myers-Briggs	Count	0	1	1	2
	% within YearCluster	.0%	.1%	.1%	.1%
NEO-PI-R	Count	0	0	3	3
	% within YearCluster	.0%	.0%	.3%	.1%
Work Values Inventory	Count	0	2	6	8
	% within YearCluster	.0%	.2%	.6%	.2%
HSPQ (High School Personality Questionnaire)	Count	1	1	0	2
	% within YearCluster	.1%	.1%	.0%	.1%
Bene Anthony Family Relations Test	Count	54	61	63	178
	% within YearCluster	4.0%	6.1%	6.0%	5.2%
KFD	Count	144	106	126	376
	% within YearCluster	10.8%	10.5%	12.0%	11.1%
HTP	Count	26	13	81	120
	% within YearCluster	1.9%	1.3%	7.7%	3.5%
HFD	Count	141	101	42	284
	% within YearCluster	10.6%	10.0%	4.0%	8.4%
KSD	Count	0	1	1	2
	% within YearCluster	.0%	.1%	.1%	.1%
Conners' Parent Rating Scale	Count	9	0	6	15
	% within YearCluster	.7%	.0%	.6%	.4%
Conners' Teacher Rating Scale	Count	16	9	9	34
	% within YearCluster	1.2%	.9%	.9%	1.0%
NEPSY	Count	0	0	4	4
	% within YearCluster	.0%	.0%	.4%	.1%
Rey Complex Figure Test	Count	13	7	2	22
	% within YearCluster	1.0%	.7%	.2%	.6%
Draw a bicycle	Count	10	0	1	11
	% within YearCluster	.7%	.0%	.1%	.3%
Quick Neurological Screening test	Count	5	1	0	6
	% within YearCluster	.4%	.1%	.0%	.2%
RAVLT/CAVLT (Reys auditory verbal learning test)	Count	0	5	10	15
	% within YearCluster	.0%	.5%	1.0%	.4%
Trailmaking test	Count	5	5	6	16
	% within YearCluster	.4%	.5%	.6%	.5%
Benton Visual Retention Test	Count	3	0	0	3
	% within YearCluster	.2%	.0%	.0%	.1%
Bender Gestalt Test	Count	106	67	83	256
	% within YearCluster	7.9%	6.7%	7.9%	7.5%
Beery Visual Motor Integration test	Count	18	4	3	25
	% within YearCluster	1.3%	.4%	.3%	.7%
VADS (Visual Digit Span test)	Count	16	11	0	27
	% within YearCluster	1.2%	1.1%	.0%	.8%
Symbol Digits Modalities Test	Count	1	6	2	9
	% within YearCluster	.1%	.6%	.2%	.3%
Purdue Pegboard	Count	3	2	0	5
	% within YearCluster	.2%	.2%	.0%	.1%

	School Observation	Count	4	15	34	53
		% within YearCluster	.3%	1.5%	3.2%	1.6%
	Play Observation	Count	19	12	12	43
		% within YearCluster	1.4%	1.2%	1.1%	1.3%
	Vineland Social Maturity Scale	Count	14	8	7	29
		% within YearCluster	1.0%	.8%	.7%	.9%
	MCMI	Count	3	0	3	6
		% within YearCluster	.2%	.0%	.3%	.2%
	MMPI	Count	3	0	2	5
		% within YearCluster	.2%	.0%	.2%	.1%
	IPAT Anxiety Scale	Count	2	0	0	2
		% within YearCluster	.1%	.0%	.0%	.1%
	Piers-Harris Children's Self Concept Scale	Count	0	0	7	7
		% within YearCluster	.0%	.0%	.7%	.2%
	Other	Count	35	14	14	62
		% within YearCluster	2.6%	1.4%	1.3%	1.8%
Total		Count	1336	1005	1051	3392
		% within YearCluster	100.0%	100.0%	100.0%	100.0%

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Table 10: Chi-Square for Diagnostic Category * Year-cluster

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	28.769[a]	18	.051
Likelihood Ratio	29.737	18	**.040**
Linear-by-Linear Association	.003	1	.960
N of Valid Cases	679		

a. 6 cells (20.0%) have expected count less than 5. The minimum expected count is 1.41.

