THE PERFORMANCE OF CHILDREN WITH AUTISM ON THE REVISED EXTENDED GRIFFITHS SCALES OF MENTAL DEVELOPMENT

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DEDICATED TO CHILDREN WITH AUTISM

The isolation of Autism need not be a negative trait. We don’t deserve to be condemned or laughed at, or made to fit into the plastic box of society’s correctness. We shouldn’t spend our entire lives trying to become someone else, someone acceptable.

(O’Neill 1998, p 199)
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ABSTRACT

Despite a widespread perception that the number of children coming to clinical attention with Autism Spectrum Disorders has greatly increased, limited South African Research has been conducted on children with Autism. Thus a need exists to accumulate knowledge about the cognitive, psychological and personal-social growth of children diagnosed with Autism.

This study is aimed at exploring the performance of children with Autism between the ages of 7 years (from 72 months) and 8 years (to 95.9 months), in South Africa (SA), utilising the Revised Extended Griffiths Scales of Mental Development (GSMD). The sample comprised an experimental group of 30 children with Autism from four schools for Specialised Education for learners with Autism in SA, and a control group comprised of 30 “normal” children, where normalcy can be broadly defined as “an absence of any sensory, physical or mental handicap”.

The six areas of general development assessed included Locomotor, Personal-Social, Language, Eye and Hand co-ordination, Performance, and Practical Reasoning. A non-probability, purposive sampling method was applied.

The major findings of the present study were as follows:

(i) Children with Autism (years 7 & 8) showed a characteristic cognitive profile when tested with the revised Extended Griffiths Scales. Their performance indicates lower performance on Subscales B, C and F than on the other Subscales.

(ii) Some children with Autism experienced major fall-outs, whereas others were slightly below average. The general performance of children with Autism was, however, in the range “cognitively impaired”.

(iii) There was significant difference between the Autistic sample and the normal sample on the GQ.
In view of the findings, it is recommended that the results of the study, which focused on the children’s areas of developmental weakness, be widely disseminated. This could facilitate the development of therapeutic programmes, so as to allow for appropriate stimulation for children with *Autism*.

Key words: *Autism, Autistic* Spectrum Disorder, Developmental Assessment, Revised Extended Griffiths Scales of Mental Development (GSMD).
CHAPTER ONE
INTRODUCTION

This introduction aims to contextualise the present study, with special reference to the testing of children with Autism on the Revised Extended Griffiths Scales of Mental Development (GSMD). For this purpose, the nature of Autism, including diagnostic considerations, prevalence, aetiology, and co-morbidity with other medical conditions is discussed. The need for the developmental assessment of children with Autism is highlighted, and specifically the appropriateness of the Revised Extended Griffiths Scales of Mental Development is argued. The research problem and aims of the study are presented. Finally, an outline of the chapters is presented.

1.1 Autism

Autism is a severe developmental disability characterised by impaired social interaction, communication abnormalities or defects, and repetitive behaviours or interests (Edwards & Brestor, 1991). In 1943, Leo Kanner published a clinical description of 11 children with so-called Infantile Autism.

The term Autism was borrowed from Eugene Bleuler’s description of schizophrenia, to characterise the “withdrawal from reality” seen in both conditions (Szatmari, 2000). This link led to the theoretical position that infantile Autism was a very early form of schizophrenia.

Wing (1979) completed her epidemiological work on Autism and delineated more carefully a subgroup of children with Autism and Autistic-like conditions. She clearly demonstrated a link, not between Autism and schizophrenia, but rather between Autism and mental retardation. She also clearly formulated the notion of a triad of impairments, namely in socialisation, in social communication, and in social play. This triad then became part of the concept of Pervasive Developmental Disorder (PDD) as it is used today.
The term *Pervasive Developmental Disorders* became enshrined in the official classification system of the American Psychiatric Association’s Diagnostic and Statistical Manual of Mental Disorders (DSM) in 1980. The term referred to the idea that the impairments in socialisation, communication and play, “pervade” all aspects of a child’s life, and arise from a developmental disability. The notion of a spectrum of *Autistic* disorders is reflected in the inclusion of *Autism* among Pervasive Developmental Disorders in the DSM-IV and the World Health Organisation’s *International Classification of Diseases* (ICD10, 1993), which also includes *Asperger Disorder* (currently distinguished from *Autistic Disorder* by an absence of significant language delay, and general intellectual skills in the normal range), *Pervasive Developmental Disorders-Not Otherwise Specified* (PDD-NOS), *Childhood Disintegrative Disorder*, and *Rett’s Disorder*. This last disorder, although showing similarities with *Autism* in its early stages, shows characteristic progressive physical regression, and is not currently conceptualised as part of the *Autism* spectrum (Wing & Gould, 1979).

*Autism* may occur in association with any other diagnosable disabilities. Learners with *Autism* may thus be multi-disabled. As a result, the specific educational needs and associated behavioural difficulties are too complex to address in totality. Many of the characteristics seen in children with *Autism* are seen in other developmental disabilities, such as mental retardation, learning disabilities, and language disorders (Mash & Barkley, 1998, p 419). What distinguishes *Autism* from other conditions is the number, severity, combination, and interaction of problems, which result in significant functional impairment. *Autism* is the composite of the deficits, not any one characteristic (Mash & Barkley, 1998).

The diagnosis of *Autism* or *Autistic* spectrum disorder is, therefore, particularly difficult, because it relies largely on observation of the behaviour through which the disorder manifests. There are no physical or pathological tests – for example, blood tests, x-rays, or physical examinations – that can confirm the diagnosis of *Autism* (Wing, 1976). Diagnosis depends upon the presence or
absence of a specific pattern of behaviour (Wing, 1980). However, according to Peeters and Gillberg (1999), all current major diagnostic systems agree that for a diagnosis of *Autism* to be made, three major impairments have to be present. These three categories include: the restriction of reciprocal social interaction, the restriction of reciprocal communication, and the restriction of imagination or imaginative play, which is often reflected in the individual’s restricted repertoire of behaviour. Once the diagnosis of *Autism* is considered, assessment of each child’s individual strengths, deficits, and emerging skills, is necessary in order to develop an effective behavioural and educational programme. A comprehensive assessment should include the measurement of cognitive and other indices, emerging skills, social adaptive behaviour, communication, learning style, and the specific *Autistic* characteristics that will affect treatment. For this purpose, developmental assessment becomes imperative.

1.2 Developmental assessment of children with *Autism*

The need for developmental assessment of infants and young children is crucial in the early identification of any possible disability. Information gained from assessments not only serves as a tool for the correct diagnosis of the disability, but also assists in the construction of appropriate intervention programmes (Aldridge-Smith, Bidder, Gardner, & Gray, 1980; Griffiths, 1984). Contemporary research provides evidence that early identification, together with early intervention, has a positive effect on the educational future of children.

The International Association of Child and Adolescent Psychiatry and Allied Professions (IACAPAP, 1999) endorses the following principle: nations and communities should develop clinical systems for early diagnosis and evaluation of young children with serious developmental and psychiatric disorders, such as *Autism* (p.158).
Holt (1979) described the necessity of assessing children with special needs, when he stated that:
any child who is suspected of having a congenital defect or deformity, a deviation of development, a medical disorder which may produce continuing disability, an impediment to educational progress or social activities or any deficiency of opportunities, is a potential handicapped child and should be assessed (p.151).

The challenge of assessing the skills of a child intensifies when severe disabilities are present (Bagnato & Neisworth, 1991). A good first step in assessing children with severe disabilities is to be aware of, and sensitive to, the impact of a known disability on overall functioning. Adapting the environment, the material, and/or the approach, in order to assess developmental skills, can facilitate a more meaningful evaluation.

An important challenge in assessing children with disabilities involves finding the most reliable means of assessing a child's skills with the least penalty to the child for his or her specific disability. It is important to know what a given test expects of a child in the way of responsiveness, in order to select the most appropriate and efficient measure available (Du Bose, 1981). The goal of test selection is to maximise the child’s opportunity to perform, using his or her most intact modalities, while sufficiently maintaining the content and focus of the test, to allow the most accurate measurement possible.

While most developmental tests focus on the cognitive development of the child, Brooks-Gunn (1990), suggests that the Griffiths Scales of Mental Development tap into the main aspects of a child's development, namely, physical, cognitive, social, and emotional.

1.3 Griffiths Scales of Mental Development

An instrument which is widely used to assess and identify special needs, is the Griffiths Scales of Mental Development (Griffiths Scales) (Luiz, 1994).
Developmental problems, which are first evident in infancy or early childhood, interfere with the future development of the child, and may cause a lifetime of lowered untapped potential. Furthermore, utilising items which are non-contemporaneous can also have far-reaching negative outcomes for the individual being assessed. In this connection, there is a strong awareness of the need for a reliable, valid, and contemporary assessment instrument for children.

Research regarding the reliability of the Griffiths Scales found acceptable overall reliability levels, thus indicating that the Griffiths Scales are stable measures of development (Aldridge Smith, Bidder & Grey 1980; Hanson, 1982 & Honzik, McFarlane & Allan, 1966). Studies conducted internationally by Beail (1985), Ramsay and Fitzharding, (1977) and Ramsay and Piper (1980) suggest that there is ample support for the construct validity of the Griffiths Scales. Worsfold (1993) supports the predictive validity of the Griffiths Scales in identifying scholastically and developmentally “at-risk” children.

Research on the Griffiths Scales has been conducted in two main domains, namely, clinical and technical studies. South African research related to the clinical use of the Scales has provided evidence that the Scales are useful in the clinical assessment and diagnosis of children from normal, as well as diverse special population groups, for example, children with physical disabilities and children with mental disabilities (Allan, 1988, 1992; Bhamjee, 1991; Heimes, 1983; Lombard, 1989; Luiz, 1988a, 1988b, 1988c, 1994a; Luiz, Oelofsen, Stewart, & Mitchell, 1995; Mothuloe, 1990; Stewart, 1997; Sweeney, 1994; Tukulu, 1996; Worsfold, 1993).

When considering the above-mentioned studies, it is evident that the Griffith Scales have fulfilled a valuable role in infant and child assessment worldwide. However, it is also apparent that, in today’s society, the Scales are no longer providing clinicians and researchers with reliable and valid information. That is to say, the items and norms of the Scales are outdated, and several of
the items are culturally biased and ambiguous. For this reason there was a clear and urgent need for revising the Griffith Scales.

The Griffiths Scales have been revised, and are currently being standardised in the British Isles. In South Africa, the Revised Scales have been revised and are being employed on numerous clinical populations, for example, on hearing-impaired children, and children born prematurely. This study, which explores the performance of children with Autism, using the Revised Griffiths Scales, is but one other clinical study.

1.4 Problem formulation and Aims

To date, no South African research has been conducted that explores the development of children with Autism. The lack of available information in terms of specific developmental trends for children with Autism becomes problematic for clinicians and educators who work with children with Autism. For this reason it is imperative to accumulate knowledge about their cognitive, psychological, and personal-social growth, in order to provide the most effective assessment and teaching methods. Findings of this study will be made available to professionals working with children with Autism, as well as to the parents of the children. These findings should facilitate the development of therapeutic programmes, to allow for appropriate stimulation in all areas of concern. This study was initiated with interest at the various schools for children with Autism. The Griffiths Scales are generally used as part of a screening battery for admission to these schools for children with Autism but no scientific quantitative research has been conducted in SA, indicating a gap in this area. This study aims to provide such information, and the sample included in this study comprises the majority of school-going children with Autism, years 7 & 8, in SA.
The specific aims of this study are:

(i) To explore and describe the performance of children with \textit{Autism} (years 7 & 8) in SA, utilising the Revised Extended Griffiths Scales.

(ii) To compare the performance of an \textit{Autistic} sample with that of “normal” learners on the Revised Extended Griffiths Scales, so as to enhance and enrich the description of the performance of children with \textit{Autism}.

1.5 Chapters of the study

Chapter 2 focuses on the condition known as \textit{Autism and on} relevant diagnostic criteria, and discusses the triad of impairments enshrined in the DSMIV. Secondly, the prevalence of \textit{Autism}, its aetiology, and the co-morbidity of \textit{Autism} with other medical conditions, are discussed.

Chapter 3 focuses, firstly, on arriving at a definition of “developmental assessment”. The need for developmental assessment for children is highlighted with specific reference to learners with \textit{Autism}. Secondly the developmental assessment process, namely: (i) identification; (ii) screening; (iii) in-depth assessment; (iv) programming and intervention; and (v) evaluation, is discussed in detail. Finally, widely used developmental instruments are outlined, again with reference to the assessment of learners with \textit{Autism}.

Chapter 4 describes the instrument of developmental assessment employed in the study, namely the Revised Extended Griffiths Scales.

Chapter 5 presents the research problem, highlighting the primary aims of the study, the methodology employed, the analysis of the data, and the ethical considerations relevant to the present study. In Chapter 6 the results and discussion of the findings according to the aims of the study, are provided. Finally, Chapter 7 comprises a critical evaluation of the study, addressing its limitations, recommendations, and suggestions for further research, followed by a conclusion.
2.1 Autism

*Autism* is a complex and variable lifelong disability. It is a neurologically based developmental disability that manifests itself in the form of a behavioural syndrome, which appears during the first 3 years of life. It is a condition which interferes with the normal development in areas of reasoning, social interaction, and communication.

2.2 Diagnosis

*The Medical Research Council’s (2001) review on Autism Research* defines *Autism* as “the term referring to a set of neurodevelopmental disorders that influence the way in which a person communicates and interacts with others.” (p.7). Kanner (1943) first introduced the term ‘*Autism*” for childhood disorders of social interaction, over 60 years ago. His clinical description included the following characteristics: preference for aloneness, obsessive insistence of sameness, propensity for elaborate routines, and islets of ability (Wolfberg, 1999). At around the same time, Hans Asperger was noticing similar characteristics in the group of children he was observing in Vienna (Wolfberg, 1999). The main difference between these two groups of children was that Asperger’s group had near-normal language development (Wolfberg, 1999). Asperger also offered a wider definition of *Autism* than Kanner, and included cases which ranged from severe impairment to almost normal ability (Wolfberg, 1999). However, today there is still some difficulty in distinguishing between Kanner’s syndrome and Asperger’s syndrome, and some researchers believe that the two groups are more similar than they are different (Miller & Ozonoff, 1997).
Since then, the understanding of Autism has changed profoundly. Wing and Gould (1979) introduced the notion of an Autistic Spectrum, covering a range of ability levels and severities, but characterised by qualitative impairments in social, communicative, and imaginative development. Today, Autism is recognised as one of a number of related Pervasive Developmental Disorders, which also include Asperger disorder, Pervasive Developmental Disorders Not Otherwise Specified (PDD-NOS), Childhood Disintegrative Disorder, and Rett’s Disorder.

In the absence of a specific biological marker (e.g., blood test) for Autism, Autistic Disorder is defined by behavioural criteria. These criteria have evolved over almost 60 years since Kanner (1943) first introduced the term Autism for childhood disorders of social interaction. In response to research findings, there has been a progressive widening of diagnostic criteria. Kanner and Eisenberg (1956) identified the two key features of Autism as being: (i) social aloofness; and (ii) insistence of sameness. Rutter (1978) later added impairment in language development. However, according to Peeters and Gillberg (1999), all current major diagnostic systems agree that for a diagnosis of Autism to be made, three major categories of symptoms have to be present. These three categories are: (i) the restriction of reciprocal social interaction; (ii) the restriction of reciprocal communication; and (iii) the restriction of imagination or imaginative play, which is often reflected in the individual’s restricted repertoire of behaviour. These three categories of symptoms have come to be known amongst professionals in the field of Autism as “the triad of symptoms” (Peeters & Gillberg, 1999). It is this triad of impairments that is described in the American Psychiatric Association’s Diagnostic and Statistical Manual, 4th edition (DSM-IV, 1994).

The following are the diagnostic criteria for 299.00 Autistic Disorder as set out in the DSM-IV (1994).

A. 1. A total of six (or more) items from (1), (2) and (3), with at least two from (1) and one each from (2) and (3).
(a) marked impairment in the use of multiple non-verbal behaviours such as eye-to-eye gaze, facial expression, body postures and gestures to regulate social interaction.
(b) failure to develop peer relationships appropriate to developmental level;
(c) a lack of spontaneous seeking to share enjoyment, interests, or achievements with other people, (e.g., by a lack of showing, bringing or pointing out objects of interest);
(d) lack of social or emotional reciprocity.

2. Qualitative impairments in communication as manifested by at least one of the following:
(a) delay in or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime);
(b) in individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others;
(c) stereotyped and repetitive use of language or idiosyncratic language;
(d) lack of varied, spontaneous make-believe or social imitative play appropriate to developmental level.

3. Restrictive repetitive and stereotyped patterns of behaviour, interests, and activities, as manifested by at least one of the following:
(a) encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus;
(b) apparently inflexible adherence to specific, non-functional routines or rituals;
(c) stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or complex whole-body movements);
(d) persistent preoccupation with parts of objects.
B. Delays of abnormal functioning in at least one of the following areas, with onset prior to age 3 years:
   (1) social interaction;
   (2) language as used in social communication; or
   (3) symbolic or imaginative play.

C. The disturbance is not better accounted for by Rett’s Disorder or Childhood Disintegrative Disorder (p.70).


The Medical Research Council’s (2001) Review on Autism reports that the range of manifestations in each of the triad of impairments, complicates diagnosis. Thus, an individual may show qualitative impairments of social interaction in the form of aloof and indifferent response to others, passivity, or over-friendly behaviour. Communication impairments, too, may vary from complete muteness to over-uterall and pedantic, but verbally fluent, language (Jordan & Powell 1995).

The three main diagnostic criteria of Autism as expressed in the DSM-IV criteria, as provided above, will be discussed in the following section.

2.2.1 Impairment in social interactions

Social deficits were considered by Kanner (1943) to be central to the pathogenesis of Autism. The most characteristic social abnormality in children with Autism is the lack of social reciprocity, and the impaired ability to develop meaningful relationships on the basis of interpersonal interactions (Bailey, Phillips & Rutter, 1996). In infancy, Autistic babies tend to avoid eye contact, and to demonstrate little conventional interest in the human voice. They do not
assume an anticipatory posture or put out their arms to be picked up, in the way that children who are not *Autistic* do. They are indifferent to affection, and seldom show facial responsiveness. As a result, parents often suspect that the child is deaf. Only one in every five children with *Autism* develops normal social skills up until the age of 18 to 24 months. Most children with *Autism* show social abnormalities before the age of 12 months (Peeters & Gillberg, 1999), and the classic picture of “*Autistic* aloneness” is most evident in early childhood, especially before the age of five (Wolfberg, 1999). In early life, these children show little prodeclarative pointing, and almost no interest in sharing pride or pleasure with other people (Bailey, Phillips & Rutter, 1996). In the more intelligent *Autistic* individuals, lack of social responsiveness may not be obvious until well into the second year of life.

While some of these children will become more socially responsive and outgoing in later life, most will continue to have social problems in adult life – although these may manifest in subtle ways and mannerisms (Wolfberg, 1999). Wing and Gould (1979) describe three distinct patterns of social behaviour which may be seen in children with *Autism*. The first of these occurs in what these authors refer to as “aloof children”. These children appear to be totally withdrawn and unresponsive, avoiding eye contact and ignoring others’ social gestures and speech. They also often avoid any physical touch, which is sometimes a reaction to tactile sensitivity, a common characteristic in children with *Autism* (Peeters & Gillberg, 1999). Aloof children approach other people only to have their basic needs fulfilled, and treat others as if they were inanimate objects. The second type of social behavioural pattern, according to Wing and Gould (1979) belongs to “passive” children. These *Autistic* children appear indifferent to others. While they are compliant and willing to go along with others in social situations, they do not take the initiative in making social contact. Passive children will probably respond to clear and direct questions, but will be unable to communicate their intentions through facial expressions or gestures, and will be unable to understand the facial expressions and gestures of others. The third class of social behaviour in children with *Autism* is referred to as “active and odd” by Wing and Gould (1979). Children in this category enjoy being with
other people, especially adults, and may approach people to interact. However, they do so in an awkward and sometimes inappropriate manner, and they lack the social perceptiveness needed for successful communication and relationship building.

An additional social behaviour and characteristic of children with Autism, is an inability to take into account other people’s social perspectives. These children are unable to develop a “theory of mind”, which is essentially the capacity to recognise and understand that others may have feelings, desires, and beliefs that are different from one’s own (Wolfberg, 1999; Baron-Cohen, Jolliffe, Mortimore & Robertson, 1997). This difficulty in reading and interpreting other people’s emotions and thoughts often impairs the Autistic child’s ability to adapt to change in everyday life (Wolfberg, 1999).

In early childhood, Autistic children continue to show deviation in eye contact. They may passively accept physical contact, such as lap sitting. They do not develop attachment behaviour, and there is a relative failure to bond. They generally do not follow their parents about the house. The majority do not show normal separation or stranger anxiety. Adults are usually treated as interchangeable, so that they may approach a stranger almost as readily as they do their parents. There is a lack of interest in being with, or playing with, other children, or they may even actively avoid other children.

2.2.2 Impairment in communication

The second diagnostic criterion of Autism is impaired communication. Because social interaction is often measured by communication ability, it is sometimes difficult to separate symptoms of social and communication impairment (Oskaar, 1983). However, specific communication problems in individuals with Autism include preverbal and verbal interactions and comprehension, along with those interactions which involve gesture, mime, and body language (Peeters & Gillberg, 1999). Peeters and Gillberg (1999) believe that, in simple terms, individuals with Autism have difficulty in dealing with
symbols or symbolic representation. Much of our world is based on symbols, including our language system, which explains why many individuals with *Autism* fail to develop language at an appropriate age and why many of them – up to 50%, according to Peeters and Gillberg (1999) – never fully master language. Some children with *Autism* develop speech early in their development, but appear to lose this capacity as they age (Wolfberg, 1999). Peeters and Gillberg (1999) believe that individuals with *Autism* who are able to speak have a tendency to process auditory information using right-hemisphere brain strategies, rather than those strategies common to the left hemisphere of the brain. This often results in echolalia, a speech pattern common in individuals with *Autism*. Echolalia is the speech of the right hemisphere of the brain, and results when language is not sufficiently analysed with regard to its meaning, and is stored in the memory in a relatively uncoded manner (Peeters & Gillberg, 1999).

2.2.2.1 Impairment in nonverbal communication

*Autistic* infants show their needs through crying and screaming. In early childhood, they may develop the concrete gesture of pulling adults by the hand to the object that is wanted. This is often done without a socially appropriate facial expression. Nodding and shaking of the head are seldom seen either as a substitute for, or as an accompaniment of, speech. They generally do not participate in imitative games. These children are less likely than normal children to follow or copy their parents’ activities (Sigman, Mundy, Sherman & Ungerer, 1986).