Table 12: Adjusted residuals for Diagnostic Category * Age Group cross-tabulation

			Age Group			
			3-8 years	9-12years	13-17years	Total
Diagnostic Cat	Mood Disorder Features	Count	18	23	43	84
		Expected Count	33.4	28.1	22.5	84.0
		Adjusted Residual	**-3.7**	-1.3	**5.4**	
	Anxiety Disorder Features	Count	32	43	13	88
		Expected Count	35.0	29.4	23.6	88.0
		Adjusted Residual	-.7	**3.3**	**-2.7**	
	PTSD Features	Count	5	5	1	11
		Expected Count	4.4	3.7	2.9	11.0
		Adjusted Residual	.4	.9	-1.3	
	ADD/ADHD Features	Count	44	19	5	68
		Expected Count	27.0	22.7	18.2	68.0
		Adjusted Residual	**4.4**	-1.0	**-3.8**	
	Behaviour Disorder features	Count	24	22	34	80
		Expected Count	31.8	26.7	21.4	80.0
		Adjusted Residual	-1.9	-1.2	**3.4**	
	Mental Retardation Features	Count	25	20	16	61
		Expected Count	24.3	20.4	16.4	61.0
		Adjusted Residual	.2	-.1	-.1	
	Learning Disorder Features	Count	55	52	28	135
		Expected Count	53.7	45.1	36.2	135.0
		Adjusted Residual	.3	1.4	-1.8	
	Pervasive Developmental Disorder Features	Count	4	1	0	5
		Expected Count	2.0	1.7	1.3	5.0
		Adjusted Residual	1.8	-.6	-1.4	
	Abuse	Count	25	12	13	50
		Expected Count	19.9	16.7	13.4	50.0
		Adjusted Residual	1.5	-1.5	-.1	
	Other	Count	38	30	29	97
		Expected Count	38.6	32.4	26.0	97.0
		Adjusted Residual	-.1	-.6	.7	
Total		Count	270	227	182	679
		Expected Count	270.0	227.0	182.0	679.0

Table 13: Adjusted residuals for Diagnostic Category * Gender cross-tabulation

			Gender		Total
			Male	female	
Diagnostic Cat	Mood Disorder Features	Count	48	36	84
		Expected Count	52.6	31.4	84.0
		Adjusted Residual	-1.1	1.1	
	Anxiety Disorder Features	Count	52	36	88
		Expected Count	55.1	32.9	88.0
		Adjusted Residual	-.7	.7	
	PTSD Features	Count	5	6	11
		Expected Count	6.9	4.1	11.0
		Adjusted Residual	-1.2	1.2	
	ADD/ADHD Features	Count	50	18	68
		Expected Count	42.6	25.4	68.0
		Adjusted Residual	**2.0**	**-2.0**	
	Behaviour Disorder features	Count	52	28	80
		Expected Count	50.1	29.9	80.0
		Adjusted Residual	.5	-.5	
	Mental Retardation Features	Count	45	16	61
		Expected Count	38.2	22.8	61.0
		Adjusted Residual	1.9	-1.9	
	Learning Disorder Features	Count	103	32	135
		Expected Count	84.5	50.5	135.0
		Adjusted Residual	**3.7**	**-3.7**	
	Pervasive Developmental Disorder Features	Count	3	2	5
		Expected Count	3.1	1.9	5.0
		Adjusted Residual	-.1	.1	
	Abuse	Count	14	36	50
		Expected Count	31.3	18.7	50.0
		Adjusted Residual	**-5.3**	**5.3**	
	Other	Count	53	44	97
		Expected Count	60.7	36.3	97.0
		Adjusted Residual	-1.7	1.7	
Total		Count	425	254	679
		Expected Count	425.0	254.0	679.0

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Table 14: Adjusted residuals for Diagnostic Category * Collapsed Race cross-tabulation

			Collapsed race data			
			Black	Indian and Coloured	White	Total
Diagnostic Cat	Mood Disorder Features	Count	20	13	51	84
		Expected Count	22.4	15.2	46.4	84.0
		Adjusted Residual	-.6	-.7	1.1	
	Anxiety Disorder Features	Count	6	17	65	88
		Expected Count	23.5	15.9	48.6	88.0
		Adjusted Residual	**-4.5**	.3	**3.8**	
	PTSD Features	Count	4	4	3	11
		Expected Count	2.9	2.0	6.1	11.0
		Adjusted Residual	.7	1.6	-1.9	
	ADD/ADHD Features	Count	14	11	43	68
		Expected Count	18.1	12.3	37.6	68.0
		Adjusted Residual	-1.2	-.4	1.4	
	Behaviour Disorder features	Count	15	12	53	80
		Expected Count	21.3	14.5	44.2	80.0
		Adjusted Residual	-1.7	-.8	**2.1**	
	Mental Retardation Features	Count	34	15	12	61
		Expected Count	16.3	11.1	33.7	61.0
		Adjusted Residual	**5.4**	1.4	**-5.9**	
	Learning Disorder Features	Count	53	20	62	135
		Expected Count	36.0	24.5	74.6	135.0
		Adjusted Residual	**3.7**	-1.1	**-2.4**	
	Pervasive Developmental Disorder Features	Count	2	2	1	5
		Expected Count	1.3	.9	2.8	5.0
		Adjusted Residual	.7	1.3	-1.6	
	Abuse	Count	13	6	31	50
		Expected Count	13.3	9.1	27.6	50.0
		Adjusted Residual	-.1	-1.2	1.0	
	Other	Count	20	23	54	97
		Expected Count	25.9	17.6	53.6	97.0
		Adjusted Residual	-1.5	1.5	.1	
Total		Count	181	123	375	679
		Expected Count	181.0	123.0	375.0	679.0

Table 15: Adjusted residuals for Year-cluster * Collapsed Race cross-tabulation

Yearcluster * Race Crosstabulation

			Race				Total
			Black	Indian	White	Coloured	
Yearcluster	1987-1989	Count	24	16	200	9	249
		Expected Count	66.4	34.5	137.5	10.6	249.0
		Adjusted Residual	**-7.6**	**-4.3**	**10.0**	-.6	
	1997-1999	Count	68	44	114	13	239
		Expected Count	63.7	33.1	132.0	10.2	239.0
		Adjusted Residual	.8	**2.5**	**-2.9**	1.1	
	2007-2009	Count	89	34	61	7	191
		Expected Count	50.9	26.4	105.5	8.2	191.0
		Adjusted Residual	**7.4**	1.9	**-7.6**	-.5	
Total		Count	181	94	375	29	679
		Expected Count	181.0	94.0	375.0	29.0	679.0

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Table 16: Adjusted residuals for Year-cluster * Grouped Number of tests

			Yearcluster			
			1987-1989	1997-1999	2007-2009	Total
Grouped numbers of tests	no tests	Count	7	20	11	38
		Expected Count	13.9	13.4	10.7	38.0
		Adjusted Residual	**-2.4**	**2.3**	.1	
	1-4 tests	Count	81	103	64	248
		Expected Count	90.9	87.3	69.8	248.0
		Adjusted Residual	-1.6	**2.6**	-1.0	
	5-8 tests	Count	126	103	80	309
		Expected Count	113.3	108.8	86.9	309.0
		Adjusted Residual	**2.0**	-.9	-1.2	
	9-11 tests	Count	29	12	33	74
		Expected Count	27.1	26.0	20.8	74.0
		Adjusted Residual	.5	**-3.6**	**3.3**	
	12-14 tests	Count	6	1	3	10
		Expected Count	3.7	3.5	2.8	10.0
		Adjusted Residual	1.5	-1.7	.1	
Total		Count	249	239	191	679
		Expected Count	249.0	239.0	191.0	679.0

Appendix D

Table 18: Partial associations table for Diagnostic Category Collapsed*Year-cluster * Gender

Effect	df	Partial Chi-Square	Sig.	Number of Iterations
DiagnosticCat9Collapsed*Yearcluster	16	26.987	.042	2
DiagnosticCat9Collapsed*Gender	8	47.830	.000	2
Yearcluster*Gender	**2**	**.813**	**.666**	**2**
DiagnosticCat9Collapsed	8	178.757	.000	2
Yearcluster	2	8.722	.013	2
Gender	1	43.532	.000	2

No significant effect between Year-cluster and Gender.