2.2.2.2 Impairment in understanding speech

Comprehension of speech is impaired to a varying degree. Severely retarded *Autistic* children may never develop any awareness of the meaning of speech. Children who are less severely impaired may follow simple instructions if given in an immediate present context, or with the aid of gestures. When impairment is mild, only the comprehension of subtle or abstract meaning may
be affected. But humour and idiomatic expressions can be confusing for even the brightest Autistic person (Jordaan & Powell, 1995).

2.2.2.3 Impairment in speech development

Many Autistic children have an impaired amount or pattern of babble in their first year. Nearly half of Kanner’s subjects were still mute by age of 5 years (Kanner & Eisenberg, 1956). About half of Autistic children remain mutes all their lives (Wing, 1976). When speech has developed, it usually exhibits many abnormalities. It is often the deviant communication features which are more characteristic than the developmental language delay (Bailey, Phillips & Rutter, 1996). This includes pronoun reversal, that is using “you” instead of “me” and using their own name instead of a personal pronoun, neologisms and inappropriate metaphorical language. In addition, children with Autism often have difficulties in learning the pragmatics of communication such as gesture, facial expression, intonation and volume (Wolfberg, 1999). Meaningless, immediate, or delayed echolalia may be the only kind of speech that is acquired in some Autistic individuals. However, while the echolalic speech may be produced quite accurately, the child often has little or no comprehension of the meaning. Higher functioning children with Autism may develop spoken language skills in advance of, and often in the absence of, the ability to communicate (Jordan & Jones, 1999).

Often the mechanical production of speech is impaired. The speech may be like that of a robot, characterised by a monotonous, flat delivery, with little change of emphasis or emotional expression. Some children may use speech primarily for self-stimulatory purposes. Such speech tends to be repetitive in nature, with words, phrases, or sounds being produced over and over, without any apparent relation to the environment or ongoing activity (Bailey, Phillips & Rutter, 1996). There may be chanting or singsong speech, with odd prolongation of sounds, syllables and words. A question like intonation may be used for prepositional statements. Odd respiratory rhythms may produce staccato speech in some Autistic individuals (Wolfberg, 1999).
When functional speech develops, it tends not to be used for the purpose of social communication. Children with *Autism* also find it difficult to maintain an ongoing topic of conversation, and are not good at building a two-way conversation on the basis of what the other person has said. These children often find it difficult to adapt their communication strategies to fit different social contexts, which often leads to inappropriate behaviour (Bailey, Phillips & Rutter, 1996). Usually, *Autistic* children rely on stereotyped phrases and repetition when they talk. Their speech almost always fails to convey imagination, abstraction, or subtle emotion. They tend to talk excessively about their special interests, and the same pieces of information tend to recur whenever the same subject is raised.

### 2.2.3 Impairment of behaviour and imagination

#### 2.2.3.1 Imaginative play

The behavioural abnormalities evident in children with *Autism* from the first year of life are believed to reflect a limited and restricted imagination, which means that the child has only a confined behavioural repertoire (Peters & Gillberg, 1999). This limited range of behaviours often manifests as stereotyped behaviour, including spinning, hand-flapping or waving the hands in front of the face. Most children with *Autism* also exhibit a very limited range of interests (Peeters & Gillberg, 1999) and often become obsessed with certain topics, for example, monsters, tornadoes, or aeroplanes, or may be overly attached to objects (Bailey, Phillips & Rutter, 1996), and may engage in elaborate and repetitive routines (Wolfberg, 1999). Imaginative play may be limited or poor, and they cannot play, for example, with a wooden block as if it were a toy car. In higher functioning individuals, their ability to play may seem more complex, but rigidity and stereotyped patterns still dominate (Sigman, Mundy, Sherman & Ungerer, 1986), thus their interest and range of activities are often limited.
2.2.3.2 Resistance to change

Autistic children are disturbed by changes in their familiar environment, and tantrums may follow even a minor change of everyday routine. Many Autistic children line up toys or objects, and become very distressed if these are disturbed. The behaviour is twice as common in low-functioning Autistic children than in Autistic youngsters with normal intelligence (Bartak & Rutter, 1976). Almost all Autistic children show a resistance to learning or practising a new activity.

2.2.3.3 Ritualistic or compulsive behaviours

Ritualistic or compulsive behaviours usually involve rigid routines (e.g., insistence on eating particular foods), or stereotyped, repetitive motor acts, such as hand clapping or finger mannerisms (e.g., twisting, flicking movements carried out near the face). Some children develop preoccupations, such as spending a great deal of time memorising weather information, state capitals, or birth dates of family members (Bailey, Phillips & Rutter, 1996). Ritualistic or compulsive behaviours are more often displayed by normally intelligent Autistic children than by low-functioning Autistic children (Bartak & Rutter, 1976). Young Autistic children may perseveringly line up, stack or twirl objects. They may repetitively flush toilets, or turn light switches on and off. There may be a continuing preoccupation with certain features or objects, such as their texture, taste, smell, colour, or shape (Wolfberg, 1999). There is often either an under-responsiveness or an over-responsiveness to sensory stimuli (Wolfberg, 1999). Thus they may be suspected of being deaf, near-sighted, or blind. Autistic children may actively avoid gentle physical contact, but react with intense pleasure to rough games. Some Autistic children may follow extreme food fads. Many children with Autism display self-destructive behaviour such as head banging, and some have an increased threshold for pain (Peeters & Gillberg, 1999).
2.2.3.4 Abnormal attachments

Many Autistic children develop intense attachments to odd objects (e.g., pipe cleaners or small plastic toys). The child may carry the object with them at all times, and protest or throw tantrums if it is removed. If the object is not eventually returned to the child, a new object is frequently chosen.

2.2.3.5 Unusual responses to sensory experiences

The inability to modulate sensory input adequately is most prominent in younger Autistic children. All sensory modalities are affected, and the faulty modulation of sensory input may be manifested as both a lack of responsiveness and an exaggerated reaction to sensory stimuli, along with sensory self-stimulation (Ornitz, 1985). Children with Autism may show both heightened awareness (distraction by background stimuli of marginal intensity) and heightened sensitivity to sensory stimulation that they seek out and induce. Many children with Autism are hypersensitive to, and have variable reactions to, external stimulation, including noise and sound, touch and light (Peeters & Gillberg, 1999).

Some of the disturbances of motility seem to provide intense sensory stimulation. They may rub, bang or flick at their ears or grind their teeth, and scratch, tap or bang surfaces to induce auditory input. Visually, they regard their own hand and finger movements, or their more vigorous hand flapping, and they scrutinise the fine detail of surfaces. They rub surfaces in response to fine whirling, rocking and swaying, or by head rolling. Hand flapping provides prior-receptive input (Ornitz, 1985).

Contrasting with the pursuit of sensory stimuli is the paradoxical distress induced by stimuli in all sensory modalities. Autistic children may become agitated by the sound of sirens, vacuum cleaners, or barking dogs, and they may cup their hands over their ears to shut out these intense sounds, as well as mild
sounds such as the crinkle of paper (Peeters & Gillberg, 1999). In the tactile modality, there may be severe intolerance for certain fabrics, for example, wool, and a preference for smooth surfaces. In addition, many children with Autism have strange eating patterns, some eating only foods with particular textures, which is related to the tactile sensitivity of the mouth, and others eating non-nourishing substances such as sand and leaves (Peeters & Gillberg, 1999). During the first two years, rough-textured table foods often evoke distress.

### 2.3 Prevalence

The Medical Research Council (2001) states that prevalence estimates will depend on exact assessment tools and ascertainment methods, and that variations across studies will likely reflect such methodological differences. However, according to recent reviews (Medical Research Council, 2001), there appears to be fairly good agreement that Autistic Spectrum Disorders affect approximately 60, (and narrowly-defined Autism 10-30), per 10,000 children under 8 years of age. However, Wolfberg, writing in 1999, claims that the incidence of children who fit the strict criteria, based on Kanner's definition, is about 2 to 4 in 10,000 births, and that approximately 20 children in every 10,000 births fit Asperger's definition. A recent article by Nash (2002) claims that cases of Autism and closely related disorders such as Asperger's have recently increased in number. Some experts believe that this explosion in the prevalence of the disorder has to do with broadening diagnostic criteria, but most, according to Nash (2002), believe that this surge in numbers is real, and a case for concern. Nash (2002) goes on to claim that the latest studies suggest that as many as one in every 150 children aged 10 years or younger may be affected by Autism or a closely related disorder. These differences in estimated prevalence show the difficulties in pinning down the exact nature of this disorder.

Baird (2002) reports a combined prevalence of 57.9 per 10,000, in children by the age of 7 years. This accords with the figure of 62.6 per 10,000 for all pervasive developmental disorders reported by Chakrabarti and Fombonne.
(2001) in their survey of 4- to 7-year-old children. These estimates make Autistic Spectrum Disorders far more common than was previously generally recognised.

Autism affects people of all social classes, from all countries and races (Medical Research Council, 2001). It is as yet unclear whether people of particular racial origins are more at risk for Autism. A male excess is generally observed, and this is especially pronounced at the high-ability end of the spectrum. Wing (2001) has speculated that this pattern reflects both greater male susceptibility to developing Autism, and a requirement for more severe brain involvement in girls before they express the Autism phenotype. This theory remains to be tested. Some authors believe that a diagnosis of Autism in females is sometimes more difficult to make, as females with Autism tend to have better language skills and sometimes demonstrate more acceptable social skills. Thus, one theory is that, while the disorder is more common in males, the extent of this inconsistency is skewed by the mis-diagnosis of many females with Autistic disorder (Peeters & Gillberg, 1999). There is currently no evidence of a social-class gradient in the prevalence of Autism (Gilberg & Coleman, 1996), and a study done by Wolfberg (1999) shows no evidence that the prevalence of Autism and its Spectrum Disorders is in any way linked to culture or geographical areas.

In recent years, there has been a widespread perception that the number of people coming to clinical attention with Autism has greatly increased (Wing, 2001). Several factors, real and artefactual, may give rise to an increase in prevalence over time. These include changing diagnostic thresholds, better case ascertainment, and changes in the prevalence of casual factors.

These aetiological factors have stimulated much clinical interest, and a discussion of these factors follows.

2.4 Aetiology

While recent years have seen an increase in the amount of research being conducted in the field of Autism, there is still no certainty as to the cause of this
disorder (Nash, 2002). The research and literature in the area seems to indicate two separate areas of thinking and speculating in terms of aetiology (Wing, 1980). The first of these believes that *Autism* has an emotional basis, and the second area of thinking suggests that *Autism* has a biological or physical basis. It was Bernard Rimland, working in 1964, who managed to significantly confront the myth of the detached mother, by proposing an organic basis to *Autism*. His work set the tone for a second school of thought, relating to the possible aetiology of *Autism* related to biological, organic, and medical conditions (Wolfberg, 1999). According to Peeters and Gillberg (1999), about one in every four individuals diagnosed with *Autism* has an associated medical disorder with a known or probable cause. Current research suggests that there are one or more abnormalities in the brain, which have been linked to such causal factors, namely viral infections, complications at birth, metabolic abnormalities, genetic conditions, and possibly environmental toxins (Wolfberg, 1999).

While it is not yet clear which of these factors is more likely to cause *Autism*, there is a strong move towards a biological cause for *Autism*. Research has established *Autism* as a neurodevelopmental disorder (Medical Research Council, 2001). Early suggestions that *Autism* might result from abnormal parenting (Kanner, 1943) have been abandoned in the face of overwhelming evidence for a biological basis and a strong genetic component. Most researchers (Jordan & Powell, 1995; Sullivan, 1988; Wing & Gould, 1979; Gilberg & Coleman, 2001) believe that *Autism* has a variety of causes, perhaps all affecting the same brain systems, or impeding development through disruption of different abilities necessary for social and communicative development. Whether environmental factors interact with genetic susceptibility is, as yet, unclear (Medical Research Council, 2001).

### 2.4.1 Genetic factors

Twin and family studies show that *Autism* is highly hereditary, although the mechanisms are likely to be complex and involve the interaction of many genes. At present, these complex genetic influences are thought to operate in most cases of *Autism*, while single gene disorders and chromosomal
abnormalities may affect a small (5-10%) proportion of those with *Autism* (Nash, 2002).

A number of epidemiological twin studies have demonstrated the heritability of *Autism*. For example, Bailey (1998) found that the probability of both twins having an *Autism Spectrum* disorder is high, if they are identical (monozygotic), whereas if they are non-identical (dizygotic), the probability is very small. In identical twins, research has demonstrated that if one twin has *Autism*, there is a 60% chance that the other twin will also have *Autism*, and a more than 75% chance that, if the second twin does not have *Autism*, he or she will exhibit one or more *Autistic* traits (Nash, 2002; Le Couteur, Bailey, Goode, Pickles, Robertson, Gottesman & Rutter, 1996; Bailey, Phillips & Rutter, 1995). While this research strongly suggests a genetic basis to *Autism*, the variability in the severity of the disorder seems to suggest that multiple genes are probably responsible for causing *Autism* (Nash, 2002).

Approximately 50% of all individuals diagnosed with *Asperger Syndrome* have a near relative with the diagnosis or obvious symptoms of it (Peeters & Gillberg, 1999). These findings provide a convincing case for a genetic basis for *Autism* and its related disorders. The genetic findings do not include the possibility that some form of gene-environment interaction may be involved in pathogenesis. That is, the presence of genetic differences may only give rise to phenotypic abnormality/differences in the presence of certain environmental factors.

### 2.4.2 Congenital Factors

#### 2.4.2.1 Prenatal or Perinatal Factors

Peeters and Gillberg (1999) claim that more children with *Autism* have suffered brain damage during the prenatal period, during delivery, or in the postnatal period, than the average population. Children with *Autism* often suffer minor medical problems during the foetal stages, which, on their own, would not cause harm to the newborn baby, but when taken together with other medical
difficulties and possible genetic predispositions, impair the development of the brain (Peeters & Gillberg, 1999). However, studies conducted by Nelson (1991) and Fombonne, Du, Cans and Crandjean, (1997) suggest that, while there may be some evidence that pre- and peri-natal problems may be more common in children with Autism, it appears that obstetric complications may be a consequence rather than the cause of the child’s Autism. Van Gent, Heijen and Treffers (1997) report that Autism has been aetiologically linked to damage to the central nervous system, caused by prenatal rubella infections. In one study, 243 children with congenital rubella were studied longitudinally, and it was found that 4% of these children developed Autistic disorder, and a further 9% developed related disorders. This study and others like it provide at least some evidence that prenatal viral infections to the brain may have some impact on the development of Autism (Van Gent, Heijen & Treffers, 1997).

The Medical Research Council (2001) states that research has been conducted with regard to in utero (prenatal) exposure to thalidomide, valproic acid, anticonvulsants, cocaine, and alcohol. Of these, the association with thalidomide is the strongest. It should be noted that thalidomide has been contra-indicated in pregnancy for many decades. Other pre-, peri- and neo-natal complications that have been researched, are maternal age, bleeding after the first trimester, use of medication, and meconium in amniotic fluid (Medical Research Council, 2001). The data reviewed did not indicate a unifying pathologic process in Autism.

2.4.3 Neurophysiological factors

There are two neurophysiologic hypotheses regarding Autism. The first, which considers a primary cortical dysfunction in Autism, emphasises the Autistic symptoms of language and communication, and assumes an underlying specific cognitive disorder that is presumably of cortical origin (Haas, 1996).
The second hypothesis proposes a primary brainstem dysfunction in children with Autism. This hypothesis was developed through observation of the impaired ability of Autistic children to modulate their responses to sensory input, and consequently their own motor input (Ornitz, 1985). In addition, some studies have demonstrated that individuals with Autism have high rates of demonstrable brain dysfunction, as shown on Computerised Axial Tomography (CAT) scans or Magnetic Resonance Imaging (MRI) scans (Bailey, 1998; Kemper & Bauman, 1998). However, these abnormalities do not show any consistent pattern. While the dysfunction seems to be focused in the temporal lobe, there is also some evidence of frontal lobe dysfunction (Peeters & Gillberg, 1999). In addition, between 50 and 55% of individuals with Autism show some evidence of clear brain stem damage, and autopsy studies have shown abnormalities in the cerebellum, brain stem, and temporal lobes (Peeters & Gillberg, 1999). It has been suggested that the primary cause of Autism could be a lesion in the reticular activating system. This part of the brain is known to influence arousal, attention and sleep. A lesion here results in too little arousal in the child’s nervous system for him to make sense of the world (Roberts, 1977). Hutt and Hutt (in Roberts, 1977), however, suggests that the defect in the reticular activation system is such that there is too much arousal in the child, which causes a block in incoming information and sensations.

Deslauriers and Carlson (in Roberts, 1977) went further to postulate a theory which incorporates both the reticular activating system and the limbic system, an area in the brain associated with self-stimulation. These researchers suggest that, to appropriately deal with incoming environmental information and stimuli, as well as stimuli from the body itself, these two systems should be in balance. In the child with Autism, these two systems are not in balance, which results in either over-sensitivity or under-sensitivity to these stimuli. More recent studies by Dr Margaret Bauman, a paediatric neurologist at Harvard Medical School, have confirmed the suggestion of abnormalities in the limbic systems of individuals with Autism. She has examined post-mortem tissue from the brains of nearly 30 individuals with Autism, and has found that the cells in the limbic system of these individuals are atypically small and tightly packed together.
(Nash, 2002). A relatively new hypothesis, which proposes a biological basis for Autism, has been put forward by Dr Eric Courchesne of the University of California. His research has shown that, at birth, the brain of a child with Autism is normal in size. However, by the time these children are two or three years of age, their brains are much larger than those of non-Autistic children. This abnormal growth is not spread evenly through the brain, but is focused in the grey matter of the cerebral cortex and the white matter of the cerebellum. It is this, Courchesne believes, which causes the signal overload in children with Autism (Nash, 2002).

2.4.4 Neuroanatomical factors

Two major studies (Kemper, & Bauman, 1998) have been carried out in this field. Areas of agreement in these studies include that brain weight is increased in an as-yet uncertain proportion of children with Autism. Decreased Purkinje cell numbers are seen in the majority of cases, and developmental abnormalities of the inferior olive are a common observation. Convergent evidence for these findings was found using MRI, in a study done by Aylward (1999). Recent studies have revealed that about one in every four individuals with Autism has a head circumference which is larger than normal (Bailey, Phillips & Rutter, 1996; Woodhouse, Bailey, Rutter, Bolton, Baird & Le Couteur, 1996).

So far, no specific neuroanatomical cause or causes have been identified. Neurobiological investigations have found various abnormalities. However, no single measure of the abnormalities has been consistently found, and the aetiologic implications remain far from clear (Medical Research Council, 2001).

2.4.5 Other factors

Another possible aetiological consideration is presented by the autoimmune hypothesis, which proposes that Autism may be caused by a breakdown of self-recognition mechanisms, or autoimmunity, which causes
immunological reactions against components of the self or, in simple terms, causes the body to reject parts of itself (Van Gent, Heijen & Treffers, 1997). Patja (2000) believes that the MMR vaccine, which is given to children to prevent measles, mumps and rubella, causes Autism. However, this hypothesis is unsubstantiated at this time (Nash, 2002). There has also been some speculation around the possibility of medication taken by pregnant mothers being the cause of Autism (Nash, 2002).

2.5 Co-morbidity of Autism with other medical conditions

Autism frequently occurs together with other medical and psychological conditions. According to Wing (1980), more than one third of all children with Autism or Autistic behaviour have a history of some medical condition that affects the brain, and is either inherited or occurs before, during, or after birth. Co-morbid medical conditions include Epilepsy, Cerebral Palsy, Fragile X, Tuberous Sclerosis, sensory impairments of hearing and vision, Down’s syndrome, Neurofibromatosis, Congenital Rubella, and Phenylketonuria. Epilepsy and Cerebral Palsy are believed to be the most prevalent (Gilberg & Coleman, 1996).

Sensory impairments are also common in Autistic children. According to Peeters and Gillberg (1999), at least one in five of all individuals with Autism has impaired vision and needs glasses. In addition, about two in every five preschool children with Autism have a squint. Hearing is also often impaired in Autism, with one in four children with Autism experiencing a considerable degree of hearing loss (Peeters & Gillberg, 1999). Gilberg and Coleman’s research (1996) reports that external ear anomalies have been observed more frequently in studies of children with Autism. Increased prevalence of Autistic symptomatology was also reported among congenitally blind and deaf children. In addition, about one in five children with Autism has Dysphasia, and therefore experiences a speech impairment (Peeters & Gillberg, 1999).

As previously mentioned, the association between Epilepsy and Autism has been recognised since the late 1960s (Rutter, 1978), and research has
proved that by adulthood, one third of individuals with *Autism* have developed Epilepsy (Volkmar & Nelson, 1960). According to Wing (1980), approximately one third of individuals with *Autism* have had at least one epileptic fit by the time they reach adulthood. What is most distinctive about the epilepsy associated with *Autism* is that the frequency of and onset of epileptic attacks in late adolescence or early adult life is particularly high (Bailey, Phillips & Rutter, 1996). As mentioned earlier under section 2.4.4. Neuroanatomical Factors of children with *Autism*, a decreased number of Purkinje cells have been observed. Volkmar and Nelson's (1990) research suggests that this may be a result of seizure activity in the brain.

There has been considerable interest in the possibility that there are significant gastrointestinal problems in children with *Autism*. Research done by Furlano (2001), suggests a higher incidence of oesophagitis, gastritis and duodenitis in children with *Autism*.

There are also two genetic disorders which are often associated with *Autistic* Disorder. The first of these is Fragile X. This genetic disorder is about as prevalent in the general population as *Autism* is, and is named for the appearance of a fragile site on the lower arm of the X chromosome (Bailey, Phillips & Rutter, 1996). Previous estimates of co-morbidity between *Autism* and Fragile X ranged between 7% and 16%. However, recent studies have shown that the two disorders occur together in between 2.5% and 5% of cases (Medical Research Council, 2001).

A second genetic disorder, which often occurs in individuals with *Autism*, is Tuberous Sclerosis. This single gene disorder occurs in approximately 1 in every 7000 individuals (Bailey, Phillips & Rutter, 1996). Studies by Hunt and Shepherd, in 1987, reported that 50% of children with Tuberose Sclerosis showed *Autistic* behaviour (Bailey, Phillips & Rutter, 1996). Later estimates, however, showed that 24% of children with this genetic disorder met DSM II-R criteria for *Autistic* Disorder and a further 19% showed *Autistic* traits (Bailey, Phillips & Rutter, 1996).
2.5.1 *Autism* and Mental Retardation

It has been estimated that between 76% and 89% of learners with *Autism* have impaired intellectual abilities, as indicated by intelligence quotient (IQ) scores of below 70 (Bryson, Clark & Smith, 1988).