Table 19: Partial associations table for Diagnostic Category Collapsed*Race2way * Gender

Effect	df	Partial Chi-Square	Sig.	Number of Iterations
DiagnosticCat9Collapsed*Gender	8	47.055	.000	2
DiagnosticCat9Collapsed*Race2way	8	54.003	.000	2
Gender*Race2way	**1**	**.050**	**.823**	**2**
DiagnosticCat9Collapsed	8	178.757	.000	2
Gender	1	43.532	.000	2
Race2way	1	7.438	.006	2

No significant effect between Race2way and Gender

Table 20: Partial associations table for Diagnostic Category Collapsed*Age2Way * Gender

Effect	df	Partial Chi-Square	Sig.	Number of Iterations
DiagnosticCat9Collapsed*Gender	8	48.682	.000	2
DiagnosticCat9Collapsed*Age2Way	8	66.023	.000	2
Gender*Age2Way	**1**	**.775**	**.379**	**2**
DiagnosticCat9Collapsed	8	178.757	.000	2
Gender	1	43.532	.000	2
Age2Way	1	15.079	.000	2

No significant effect between Age2Way and Gender

Table 23: Backward elimination table

Step[a]		Effects	Chi-Square[c]	df	Sig.	Number of Iterations
0	Generating Class[b]	DiagnosticCat9collapsed*Yearcluster*Race2way*Age2way	.000	0	.	
	Deleted Effect 1	DiagnosticCat9collapsed*Yearcluster*Race2way*Age2way	6.742	16	.978	5
1	Generating Class[b]	DiagnosticCat9collapsed*Yearcluster*Race2way, DiagnosticCat9collapsed*Yearcluster*Age2way, DiagnosticCat9collapsed*Race2way*Age2way, Yearcluster*Race2way*Age2way	6.742	16	.978	
	Deleted Effect 1	DiagnosticCat9collapsed*Yearcluster*Race2way	25.744	16	.058	5
	2	DiagnosticCat9collapsed*Yearcluster*Age2way	8.399	16	.936	4
	3	**DiagnosticCat9collapsed*Race2way*Age2way**	**15.488**	**8**	**.050**	3
	4	Yearcluster*Race2way*Age2way	5.710	2	.058	5
2	Generating Class[b]	DiagnosticCat9collapsed*Yearcluster*Race2way, DiagnosticCat9collapsed*Race2way*Age2way, Yearcluster*Race2way*Age2way	15.140	32	.995	
	Deleted Effect 1	DiagnosticCat9collapsed*Yearcluster*Race2way	25.872	16	.056	5
	2	**DiagnosticCat9collapsed*Race2way*Age2way**	**18.051**	**8**	**.021**	4
	3	**Yearcluster*Race2way*Age2way**	**9.790**	**2**	**.007**	3
3	Generating Class[b]	DiagnosticCat9collapsed*Race2way*Age2way, Yearcluster*Race2way*Age2way, DiagnosticCat9collapsed*Yearcluster	41.012	48	.752	
	Deleted Effect 1	**DiagnosticCat9collapsed*Race2way*Age2way**	**18.426**	**8**	**.018**	6
	2	**Yearcluster*Race2way*Age2way**	**14.321**	**2**	**.001**	5
	3	**DiagnosticCat9collapsed*Yearcluster**	**37.727**	**16**	**.002**	2
4	Generating Class[b]	DiagnosticCat9collapsed*Race2way*Age2way, Yearcluster*Race2way*Age2way, DiagnosticCat9collapsed*Yearcluster	41.012	48	.752	

a. At each step, the effect with the largest significance level for the Likelihood Ratio Change is deleted, provided the significance level is larger than .050.

b. Statistics are displayed for the best model at each step after step 0.

c. For 'Deleted Effect', this is the change in the Chi-Square after the effect is deleted from the model.

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Table 24: Goodness-of-fit-tests for final model

Goodness-of-Fit Tests

	Chi-Square	Df	Sig.
Likelihood Ratio	41.012	48	.752
Pearson	37.650	48	.859

Table 25 : Goodness-of-fit tests from general log-linear analysis

Goodness-of-Fit Tests[a,b]

	Value	Df	Sig.
Likelihood Ratio	41.012	48	.752
Pearson Chi-Square	37.703	48	.857

a. Model: Poisson

b. Design: Constant + DiagnosticCat9Collapsed + Yearcluster + Race2way + Age2Way + DiagnosticCat9Collapsed * Yearcluster + DiagnosticCat9Collapsed * Race2way + DiagnosticCat9Collapsed * Age2Way + DiagnosticCat9Collapsed * Race2way * Age2Way + Yearcluster * Race2way * Age2Way

Table 26: Cell counts and residuals for the general log-linear model

Diagnostic Category	Year-cluster	Race	Age	Observed Count	Observed %	Expected Count	Expected %	Residual	Standardized Residual	Adjusted Residual
Mood Disorder Features	1987-1989	black	3-10 years	0	.0%	.732	.1%	-.732	-.856	-.943
			11-17 years	1	.1%	1.837	.3%	-.837	-.617	-.735
		white	3-10 years	8	1.2%	7.745	1.1%	.255	.092	.153
			11-17 years	16	2.4%	14.686	2.2%	1.314	.343	.749
	1997-1999	black	3-10 years	3	.4%	2.945	.4%	.055	.032	.046
			11-17 years	9	1.3%	8.222	1.2%	.778	.271	.462
		white	3-10 years	5	.7%	5.928	.9%	-.928	-.381	-.556
			11-17 years	13	1.9%	12.906	1.9%	.094	.026	.052
	2007-2009	black	3-10 years	4	.6%	3.323	.5%	.677	.371	.565
			11-17 years	16	2.4%	15.942	2.3%	.058	.015	.034
		white	3-10 years	6	.9%	5.327	.8%	.673	.292	.432
			11-17 years	3	.4%	4.408	.6%	-1.408	-.671	-.963
Anxiety Disorder Features +PTSD	1987-1989	black	3-10 years	6	.9%	4.095	.6%	1.905	.941	1.238
			11-17 years	1	.1%	.852	.1%	.148	.161	.180
		white	3-10 years	22	3.2%	22.322	3.3%	-.322	-.068	-.156
			11-17 years	14	2.1%	15.731	2.3%	-1.731	-.436	-.911
	1997-1999	black	3-10 years	11	1.6%	10.620	1.6%	.380	.117	.207
			11-17 years	3	.4%	2.457	.4%	.543	.346	.470

		white	3-10 years	8	1.2%	11.012	1.6%	-3.012	-.908	-1.494
			11-17 years	11	1.6%	8.911	1.3%	2.089	.700	1.134
	2007-2009	black	3-10 years	7	1.0%	9.285	1.4%	-2.285	-.750	-1.320
			11-17 years	3	.4%	3.691	.5%	-.691	-.360	-.579
		white	3-10 years	11	1.6%	7.666	1.1%	3.334	1.204	1.903
			11-17 years	2	.3%	2.358	.3%	-.358	-.233	-.287
ADD/ADHD Features	1987-1989	black	3-10 years	1	.1%	2.373	.3%	-1.373	-.891	-1.095
			11-17 years	1	.1%	.295	.0%	.705	1.298	1.380
		white	3-10 years	15	2.2%	14.298	2.1%	.702	.186	.428
			11-17 years	5	.7%	5.035	.7%	-.035	-.015	-.026
	1997-1999	black	3-10 years	8	1.2%	7.277	1.1%	.723	.268	.449
			11-17 years	1	.1%	1.007	.1%	-.007	-.007	-.008
		white	3-10 years	8	1.2%	8.343	1.2%	-.343	-.119	-.200
			11-17 years	3	.4%	3.373	.5%	-.373	-.203	-.288
	2007-2009	black	3-10 years	12	1.8%	11.350	1.7%	.650	.193	.395
			11-17 years	2	.3%	2.698	.4%	-.698	-.425	-.787
		white	3-10 years	10	1.5%	10.360	1.5%	-.360	-.112	-.211
			11-17 years	2	.3%	1.592	.2%	.408	.323	.392
Behaviour Disorder Features	1987-1989	black	3-10 years	0	.0%	1.286	.2%	-1.286	-1.134	-1.360
			11-17 years	1	.1%	3.289	.5%	-2.289	-1.262	-1.701