Rutter’s research (1978) proved that between 40% and 60% of *Autistic* children have an IQ of below 50, and only 20% – 30% have an IQ of 70 or above. More recent research conducted by Wolfberg (1999) in New York, based on data from standardised intelligence measures, including the Wechsler Intelligence Scale for Children-Revised (WISC-R), indicated that 60% of children with *Autism* fall in the severe mental retardation range, 20% of children with *Autism* fall in the mild mental retardation category, and 20% of children with *Autism* have average or above average intelligence. The use of the WISC-R will be discussed later in the section on Developmental assessment. Peeters and Gillberg (1996) believe that the prevalence of severe mental retardation amongst children with “Classic *Autism*” or *Autistic* Disorder, is as high as 80%. These authors go on to explain that children with Asperger’s syndrome are usually of superior, normal, or low-normal intelligence. While a number of individuals with *Autism* show remarkable talents or abilities, such as rote memory or exceptional visual-spatial ability (Wolfberg, 1999), these are usually isolated areas of ability, and do not necessarily mean that the child is functioning at an above-average intellectual level.

Ornitz (1985) refuted the belief that *Autistic* children have normal intellectual potential whose ability is obscured by *Autistic* features and it is widely accepted that the majority of these children will function in the mentally retarded range for their entire life.

Although both low-IQ and high-IQ *Autistic* children are similar in terms of the main symptoms associated with *Autism*, those with a low IQ show a more severely impaired social development and are more likely to display deviant
social responses, such as touching or smelling people, and self-injury (Bartak & Rutter, 1976).

Earlier studies (Rutter, 1978) suggested that the retardation accompanying Autism is differentiated from general retardation by islets of normal or near-normal intellectual function, revealed particularly on performance tests, or in special abilities of the “idiot savant” kind. Kanner (1943) noted the excellent rote memories of Autistic children. The most common areas of special skill tend to be musical, mechanical and mathematic abilities. Rutter (1978) noted that, in contrast to a clinic control group matched for IQ, Autistic children were generally superior on the subtests requiring manipulative or visual-spatial skills or immediate memory, whereas they performed poorly on tasks demanding symbolic or abstract thought and sequential logic. Studies by Jordan and Powell, (1995) and Jordan and Jones, (1999) have shown that cognition in Autistic children is impaired, most particularly in capacity for imitation, comprehension of spoken words and gestures, flexibility, inventiveness, rule formation and application, and information utilisation. The impairment is both more severe and more extensive than in non-Autistic children of comparable IQ.

On the other hand, mentally retarded Autistic children tend to have a wider cognitive deficit involving general difficulties in sequencing and feature extraction, whereas in normally intelligent Autistic children, the deficits mainly affect verbal and coding skills (Rutter 1978).

The above chapter has attempted to conceptualise Autism and the complex task that face clinicians in assessing and facilitating appropriate diagnosis and scholastic placement of children with Autism. Chapter 3 aims to provide a theoretical background to developmental assessment, with specific reference to children with Autism. Various assessment instruments used in the assessment process will be discussed in terms of their development content and applicability for children with Autism.
CHAPTER THREE
DEVELOPMENTAL ASSESSMENT OF CHILDREN WITH AUTISM

3.1 Introduction

The focus in chapter two was on Autism, and the diagnostic challenges that face the clinician. Subsequently, it is the aim of this chapter to highlight the importance of a valid and reliable developmental assessment tool for an accurate diagnosis of Autism. By referring to relevant literature, the first part of the chapter will be devoted to defining developmental assessment, and stressing its importance. The steps in the assessment process will be outlined, after which specific reference will be made to the developmental assessment of children with Autism. A discussion of various assessment instruments, similar to the Griffiths Scales, will be discussed in terms of their development, content, and applicability for children with Autism.

3.2 Defining Developmental Assessment

Assessment, in general, has been defined as “the systematic use of a variety of special techniques in order to better a given individual, group or psychological ecology” (McReynolds, 1968, p. 2).

Generally, assessment refers to the process of gathering information for the purpose of making a decision (Wilderstrom, Mowder & Sandall, 1997). Snow (1998) elaborates on the process of developmental assessment, by which information is obtained about the abilities and characteristics of the infant or child. Once the data is obtained, it can be used in various ways. Meisels and Wiske, (1993) name such ways to include: (i) identifying infants who may be at risk for developmental problems (screening); (ii) verifying the presence and severity of the potential problem (diagnosis); (iii) planning an appropriate environment, curriculum activities or other strategies to facilitate development
(programme planning); and (iv) testing theories and hypotheses about various aspects of infant development (research).

For the purpose of this study, the developmental assessment of children with Autism will be defined as a comprehensive psychological investigation of a child with Autism’s abilities, including motor, social and cognitive abilities (including language, memory, reasoning, and problem-solving), using direct observation, testing, medical reports, and biographical information.

3.3 The Assessment Process in Early Intervention

This section aims to highlight the assessment process and procedures used by psychologists and other professionals in the assessment of children. It is important to note that, in order to facilitate the delivery of services to children in need of assistance, early identification is essential (National Association for the Education of Young Children, 1998). A structured approach to evaluation is a valuable aid in early identification of such children and the implementation of the necessary intervention.

The following distinguishable steps of the process will be discussed: (i) identification; (ii) screening; (iii) in-depth assessment; (iv) programme and intervention, and (v) evaluation.

3.3.1 Identification

“Identification” refers to the process of locating infants, toddlers, preschoolers and their families, who might be eligible (in need of assistance) for early intervention (Wilderstrom, Mowder & Sandall, 1997). Identification involves a variety of activities related to defining the target population, increasing public awareness of services, encouraging referrals, and canvassing the community for children and facilities who may be in need of services (Peterson, 1997).
3.3.2 Screening

Screening allows for many children to be assessed in a group, in order to identify those who may require a more comprehensive assessment. Brooks-Gunn (1990) regards the following to be requisite characteristics of screening measures:

i. The test should be short.
ii. It should be designed in such a manner as to allow for its use in post-natal clinics, paediatricians’ offices, outpatient hospital clinics, and community health services.
iii. Various professionals should be able to administer the test with a minimal amount of training.
iv. The test should be tailored to the constraints of busy clinical practice, in order to ensure its proper implementation.
v. The test should be so constructed as to discourage personnel from administering only parts of the test (as this will reduce the test’s validity and reliability).
vi. Scoring systems should be simple and not time-consuming.
vii. The test should minimise the number of false negatives (suspect children placed in a non-suspect group), as such children would not be re-tested.

During the screening stage of the assessment process, the child’s skills are examined to provide a widespread representation of his/her overall functioning. Screening sifts out indications of developmental concerns, through analysing patterns of peaks and lows, and identifies areas that require closer examination (Bondurant-Utz & Luciano, 1994).

3.3.3 In-depth assessment

Conversely, in-depth assessment or diagnosis involves a comprehensive assessment to verify or identify the existence, severity, and nature of a disability or developmental delay, so that appropriate interventions can be planned.
(Bondurant-Utz & Luciano, 1994). Widerstrom, Mowder and Sandall (1997) describe diagnosis as the determination of the cause of a delay or disorder, in order to prescribe treatment that will result in a cure.

During the screening stage of assessment, the cause of a developmental problem is difficult to determine or still unknown, and appropriate interventions, which are based on the cause, cannot be planned. On the other hand, in-depth assessment provides more detail, that can be employed for diagnostic and intervention purposes. According to Bondurant-Utz and Luciano (1994), in-depth assessment should include:

i. A detailed and comprehensive analysis of child-developmental abilities that ascertains the goal of the interventions.

ii. A product or score, and more importantly, qualitative information regarding the child’s means and approach to earning that score.

iii. A synopsis of strengths and weaknesses with recommendations regarding the best way in which the child learns.

iv. An analysis of the child’s development, focusing on the problem areas which were identified during the screening stage, as well as the factors influencing the developmental areas, which require intervention.

3.3.4 Programming and Intervention

The process of programming and intervention involves determining the intervention objectives and outcomes, as well as identifying appropriate and effective intervention strategies, to provide the support and services required by the child and his/her family (Wilderstrom, Mowder & Sandall, 1997). Treatment options may include planning individualised activities, providing practical guidelines to parents, making appropriate referrals to other professionals, planning adaptive strategies for teaching, and so forth (Barnard, 2000).
3.3.5 Evaluation

In order to conform to best practices, it is imperative, as part of the assessment process, to continuously determine the effectiveness of the intervention activities and strategies, and to monitor the child’s progress. Regardless of the widely supported notion of multiple methods to collect data in the in-depth assessment process, the importance of official and standardised assessment instruments cannot be neglected. “Standardisation” refers to uniformity of the procedure in administering and scoring the test, thereby allowing for meaningful comparisons of children (Anastasi, 1982). If the measures which are used are not standardised for the group on which they are applied, are not appropriate for the context, are not reliable and valid, and are not relevant for the problem that is being explored, the positive aspects of official testing can be outweighed by the disadvantages. It is therefore necessary to continuously evaluate the use, contemporarity and statistical properties of clinical instruments that are currently being employed both nationally and internationally (Barnard, 2000).

3.4 Assessment of Learners with Developmental Delays

Early writers have stressed the importance of assessment of learners with developmental delays. Holt (1979) has comprehensively summarised the necessity of assessment in childhood as follows: “any child who is suspected of having a congenital defect or deformity, a medical disorder, an impediment to educational progress or social activities, or any deficiency of opportunities, is a potentially handicapped child and should be assessed”. (p151).
Holt adds:

Handicap is not a medical, educational or social problem to be treated, trained or counselled, but it is a burden, which is impeding a child’s development. Our task is to ease this burden and so promote the development of the person. Comprehensive assessment is the cornerstone of this work (p161).

As has become clear, developmental assessment of children with potential handicaps is important for several reasons. Knobloch and his colleagues (Knobloch, 1959; Knobloch & Pasamanick, 1963, Pasamanick & Knobloch, 1974) are of the opinion that the function of testing in infancy and early childhood is to detect abnormal neurological conditions and subnormal developmental potential, and not to determine mental superiority or exact IQ scores. Early identification of such abnormal neurological conditions or impaired developmental potential can prove valuable in facilitating the interventions necessary to help speed up the child’s overall development.

However, Honzik (1976) summed up the position of infant testing when she said:

The purpose of infant testing is to determine the progress of an individual child or mental development of all children. Prediction of later intellectual functioning is a worthy aim of infant tests, but secondary to the more important objective of adding to our understanding and knowledge of the course of development of mental abilities in infancy and early childhood (p. 91).

Simeonsson & Bailey (1988) depict the elements of the assessment process of learners with developmental delays in the following diagram:
As is evident in Figure 1, assessment of learners with developmental problems is a process with many component parts. Typically a problem, such as delayed development, presents itself in one form or another. A short screening process aids in the determination of whether a more detailed diagnostic assessment is required. The detailed assessment, usually consisting of a combination of interviews, observations and direct testing, provides the core of information necessary for informal decision-making. Several kinds of decisions are likely to be made on the basis of assessment data. One type of decision is diagnostic, either confirming or disconfirming a diagnostic entity such as mental retardation or Autism. A second type of decision pertains to the documentation of status, that is, the definition of the child’s current capabilities and/or deficits. Assessment for this purpose is likely to be made at an initial point, and to be repeated on one or more occasions following intervention, to demonstrate progress (Duncan, Sbardellati, Maheady & Sainato, 1981). A formal psychological measure, such as the Griffiths Scales, is likely to be administered at this stage. A third type of decision focuses on the prescription of an
appropriate intervention matched to the assessed needs of the child. In early intervention efforts, these decisions are not mutually exclusive, and data from the same assessment may serve several purposes simultaneously. Assessment for prescribing individualised treatment can be informal, whereas the diagnosis or documentation of status requires assessment that is typically formal and standardised (Bailey & Wolelry, 1989).

The use of standardised assessment, specifically in exploring child development, cannot be neglected. Richter and Griesel (1988) distinguish the role of psychological tests as not subtracting from the multimethod, multisource and multisetting approach, but rather regard them to be avenues through which further remedial or diagnostic activities can evolve. Squires, Nickel and Eisert (1996) add that the contributions made in using standardised measures are threefold. Firstly, they will outweigh the limitations of pure observation. Secondly, they will provide a structure for observation, and thirdly, they will increase the identification of children having minor problems, who may otherwise go unidentified. Bondurant-Utz and Luciano (1994) expand on the advantages of developmental assessment, specifically the use of norm-referenced tests. The standard procedures of administration and scoring, allow a child’s performance to be meaningfully compared to a representative sample. Furthermore, the results entitles the test user to make a comparison between a child’s performance in various areas of assessment and hence generate a pattern of strengths and weaknesses.

3.5 Assessment of children with Autism

The report of The New York State Department Recommendations on Autism (1999) stresses the importance of identifying children with Autism as soon as possible, since early intervention may help speed the child’s overall development, reduce inappropriate behaviours, and lead to better long term functional outcomes. The report indicates that it is often possible to recognise and diagnose Autism within the first 3 years of life, and stresses the following:
i. It is important for all children with suspected developmental problems to have an age-appropriate developmental assessment. This may include evaluation of such areas as cognition, communication (including an objective test of hearing), behaviour, social interaction, motor and sensory abilities, and adaptive skills.

ii. It is important to carry out a developmental assessment for children with possible disabilities because such assessments can:
   - help to identify possible developmental problems and assist in making an accurate diagnosis;
   - provide an objective description of the child’s abilities and deficits;
   - determine eligibility for various programmes, such as early intervention programmes;
   - aid in planning for appropriate interventions, and
   - provide a baseline for measuring progress and effects for interventions.

iii. It is important that the developmental assessment not to be viewed as a single event, but as an ongoing process that follows the child over time.

iv. It is important that the developmental assessment:
   - be individualised for each child;
   - utilise the procedures that are reproducible by other professionals;
   - focus on the child’s presenting problems (such as suspected delays or deviations in development or behavioural problems);
   - define the child’s strengths and/or compensatory abilities, and
   - make use of parents’ observations of their child’s skills and behaviours (p.3).

Clinicians often find it challenging to select appropriate instruments for assessing children with Autism (Browder, 1987). This is a result of the difficulties that learners with Autism generally experience with social interaction, in communication, and with ritualistic or compulsive behaviours. A discussion of
frequently used assessment instruments, will now be discussed in terms of their development, content and applicability for children with *Autism*.

3.6 Assessment instruments used for assessing children with *Autism*

3.6.1 Introduction

In the following section, relevant assessment instruments are evaluated in terms of their development, content coverage, and revision, as well as their relevance to the New York State Departments recommendations on assessment of children with *Autism*. In early childhood, developmental assessment translates into using observations, standardised tests, checklists and other instruments to help a teacher, parent, or intervention team to make decisions about a child’s diagnosis, placement, instructional programme, or progress (McLean, 1996). Standardised tests generally fall into the following categories (National Association for the education of Young Children, 1988):

(i) Developmental screening tests. These are tests which are designed to “identify children who, because of risk of a possible learning problem or handicapping condition, should proceed to a more intensive level of diagnostic assessment” (Meisels & Wiske, 1993, p.1).

(ii) Psychological or intelligence tests. These tests of competency focus on the knowledge, skills and attitudes that a child uses to function effectively in specified environments and situations (Anastasia, 1982; Kaufman, 1979).
3.6.2 Developmental Screening Tests

The following two developmental screening measures are used widely in South Africa and internationally for the screening of children with Autism (Klinger, Grofer & Renner, 2000), namely the Childhood Autism Rating Scale (CARS) and the Checklist for Autism in Toddlers (CHAT).

3.6.2.1 The Childhood Autism Rating Scale

The Childhood Autism Rating Scale (CARS) (Schopler, Reichler, DeVellis & Daly, 1980) is the most widely used screening measure for Autism symptomatology, and can be scored with either structured or unstructured observations in a clinic, home, or school setting. Although it is considered a reliable and valid measure of Autism symptomatology (Van Bourgondien, Marcus & Schopler, 1992), the lack of defined setting and activities in which the child is observed, prevents the CARS from being considered a performance-based assessment instrument. Additionally, the CARS can be scored solely on the basis of parent or teacher report. This removes the CARS even further from a true performance-based instrument. The focus of the CARS on current behaviour provides a current, but not lifetime, diagnosis of Autism. The CARS was developed prior to the current DSM-IV diagnostic system. It does not use the same symptom triad, and does not differentiate between the different subtypes of PDD defined by the DSM-IV. Thus, it has been suggested as a screening device but not as a formal diagnostic instrument for making DSM-IV diagnosis (Lord, Rutter & Le Couteur, 1997). Although the CARS meets certain of the requirements of the New York State Department’s recommendations on assessment of children with Autism in that it helps to identify possible developmental problems and assists in making an accurate diagnosis of Autism, it does not comprehensively evaluate such areas as cognition, communication (including an objective test of hearing), behaviour, social interaction, motor and sensory abilities, and adaptive skills.
3.6.2.2 The Checklist for *Autism* in Toddlers (CHAT)

The CHAT (Baron-Cohen, Cox, Baird, Swettenham, Nightingale, Morgan, Drew & Charman, 1996) is a combined 9-item parent-report and 5-item observation-based instrument designed to screen for symptoms of *Autism* at 18 months of age. It is designed as a 5-minute screening device to be used in primary-care settings as well as child clinics. The observations are intended to confirm parental report. The observational section can be considered as a brief, performance-based measure of *Autism* symptomatology. Nine different developmental areas are assessed, with failure on two joint-attention tasks (gaze monitoring & prodeclarative pointing) and the pretend play task, being indicative of *Autism* symptomatology. The sensitivity and validity of the CHAT was tested in a large-scale, longitudinal study of more than 16,000 children (Baird, 2000). In this study, 38 children were identified as at high risk for developing *Autism* at 18 months, and were followed until 7 years of age. At 7 years of age, 10 of these children had received a diagnosis of *Autism* (positive predictive validity = 26.3%). An additional 40 children who had not been identified at 18 months were later diagnosed with *Autism* (sensitivity = 20%). When the CHAT was readministered a month later, the positive predictive validity increased. Twelve children were identified by both administrations, and nine had a confirmed diagnosis of *Autism* at 7 years (positive predictive validity = 75%).

Even with two administrations, however, the CHAT continued to have poor sensitivity (18%). The CHAT is, however, unique in its combination of parent interview and performance-based observation. The New York State Department’s recommendations on assessment of children with *Autism* specifies, as previously mentioned, that assessment instruments should evaluate such areas as cognition, communication (including an objective test of hearing), behaviour, social interaction, motor and sensory abilities, and adaptive skills. This measure remains an observation-based instrument designed to screen for symptoms of *Autism*, and does not evaluate areas as cognitive functioning, social interaction, motor and sensory abilities, and adaptive skills.
3.6.3 Diagnostic Tests

According to research done by Klinger, Grofer and Renner (2002), the following psychological tests are widely used with children with *Autism*. This is a result of the absence of psychological tests specifically designed for assessment of children with *Autism*.

3.6.3.1 Bayley Scales of Infants Development-II (BSID-II)

The BSID-II was published in 1969, and the revised and restandardised version was completed in 1993 (Bayley, 1969; 1993). The revised Scales are applicable to children between the ages of 1 month and 42 months. The BSID was standardised for use with Black South African children in 1988 (Richter & Griesel, 1988), “for the practical purpose of making assessments of the development of Black South African infants”.

The BSID-II was designed to identify children who have a cognitive or motor delay, and suggests needed forms of intervention. The instrument comprises three scales. The Mental Scale yields a normalised standard score, and is intended to assess sensory-perceptual acuities and discrimination, object constancy, memory, learning, problem solving, early verbal communication, early abstract thinking, and early number concept. The Motor Scale also yields a standard score, and evaluates body control, as well as fine and gross motor skills. The Behavioural Scale provides a qualitative assessment of attention, orientation, emotional regulation, and motor quality (Brown, 1994). Thus, the BSID-II was designed to gain information about a wide variety of developmental abilities and the achievement of developmental milestones. Anastasi (1982) considers the test construction procedures to be of a very high technical standard, with an average reliability coefficient of .88 being reported. However, more construct validity studies still need to be conducted with the revised version. Furthermore, information relating to use with special populations is lacking. The use of parent observations is omitted, which is one of the
requirements of the New York State Department’s recommendations on assessment of children with *Autism*.

### 3.6.3.2 Wechsler Intelligence Scale for children – Revised (WISC-R)

Wechsler, of the Bellevue Psychiatric Hospital in the USA, developed an initial scale, called the Wechsler-Bellevue Intelligence Scale (WBIS), which was composed of tests of two categories, Verbal and Performance. Later in 1949, Wechsler developed the Wechsler Intelligence Scale for Children (WISC). The WISC assesses the intelligence of children between the ages of 5 and 15 years. In 1974 the WISC was replaced by a restandardised version, namely, the Wechsler Intelligence Scale for Children-Revised (WISC-R)(Wechsler, 1974). The Wechsler Scales changed from being an age-linked scale of intelligence to a point scale. Despite the fact that the WISC-R is said to be technically superior in terms of its construction procedures and reliability, validity studies have been insufficient and inconclusive (Anastasi, 1982; Groth-Marnat, 1984). These scales have been again been replaced by a standardized version, The Weschler Intelligence Scales for Children-3rd Revision, (WISC III, 1992).

Although the WISC III is useful because it can help compare verbal ability with non-verbal ability, the performance scale is not specifically designed for children with language impairments, for example, children with *Autism*. Again, the use of parent observations is omitted, which is one of the requirements of the New York State Department’s recommendations on assessment of children with *Autism*.

### 3.6.3.3 The Weschler Pre-school and Primary Scale of Intelligence-Revised (WPPSI-R)

The Wechsler Pre-school and Primary Scale of Intelligence-Revised (WPPSI-R) was developed in 1989 as a downward extension of the WISC. It
measures the intelligence of children between 4 years and 6 years 7 months of age, across 12 subtests. The subtests are grouped into a verbal and a performance scale (Wechsler, 1967; 1974). The major assets of the WPPSI-R appear to be the simple administration procedure, its popularity and familiarity to most psychologists, and the ability to assist in evaluating personality variables. Despite the above-mentioned assets, the WPPSI-R remains deficient in terms of estimating IQs of severely retarded children. Demonstration items are not included in the procedure, and some of the verbal instructions in the WPPSI-R, for example Mazes, are quite complex. Furthermore, the norms are said to be unsuitable for ethnic minority persons from lower socio-economic backgrounds (Groth-Marnat, 1984).

3.6.3.4 Junior South African Individual Scales (JSAIS)

During consultation with the psychologists at the various schools for children with Autism in South Africa, it was found that the Junior South African Individual Scales (JSAIS) and the Griffiths Scales are the most widely used psychological tests for assessing children with Autism. These tests are usually done in conjunction with the CARS or the CHAT.

The JSAIS (Madge, 1981) was developed in 1979 for White South African children aged 3 to 7 years. It was developed at a time when separate tests were used for “different population” groups in South Africa. The main aim of the scale is twofold, namely to establish the general intellectual level of children between the ages of 3 years 0 months and just under 8 years; and to evaluate a child’s relatively strong and weak points (Madge, 1981). The test yields a Global Intelligence Scale (GIQ Scale), as well as Verbal (VIQ Scale) and Performance (PIQ Scale) Intelligence Scales. The usefulness of these scales is ascribed to a wide spectrum of abilities, from which the child’s general intellectual level is obtained.

Swart (1987) adapted and standardised the JSAIS for Asian children, and JSAIS norms specifically for “Coloured” children were also published.
Van den Berg (1987), however, argued that Black children could be included in the norm population only once parallel forms of the test had been developed for South African Black languages. The New York State Department Recommendations on *Autism’s* report (1999) stresses the importance of the use of parents’ observations of their child’s skills and behaviours. The JSAIS makes no provision for parent input.

The major limitation of the JSAIS, however, remains, that it has only been standardised for the White and Asian South African populations.

### 3.6.3.5 Non-verbal Psychological Tests

Among the most popular non-verbal tests used today are the Test of Nonverbal Intelligence (TONI) (Brown, Sherbenou, & Dollar, 1982); the Vineland Social Maturity Scales (Vineland) (Doll, 1965); the Goodenough-Harris Draw-a-Person Test (DAP) (Harris, 1963); Raven’s Progressive Matrices (RPM) (Raven, 1938, 1947a, 1947b) and the Kaufmann Assessment Battery for Children (K-ABC) (Kaufmann & Kaufmann, 1983).

The DAP requires drawings of people, while the TONI, Raven and the K-ABC are figural reasoning tests. Non-verbal tests have gained significance because of their so-called “culture-fair” attributes (Allan, 1992). According to Sundberg & Gonzalies (1981), “culture-reduced non-verbal tests have not proved better for predictive purposes than the usual verbal tests, with minority groups in the United States or elsewhere” (p. 487). Additionally, all age groups and all areas of development are not included in any of the mentioned non-verbal tests. The TONI and the RPM cannot be used for children younger than 5 and 6 years of age respectively. The RPM consists of three separate tests, and should preferably be used in conjunction with a vocabulary test (Vass, 1992). The DAP and the K-ABC cannot be used for children under 3 years and 2 years 6 months respectively. Despite the Vineland including items for the first 3 years of life, it does not cover all important areas of development, since it is only a measure of social competence. Because of the non-verbal nature of these tests, they do not
assess verbal ability, which is generally impaired in children with Autism. The above mentioned tests therefore do not comply with the recommendations of The New York State Department on Autism’s report (1999), which stresses the importance of focusing on the child’s presenting problems (such as suspected delays or deviations in developmental problems).

The focus in this chapter was on the developmental assessment of children, with special reference to that of children with Autism. The steps of the assessment process were outlined, and recommendations were made for early identification and developmental assessment of children with Autism. A discussion on the suitability of various diagnostic and developmental tests for children with Autism followed.

As mentioned above, during consultation with the various psychologists at the schools for Autism included in the study, the Griffiths Scales of Mental Development (GSMD) are widely and effectively used to assess children with Autism. They fulfil the recommendations of The New York State Department on Autism’s report (1999) in that they:

(i) include the evaluation of areas such as cognition, communication (including an objective test of hearing), behaviour, social interaction, motor and sensory abilities, and adaptive skills;
(ii) provide an objective description of the child’s abilities and deficits and provide a baseline for measuring progress and effects for interventions;
(iii) ensure that the assessment focuses on the child’s presenting problems (such as suspected delays or deviations in development or behavioural problems); and
(iv) make use of parents’ observations of their child’s skills and behaviours (p.3).

As the topic of the study is these Scales, or more specifically the Revised Extended Scales, they will be discussed in more depth in Chapter 4.
CHAPTER FOUR
THE GRIFFITHS SCALES OF MENTAL DEVELOPMENT

4.1 Introduction

The measuring instrument employed in the present study, namely, the Griffiths Scales of Mental Development (GSMD) is reviewed in this chapter. In addition, both normative and clinical studies are discussed, and standardisation of the GSMD is addressed. The GSMD (Griffiths, 1954; 1970; 1984) were developed to assess the development level of children from birth to 2 years of age on five Subscales. The Subscales are the Locomotor (A), Personal-Social (B), Hearing and Speech (C), Eye and Hand Co-ordination (D) and Performance (E) Subscales. During the 1960s the Subscales were expanded to cover ages from birth to 8 years 4 months (Griffiths, 1970). A sixth Subscale named Practical Reasoning (Scale F) was added to the Extended Griffiths Scales for children aged 2 years and older, to provide more comprehensive coverage of the young child's emerging problem-solving and logical reasoning skills (Griffiths, 1970).

4.2 History and Development of the Griffiths Scales

The valuable contribution made by the Griffiths Scales has been evident in the United Kingdom since its introduction in 1954 and the Griffiths Extended Scales were published in 1970 (Griffiths, 1970, 1984). Since the introduction of the GSMD into South Africa approximately 25 years ago, a considerable gap has been filled in the developmental assessment of infants and young children. To date, the GSMD have been successfully utilised in South Africa on a wide range of the population, for example, normative studies with black, white, “coloured” and Indian children; children with physical disabilities, and children with mental disabilities (Allan, 1988, 1992; Bhamjee, 1991; Heimes, 1983; Lombard, 1989; Luiz, 1988a, 1988b, 1988c, 1994a; Luiz, Oelofsen, Stewart & Mitchell, 1995; Mothuloe, 1990; Stewart, 1997; Sweeney, 1994; Tukulu, 1996; Worsfold, 1993).
The GSMD have also been translated into Afrikaans, using Brislin's (1976) back-translation technique (Allan, 1988), and into Xhosa (Tukulu, 1996). The latter are employed in the present study. In addition, items from a number of Scales have been adapted (e.g., “potato” for “turnip”), making them more applicable for use within the South African context. Some of these studies will be expanded upon in section 4.6.

4.3 Nature of the Scales

The majority of developmental tests focus on the cognitive development of the child, but the GSMD provide a comprehensive developmental profile. The items on the GSMD are diverse (Brooks-Gunn, 1990), tapping the main aspects of a child’s development, namely, physical, cognitive, social, and emotional. It is a norm-referenced test, and the items are placed in order of gradually increasing difficulty. Many of the items on the GSMD are based on natural activities such as walking, talking, and playing. Play is an experience that is common to all cultures. Research on the GDMS has shown that they have practical and diverse applications in the evaluation and treatment of infants and young children from a variety of cultural backgrounds (Allan, 1988; Mothuloe, 1990; Bhamjee, 1991). Furthermore, the GSMD allow for an administration that includes direct observation, official testing, and report items. The GSMD were introduced to South Africa in 1977, and to date there are approximately 600 registered South African users.

Extensive international research in Canada, (Ramsay & Fitzharding, 1977), Columbia, (Cobos, Rodrigues, & De Venegas, 1971), France (Laroche, Brabant, & Brabant, 1976; Laroche, Gutz & Desbiolles, 1974), Germany (Brandt, 1983, 1984), China (Collins, Jupp, Maberly, Morris & Eastman, 1987), Norway (Sletten, 1970, 1977) South Africa, Australia, Greece, Lebanon, and the United State of America (USA), has demonstrated that the GSMD are applicable to diverse populations, and that they seem to tap experiences that are common to different cultures, an attribute that is obviously very significant in a multicultural context. In addition, the GSMD can be regarded as having filled the void that
existed in the developmental assessment of young children in South Africa, in that they include the first 3 years of a child’s life. Today, the GSMD are globally amongst the most widely researched tests for the assessment of infants and young children (Luiz, 1994a).

4.4 Description of Subscales

Griffiths (1970) stated that each Subscale of the GSMD was formulated to be a separate and complete Scale in itself. This made provision for any single “basic avenue of learning”, or process of development, to be measured independently and as completely as possible. The origin and interactions among the basic avenues of learning, namely, the eyes, hands, voice, and hearing, comprise the underpinning on which the GSMD were constructed (Griffiths, 1960). Griffiths (1960, 1970) emphasised the physiological functions as being responsible for the earliest beginnings of mental development. The physiological functions, which include sleeping, waking, and ingestion, are rhythmical, occurring regularly in time.

The six Subscales comprise the General Quotient (GQ) and are equal in difficulty at each age level. A brief account of the six Subscales follows.

The Locomotor Subscale (A) provides the possibility to observe certain physical weaknesses or disabilities, or more definite inadequacies of movement. Items include walking up and down stairs, hopping, throwing and kicking a ball, and jumping over a rope. The items challenge the child’s regular physical strength, skill in speed and movement, rhythm and poise, to a degree which corresponds with their age.

The Personal-Social Subscale (B) assesses personal and social development. At a level which corresponds with the child’s age, a degree of self-help is necessary from the child in terms of personal cleanliness, efficiency at the table etc. Extra information such as the child’s name, home address, and family name, can be gleaned through a casual conversation with the child. Some
degree of social interaction is necessary from the child, as is co-operation in play with other children. Emotional factors affect performance on all Subscales, but they usually have a more explicit influence on this Subscale. Griffiths (1984) stated that the over-protected child and the neglected child usually do rather poorly on this Subscale.

The Hearing and Speech Subscale (C) assesses the growth and development of both receptive and expressive language. This Subscale necessitates the comprehension of language, as well as specific verbal expressive skills, in terms of vocabulary, the use of different parts of speech, and the use of sentences and paragraphs. Items include the naming of colours, the naming of similarities and opposites, the repetition of sentences with a varying number of syllables, and the naming of stimulus picture cards. Poor performance on this Subscale does not necessarily imply that the child has low intellectual functioning, but may be a result of deafness or some degree of hearing loss.

The Eye and Hand Co-ordination Subscale (D) is comprised of items relating to handwork and visual ability. The child is required to demonstrate manual dexterity, co-ordination between the eyes and hands, careful work, and persistence at a task. From a child’s performance on this Subscale, one can also obtain information on his/her personality, as well as his/her conception of space and form-relations. Items include the threading of beads, both formal and informal drawings, and the cutting of paper.

The Performance Subscale (E) assesses skills in manipulation, speed and precision of work. Spatial perception and visual activity are required for the completion of the tasks. Items correspond with those on the Hand and Eye Co-ordination Subscale, as a certain degree of manual performance is required of the child. Items on this Subscale include building stairs and bridges with blocks, the use of form-boards, and pattern making.
The Practical Reasoning Subscale (F) focuses mainly on assessing the most primitive indications of arithmetical comprehension, and the realisation of the most basic practical problems. It has value in demonstrating a child’s ability to benefit from formal schooling. Attention and concentration span also play a role on this Subscale, as with all the other Subscales. Items include the repetition of digits (giving an indication of short-term auditory memory), as well as differentiation of objects in terms of size, weight, length, and height.

4.5 Standardisation of The Scales

Regarding the standardisation of the GSMD, the British samples utilised for the development and extension of the GSMD (Griffiths, 1960) were selected to be as representative as possible of the entire British community. The sample consisted of 2260 children from the first to the eighth year of life, and comprised the following:

- approximately equal numbers of girls and boys;
- children from congested urban areas as well as secluded country and coastal areas, and from diverse geographical areas of the country (England, Wales and Scotland);
- children from different institutions, for example, schools, play centres and child guidance clinics, and
- children in each group of the sample, which corresponded significantly to the most recent available population census (1960) regarding paternal occupation.

In the standardisation and equalising of the original Scales, the number and percentage of children passing each item were calculated for each 2-month age group, commencing with the first 2 months of the first year, and continuing to the 96th month. In the definitive format of the GSMD, each item was positioned as close as possible to the point where it was passed by 50% of the children in a 2-month age group. The progressive deterioration in the percentage of children
passing the successive items in every Subscale, demonstrates that items in every Subscale are arranged in order of increasing difficulty (Griffiths, 1960).

4.6 Clinical Utility of Scales

Research on the GSMD has been conducted in two main domains, namely, clinical and technical studies. Research related to the clinical use of the Scales has provided evidence that the GSMD are useful in the clinical assessment and diagnosis of children from normal, as well as diverse special population, groups. This will be the focus of the present study, with the clinical group being children with Autism (years 7 and 8) in South Africa.

As mentioned, research on the GSMD has been conducted extensively, both nationally and internationally. In Britain, a study was done of 70 children and adolescents with Autism using the Griffiths Scales of Mental Development (Sandberg, Nyden, Gillberg & Hjelmquist, 1993). In South Africa, it has also been administered to a wide range of children, including a deaf child (Luiz, 1988a), a battered child (Luiz, 1988b), borderline mentally handicapped pre-schoolers (Houston-McMillan, 1988), and a physically disabled child (Krige, 1988). Luiz, Oelofsen, et al. (1995) demonstrated the diverse nature of problems for which the GSMD are utilised. Figure 2 reflects this diverse nature.

Figure 2
The use of the GSMD for various problems

<table>
<thead>
<tr>
<th>Types of diagnoses for which the Extended Scales were most often used</th>
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</thead>
<tbody>
<tr>
<td><strong>Problem</strong></td>
</tr>
<tr>
<td>General developmental delay</td>
</tr>
<tr>
<td>Delayed speech</td>
</tr>
<tr>
<td>Environmental deprivation</td>
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<tr>
<td>Locomotor delay</td>
</tr>
<tr>
<td>Behavioural disturbance</td>
</tr>
<tr>
<td>Eye and hand co-ordination</td>
</tr>
<tr>
<td>Down Syndrome</td>
</tr>
<tr>
<td>Condition</td>
</tr>
<tr>
<td>---------------------------</td>
</tr>
<tr>
<td>Clumsiness</td>
</tr>
<tr>
<td>Cerebral Palsy</td>
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<tr>
<td>Birth complications</td>
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<tr>
<td>Prematurity</td>
</tr>
<tr>
<td>Convulsions</td>
</tr>
<tr>
<td>Hearing impaired</td>
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<tr>
<td>Hydrocephalus</td>
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<tr>
<td>Visually impaired</td>
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<td>Spina bifida</td>
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<tr>
<td>Milestones</td>
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<td>Phenylkelonoria</td>
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<td>Learning problem</td>
</tr>
<tr>
<td>Hypothyroidism</td>
</tr>
<tr>
<td>ADHD</td>
</tr>
<tr>
<td>Encephalocele</td>
</tr>
<tr>
<td>Emotional</td>
</tr>
<tr>
<td>Hypercalcaemia</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>

(Luiz, Oelofsen, et al., 1995)

As can be noted from Figure 2, research regarding the performance of children with *Autism* on the GSMD, in South Africa has not been done, hence highlighting the value of the present study. Taking this into account, this study will also contribute towards research about *Autism* in South Africa.

Normative and clinical research, applicable to this study, completed at both a national and international level utilising the GSMD, will be presented. The research will be presented within a historical perspective, spanning a time-frame of more than thirty years.

Lister (1981) purposed the value and significance of using graphically presented profiles. Lister (1981) found that substantial numbers of developmental profiles were characterised by marked irregularity. The sample
comprised British children aged between 2 and 7 years (N = 63). Luiz (1988d) (discussed below) confirmed Lister’s (1981) study, and verified the usefulness of developmental profiles for identifying specific developmental delays, in a clinical population of South African children. Luiz’s (1988d) sample (N = 98) consisted of children aged between 2 years and 6 months and 7 years and 7 months. In both Lister’s (1981) and Luiz’s (1988d) studies, a difference between the highest and lowest developmental quotients was approximately 16 points or more. Moreover, through profile analysis, a vulnerable child could be identified when compared with an established subtype profile. Subsequently, areas of risk by profile analysis could be identified, and hence referral to the appropriate resource(s) for remediation could be instigated.

Krige (1988) conducted a longitudinal study of a physically disabled child. The study exemplified how the GSMD were utilised to assess a child’s gains and losses in six separate areas of learning, over approximately a four-and-a-half-year period. This child had two fingers on his left hand and one finger on his right hand. He had only two toes on each foot. On four separate occasions, he was assessed on the GSMD. He was initially assessed at the age of 38 weeks, and subsequently reassessed at the ages of 26, 40 and 64 months. The GSMD permitted a comparison of the child’s total potential (the general quotient) with that of his age group. Utilising the individual Subscales, it was also feasible to isolate his strengths and limitations, and to determine any changes over time. In addition, the GSMD allowed the researcher to closely monitor the child’s progress. Krige (1988) could therefore provide the child’s parents with the reassurance that their child continued to do well on the most intellectual scale namely, the Hearing and Speech Scale (Scale C). The feedback received through the ongoing assessments was very important to the family system. Repeated assessment of children with Autism on the GSMD at appropriate time intervals can prove equally valuable.

Luiz (1988a) completed a case study on a boy diagnosed on the GSMD as having a hearing loss at the age of 30 months. He had intermittent contact with the researcher for a further 3 years. The child did not have a history of congenital deafness, but he had experienced pain in his ears. The audiologist
struggled to assess him, because of his lack of co-operation and high activity level. This study verified the effectiveness of the GSMD in the early diagnosis of a hearing problem. Through the assessment of the six avenues of learning, it was established that the child was not generally retarded, but was, in fact, an intelligent child with limitations in a specific area. This study has applicability for children with Autism, as they are often thought to be deaf because of a lack of response to auditory stimulation.

Luiz (1988b) conducted an 18-month follow-up study with an assaulted child, who was initially assessed at the age of 31 months. Assessment at the time of placement in foster-care, and then 18 months thereafter, the GSMD revealed the value of the Scales in appraising the extent to which a child who has been removed from a destitute and unstable environment, can benefit from a caring and stimulating environment.

Houston-McMillan (1988) completed a study with borderline mentally handicapped pre-schoolers. The sample (N = 27) comprised pre-schoolers between the ages of 3 years 6 months and 6 years. The study was concerned with identification and treatment evaluation using the GSMD. Using the same Scales, the children’s progress was evaluated over a 2-year period of attendance. An inspection of the mean General Quotients (GQs), Personal-Social Quotients (BQs), and Hearing and Speech Quotients (CQs) achieved by the sample prior to commencement of school, compared with those achieved at the end of years 1 and 2, revealed that there was significant amplification in scores over time, except for the Hearing and Speech Scale (Scale C). The results revealed that the GSMD had made a significant contribution, firstly in the initial diagnosis of the children, and then also in the appraisal of their progress (Houston-McMillan, 1988). Furthermore, it supplied parents with appropriate and accessible information regarding their child’s progress. The GSMD also gleaned information, which could be construed within the terminology of many different disciplines. Such findings provided the team members with an opportunity to communicate their findings within a common developmental framework. The multi-disciplinary team approach is central to the diagnosis and education of
children with *Autism*, and information gleaned from the GSMD can provide team members with valuable information.

Allan (1988) completed a study aimed at exploring whether the British norms (1960) of the Griffiths Scales were suitable for South African (SA) children. The sample ($N = 60$) comprised 5-year-old English- and Afrikaans-speaking white South African children. In addition, the degree to which the subject variables of gender, language, and socio-economic status (SES) influenced performance, was investigated. The principal conclusions of the investigation were that 5-year-olds in the SA and British standardisation samples differed significantly on the General Quotient (GQ) and in their performance on four of the six Subscales, namely the Locomotor, Personal-Social, Hearing and Speech, and Performance Subscales.

Children in the different SES groups differed significantly on the GQ, and in their performance on four of the six Subscales (namely the Hearing and Speech, Eye and Hand Co-ordination, and Practical Reasoning Subscales), children from the upper SES group performed significantly better than those from both the middle and lower SES groups. On the Performance Subscale and GQ, the upper SES group scored significantly higher than the middle and lower SES groups, and the middle SES group scored significantly higher than the lower SES group. Allan (1988) was therefore of the opinion that socio-economic status should be considered in the interpretation of the GSMD, which will be a factor to take into account in the present study.

Mothuloe’s (1990) study aimed at investigating the potential use of the GSMD as an assessment instrument for South African black children. As there were seven children with *Autism* from this race group included in the sample, Mothuloe’s study has applicability to this study. Mothuloe examined the concurrent and predictive validity of the GSMD, and compared the Griffiths Scales performance of black school beginners with that of their counterparts in the British standardisation sample. The author also explored the influence of certain subject variables on the Griffiths Scales performance of black South African children. Mathuloe made a valuable contribution in the translation of the
Griffiths Scales to Setswana. Mothuloe used a sample of 45 black Setswana-speaking children aged between 5 years 9 months and 7 years 3 months. He correlated their developmental quotients (GQ) of the GSMD with the Aptitude Tests for School Beginners (ASB) scores, and the end-of-the-year academic results.

The findings demonstrated that the mean performance of South African black children was similar to the British (1960) standardisation sample. There was a significant positive relationship between the GQ of the GSMD and the ASB total. However, a correlation of the GQ with the mean score of subjects on each of the ASB Subscales showed that only the Spatial and Verbal Comprehension subtests of the ASB correlated significantly with the GQ scores.

Bhamjee (1991) completed a study which examined the relevance of the GSMD for South African Indian children. The sample (N = 360) comprised children between the ages 3 years and 8 years, with equal numbers from each gender group. In the pre-school age group, the differences were most significant. The results demonstrated that the South African Indian children performed significantly higher than their British counterparts, with respect to the General Quotient (GQ) at each age level, and on at least three of the six Subscales (i.e., Personal-Social, Performance and Practical-Reasoning). Bhamjee’s (1991) findings regarding socio-economic status, are coherent with those of preceding researchers, namely, that there were significant differences in the performances of children from the different socio-economic groups, with the children from the upper group performing better (Allan, 1977; Heimes, 1983; Hindley, 1960). Bhamjee (1991) stated that the use of the British norms would be a serious mistake, as it would lead to a failure in identifying specific problems and limitations. In addition, assessing children with material which is not “culture-fair”, can also result in a failure to identify specific problems and limitations.

Allan (1992) conducted a comparative study on the performance of South African normal pre-school children on the GSMD. The study aimed to extend
previous research findings, by comparing the performance of South African black, coloured, Indian and white children on the GSMD. The sample (N = 200) comprised children between the ages of 5 and 6 years old. The relevance of the present British norms for South African children from the various cultural groups was also investigated. In addition, the degree to which the subject variables of gender, language and SES could impinge on the test performance of these children, was investigated. An analysis of the performance of children from the four cultural groups on the items of the individual Subscales was also executed, in an attempt to identify culturally loaded items. With regard to the Hearing and Speech Scale (Scale C), the findings indicated that no consistent, significantly higher scores were found for children from a specific cultural group. There were no significant differences between the cultural groups with respect to the General Quotient (GQ), or on their performance on the Personal-Social scale (BQ) and the Practical-Reasoning scale (FQ). With respect to the other four individual Subscales, the coloured and black groups did not differ significantly from each other. However, their performance differed significantly from that of the Indian and white groups. There were also significant differences in the performance of the Indian and white groups, when considering the latter four individual Subscales. There were no significant differences in the test performance of English- and Afrikaans- speaking coloured children. However, the only individual scale on which white English-speaking children scored significantly higher, was on the Hearing and Speech Scale (Scale C). This finding does not inevitably imply that the two language versions (English and Xhosa) of the GSMD are not comparable. Culture must be considered to be a confounding variable in any study which explores the effect of language on test performance.