		white	3-10 years	15	2.2%	14.080	2.1%	.920	.245	.522
			11-17 years	22	3.2%	19.345	2.8%	2.655	.604	1.482
	1997-1999	black	3-10 years	3	.4%	2.606	.4%	.394	.244	.352
			11-17 years	8	1.2%	7.410	1.1%	.590	.217	.370
		white	3-10 years	6	.9%	5.425	.8%	.575	.247	.351
			11-17 years	7	1.0%	8.559	1.3%	-1.559	-.533	-.898
	2007-2009	black	3-10 years	3	.4%	2.108	.3%	.892	.614	.836
			11-17 years	12	1.8%	10.301	1.5%	1.699	.529	1.102
		white	3-10 years	2	.3%	3.495	.5%	-1.495	-.800	-1.078
			11-17 years	1	.1%	2.096	.3%	-1.096	-.757	-.932
Mental Retardation Features	1987-1989	black	3-10 years	13	1.9%	10.593	1.6%	2.407	.739	1.541
			11-17 years	5	.7%	4.516	.7%	.484	.228	.355
		white	3-10 years	3	.4%	3.678	.5%	-.678	-.354	-.731
			11-17 years	3	.4%	5.212	.8%	-2.212	-.969	-2.107
	1997-1999	black	3-10 years	12	1.8%	14.565	2.1%	-2.565	-.672	-1.520
			11-17 years	6	.9%	6.908	1.0%	-.908	-.345	-.593
		white	3-10 years	2	.3%	.962	.1%	1.038	1.058	1.240
			11-17 years	4	.6%	1.565	.2%	2.435	1.946	2.416
	2007-2009	black	3-10 years	7	1.0%	6.842	1.0%	.158	.060	.110
			11-17 years	6	.9%	5.576	.8%	.424	.180	.303

				Count	%					
		white	3-10 years	0	.0%	.360	.1%	-.360	-.600	-.641
			11-17 years	0	.0%	.223	.0%	-.223	-.472	-.490
Learning Disorder Features	1987-1989	black	3-10 years	8	1.2%	6.652	1.0%	1.348	.523	.748
			11-17 years	3	.4%	3.487	.5%	-.487	-.261	-.339
		white	3-10 years	20	2.9%	21.877	3.2%	-1.877	-.401	-.872
			11-17 years	11	1.6%	9.985	1.5%	1.015	.321	.569
	1997-1999	black	3-10 years	24	3.5%	23.653	3.5%	.347	.071	.154
			11-17 years	12	1.8%	13.793	2.0%	-1.793	-.483	-.903
		white	3-10 years	18	2.7%	14.799	2.2%	3.201	.832	1.449
			11-17 years	6	.9%	7.755	1.1%	-1.755	-.630	-.988
	2007-2009	black	3-10 years	11	1.6%	12.696	1.9%	-1.696	-.476	-.835
			11-17 years	15	2.2%	12.720	1.9%	2.280	.639	1.189
		white	3-10 years	5	.7%	6.325	.9%	-1.325	-.527	-.733
			11-17 years	2	.3%	1.260	.2%	.740	.659	.737
Pervasive Developmental Disorder Features	1987-1989	black	3-10 years	0	.0%	.000	.0%	.000	.000	.000
			11-17 years	0	.0%	.000	.0%	.000	.000	.000
		white	3-10 years	0	.0%	.000	.0%	.000	.000	.000
			11-17 years	0	.0%	.000	.0%	.000	.000	.000
	1997-1999	black	3-10 years	2	.3%	1.556	.2%	.444	.356	1.011
			11-17 years	0	.0%	.000	.0%	.000	.000	.000

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		white	3-10 years	0	.0%	.444	.1%	-.444	-.667	-1.011
			11-17 years	0	.0%	.000	.0%	.000	.000	.000
	2007-2009	black	3-10 years	2	.3%	2.444	.4%	-.444	-.284	-1.011
			11-17 years	0	.0%	.000	.0%	.000	.000	.000
		white	3-10 years	1	.1%	.556	.1%	.444	.596	1.011
			11-17 years	0	.0%	.000	.0%	.000	.000	.000
Abuse	1987-1989	black	3-10 years	0	.0%	1.662	.2%	-1.662	-1.289	-1.547
			11-17 years	0	.0%	.214	.0%	-.214	-.463	-.490
		white	3-10 years	7	1.0%	6.864	1.0%	.136	.052	.094
			11-17 years	8	1.2%	6.260	.9%	1.740	.696	1.248
	1997-1999	black	3-10 years	8	1.2%	7.267	1.1%	.733	.272	.497
			11-17 years	1	.1%	1.043	.2%	-.043	-.042	-.055
		white	3-10 years	7	1.0%	5.711	.8%	1.289	.539	.849
			11-17 years	4	.6%	5.979	.9%	-1.979	-.809	-1.382
	2007-2009	black	3-10 years	8	1.2%	7.071	1.0%	.929	.349	.655
			11-17 years	2	.3%	1.743	.3%	.257	.195	.319
		white	3-10 years	3	.4%	4.425	.7%	-1.425	-.677	-1.036
			11-17 years	2	.3%	1.761	.3%	.239	.180	.224
Other	1987-1989	black	3-10 years	4	.6%	4.607	.7%	-.607	-.283	-.386
			11-17 years	5	.7%	2.510	.4%	2.490	1.572	1.969