A further factor, which may contribute to the significant difference on the Hearing and Speech Scale (Scale C), is the influence on test scores of the experiential world of the young urban child. Earlier research demonstrated that black African children did not feel comfortable or familiar with pictorial representations (Biesheuvel, 1949; Minde & Kantor, 1976). Moreover, it is plausible that the children from different cultural and social groups were not equally familiar with some of the test items, which in turn influenced their test
performance. Allan (1992) reported that, although the white and black children were highly comparable in terms of parental education and occupational levels, Duminy (1973) proposed that the environment in which the black child lives, is entirely different from that of his white counterpart. This finding has relevance to the present study, as the sample will include South African Xhosa-speaking children with Autism.

Regarding the analysis of individual items, the items of each individual scale of the GSMD are arranged in order of increasing difficulty (Griffiths, 1984). A decreasing trend was found in the percentage of 5- and 6-year old children from each cultural group, who passed successive items on the individual Subscales. For the 5-year-olds from the British standardisation sample, and each of the South African cultural groups, the percentage of children who passed successive items of the individual Subscales was correlated. This was done for every individual scale. Allan’s (1992) study demonstrated that item bias might hinder a national multicultural standardisation of the GSMD for South African children. The present British norms are furthermore not applicable for South African Indian and white children, but appear to be more applicable for South African black and coloured children. This point will be elaborated upon in the discussion of the revised Scales, to follow.

Tukulu (1996) completed a correlational study using the Denver II Scales, a screening measure, and the GSMD, with Xhosa-speaking pre-school children. Tukulu (1996) concluded that the GSMD are a relevant diagnostic measure for use with South African Xhosa-speaking children. This finding also has relevance to the present study, as the sample will include South African Xhosa-speaking children with Autism.

Despite the advantages of any assessment instrument, assessing individuals in a culture for which the instrument was not developed or standardised, can have long-lasting consequences for the individual who is being assessed. Therefore, when living in a multicultural society, such as South Africa, one needs constantly to be aware of the probable restrictions of the instrument
utilised for the various language or cultural groups. Because of such factors, extensive national and international research has indicated a need for the revision of the GSMD.

4.7 Need for revision of Scales

Extensive research conducted on a national and international basis highlighted that several items of the Griffiths Extended Scales were culturally biased and out-dated, and were thus in need of revision (Allan, 1988, 1992; Bhamjee, 1991; Heimes, 1983; Huntley, 1994, 1996; Luiz, 1994a; Luiz, et. Al., 1995; Stewart, 1997; Tukulu, 1996). This resulted in a multi-phase project (Luiz, Collier, Stewart, Barnard & Kotras, 2000) aimed at making the items more contemporaneous, improving the content coverage of the GSMD, and updating the 1960 norms. The revision of the Revised Extended GSMD is in process and will be discussed below. The Revised GSMD is employed in the present study.

4.7.1 Revision of the Baby Scales

The initial step in the revision of the GSMD was completed by Huntley (1996) with the publication of the 1996 revised Baby Scales (with an age range of 0 to 24 months). Huntley developed an experimental version of the Baby Scales, utilising all the original items and supplementing new ones. The aim of the revision of the Scales was to preserve their original form and to make only such changes as were necessary to update them, so that they would be appropriate to the standards, expectations, behaviour and activities of babies growing and developing in the environment of the modern world. The original five Subscales were therefore retained. Hence, the unique feature of the GSMD was also retained, namely, that the five Subscales will continue to be assessed and scored individually, and in addition can be combined to give an overall estimate of an infant’s development. Achievements are indicated as was previously done, as Developmental (Mental) Ages and Sub- and General Quotients, but their calculation has been simplified. Also available are percentile
equivalents of Sub-Quotients, as an additional means of expressing an infant’s performance relative to the general population (Huntley, 1996).

During the process of the revision of the GSMD, Huntley (1996) conducted two field trials ($N = 413$ & $N = 252$ respectively) using the experimental version of the Baby Scales. After the first trial, item analysis procedures were completed and levels of complexity, as well as discrimination indices, were acquired. After making additional alternations to the Revised Version, a second field trial was conducted. The samples from the first and second field trials were combined to create the final revision sample ($N = 650$). This sample included children of different ethnic groups (Caucasian & non-Caucasian), social class, and geographic location. A new Record Book and Scoring table, as well as a new manual for the Revised Griffiths Baby Scales, was published. The manual includes the instructions for the administration and scoring of the Scales (Huntley, 1996).

4.7.2 Revised Extended Griffiths Scales

As previously stated, despite there being such an extensive amount of support for the GSMD, more recent research has indicated a need for the revision of the Extended GSMD. Studies completed by Hanson (1982; 1983), Hanson and Aldridge Smith (1982; 1987), Hanson, Aldridge Smith and Hume (1985), Allan (1988; 1992) and Bhamjee (1991) have suggested that the 1960 norms are no longer valid. Studies by Hanson (1983) and Luiz, Oelofsen, Stewart and Mitchell (1995) have indicated the need to revise some of the items of the GSMD.

In March 1994, in Manchester, England, the Association for Research in Infant and Child Development (A.R.I.C.D) held a conference for Griffiths Scales’ Tutors, as an introduction to the revised Baby Scales (Huntley, 1996). At the conference, the need to expand and co-ordinate efforts to revise the Extended GSMD was highlighted. Prof. DM Luiz was appointed as the co-ordinator of the project to revise and re-standardise the Extended Scales. A research proposal
was submitted to the Executive Committee of the A.R.I.C.D (Luiz, 1994b), and
the following set of objectives for the revision were drawn up:

(i) The basic qualities of the GSMD should be preserved: Throughout the
revision process, the “child-friendly” nature of the Scales should be
preserved;

(ii) The age range of the GSMD should remain. The revision of the Infant
Scales should be brought to finality. The revision of the Extended Scales
should concentrate on the age range 2 years to 5 years, and then on the
age range 5 years to 8 years;

(iii) The revision should involve international consultation of all tutors and
interested members of the A.R.I.C.D. A survey should be conducted of all
A.R.I.C.D members, inviting them to identify the strengths and
weaknesses of the Scales;

(iv) The revision should improve the content coverage of the GSMD. The
GSMD should represent current theoretical and empirical work, and the
items should be relevant and contemporaneous. Statistical procedures
such as cluster and factor analysis should be employed in the attainment
of this objective;

(v) The normative data on the GSMD should be updated: the GSMD should
be standardised on a contemporary sample that reflects the UK population
in terms of ethnicity and gender and socio-economic status of the parents;

(vi) The psychometric quality of the GSMD should be updated. Reliability and
validity studies should be conducted, employing statistical procedures
such as cluster and factor analysis;

(vii) Finally, the clinical utility of the GSMD should be enhanced by collecting
data on children with a clinical diagnosis.

The Executive Committee of the A.R.I.C.D accepted a research proposal
citing the above-mentioned seven objectives for the revision of the Extended
Scales (Luiz, 1994b), and the methodology used for the revision of the Extended
Scales was done in accordance with these objectives. A number of studies were
conducted in the process of revising the Extended Scales. These studies
focused on the identification of problematic items, the writing of new items, the
testing of the new items on a number of different samples, reviewing the
children’s performance on the new items, and then re-testing the new items
again.

One of the first studies to undertake the objectives set out by Luiz (1994b) was an international survey relating to strengths and weaknesses of the GSMD. One of the limitations of the existing Extended Scales that was identified, was that children as young as 5 years of age already begin to achieve the ceiling on the Scales. In fact, the effectiveness of the Scales with children past their 4th year, who fall within the normal GQ-range, has been questioned (Hanson & Aldridge Smith, 1987). 57% of responding users expected normal children to obtain GQs in the range of 105-115. This is in accordance with an upward trend in GQ-scores reported by various researchers both in the United Kingdom and abroad (Allan, Luiz, & Foxcroft, 1988; 1992; Hanson & Aldridge Smith, 1987). These findings suggest that the revision of the item difficulty levels and placement for the GSMD has become a mandatory priority. New items for older children on those Scales affected by the ceiling effect would also need to be developed. Moreover, it is evident that users of the Scales find certain items culturally biased and outdated. Changes in the social world of children in the 1990s, when compared to that of children during the 1960s when the Extended Scales were standardised, may account for the unsuitability of the items. Clinicians have also become sensitised to items that measure culture-bound social practices, such as letting children help lay the table or eating with cutlery (Luiz et al., 1995).

These examples indicate that the revision of the Extended GSMD cannot be removed from the broader social context in which children are currently growing up. The test is used in diverse settings in both first- and third-world contexts (Hanson & Aldridge Smith, 1982; Victora, Victora, & Barros, 1990; Allen, Luiz & Foxcroft, 1988, 1992). In order to conduct correct developmental assessments of children from diverse backgrounds, test items may need to be modified for the different contexts in which the test is used (Luiz et al., 1995).
The results presented here indicated that the GSMD are valuable to clinicians in the field of child developmental assessment, though Luiz et al. (1995) identified specific problem areas and trends in the utilisation of the Extended GSMD. These problems have been taken into account in recent research projects undertaking the revision of the Extended Scales.

One of the objectives of the research proposal for the revision of the Extended Scales (Luiz, 1994b) required that the Scales remain contemporaneous and relevant to theoretical and social developments. Hanson (1982) identified various items of the Hearing and Speech Subscale (Subscale C) as problematic. The survey conducted by Luiz et al. (1995) substantiated some of Hanson’s findings on the Hearing and Speech Scale. Kotras (1998), in a South African study, revised the 20 Small Pictures and Large Picture of the Hearing and Speech Scale.

In order to establish which items were problematic, the authors developed a scoring system that combined their findings with those of Hanson (1983) and Luiz et al. (1995). A number of items were identified as problematic. While the majority of items were found to be acceptable, some items are in need of complete replacement, and other items need to be modified to make them more acceptable and contemporaneous. Once the problematic items had been identified, the authors set out to develop new items and modify existing items of the Extended Scales.

The new and modified items have been included in a new protocol. Ruth Griffiths’ original manual has been updated to include the instructions for the new items, as well as the additional scoring guidelines for the modified items. The final phase of the updating of the Extended Scales, that is, the standardisation of the GSMD, is almost complete. The original sample used for the standardisation included a total of N= 241. For each age group, male and female children of the four ethnic groups were included. It is from this sample that the “normal” sample used in the group matched design, to compare with the Autistic sample, was
drawn. In this study the two groups were matched according to age, gender, and SES. In practice, this related to the researcher matching a 7 year-old boy, with Autism, from lower economic status, with a 7 year-old boy without developmental delays, also from lower economic status. In order to obtain the most reliable and valid results on the Revised Extended Scales, certain adaptations when testing children with Autism were implemented. These adaptations are discussed in Chapter 5, section 5.6.1. In the following section, the procedure for the standardisation of the Extended Scales will be outlined.

4.7.3 Standardisation of the Revised Extended Scales

The standardisation data will be used to establish new norms for the measure, therefore it is fundamental to ascertain that the sample represents children of normal development. Hence, children will be screened for “normalcy”, where normalcy can be broadly defined as “an absence of any sensory, physical or mental handicap”.

The standardisation of the revised Extended Scales is the accountability of a team of international researchers, the Griffiths research Team (GRT). This team is multifaceted, and includes an international director of research, assisted by three researchers in South Africa (SAGRT), regional co-ordinators and examiners. Regional researchers have been appointed for England, Wales, Scotland, Northern Ireland, and Southern Ireland. England has been further separated into five regions, namely, Northern, Central, Eastern, South Western, and South Eastern England. Approximately 1100 children are currently being tested, and, as previously mentioned, the standardisation of the Revised Scales is almost complete.

In summary, this chapter has provided an overview of the history, development and nature of the Griffiths Scales of Mental Development. A discussion of the standardisation of the Scales, as well as their clinical utility, followed. The need for the revision of the original Griffiths Scales and the
process of Standardisation of the Revised Extended Griffith Scales is expounded upon.

As highlighted by the above, it can be concluded that the revision and standardisation of the Revised Extended Griffiths Scales will contribute to making the Scales a more contemporaneous and valuable assessment tool. The present study aims to further contribute to the value of the Revised Extended GSMD, as an instrument used to assess the clinical population of children with Autism, and thus enhance the clinical utility of the Scales as suggested in objective (vii) of the revision.
CHAPTER FIVE

PROBLEM STATEMENT AND RESEARCH METHODOLOGY

5.1 Introduction

Chapter 5 presents the problem statement and primary objective of the present study. It further refers to the methodology employed in conducting the study, including the research design, the participants, the sampling method, the assessment measures, and the procedure. This is followed by a description of the statistical analysis and the ethical considerations.

5.2 Problem Statement

Although some studies have been done internationally on the intellectual abilities of children with Autism (Lincoln, Courchesne, Kilman, Elmasian & Allan, 1988; Ohta, 1987; Rumsey & Hamburger, 1990; Shah & Holmes, 1985), no South African research has been conducted, to date, that explores the developmental profile of children with Autism. For this reason it is imperative to accumulate knowledge about their cognitive, psychological, and personal-social growth, in order to provide them with the most effective assessment and teaching methods available. Furthermore, findings of the study, which focuses on the children’s areas of developmental weakness, will be made available to professionals working with children with Autism, as well as the parents of the children in the sample. These findings will aim to facilitate the development of therapeutic programmes, to allow for appropriate stimulation in all areas of concern.
5.3 Primary Objective

The study is aimed at exploring and describing the performance of children with Autism (Years 7 & 8) in South Africa, utilising the Revised Extended Griffiths Scales of Mental Development. The performance of the Autistic sample is compared to that of “normal” learners, also assessed on the Revised Extended Griffiths Scales, so as to enhance and enrich the description of the performance of the Autistic sample.

5.4 Research Design

An exploratory descriptive, research design was employed in the present study. The design is quantitative, because the analysis of the results is numerical in nature. No research has been done on children with Autism using the Revised Extended Griffith Scales, hence an exploratory design was employed (McGuigan, 1990). Exploratory-descriptive research sets out to observe, record, and describe behaviour of interest. Exploratory-descriptive research involves providing an accurate and detailed description of a given phenomenon or construct (Christensen, 1997), and involves the systematic examination and organisation of carefully observed information about that specific phenomenon or construct (Cozby, 1989, 1993; Dane, 1990). The study is descriptive because the numerical data (test scores) was statistically summarised to make it more easily interpretable (Colman,1995). When employing a descriptive design, the researcher often has no formal hypothesis, which is the case in the present study. Descriptive studies attempt to describe a phenomenon (i.e., to describe what was found) in contrast to explanatory studies, which generally attempt to explain a phenomenon by specifying why or how it happened (Bailey, 1987).

A matched group design was used to compare the performance of similar children on the Revised Extended Griffiths Scales. In this study the two groups were matched according to age, gender, and SES. In practice, this related to the researcher matching a 7-year-old boy, with Autism, from lower economic status, with a 7-year-old boy without developmental delays, also from lower economic
status. The researcher thus modified the design, as participants were not randomly assigned to the groups. The small sample size and the inclusion of all school-going children with *Autism* did not allow for random assignment.

### 5.4.1 Sampling

A non-probability purposive sampling method was employed in identifying children to be tested. In non-probability sampling, the probability of any particular member of the population being selected is not known (Cozby, 1989). The disadvantage of non-probability sampling is that, because the probability that an individual will be selected is not known, the researcher cannot generally claim that the sample is representative of the larger population. This will greatly limit the researcher’s ability to generalise the research findings beyond the specific sample studied. Furthermore, the researcher cannot estimate the degree of departure from representation (sampling error). The advantage of non-probability sampling is that it is far less complicated, more economical, and can be conducted so as to take advantage of available (and possibly unanticipated) subjects, without the statistical complexity of a probability sample. A non-probability sample may prove to be entirely adequate if the researcher does not intend to generalise the findings beyond the studied sample, or if the study is merely a trial run for a larger study (Bailey, 1987), as is the case with the present study. Purposive sampling is “where the procedures are directed toward obtaining a certain type of element” (Dane, 1990, p.303). As this study employed purposive sampling, the operational definition of the subject’s status as a child with *Autism*, included the following:

1. That the classification or diagnosis had been made by a registered psychologist according to the criteria set out in the DSM-IV and the Childhood *Autism* Rating Scale (CARS) (Schopler, Reichler, Devellis, & Daly, 1980; Schopler, Reichler, & Renner, 1988). This rating scale is used internationally in the diagnosis of children with *Autism*, and was discussed in Chapter 3.
(ii). That the child is between years 7 & 8, and has been exposed to a structured programme within a specialised educational setting. In purposive sampling, the researcher’s own judgment is used regarding which subjects to select, and only those are chosen who best meet the objectives of the study. The advantage of purposive sampling is that the researcher’s skill and prior knowledge in selecting subjects can be employed (Bailey, 1987). Research has proven (Powers, 1989) that autistic behaviours are more severe around the ages of 3 to 5 especially when children have not been exposed to a structured programme. This results in this age group of learners being less receptive to formal testing procedures. It was therefore decided to select learners in year’s 7-8, who had been exposed to a structured programme, in order to obtain test results which were as reliable as possible.

(iii). That the child is a learner at a school for Specialised Education for Learners with Autism.

5.5 Subjects

5.5.1 Description of sample

As previously mentioned, the samples included in the present study comprised the following.

(i) 30 children (years 7 & 8) from four schools for Specialised Education for learners with Autism in SA. There are only five departmental schools for children with Autism in SA. These schools were selected as they had a registered psychologist who could assist with the administration of the Revised Extended Scales. All the children with Autism (years 7 & 8) in the four schools formed part of the sample, and no subjects were excluded on the basis of intellectual level or neurological disorders, for example epilepsy. The sample thus comprised the majority of school-going children with Autism, years 7 & 8 in SA. 30 children, (years 7 & 8) from four schools for Specialised Education for learners with Autism in SA were identified. Table 1 below indicates the minimum
and maximum ages, and distribution according to gender, socio-economic status (SES) and race grouping.

Table 1
Description of Autistic sample

<table>
<thead>
<tr>
<th>Age</th>
<th>Minimum age - 70.70 months</th>
<th>Maximum age - 95.40 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Females - 5</td>
<td>Males – 25</td>
</tr>
<tr>
<td>SES</td>
<td>Lower - 10</td>
<td>Middle - 14</td>
</tr>
<tr>
<td>Race Group</td>
<td>Asian – 2</td>
<td>Black - 7</td>
</tr>
</tbody>
</table>

(ii) A comparison sample of 30 “normal” children, where normalcy can be broadly defined as “an absence of any sensory, physical or mental handicap”. The comparison sample of normal children was tested as part of the Revision process (Luiz, Collier, Steward, Barnard, & Kotras, 2002), and included 241 children from all four cultural groups. On inclusion, these children were screened on The Neurological Checklist (Foxcroft, 1985). This checklist evaluates the child’s physical development in the areas of sitting, standing, involuntary movements, coordination and association movements, walking, and vision. Subsequent researchers have also included the neurological checklist when attempting to select normal children (Allan, 1988; Bhamjee, 1991).

A matched group design was used, to match the sample of children with Autism to the sample of “normal” children. The two groups were matched according to the age, gender and SES. Coupled with the fact that the checklist is based only on the physical development of the child, a detailed biographical questionnaire was used in collaboration with the checklist.
5.6 Assessment Measures

Two measures were employed in the present study, namely the Revised Extended Griffiths Scales of Mental Development, and a Biographical Questionnaire. These are discussed below.

5.6.1 The Revised Extended Griffiths Scales of Mental Development

As previously mentioned, the Revised Extended GSMD consists of six Scales. The Subscales are the Locomotor (A), Personal-Social (B), Language (C), Eye & Hand Co-ordination (D), Performance (E) and Practical Reasoning (F). A detailed description of the Subscales was provided in Chapter 4.

Reliability and validity studies have been conducted on the original Griffiths Scales of Mental Development, as discussed Chapter 4. No reliability or validity studies have been completed on the Revised Extended Griffiths Scales of Mental Development, but preliminary studies of face and construct validity have been established (Luiz, Collier, Steward, Barnard, & Kotras, 2002).

In order to obtain the most reliable and valid results on the Revised Extended Scales, certain adaptations when testing children with Autism were implemented. These were implemented after consultation with a multi-disciplinary team of psychologists, speech therapists, teachers, and parents of children with Autism, regarding their suitability. All testers were trained regarding these adaptations, and provided with the material they were allowed to use. Research has proved that the ability of children with Autism to process visuo-spatial information is superior to their processing of auditory-temporal information (Janert, 2000). Graphic augmentative systems are used successfully with children with Autism. Such systems include picture symbols (Mirenda & Iacono, 1988; Mirenda & Santogrossi, 1985), pictographs (Quill, 1991), and the written word (LaVigna, 1977). The following adaptations were allowed.
(i) The use of picture symbols from the Mayer Johnson Picture Communication Symbol system (Mayer & Johnson, 1995) were allowed when administering certain items of the Revised Extended Scales. This symbol system is presently used in all of the identified schools. Care was taken that the constructs underlying the items on the Revised Extended Griffiths Scales were not altered. For example, when the tester fetched the testee, the tester would prepare the testee by showing the testee a picture card of a testing situation, and then give the testee the choice to participate or not, by also allowing the testee to indicate their choice on a yes or no picture card.

(ii) The written word was also used in the administration of Items F.VIII.3. and F.VIII.5. on the Practical Reasoning Scale. In Item F.VIII.3, the testee is required to count backwards from 10. The tester was allowed to show the testee flashcards with the numerals 1-10. The testee might arrange the flashcards in descending order, rather than count backwards verbally. The tester might start counting verbally to demonstrate. In item F.VIII.5, a similar procedure was used. In this item, however, the learner was expected to count backwards from 20. Flashcards with numerals of 1 to 20 were presented to the learner. Again, the tester might start counting verbally to demonstrate.

(iii) In Item, F.V.3., the testee is required to say whether it is morning or afternoon. The tester was allowed to show the testee two flashcards with the words “morning” and “afternoon”. The testee did not need to verbalise whether it was morning or evening, but was required to point out the appropriate flashcard.

(iv) In item F.VII.4, the testee is required to say the names of six of the seven days of the week. Flashcards with the names of the days of the week, as well as four distractor items, namely the names of the seasons,
were shown to the testee. The testee did not need to verbalise the days of the week, but was required to point out six of the seven days of the week.

(v) In Item FVIII.1, the testee is asked three questions, namely; "What day comes after Tuesday?" “What day comes before Saturday?” and “What day comes after Sunday?” The flashcards used with item F.VII.4, were used again, and the learner had to point to the correct flashcard when asked the various questions, for example, “What day comes after Tuesday?” The testee did not need to verbalise the day of the week, but was required to point out the appropriate flashcard indicating the day of the week.

5.6.2 Biographical Questionnaire

To gain additional information from the parents regarding the children’s birth history, living conditions, physical, mental, behavioural and social development and medical history, a biographical questionnaire was completed by the subjects’ parents, as presented in Appendix A. In cases where the parents were not able to attend the testing, the tester relied on the background information provided by the biographical questionnaire. Such information has been found to enrich the interpretation of test results.

5.7 Procedure

The following procedure was employed in order to achieve the aims of the study:

1. Contacting and informing the authorities about the purpose of the study and gaining their permission to conduct the research, that is, to assess children with *Autism* on the Revised Extended GSMD. Such authorities included:
   (i) The Director of Educational Research (Western Cape Education Department);
ii) The Deputy Chief Education Specialist: Learners with Special Needs (Eastern Cape Education Department);

iii) The Principals of the selected schools for Learners with Autism, and

iv) The Ethics Committee of the University of Port Elizabeth.

2. Adaptation of the items in consultation with a multi-disciplinary team (See section 5.6.1).

3. Training the three registered psychologists who are also registered Griffiths users at the identified schools, in the use of the Revised Extended GSMD and the adapted items.

4. Providing the psychologists with the standardised material for the adaptations, for example, number flash cards, flash cards with days of the week, and distractor items.

5. Identifying children with Autism who met the research criteria, as stipulated above.

6. Contacting the parents and seeking written consent for their children to participate in the present study. The parent/child was free to refuse or to withdraw from participating at any stage of the assessment. Protocols that were incomplete owing to children or parents' refusal or withdrawal, were not included in the study.

7. Assessments took place at the various schools, and when necessary, were completed over two sessions. The Revised Extended GSMD was administered to all of the subjects in their home language, namely, English, Afrikaans, or Xhosa. The translation of the Revised Extended GSMD was obtained using the back-translation method. (Luiz, Collier, Steward, Barnard, & Kotras, 2002). This method provides empirical evidence of the equivalence
of different language versions. This technique has been successfully used in translating from English to Afrikaans and Xhosa (Allan, 1988; Foxcroft, 1985; Hawke, 1986).

8. The parent(s) were asked to complete a Biographical Questionnaire.

9. The biographical questionnaires were collected from the parent(s) and the testers scored the protocols (completed tests).

10. Matching of the Autistic Sample with that of the “normal” sample, according to criteria of age, gender, and SES was done.

11. Statistical analysis of the protocols and specific data from the biographical questionnaires was conducted by the research team SA Griffiths Research Team (SAGRT) appointed by the International Association for Research in Infant and Child Development, based in the UK.

12. Verbal feedback was given to the respective parents of each child tested by the school psychologist.

13. Parents received a report detailing their child’s performance on the Revised Extended GSMD.

14. Each of the identified schools would receive a copy of the research results.
5.8 Data Analysis

Descriptive statistics were employed to describe the results of the study. Such statistics included measures of central tendency (e.g., mean) and variability (e.g., standard deviation) (Cozby, 1989). Frequencies were conducted, to summarise the biographical details of the Autistic sample, including age, gender, SES, race, use of medication, pre-maturity, and co-morbidity of epilepsy and Attention Disorders at the time of testing. Furthermore, descriptive statistics were employed to describe the performance of subjects on each of the six Subscales of the Revised Extended GSMD, by giving the mean sub-quotients, ranges, and standard deviations. This is graphically presented in Chapter 6. Some aspects may be lost when considering an average result, but they may be evident on an individual level, therefore each individual participant’s mental age or sub quotient, depicting the child’s performance on each of these Subscales is presented in Table form. A General Quotient (GQ) was presented for each subject’s performance. Although the sample of children with Autism is only 30, this includes most of the population of children with Autism (years 7-8) in SA, and thus enriches the description of the data.

A comparison between the Autistic sample and a “normal” sample was made, employing the appropriate statistics. A dependent samples t-test was used to compare the performance between the two groups on the GQ. As the GQ is a summary of the six Subscales, any large discrepancy in one of the Subscales could have caused the overall score to differ significantly for the two groups. When there is more than one score for each individual, or if there are individuals paired with each other, then a more sophisticated procedure must be selected. The Hottellings $T^2$ was used to compare Subscales A to F in one analysis, and provide a p (significance) value for each. The results are presented below in Chapter 6 Table 8.
5.9 Ethical considerations

The primary purpose of ethical principles and values is to protect the welfare and rights of research participants, and to reflect the basic ethical values of respect for individuals, beneficence (not doing any harm), and justice (Ethics in Health Research in South Africa, 2000). The following ethical principles were upheld throughout this research study.

5.9.1 Respect and Dignity

The primary concern for health research involving human participants should be respect for individuals. Factors to consider include language, beliefs, culture, customs, and perceptions (Ethics in Health Research in South Africa, 2000). In the present study, these factors were considered, and built into the research design and identified population, for example, children were tested in their home language.

5.9.2 Relevance

South African researchers have an ethical and moral responsibility to ensure that their research is relevant to both the country’s broad health and development needs, as well as to the real needs to those suffering from the concerns and diseases being studied. The research findings must be translatable into procedures for improving the health status of South Africans (Ethics in Health Research in South Africa, 2000). The present study is relevant, and its potential contributions have been highlighted in the conclusions cited in Chapter 7.

5.9.3 Scientific Integrity

Besides demonstrating a value and need for the research, the proposed researcher must also demonstrate thorough methodology and a strong prospect for providing answers to the specific research questions which have been posed.
The research protocol must show sound knowledge of the relevant literature (Ethics in Health Research in South Africa, 2000). The present study reflects thorough methodology, a strong prospect for providing answers, and sound knowledge of the relevant literature, as presented in Chapters 1 to 3.

5.9.4 Investigator Competence

A suitably qualified individual should carry out the research study. Two major parameters are used to assess the researcher’s competence, namely technical and humanistic. Education, knowledge, certification and experience, which includes research competence, are the parameters used to assess technical competence. Humanistic parameters demand compassion and empathy (Ethics in Health Research in South Africa, 2000). In the present study, the researcher, as well as the testers, are completing or have completed a masters degree in psychology, are all registered users of the GSMD, and were trained on the Revised Extended Griffiths Scales and its adaptations for children with Autism.

5.9.5 Informed Consent

Before the research can begin, informed consent must be obtained from research participants. Both verbal and written consent must be acquired, unless there are valid reasons to the contrary. “Informed consent” implies that a person is informed about the benefits and risks of the research, and that they are free to give consent to participate without undue influence, coercion, or incentives. Furthermore, a participant must be at liberty, at any time, to withdraw consent to further involvement in the research, without any unfair negative consequences or disadvantage (Ethics in Health Research in South Africa, 2000). In the present study, informed consent was obtained in writing from the parents of the participants before the research was commenced (see Appendices B & C). The research findings were also shared with the participants’ parents after the data had been analysed, so that they could benefit from the research. Participants also had the right to withdraw from the research at any stage, without coercion.
5.9.6 Privacy and Confidentiality

“Privacy” relates to the access of personal records, while “confidentiality” refers to the use and release of personal information once it has been disclosed. The rights of the research participants to both privacy and confidentiality must be protected at all times (Ethics in Health Research in South Africa, 2000). In the present study, the researchers upheld the participants’ right to privacy during the research, by ensuring confidentiality of all data collected.

5.9.7 Inclusion/Exclusion Criteria

It is essential that the recruitment, selection, inclusion and exclusion of research participants in a research study are fair and just, based on ethical and scientific principles. Individuals must not be excluded unjustly or inappropriately based on their age, gender, race, religious beliefs, or disability (Ethics in Health Research in South Africa, 2000). In the present study, these factors were considered, and built into the research design and identified population, as outlined in section 5.4 of the current chapter.

5.9.8 Transparency

Research investigators are obliged to distribute the research results in a competent and timely manner. In addition, it is essential that the release of research findings be conducted in an ethical manner, so as to guarantee that false anticipations are not raised in a susceptible public (Ethics in Health Research in South Africa, 2000). As mentioned above, the research findings were shared with the participants’ parents after the data had been analysed, so that they could benefit from the research.
5.9.8 Conflict of Interest

Researchers are obliged to disclose the source of funding for the research to the research participants, as well as the ethics committee, and where appropriate, to the regulatory authority. In addition, the researcher must declare any affiliation or financial interest when proposing and reporting the research (Ethics in Health Research in South Africa, 2000). The present study was funded by the Association for Research in Infant and Child Development (ARICD) and the National Research Foundation (NRF). This information was disclosed to the ethics committee, and no conflict of interest was raised.

5.9.10 Ethical Review

An ethics committee must review all health research which is carried out in SA, and it must not commence until and unless approval has been granted (Ethics in Health Research in South Africa, 2000). Before commencing the present study, the proposed research was reviewed by the Ethics Committee of the University of Port Elizabeth. Approval for the study to commence was granted unconditionally.

5.9.11 Beneficence

The researcher must endeavor to avoid exposing the research participants to physical or psychological harm (Polit & Hungler, 1993). In the present study, follow-up reports or interviews were conducted with the participants’ parents, to discuss the research findings and to allow for any questions to be answered.
5.9.12 Conclusion

The focus in the above chapter has included the problem statement and the primary objectives of the present study. The research design, sample and assessment measures were described. The procedure followed during the implementation of the study and the data analysis was expanded upon. The ethical considerations were also highlighted.
CHAPTER SIX
FINDINGS AND DISCUSSION

6.1 Introduction

The study was primarily aimed at exploring and describing the performance of children with Autism (years 7 and 8) in South Africa (SA), utilising the Revised Extended Griffiths Scales of Mental Development (GSMD). The six areas of development assessed included: Locomotor, Personal-Social, Language, Eye and Hand Co-ordination, Performance and Practical Reasoning.

The empirical findings of the primary objective of the study are presented and discussed below. Descriptive statistics are presented to summarise the general performance and profile of the Autistic sample (N = 30). This is followed by the biographical details of the sample, for which frequencies and cross tabulations were used to summarise the results. A comparison between the Autistic sample and the “normal” sample is then presented employing a Dependant sample $t$ – test and a Hotteling $T^2$ test. The performance of the Autistic sample without co-morbid conditions, the “normal” sample and the Autistic sample with Epilepsy and ADD are then described. Lastly a description of the performance of the Autistic and the “normal” sample on each of the six Subscales is presented in terms of frequencies.

The range of scores (minimum and maximum) was included to enrich the description of the results. It should be noted that norms for South African children with Autism are not currently available for the Revised Extended GSMD and hence the results should be interpreted with caution.
6.2 General performance of children with Autism

6.2.1 General performance of children with Autism on the Subscales

Descriptive statistics were employed to describe the performance of the children with Autism on each of the six Subscales of the Revised Extended GSMD. Such statistics included measures of central tendency (e.g., mean) and variability (e.g., standard deviation) (Cozby, 1989). As depicted quantitatively in Table 2 below, the mean GQ for the children with Autism (N=30) was 59.39. On general performance, the minimum score recorded was 27, which is in the cognitively impaired range, while the maximum score was 98.09, which is in the average range. This indicates a marked variance of 289.72 and a standard deviation of 17.02. As depicted in Table 2 below, all of the standard deviations for the various Subscales, except for Subscale C, are higher than the standard deviations on the original Griffiths Subscales. This variance is sample specific and may be a result of the small sample size.

Table 2
The Performance of children with Autism in years 7 and 8 (N=30)

<table>
<thead>
<tr>
<th>Griffiths Scale</th>
<th>Mean Quotient</th>
<th>Minimum Score</th>
<th>Maximum Score</th>
<th>Range</th>
<th>Variance</th>
<th>Std Deviation</th>
<th>Performance Categorisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>GQ</td>
<td>59.39</td>
<td>27.00</td>
<td>98.09</td>
<td>71.09</td>
<td>289.72</td>
<td>17.02</td>
<td>Cognitively impaired</td>
</tr>
<tr>
<td>AQ</td>
<td>69.60</td>
<td>42.00</td>
<td>117.00</td>
<td>75.00</td>
<td>340.73</td>
<td>18.45</td>
<td>Below Average</td>
</tr>
<tr>
<td>BQ</td>
<td>58.63</td>
<td>28.00</td>
<td>104.00</td>
<td>76.00</td>
<td>452.03</td>
<td>21.26</td>
<td>Borderline</td>
</tr>
<tr>
<td>CQ</td>
<td>43.83</td>
<td>14.00</td>
<td>84.00</td>
<td>70.00</td>
<td>285.04</td>
<td>16.88</td>
<td>Cognitively Impaired</td>
</tr>
<tr>
<td>DQ</td>
<td>62.86</td>
<td>22.00</td>
<td>116.00</td>
<td>94.00</td>
<td>563.15</td>
<td>23.73</td>
<td>Borderline</td>
</tr>
<tr>
<td>EQ</td>
<td>66.43</td>
<td>16.00</td>
<td>99.00</td>
<td>83.00</td>
<td>388.87</td>
<td>19.71</td>
<td>Below Average</td>
</tr>
<tr>
<td>FQ</td>
<td>55.10</td>
<td>28.00</td>
<td>105.00</td>
<td>77.00</td>
<td>368.43</td>
<td>19.19</td>
<td>Borderline</td>
</tr>
</tbody>
</table>

The various performance categories are computed according to the standard deviations for the GQ and for each of the Subscales. The performance
category for each Subscale is presented in key form with the discussion of the performance of the samples (section 6.5.4).

6.2.2 Subscale profile of performance of children with Autism

Through studying the profiles of a number of children, Griffiths (1984) identified prominent patterns, which can be used for diagnostic purposes. Graphically presented profiles are used to signify the wide differences regarding the child’s developmental abilities. An example of such a profile is a child who is physically disabled or suffering from some form of physical weakness, as he/she will fall out on the Locomotor Scale (Scale A) and the Eye and Hand Coordination Scale (Scale D), while the remaining Subscales will fall within the average range.

The profile obtained by children with Autism indicates lower performance on Subscales B, C and F. These findings are in agreement with the notion of the triad of impairments discussed in Chapter 2. These impairments are in the fields of socialization, social communication and in social play. Subscale B focuses on the assessment of personal and social skills. The mean BQ for the Autistic sample was 58.63 which falls in the borderline range. Subscale C focuses on the assessment of both receptive and expressive language skills. The mean CQ for the Autistic sample was 43.83 which falls in the range of cognitively impaired. Subscale F has value in demonstrating a child’s ability to benefit from formal schooling and together with Subscale C has a high correlation with language ability. The mean FQ for the Autistic sample was 55.10 which falls in the borderline range. As discussed earlier, 50% of the Autistic sample has been diagnosed with Attention Deficits. Attention and concentration span play a major role in this subscale. The verbal response on, count to 20 or answering certain questions were adapted. Children with Autism experience difficulties with receptive and expressive language. These factors could have impacted on these scores. It needs to be considered that certain adaptations were allowed in the administration of this subscale with the Autistic
sample and that without these adaptations the mean FQ may have been even lower. Figure 3 is a graphically presented profile, depicting the performance of the children with Autism (N=30) on each of the Subscales, using the average sub quotients.

Figure 3
Griffiths developmental profile of children with Autism (between years 7-8) (N=30).

![Griffiths developmental profile of children with Autism](image)

Lister (1981) purposed the value and significance of using graphically presented profiles, such as that depicted in Figure 3. Lister (1981) found that substantial numbers of developmental profiles have been characterized by marked irregularity. Luiz (1988d) confirmed Lister’s (1981) study and verified the usefulness of developmental profiles for identifying specific developmental delays in a clinical population of South African children. In both Lister’s (1981) and Luiz’s (1988d) studies, differences between the higher and lowest developmental quotient were at least 16 points or more.

Such findings are relevant to the present study as the results of participants assessed on the Revised Extended GSMD often show a differences between the higher and lowest developmental quotient were at least 16 points or
more. This also applies to the results of the sample as a whole. In the present study, a difference between the highest (BQ of 69.60) and lowest (CQ of 43.83) developmental quotients for children with *Autism* was approximately 26 points, which is in accordance with the findings of Lister (1981) and Luiz (1988d).

6.3 Individual Participants Scores

Some aspects may be lost when considering the average mean performance of subjects, but may be evident on an individual level. Table 3 illustrates the performance of the individual participants of the *Autistic* sample on each of the Subscales as well as providing the GQ for each of the individual participants, thus 30 in total.

Table 3
Performance of Individual participants of *Autistic* Sample

<table>
<thead>
<tr>
<th>CASES</th>
<th>AQ</th>
<th>BQ</th>
<th>CQ</th>
<th>DQ</th>
<th>EQ</th>
<th>FQ</th>
<th>GQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>45</td>
<td>35</td>
<td>22</td>
<td>22</td>
<td>16</td>
<td>28</td>
<td>27.87</td>
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<tr>
<td>2</td>
<td>76</td>
<td>83</td>
<td>60</td>
<td>34</td>
<td>60</td>
<td>57</td>
<td>62.00</td>
</tr>
<tr>
<td>3</td>
<td>91</td>
<td>83</td>
<td>59</td>
<td>93</td>
<td>99</td>
<td>59</td>
<td>80.00</td>
</tr>
<tr>
<td>4</td>
<td>80</td>
<td>28</td>
<td>21</td>
<td>50</td>
<td>75</td>
<td>38</td>
<td>49.00</td>
</tr>
<tr>
<td>5</td>
<td>42</td>
<td>28</td>
<td>14</td>
<td>28</td>
<td>24</td>
<td>28</td>
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</tr>
<tr>
<td>6</td>
<td>82</td>
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<td>70</td>
<td>84</td>
<td>80</td>
<td>63</td>
<td>77.00</td>
</tr>
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<td>7</td>
<td>47</td>
<td>47</td>
<td>30</td>
<td>65</td>
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<td>58</td>
<td>49.83</td>
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<td>8</td>
<td>94</td>
<td>104</td>
<td>84</td>
<td>111</td>
<td>81</td>
<td>94</td>
<td>94.48</td>
</tr>
<tr>
<td>9</td>
<td>54</td>
<td>43</td>
<td>24</td>
<td>54</td>
<td>51</td>
<td>31</td>
<td>42.69</td>
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<td>10</td>
<td>54</td>
<td>41</td>
<td>36</td>
<td>41</td>
<td>46</td>
<td>36</td>
<td>42.58</td>
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<tr>
<td>11</td>
<td>64</td>
<td>69</td>
<td>33</td>
<td>43</td>
<td>60</td>
<td>50</td>
<td>53.20</td>
</tr>
<tr>
<td>12</td>
<td>76</td>
<td>88</td>
<td>54</td>
<td>48</td>
<td>57</td>
<td>59</td>
<td>63.60</td>
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<td>13</td>
<td>68</td>
<td>63</td>
<td>58</td>
<td>74</td>
<td>71</td>
<td>52</td>
<td>64.38</td>
</tr>
<tr>
<td>14</td>
<td>64</td>
<td>45</td>
<td>36</td>
<td>47</td>
<td>74</td>
<td>43</td>
<td>51.40</td>
</tr>
<tr>
<td>15</td>
<td>62</td>
<td>51</td>
<td>46</td>
<td>54</td>
<td>51</td>
<td>54</td>
<td>52.99</td>
</tr>
<tr>
<td>16</td>
<td>71</td>
<td>66</td>
<td>29</td>
<td>66</td>
<td>66</td>
<td>29</td>
<td>54.42</td>
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<td>17</td>
<td>63</td>
<td>68</td>
<td>47</td>
<td>52</td>
<td>45</td>
<td>45</td>
<td>53.48</td>
</tr>
<tr>
<td>18</td>
<td>52</td>
<td>36</td>
<td>34</td>
<td>48</td>
<td>65</td>
<td>48</td>
<td>47.17</td>
</tr>
<tr>
<td>19</td>
<td>76</td>
<td>41</td>
<td>30</td>
<td>48</td>
<td>67</td>
<td>44</td>
<td>51.08</td>
</tr>
</tbody>
</table>
It is evident from the above table that although there are individual cases of children with *Autism* whose performance falls into the average range, the majority of the children’s performance falls into the range of below average, borderline and cognitively impaired. This confirms research by Wolfberg (1999) that indicated that 60 % of children with *Autism* fall in the severe mental retardation range, 20 % of children with *Autism* fall in the mild mental retardation category, and 20 % of children with *Autism* have average or above average intelligence. Furthermore what is evident is that in cases where the child with *Autism*’s mean GQ indicates average performance, the CQ, BQ and FQ fall in the borderline or cognitively impaired range as can be seen in the highlighted profiles in Table 3. This characteristic cognitive profile of children with *Autism* offers support for the use of the Griffiths Scales as they enable the clinician to plot and identify specific profiles as well as provides a clear indication of each individual participants performance.

### 6.4 Biographical information

Descriptive statistics were employed to summarise the biographical details of the *Autistic* sample (N=30) including gender, age, socio-economic status (SES), race, use of medication, pre-maturity and co-morbidity of Epilepsy and Attention Deficit Disorder or Attention Deficit Hyperactivity Disorder. These are displayed in Figures 4 and 5 and Tables 4 and 5.
6.4.1 Biographical details regarding gender

Figure 4
Gender expressed as a percentage of the total Autistic sample (N=30)

The Autistic sample comprised of 83% boys (n=25) and 17% (n=5) girls as presented in Figure 4. Research by Wing (2001) stipulates that Autism affects more males than females, and this is especially pronounced on the high-ability end of the spectrum. This pattern reflects both greater male susceptibility to developing Autism, as well as more severe brain involvement in girls. Although this theory remains to be tested, some authors e.g., Peeters and Gillberg, believe that a diagnosis of Autism is difficult to make, as females with Autism tend to have better language skills and demonstrate more acceptable social skills. Such findings are relevant to the present study, as can be seen in Figure 4 in that the sample comprised of 83% boys and 17% girls. However, the mean General Quotient (GQ) for the boys was 60.04, where as the mean GQ for the girls sample was 56.14, slightly lower.

Although the performance of girls on the Personal-Social Scale (BQ) was not higher (56.20) than that of the boys (59.12), the minimum score for girls (41) was much higher than that of the boys (28). The small number of girls included in the sample needs to be kept in mind when interpreting this data as this could have impacted on the mean scores. The mean CQ scores on the Language
Scale (CQ), although slightly higher for girls (44.20), than boys (43.76), again illustrate the trend of a higher minimum score of 30, than that of the boys, with a minimum score of 14.

6.4.2 Biographical details regarding age

The biographical details regarding the age of the Autistic sample are summarized in Table 4.

Table 4
Biographical information regarding age

<table>
<thead>
<tr>
<th></th>
<th>MEAN</th>
<th>MIN</th>
<th>MAX</th>
<th>RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE IN MONTHS</td>
<td>80.43</td>
<td>70.70</td>
<td>95.40</td>
<td>24.70</td>
</tr>
<tr>
<td>AGE OF BOYS</td>
<td>80.44</td>
<td>71.03</td>
<td>95.40</td>
<td>24.37</td>
</tr>
<tr>
<td>AGE OF GIRLS</td>
<td>80.38</td>
<td>70.70</td>
<td>86.80</td>
<td>16.10</td>
</tr>
</tbody>
</table>

The mean age of the entire Autistic sample (N=30) was 80.43 months. The mean age for boys (n=25) was 80.44 months. The minimum age for the boys in the sample was 71.03 months and the maximum age was 95.40 months. The mean age for girls was 80.38 months, with the minimum age being 70.70 months and the maximum being 86.8 months, thus indicative of fairly similar age distributions across the gender subgroups.
6.4.3 Biographical details regarding Socio-Economic Status

Figure 5 below indicates the performance of the sample according to socio-economic status (SES).