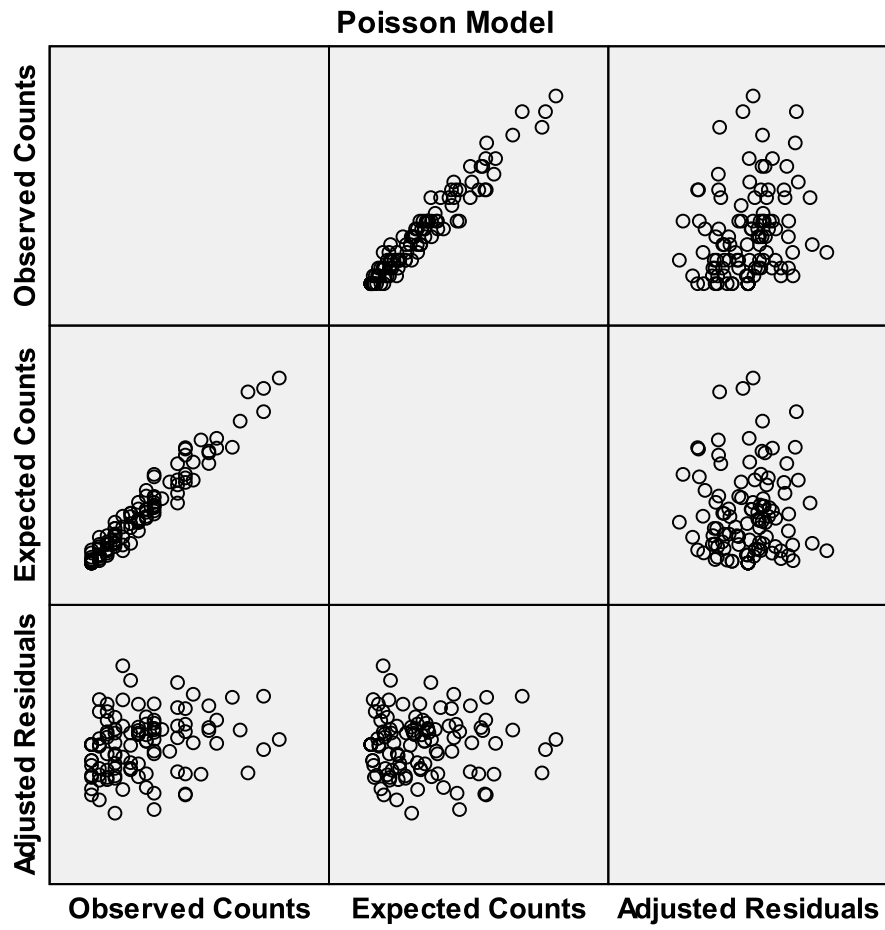|									
	white	3-10 years	19	2.8%	18.137	2.7%	.863	.203	.444
		11-17 years	12	1.8%	14.746	2.2%	-2.746	-.715	-1.547
1997-1999	black	3-10 years	8	1.2%	8.513	1.3%	-.513	-.176	-.285
		11-17 years	6	.9%	5.160	.8%	.840	.370	.534
	white	3-10 years	5	.7%	6.376	.9%	-1.376	-.545	-.776
		11-17 years	7	1.0%	5.952	.9%	1.048	.430	.629
2007-2009	black	3-10 years	12	1.8%	10.880	1.6%	1.120	.340	.622
		11-17 years	8	1.2%	11.330	1.7%	-3.330	-.989	-1.996
	white	3-10 years	7	1.0%	6.488	1.0%	.512	.201	.297
		11-17 years	4	.6%	2.302	.3%	1.698	1.119	1.369

Figure 5: Adjusted residual scatter-plot for general log linear model

Appendix E

Table 31: Wilcoxon Signed-Rank Test on assessment measures per year-cluster

Test Statistics[c]

	y19971999 - y19871989	y20072009 - y19871989	y20072009 - y19971999
Z	-2.788[a]	-2.075[a]	-.593[b]
Asymp. Sig. (2-tailed)	.005	.038	.553

a. Based on positive ranks.

b. Based on negative ranks.

c. Wilcoxon Signed Ranks Test