Figure 5
The performance of the participants according to socio-economic status

![Graph showing performance of participants by SES]

The lower SES group comprised 10 participants (n=10), the middle group comprised 14 (n=14) and the upper group comprised 6 (n=6). The average GQ indicated that participants in the lower SES group achieved a lower GQ than those from the middle SES group. The sample from the higher SES group elicited the highest mean GQ of the entire sample. The mean scores on each of the Subscales were higher, especially on Subscale F where, for example, the mean FQ for the lower SES group is 50.20, slightly higher at 55.57 for the middle SES group and 62.16 for the higher SES group. These statistics are in accordance with the findings of Bhamjee (1991) and all previous research completed on the Griffiths Scales, in that there were differences in the performances of children from the different socio-economic groups, with children
from the upper groups, performing better (Allan 1988; Heimes 1983; Hindley 1960).

6.4.4 Biographical details regarding Race groupings

Table 5 indicates the performance of the various race groups of the Autistic sample.

Table 5
Biographical details regarding race groupings

<table>
<thead>
<tr>
<th>RACE GROUP</th>
<th>MEAN GQ</th>
<th>NUMBER IN SAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian</td>
<td>62.42</td>
<td>2</td>
</tr>
<tr>
<td>Black</td>
<td>54.89</td>
<td>7</td>
</tr>
<tr>
<td>Coloured</td>
<td>44.29</td>
<td>4</td>
</tr>
<tr>
<td>White</td>
<td>64.43</td>
<td>17</td>
</tr>
</tbody>
</table>

It is evident from Table 5 that children from the white race group scored the highest. The children from the Asian race group scored slightly lower, and the children from the black and coloured race groups scored the lowest. The small number of children from the Asian and coloured race groups included in the present study, needs to be kept in mind when interpreting the results of the study, as this could have impacted on the obtained mean scores.

There is currently no evidence linking Autism to race, culture or geographical areas (Wolfberg, 1999). Bhamjee (1991) completed a study investigating the applicability for the Griffiths Scales for South African Indian children. The results of the study indicated that the South African Indian Children performed higher than their British counterparts with respect to the GQ, as well as on three of the six Subscales, namely, Personal-Social, Performance and Practical Reasoning. Although the present study only included children with Autism, the Asian children with Autism in the sample also performed higher on
the Personal-Social (mean BQ of 67.00) and Performance Subscales (mean EQ of 79.50) than their counterparts with Autism in any other race group. However, their scores on the Practical Reasoning Subscale were contradictory to Bhamjee’s study and were lower than the children in the White race group. Again, the fact that only 2 children from the Asian race group were included in the study could have impacted on the scores.

6.4.5 Biographical details regarding the use of medication by children with *Autism* included in the sample

Based on responses made by the parent(s) of the research participants, 54% (n=16) of the participants use no medication, while the remaining 46% (n=14) use some form of medication. This finding is in agreement with Wing’s research (1980) who reported that one third of all children with *Autism* have a history of some medical condition. The higher ratio of children in the sample in the lower and middle SES groups, might also impact on the results, in that it reflects the limited availability of pharmaceutical drugs at the local health services or hospitals, as well as the restriction of their supply.

6.4.6 Biographical details regarding Pre-maturity in children with *Autism* included in the sample

Responses made by the parent(s) of the research participants, indicated that 50% of the sample was born pre-maturely. This finding is in agreement with research by Peeters and Gillberg (1999) who claim that children with *Autism* often suffer minor medical problems during the foetal stages. Nelson (1999) and Fombonne et.al. (1997) also suggest that although there may be evidence that pre- and peri-natal problems may be more common in children with *Autism*, it appears that obstetric complications may be a consequence rather than a cause of *Autism*. 
6.4.7 Co-morbidity of Epilepsy and Attention Disorders

Descriptive statistics regarding the co-morbidity of Epilepsy and Attention Deficit Disorder (ADD) and Attention Deficit Hyperactivity Disorder (ADHD) indicated that seven of the participants, that is 23%, have developed Epilepsy. This is in agreement with research conducted by Rutter (1978), who reported that by adulthood, one third of individuals with Autism have developed epilepsy. Bailey, Phillips and Rutter (1996) substantiate this research and report that the frequency and onset of epileptic attacks associated with Autism, is particularly high in late adolescence or early adulthood. Fifteen of the participants, that is 50% of the sample, is reported to have been diagnosed as ADD or ADHD. Although there is no research to substantiate these statistics, it indicates that a large number of the participants suffer from ADD or ADHD.

6.5 Comparison of Autistic sample with “normal” sample

In order to further enhance and enrich the description of the performance of the Autistic sample, their performance was then compared with that of “normal” learners”, using a modification of the matched group design. In this study the two groups were matched on three variables, namely age, gender and SES. In practice, this related to the researcher matching a 7-year-old boy, with Autism, from lower economic status, with a 7-year-old boy without developmental delays, also from lower economic status. The matching was done according to the three variables with a 3-month range on either side of the participant’s chronological age. A characteristic cognitive profile of children with Autism becomes evident when comparing the performance of the participants with Autism with the performance of the “normal” sample Figure 6 is a graphically presented profile, depicting the performance of the children with Autism (N=30), and the “normal” sample (N=30) on each of the Subscales, using the average sub quotients.
Figure 6 depicts a difference between the highest (BQ of 69.60) and lowest (CQ of 43.83) developmental quotients for children with Autism of approximately 26 points. The highest developmental quotients for children in the "normal" sample is the AQ with a score of 111.63 and the lowest score is the EQ with a score of 97.46. This depicts a difference of 14.17. Again the performance of the Autistic sample indicates lower performance on Subscales B, C and F than on the other Subscales.

6.5.1 Matched Sample t-Test

A dependent samples t-test was used to compare the performance between the two groups on the GQ. The results are presented below in Table 6.
Table 6

The Dependent samples *t* – test comparing “normal” and *Autistic* scores on the General Quotient

<table>
<thead>
<tr>
<th>Groups</th>
<th>Mean</th>
<th>SD</th>
<th>df</th>
<th><em>t</em></th>
<th><em>p</em></th>
<th>NS/S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autistic (N=30)</td>
<td>59.39</td>
<td>17.02</td>
<td>29</td>
<td>-14.02</td>
<td>&lt;0.001</td>
<td>S</td>
</tr>
<tr>
<td>Normal (N=30)</td>
<td>102.37</td>
<td>12.26</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The above results indicate that there was a significant difference between the *Autistic* (*X*=59.39) sample and the “normal” (*X*=102.37) sample on the GQ of the Revised Extended Griffiths Scales, *t* (29) =-14.02, *p*< 0.001.

6.5.2 Post hoc Analysis

As the GQ is a summary of the six Subscales, any large discrepancy in one of the Subscales could have caused the overall score to differ significantly for the two groups. When there is more than one score for each individual or if there are individuals paired with each other, then a more sophisticated procedure must be selected. The Hottellings $T^2$ was used to compare the performance of the *Autistic* sample and the “normal” sample across all six Subscales in one analysis and provide a significance value for each. The results are presented below in Table 7.
Table 7
The Hottellings $T^2$ comparing “normal” and Autistic scores on the Griffiths Scales

<table>
<thead>
<tr>
<th>Subscales</th>
<th>Autistic Mean</th>
<th>Normal Mean</th>
<th>$t$-Value</th>
<th>df</th>
<th>$p$</th>
<th>Std.Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>AQ</td>
<td>69.60</td>
<td>111.63</td>
<td>-11.04</td>
<td>58</td>
<td>0.000</td>
<td>18.45</td>
</tr>
<tr>
<td>BQ</td>
<td>58.63</td>
<td>106.40</td>
<td>-10.07</td>
<td>58</td>
<td>0.000</td>
<td>21.26</td>
</tr>
<tr>
<td>CQ</td>
<td>43.83</td>
<td>97.97</td>
<td>-12.31</td>
<td>58</td>
<td>0.000</td>
<td>16.88</td>
</tr>
<tr>
<td>DQ</td>
<td>62.86</td>
<td>100.51</td>
<td>-7.38</td>
<td>58</td>
<td>0.000</td>
<td>23.73</td>
</tr>
<tr>
<td>EQ</td>
<td>66.43</td>
<td>97.46</td>
<td>-6.67</td>
<td>58</td>
<td>0.000</td>
<td>19.71</td>
</tr>
<tr>
<td>FQ</td>
<td>55.10</td>
<td>97.91</td>
<td>-9.30</td>
<td>58</td>
<td>0.000</td>
<td>19.19</td>
</tr>
</tbody>
</table>

As can be seen in Table 7 above, The Hottelling $T^2$ test showed that there was a significant difference between, the Autistic and the “normal” sample on each of the six Subscales, namely $p < 0.001$ for each Subscale.

6.5.3 Performance of Autistic and “normal” sample regarding co-morbid conditions

Statistical Analysis, namely frequencies, were employed to describe the performance of the Autistic sample without co-morbid conditions, the sample of Autistic participants with epilepsy and ADD and the “normal” sample. As discussed in section 6.3.7, seven of the participants have developed Epilepsy and fifteen of the participants have been diagnosed as ADD or ADHD. Figure 7 below presents, in frequencies, the performance of the normal sample, the Autistic sample without co-morbid conditions and the sample of Autistic participants with Epilepsy and ADD.
Figure 7
The performance of “normal” and Autistic participants with and without co-morbid conditions

![Graph showing performance of normal and autistic participants](image)

**KEY**

<table>
<thead>
<tr>
<th>Cognitively impaired</th>
<th>&lt;61.71</th>
<th>Above Average</th>
<th>112.77—125.52</th>
</tr>
</thead>
<tbody>
<tr>
<td>Borderline</td>
<td>61.72—74.47</td>
<td>Superior</td>
<td>125.53—138.28</td>
</tr>
<tr>
<td>Below Average</td>
<td>74.48—87.23</td>
<td>Very Superior</td>
<td>&gt; 138.29</td>
</tr>
<tr>
<td>Average</td>
<td>87.24—112.76</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Autistic Sample**

<table>
<thead>
<tr>
<th>Mean</th>
<th>59.39</th>
<th>Normal Sample</th>
<th>Mean</th>
<th>111.63</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Deviation</td>
<td>17.02</td>
<td>Standard Deviation</td>
<td>12.26</td>
<td></td>
</tr>
</tbody>
</table>

Although there were only 3 children in the Autistic sample that did not have co-morbid conditions of either Epilepsy or ADD, these participants performed better than the participants with Autism and co-morbid conditions. The seven participants, that is 23 %, with Autism and Epilepsy obtained the lowest scores. The participants with Autism and ADD performed better than those with Epilepsy but not as well as those without co-morbid conditions.
6.5.4 The performance of the *Autistic* sample and the “normal” sample on each of the six Subscales

6.5.4.1 Performance of the *Autistic* sample and the “normal” sample on the Locomotor Subscale (AQ).

Subscale A, the Locomotor Subscale, gives opportunity to observe physical development in young children. The mean quotient for children with *Autism* on Subscale A (AQ), was 69.60 which falls in the below average range while the mean quotient for the “normal” sample was 111.63. On locomotor performance, the minimum score recorded for the *Autistic* sample was 42.00 while the maximum score was 117, indicating a range of 75. For the “normal” sample the minimum score was 92 and the maximum score was 131.10. Despite the high maximum score (117), in the *Autistic* sample, and thus, the large range of 75, this results in the mean quotient of the participants with *Autism* still falling into the lower range as is evident in Figure 8 below. The results indicate a variance of 340.73 and a standard deviation of 18.45.

It must however be noted that, for the *Autistic* sample, the scores on the Locomotor Subscale were the highest of all the Subscales. Several studies on the cognitive abilities of children with *Autism* show a corresponding profile, i.e. higher results on the Locomotor and Performance Subscales and lower performance on verbal Subscales (Lincoln, Courchesne, Kilman, Elmasian & Allan, 1988; Ohta, 1987; Rumsey & Hamburger, 1990; Shah & Holmes, 1985). Figure 8 below illustrates the performance of the *Autistic* sample and the performance of the “normal” sample.
Figure 8
The Performance of the Autistic sample and the “normal” sample on the Locomotor Subscale (AQ)

![Performance graph]

<table>
<thead>
<tr>
<th>KEY</th>
<th>Cognitively impaired</th>
<th>Below Average</th>
<th>Average</th>
<th>Superior</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;51.03</td>
<td>67.36—83.67</td>
<td>83.68—116.32</td>
<td>&gt;148.97</td>
</tr>
<tr>
<td>Borderline</td>
<td>51.04—67.35</td>
<td>Superior</td>
<td>132.64—148.96</td>
<td></td>
</tr>
<tr>
<td>Below Average</td>
<td>67.36—83.67</td>
<td>Very Superior</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>83.68—116.32</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Autistic Sample | Normal Sample
Mean | 69.60 | Mean | 111.63
Standard Deviation | 18.45 | Standard Deviation | 9.66

6.5.4.2 Performance of the Autistic sample and the “normal” sample on the Personal-Social Subscale (BQ)

The Personal-Social Scale (Scale B) together with the Locomotor Subscale (Scale A) is the least intellectual of the GSMD. The Personal-Social...
Subscale gives opportunity to assess personal, social and emotional development. On Scale B, the mean quotient (BQ) for the Autistic sample was 58.63 indicating below average performance on this scale. On personal-social performance, the minimum score was 28, while the maximum score recorded was 104, indicating a range of 76. The results indicate a variance of 452 and a standard deviation of 21.26.

The mean quotient for the “normal” sample was 106.40 with a maximum of 133.60 and a minimum of 80. The standard deviation was 14.90.

The low mean quotient (BQ) of the Autistic sample reflects the social deficits which are considered to be central to the pathogenesis of Autism (Kanner, 1943; Bailey, Phillips & Rutter, 1996 and Peeters & Gillberg, 1999). Impairment in social interaction is one of the diagnostic criteria for Autistic Disorder as set out in the DSM-IV (1994). One of the most characteristic social abnormalities in children with Autism is the lack of social reciprocity and the impaired ability to develop meaningful relationships on the basis of interpersonal interactions (Bailey, Phillips & Rutter, 1996). These are some of the items that are assessed on the Griffiths Scales. Figure 9 below illustrates the performance of the Autistic sample and the performance of the “normal” sample.
6.5.4.3 Performance of the Autistic sample and the “normal” sample on the Language Subscale (CQ).

Subscale C, the Language Subscale gives opportunity for the study of the growth and development of language. On Subscale C, the mean quotient (CQ) for the autistic sample was 43.83. On language performance, the minimum score was 14, while the maximum score was 84, indicating a range of 70. The results indicate a variance of 285.04 and a standard deviation of 16.88.
The mean quotient for the “normal” sample was 97.97 with a minimum of 67 and a maximum of 123. The standard deviation was 17.17.

As was discussed in Chapter 2 under diagnosis, qualitative impairments in communication are identified as a key feature of Autism. This includes impairments with expressive and receptive language skills. In addition, children with Autism often have difficulties in learning the pragmatics of communication such as gesture, facial expression, intonation and volume (Wolfberg, 1999). Meaningless, immediate or delayed echolalia may be the only kind of speech that is acquired in some Autistic individuals. However, while the echolalia speech may be produced quite accurately, the child often has little or no comprehension of the meaning. Higher functioning children with Autism may develop spoken language skills in advance of, and often in the absence of the ability to communicate (Jordan & Jones, 1999).

However all major diagnostic systems agree that for a diagnosis of Autism to be made, language impairment must be present. As depicted graphically in Table 2, this Subscale has the lowest mean quotient of all six Subscales and is more than 16 points lower than the mean GQ of the entire sample. Figure 10 below depicts the performance of the Autistic sample as well as the performance of the “normal” sample on the Language Subscale (CQ).

The difference between scores for boys and girls has been discussed under gender, section 6.3.2.
Figure 10

The Performance of the Autistic sample and the “normal” sample on the Language Subscale (CQ)

![Performance of the Autistic sample and the “normal” sample on the Language Subscale (CQ)](image)

<table>
<thead>
<tr>
<th>Performance</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below borderline</td>
<td>0</td>
</tr>
<tr>
<td>Borderline</td>
<td>5</td>
</tr>
<tr>
<td>Far below average</td>
<td>10</td>
</tr>
<tr>
<td>Average below</td>
<td>15</td>
</tr>
<tr>
<td>Average</td>
<td>20</td>
</tr>
<tr>
<td>Average above</td>
<td>25</td>
</tr>
<tr>
<td>Superior</td>
<td>30</td>
</tr>
<tr>
<td>Very superior</td>
<td>35</td>
</tr>
</tbody>
</table>

**KEY**

<table>
<thead>
<tr>
<th>Cognitively impaired</th>
<th>&lt;46.74</th>
<th>Above Average</th>
<th>117.76—135.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Borderline</td>
<td>46.75—64.4</td>
<td>Superior</td>
<td>135.6—153.25</td>
</tr>
<tr>
<td>Below Average</td>
<td>64.5—82.24</td>
<td>Very Superior</td>
<td>&gt;153.26</td>
</tr>
<tr>
<td>Average</td>
<td>82.25—117.75</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Autistic Sample**

<table>
<thead>
<tr>
<th>Mean</th>
<th>43.83</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Deviation</td>
<td>16.88</td>
</tr>
</tbody>
</table>

**Normal Sample**

<table>
<thead>
<tr>
<th>Mean</th>
<th>97.97</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Deviation</td>
<td>17.17</td>
</tr>
</tbody>
</table>

6.5.4.4 Performance of the Autistic sample and the “normal” sample on the Eye and Hand Co-ordination Subscale (DQ).

Subscale D, the Eye and Hand Co-ordination Scale consists of items relating to handwork and visual ability of a child. On Subscale D, the mean quotient (DQ) for the Autistic sample was 62.86, with a minimum score of 22 and a maximum score of 116. The range was 94, with a variance of 563.15 and a standard deviation of 23.73.

The mean quotient for the “normal” sample was 100.53 with a minimum of 77 and a maximum of 125.10. The standard deviation was 14.73.
Tasks on this Subscale demand some imitative and creative skill. Children with *Autism* generally do not participate in or enjoy imitative activities and are less likely than normal children to follow or copy their parent’s activity (Sigman, Mundy, Sherman & Ungerer, 1986).

Figure 11 below illustrates the performance of the *Autistic* sample as well as the performance of the “normal” sample on the Eye-Hand Subscale (DQ)

Figure 11

The Performance of the *Autistic* sample and the “normal” sample on the Eye-Hand Co-ordination Subscale (DQ)

<table>
<thead>
<tr>
<th>Performance</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below borderline</td>
<td>5</td>
</tr>
<tr>
<td>Borderline</td>
<td>10</td>
</tr>
<tr>
<td>Far below average</td>
<td>15</td>
</tr>
<tr>
<td>Below average</td>
<td>20</td>
</tr>
<tr>
<td>Average</td>
<td>25</td>
</tr>
<tr>
<td>Above average</td>
<td>20</td>
</tr>
<tr>
<td>Superior</td>
<td>15</td>
</tr>
<tr>
<td>Very superior</td>
<td>10</td>
</tr>
</tbody>
</table>

**KEY**

| Cognitively impaired | <53.25 | Above Average | 115.89—131.16 |
| Borderline | 53.26—68.83 | Superior | 131.17—146.74 |
| Below Average | 68.84—84.41 | Very Superior | >146.75 |
| Average | 84.42—115.58 |

**Autistic Sample**

| Mean | 62.86 |
| Standard Deviation | 23.73 |

**Normal Sample**

| Mean | 100.51 |
| Standard Deviation | 14.73 |
6.5.4.5 Performance of the Autistic sample and the “normal” sample on the Performance Subscale (EQ).

Subscale E, the Performance Scale, is very largely a scale of visual-spatial performance tests and includes items like form boards and pattern-making. On Subscale E, the mean quotients (EQ) for the Autistic sample was 66.43. The minimum score was 16, while the maximum score was 99 with a range of 83. The variance was 388.87 with a standard deviation of 19.71.

The mean quotient for the “normal” sample was 97.46 with a minimum of 68.20 and a maximum of 129. The standard deviation was 16.07.

As depicted in Table 2, children in this sample obtained the second highest mean quotient on this Subscale. This could be attributed to the fact that the items on this Subscale demand a certain amount of repetitive behaviour, namely the four, six and eleven hole boards, as well as pattern making activities. Children with Autism often enjoy activities involving repetition or repetitive acts (Bailey, Phillips & Rutter, 1996). Children with Autism also perform better on tasks that have a clearly defined solution and demand little social contact, for example, form boards (Sandberg, Nyden, Gillberg & Hjelmquist, 1993). Figure 12 below depicts the performance of the Autistic sample and the performance of the “normal” sample on the Performance Subscale (EQ).
Allan (1988) completed a study aimed to explore whether the British norms (1960) of the Griffiths Scales were suitable for South African (SA) children. Moreover, the degree to which the subject variables of gender, language and socio-economic status (SES) influenced performance was investigated. The principal conclusions of the investigation were that 5 year-olds in the SA and British standardization sample, differed significantly on the General Quotient (GQ) and in their performance on four of the six Subscales, namely the
Locomotor development, Personal-Social development, Hearing and Language, and Performance. Children in the different SES groups differed significantly on the GQ and in their performance on four of the six Subscales, namely, the Hearing and Language (Scale C), Eye and Hand Co-ordination (Scale D), Performance (Scale E) and Practical-Reasoning (Scale F) Subscales. On the Hearing and Language, Eye and hand Co-ordination, and Practical-Reasoning Subscales, children from the upper SES group performed significantly better than those from both the middle and lower SES groups. On the Performance Subscale and GQ, the upper SES group scored significantly higher than the middle and lower SES groups, and the middle SES group scored significantly higher than the lower SES group. Allan (1988) was therefore of the opinion that socio-economic status be considered in the interpretation of the Scales. As 33% of the children included in the sample are from the lower SES group, this may have impacted on the scores. In this sample, the mean quotient for the lower SES group was 55.40 with a minimum of 16.00 and a maximum of 94.00. The mean quotient for the middle SES group was 70.00 with a minimum of 51.00 and a much higher maximum of 99.00. The mean quotient for the upper SES is even higher at 76.50 with a minimum of 57.00 and a maximum of 99.00. This substantiates results of Allan’s study (1988).

6.5.4.6 Performance of the Autistic sample and the “normal” sample on the Practical Reasoning Subscale (FQ).

The Practical Reasoning Subscale (FQ) focuses mainly on recording the earliest indications of arithmetical comprehension, and the realization of the simplest practical problems. On the Practical Reasoning Subscale, the mean quotient (FQ) for the Autistic sample was 55.10 with a minimum of 28.00 and a maximum of 105.00. The range was 77.00 with a variance of 368.43 and a standard deviation of 19.19. This mean quotient on this scale was the second lowest of the six Subscales. Descriptive statistics mentioned earlier indicate that 50% of the children in the Autistic sample had been diagnosed with ADD or ADHD. Children with Autism also experience difficulty with expressive and receptive language. The verbal nature of the items in this scale, as well as the
difficulties with attention and concentration could have impacted on the mean scores. As discussed in 5.6.1, it needs to be considered that certain adaptations were allowed in the administration of this subscale with the Autistic sample and that without these adaptations the mean FQ may have been even lower.

The mean quotient for the “normal” sample was 97.91 with a minimum of 62 and a maximum of 118.90. The standard deviation was 16.34. Figure 13 below depicts the performance of the Autistic sample and the performance of the “normal” sample on the Practical Reasoning Subscale (FQ).

Figure 13
The performance of the Autistic sample and the “normal” sample on the Practical Reasoning Subscale (FQ)

![Graph](image)

<table>
<thead>
<tr>
<th>Performance</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below average</td>
<td>5</td>
</tr>
<tr>
<td>Average</td>
<td>10</td>
</tr>
<tr>
<td>Above average</td>
<td>20</td>
</tr>
<tr>
<td>Superior</td>
<td>15</td>
</tr>
<tr>
<td>Very Superior</td>
<td>10</td>
</tr>
</tbody>
</table>

**KEY**

<table>
<thead>
<tr>
<th>Categorization</th>
<th>Autistic Sample</th>
<th>Normal Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitively impaired</td>
<td>55.10</td>
<td>97.91</td>
</tr>
<tr>
<td>Borderline</td>
<td>19.19</td>
<td></td>
</tr>
<tr>
<td>Below Average</td>
<td>117.43—134.86</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>82.57—117.43</td>
<td></td>
</tr>
<tr>
<td>Above Average</td>
<td>134.87—152.29</td>
<td></td>
</tr>
<tr>
<td>Superior</td>
<td>&gt;152.30</td>
<td></td>
</tr>
<tr>
<td>Very Superior</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6.5 Conclusions

In summary the children with *Autism* showed a characteristic cognitive profile when tested with the Revised Extended Griffiths Scales. The highest results emerged on the Locomotor and Performance Subscales and the lowest on the Language and Practical Reasoning Subscale. Several studies on the intellectual abilities of children with *Autism* show a corresponding profile, i.e. higher results on performance and lower on verbal Subscales (Lincoln, Courchesne, Kilman, Elmasian & Allan, 1988; Ohta, 1987; Rumsey & Hamburger, 1990; Shah & Holmes, 1985). The children with *Autism* performed better on the Performance Subscale than on the Eye and Hand Co-ordination Subscale. This can be accounted for by the fact that children with *Autism* perform better on tasks that have a clearly defined solution and demand little social contact (e.g. form boards from the Performance Subscale), than on tasks that demand some imitative and creative skills (e.g. draw a man from the Eye and Hand Co-ordination Subscale) (Sandberg et al.1993). These finding are also in agreement with the notion of the triad of impairments present in children with *Autism*. These impairments are in the fields of socialization, social communication and in social play.

The mean GQ of the majority of the children with *Autism*, in this sample falls into the range of below average, borderline or cognitively impaired. This confirms research by Wolfberg (1999) that indicated that 60 % of children with *Autism* fall in the severe mental retardation range, 20 % of children with *Autism* fall in the mild mental retardation category, and 20 % of children with *Autism* have average or above average intelligence. Furthermore what is evident is that even in cases where the child with *Autism’s* mean GQ indicates average performance, the CQ, BQ and FQ fall in the borderline or cognitively impaired range. Moreover there was significant difference between the *Autistic* sample and the “normal” sample on the GQ of the Revised Extended Griffiths Scales.
CHAPTER SEVEN
CRITICAL EVALUATION AND CONCLUSION

7.1 Introduction

A critical evaluation, including the limitations and recommendations, as well as the conclusion of the study is presented below. As previously mentioned this study is a pilot study, which forms part of the revision process to enhance the clinical utility of the Griffiths Scales. The magnitude of this study is that of a Master’s study and it thus forms a springboard for more in-depth studies using, for example, item analysis.

7.2 Limitations

The limitations of the present study need to be acknowledged. These include:

7.2.1 Limitations regarding the sampling and assessment procedures

A non-probability purposive and convenience sampling method was applied in identifying suitable children to be tested. As mentioned in chapter 5, the disadvantage of non-probability sampling is that due to the fact that the probability that an individual will be selected is not known, the researcher cannot generally claim that the sample is representative of the larger population. This greatly limits the researcher’s ability to generalise the research findings beyond the specific sample being studied. Furthermore, the researcher cannot estimate the degree of departure from representation (sampling error). However, a non-probability sample may prove to be entirely adequate if the researcher does not intend to generalise the findings beyond the studied sample, as is the case with the present study. Moreover all the children with Autism (years 7 & 8) in the four schools formed part of the sample and no subjects were excluded on the basis of intellectual level or neurological disorders, for example epilepsy. As a result of the researcher not excluding children with co-morbid conditions, this on one hand
complicated the interpretation of data but, on the other, resulted in a more accurate picture of reality.

Psychologists at the schools included in the study did the testing of the children with Autism. Although all of these testers were registered users of the GSMD, were trained on the Revised Extended Griffiths Scales, and the adaptations for Autism, inter-tester variance must be considered.

Although testing circumstances were kept as ideal as possible (for example, the children were tested on their own school premises and by a familiar person) certain variables, specific to their disability, such as the lack of social reciprocity and their inability to sustain a conversation with others, could have impacted on the scores.

7.2.2 Limitations regarding the sample size

Thirty children with Autism in years 7 and 8 make up the Autistic sample size in the present study. A comparison sample of 30 “normal” children was also included. As only children between the ages 7 years (from 72 months) and 8 years (to 95.9 months) were included in the present study, the ability to generalise the findings to children with Autism of older or younger age ranges must be done with caution, and with a developmental perspective in mind. Secondly, these children were learners at schools for Specialised Education for Learners with Autism, and have been exposed to a structured programme. Again the ability to generalise these results to children with Autism who are not in a specialized educational setting must be done with caution. Thirdly the number of children with Autism falling in specific language or socio-economic groupings (e.g., Xhosa children from the higher socio-economic group) was small relative to the other sample sizes. This factor could limit the generalisability of findings regarding the respective groupings. Although the sample of children with Autism is only 30, this includes most of the population of children with Autism (years 7 – 8) in specialised educational settings in SA. A sample size of 30 can therefore be considered to be adequate for the purpose of the present study.
7.2.3 Limitations regarding the research approach

In achieving the primary objective of the present study, the research design was exploratory in nature and hence the research approach was descriptive. Although employing this method did not provide the opportunity to allow for appropriate cross-cultural comparisons, and hence limits the generalisation of the results among different cultural groups, culture was not part of the design as it was exploratory in nature. Therefore varying numbers from different culture groups formed part of the sample.

7.2.4 Limitations regarding the lack of South African norms for the Revised Extended GSMD

As mentioned in Chapter 5, norms for South African children are not currently available for the Revised Extended GSMD and hence the results should be interpreted with caution.

7.2.5 Limitations regarding the lack of South African research conducted on Children with Autism

As mentioned, little research has been conducted in the field of children with Autism in South Africa. To date no South African research has been conducted on children with Autism years 7 and 8. Linking the findings of the present study to other related research is therefore limited.
7.3 Recommendations

The following recommendations are made:

(i) Findings of the study, which focuses on the children’s areas of developmental weakness be made available to the parent’s of the sample group, as well as to parents of other children with Autism. Therapeutic programmes be developed so as to allow for early intervention and appropriate stimulation in all areas of concern. The areas of concern highlighted by the overall profile of children with Autism i.e. Subscale B (Personal-Social), Subscale C (Language) and Subscale F (Practical Reasoning) can be integrated into existing programmes or used in the design of additional programmes.

(ii) The findings of the present study be disseminated as broadly as possible so that therapeutic programmes can be further developed so as to allow for early intervention and appropriate stimulation in all areas of concern.

(iii) The development of norms for the children of South Africa, including cross-cultural research.

(iv) Further statistical analysis of the Subscales that were highlighted as areas of concern, namely, Subscale B (Personal-Social), Subscale C (Language) and Subscale F (Practical Reasoning), may be done and so enrich other studies of children with Autism.

7.4 Conclusions

7.4.1 Contributions

This study has made the following contributions:

(i) The study contributes to research in South Africa about Autism.
(ii) It provides teachers, psychologists and other professionals with information regarding the development of children with Autism.

(iii) It can provide extensive clinical value in various settings, namely, clinics hospitals, pre-schools, primary schools and early learning centres regarding the general development of children with Autism.

(iv) The process of revision and clinical utility of an already existing culture-common test in South Africa, namely the Griffiths Scales, has been furthered. The findings in the present study concur with the results of the study done with children with Autism on the original Griffiths (Sandberg et al.1993).

7.4.2 The major findings of the present study were as follows:

(i) Children with Autism (years 7 & 8) showed a characteristic cognitive profile when tested with the Revised Extended Griffiths Scales. Their performance indicates lower performance on Subcales B, C and F than on the other Subscales.

(ii) Children with Autism (years 7 & 8) performed differentially on the Revised Extended GSMD. Some children experienced major fall-outs whereas others were slightly below average.

(iii) The general performance children with Autism, was in the range cognitively impaired.

(iv) There was significant difference between the Autistic sample and the “normal” sample on the GQ of the Revised Extended GSMD.

In conclusion, the assessment of children should always take into account that their progression through their formative years depends on their needs and
to the variety of experiences that their environment offers to them. The child cannot proceed faster than his or her previous level of maturation nor can he or she proceed faster than the opportunity to gain skills at another level (McCarthy, 1930). In addition, during the formative years, the rate of development is not constant especially in children with developmental and psychiatric disorders, such as Autism.

However, despite the limitations of this study, the multidisciplinary team employed, the adaptations that were made to obtain the most reliable results, and the clinical judgement of a team of researchers, ensured that the clinical utility of the Revised Extended GSMD was enhanced by the collection of data on children with Autism.
REFERENCES:


Hanson, R. (1983). Proposals for the revision of the Griffiths Scales based on studies carried out at the University of Leeds during the years 1980 to 1982. Unpublished manuscript.


APPENDICES

Appendix A: Biographical questionnaire to be completed by the learners’ parent(s).

Appendix B: Letter to parents requesting permission of their child’s participation.

Appendix C: Consent form to be completed by the learners’ parent(s).

Appendix D: Letter to authorities informing them of the purpose of the study.
Appendix A

Biographical Questionnaire to be completed by parent(s)

SECTION A
PERSONAL DETAILS

Child's Name and Surname: ________________________________________________

Address: _______________________________________________________________
Suburb: _________________________________________________________________
Telephone number: _______________________________________________________
Date of Birth: 19____/____/____
Date of testing: 20____/____/____

Gender: M F

Current School: ___________________________________________________________
School Telephone No: ________________________________
Home language: __________________________________________________________
How many children in your family? (state gender and age): _______________________

Where is your child positioned in the family? (i.e., eldest, youngest, etc)_____________

SECTION B

1. Birth History:
   Please describe anything unusual about the pregnancy or delivery:
   ________________________________________________________________
   ________________________________________________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________

   __________
Please tick the appropriate answer (Y = Yes, N = No):

<table>
<thead>
<tr>
<th></th>
<th>Question</th>
<th>Y / N</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Was your pregnancy planned?</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Did you give birth to your child naturally?</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Was your child anoxic (i.e. did he/she lack oxygen at birth?)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Was your child born either prematurely or after more than 41 weeks of pregnancy? If yes, after how many weeks:</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Is your child one of a twin?</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Did you bond easily with your child?</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Did you breast feed your child?</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Did you experience postpartum depression?</td>
<td></td>
</tr>
</tbody>
</table>

**Motor Development**

<table>
<thead>
<tr>
<th></th>
<th>Question</th>
<th>Y / N</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>At what age did your child sit: ___________months</td>
<td></td>
</tr>
<tr>
<td></td>
<td>crawl: ___________months</td>
<td></td>
</tr>
<tr>
<td></td>
<td>walk: ___________months</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Is your child extremely underactive?</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Is your child noticeably physically overactive?</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Is your child clumsy?</td>
<td></td>
</tr>
</tbody>
</table>

**Language Development**

<table>
<thead>
<tr>
<th></th>
<th>Question</th>
<th>Y / N</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>Did your child have difficulty with sucking and chewing?</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>At what age did your child start to babble? ____________________________ months</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Does your child use single words? If yes, at what age - ___________ years</td>
<td></td>
</tr>
</tbody>
</table>
17. Does your child speak in sentences? If yes, at what age___________years  
18. Does your child ask repetitive questions?   
19. Does your child talk to himself excessively?  
20. Does your child echo words or phrases constantly?  

<table>
<thead>
<tr>
<th>Emotional Development</th>
</tr>
</thead>
</table>
| 21. Does your child cry or laugh for no reason?  
22. Does your child prefer to be alone?  
23. Does your child enjoy cuddling and respond to affection?  
24. Does your child have temper tantrums regularly?  
25. Does your child display extreme distress for no apparent reason?  |

<table>
<thead>
<tr>
<th>Social Development</th>
</tr>
</thead>
</table>
| 26. Does your child have difficulty in mixing with other children?  
27. Does your child make little or no eye contact?  
28. Does your child form inappropriate attachment to certain objects?  |

<table>
<thead>
<tr>
<th>Sensory /Hearing Development</th>
</tr>
</thead>
</table>
| 29. Does your child appear as if he/she does not hear you?  
30. Does your child cover his /her ears?  
31. Is your child upset by noises? |

<table>
<thead>
<tr>
<th>General</th>
</tr>
</thead>
</table>
| 32. Is your child on any kind of medication? If yes, for what?  
33. Does your child enjoy watching objects spinning?  
34. Does your child spin him/herself?  
35. Does your child ever flap his /her hands?  
36. Does your child wiggle his /her fingers?  
37. Does your child jump up and down repetitively?  
38. Does your child grimace? |
SECTION C

The following questions are applicable to children of a broad age range; therefore, we do not necessarily expect your child to be capable of all of the tasks listed below. We would appreciate a completely honest evaluation of your child's ability. Please do not be concerned if your child is not yet able to complete each of the activities.

<table>
<thead>
<tr>
<th>Question</th>
<th>Y / N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does your child help with small household tasks?</td>
<td></td>
</tr>
<tr>
<td>Does your child help with routine tasks when requested?</td>
<td>Y / N</td>
</tr>
<tr>
<td>Does your child help tidy a room?</td>
<td>Y / N</td>
</tr>
<tr>
<td>Does your child bath or shower with minimal assistance?</td>
<td>Y / N</td>
</tr>
<tr>
<td>Does your child clean his/her own teeth?</td>
<td>Y / N</td>
</tr>
<tr>
<td>Does your child wash own hands and face, but needs assistance with drying?</td>
<td>Y / N</td>
</tr>
<tr>
<td>Does your child wash and dry own hands and face, but needs checking?</td>
<td>Y / N</td>
</tr>
<tr>
<td>Does your child wash and dry own hands and face without assistance?</td>
<td>Y / N</td>
</tr>
<tr>
<td>Does your child need some assistance to bath or shower?</td>
<td>Y / N</td>
</tr>
<tr>
<td>Does your child bath or shower without assistance?</td>
<td>Y / N</td>
</tr>
<tr>
<td>Does your child bath or shower, and dry him/herself without assistance?</td>
<td>Y / N</td>
</tr>
<tr>
<td>Does your child need assistance to put on his/her own shoes and socks, e.g. putting shoes on correct feet?</td>
<td>Y / N</td>
</tr>
<tr>
<td>Does your child put on his/her own shoes and socks without assistance?</td>
<td>Y / N</td>
</tr>
<tr>
<td>Does your child choose his/her own clothes?</td>
<td>Y / N</td>
</tr>
<tr>
<td>Does your child deliver a simple message?</td>
<td>Y / N</td>
</tr>
<tr>
<td>Does your child deliver a fairly complex message?</td>
<td>Y / N</td>
</tr>
<tr>
<td>Does your child go on instruction to get a specific item in a public area, e.g. go and get bread from the counter and bring it to mother?</td>
<td>Y / N</td>
</tr>
<tr>
<td>Does your child go alone on errands to nearby shops, etc?</td>
<td>Y / N</td>
</tr>
<tr>
<td>Does your child make a small purchase in a shop with some assistance, e.g. checking the change?</td>
<td>Y / N</td>
</tr>
<tr>
<td>Does your child make a small purchase in a shop without assistance?</td>
<td>Y / N</td>
</tr>
<tr>
<td>Does your child demonstrate an understanding that it is unsafe to accept rides, food or money from strangers?</td>
<td>Y / N</td>
</tr>
<tr>
<td>Does your child need to be reminded to follow the rules in a simple game?</td>
<td>Y / N</td>
</tr>
<tr>
<td>Does your child follow the rules in a simple game, without being reminded?</td>
<td>Y / N</td>
</tr>
<tr>
<td>Question</td>
<td>Y / N</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>Does your child neaten (brush or comb) own hair in the morning?</td>
<td></td>
</tr>
<tr>
<td>Does your child ask to use the toilet?</td>
<td></td>
</tr>
<tr>
<td>Does your child have bladder control during the day, with a few accidents?</td>
<td></td>
</tr>
<tr>
<td>Does your child have complete bladder control during the day and night?</td>
<td></td>
</tr>
<tr>
<td>Does your child get a drink of water from the tap without assistance?</td>
<td></td>
</tr>
<tr>
<td>Does your child get a drink of water from the tap with some assistance?</td>
<td></td>
</tr>
<tr>
<td>Does your child eat without assistance?</td>
<td></td>
</tr>
</tbody>
</table>

Thank you for your co-operation in filling in this Questionnaire. All the information that you have supplied us with will be treated as strictly confidential.
Appendix B

Letter to parents for their permission to test their children

Dear Parent

The University of Port Elizabeth (UPE) plans to conduct a research project exploring a developmental profile of children with Autism Spectrum Disorders using the Revised Extended Griffiths Scales of Mental Development. The six areas of general development assessed on these Subscales include: Locomotor; Personal-Social; Language; Eye-and-Hand Co-ordination; Performance and Practical Reasoning. The Griffiths Scales were developed in Britain in the 1960's and are used internationally for the developmental assessment of young children. A research team based at UPE has recently revised the Scales, making them more culture fair and contemporaneous.

The present study is aimed at exploring a developmental profile of children with Autism Spectrum Disorder at the following schools for Autistic learners:

- Quest School, in Port Elizabeth;
- Vera School, in Cape Town;
- Alpha School, in Cape Town;
- Unica School, in Pretoria.

The study aims to contribute to research into Autism. Despite the Griffiths Scales of Mental Development being used widely in assessment of learners with Autism, no South African research has been conducted on the profiles of such learners.

Registered Psychologists at the identified schools have been trained in the use of the Revised Griffiths Scales and will administer the Scales to the identified sample of learners.

The assessment will take approximately two hours and, if necessary, can be conducted over two sessions. As the Griffiths Scales are based on play, your child will find the assessment enjoyable. You, as the parents of the child to be assessed, will be asked to complete a Biographical Questionnaire. Your child will be informed that he/she will be free to refuse or withdraw from participating at any stage of the assessment.

Prior to the commencement of the research, we require your permission that your child participates. We therefore kindly request that you complete the
Consent by parent section attached, as well as the Biographical Questionnaire.

All information gathered will be treated as strictly confidential. Should you require any further information, please feel free to contact Mrs Rose Gowar on 041-581 0964 at Quest School.

On completion of the assessment, feedback will be given to you by the respective psychologist.

We would like to stress that the success of this project depends entirely on your voluntary co-operation and we thank you in anticipation.

Yours sincerely

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Mrs R. V. Gowar  
Intern Psychologist  
(Department of Psychology, UPE)

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Dr N. Kotras  
Co-Supervisor  
(Department of Psychology, UPE)

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Mrs A. Barnard  
Co-Supervisor  
(Department of Psychology, UPE)

Professor D. M. Luiz  
Supervisor  
(Head of Department of Psychology, UPE)
Appendix C

Consent form to be completed by the child's parent(s)

I, the undersigned, hereby give permission for my child to be included in the research project being conducted by the University of Port Elizabeth (UPE). The study aims to explore a developmental profile of learners with Autism Spectrum Disorder, using the Revised Extended Griffiths Scales of Mental Development. I understand that the process will include giving consent for my child to participate by signing this form and by providing biographical information. I understand that all information will be treated as strictly confidential.

Signature: ..............................
Date .................................
Name in print..................................................
Relationship.................................
Appendix D

Letter to authorities informing them of the purpose of the study

Dear ………………………………. date

Re: Permission to conduct research project

I refer you to our telephonic conversation regarding research into the developmental profile of learners with Autism Spectrum Disorder.

The University of Port Elizabeth (UPE) plans to conduct a research project exploring a developmental profile of children with Autism Spectrum Disorder using the Revised Extended Griffiths Scales of Mental Development (GSMD). The six areas of general development assessed on this Scale include: Locomotor; Personal-Social; Language; Eye-and Hand Co-ordination; Performance and Practical Reasoning. The GSMD were developed in Britain in the 1960s are used internationally for the developmental assessment of young children. A research team based at UPE has recently revised the Scales making them more culture fair and contemporaneous.

The present study is aimed at exploring a developmental profile of children with Autism Spectrum Disorder. The study will involve the assessment of such learners at the following schools for Autistic learners:

- Quest School, in Port Elizabeth;
- Vera School, in Cape Town;
- Alpha School, in Cape Town;
- Unica School, in Pretoria.

The study aims to contribute to research into Autism. Despite the GSMD being used widely in assessment of learners with Autism, no South African research has been conducted on the profiles of such learners.

Registered Psychologists at the identified schools have been trained in the use of the Revised GSMD and will administer the Scales to the identified sample of learners.

Prior to the commencement of the research, we require your permission that learners (year 7 and 8) at your school participate in the study. All information gathered will be treated as strictly confidential.
Should you require any further information, please feel free to contact Mrs Rose Gowar on 041-581 0964 at Quest School or any of the undersigned at UPE on 041-504 2354.

On completion of the study, feedback will be made available to the various schools involved in the study.

Please find attached a copy of a covering letter, Biographical Questionnaire and a consent form to be completed by the parents of the children who are involved in the study.

We would like to stress that the success of this project depends entirely on your voluntary co-operation and we thank you in anticipation.

Yours sincerely

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Mrs R. V. Gowar
Intern Psychologist
(Department of Psychology, UPE)

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Dr N. Kotras
Co-Supervisor
(Department of Psychology, UPE)

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Mrs A. Barnard
Co-Supervisor
(Department of Psychology, UPE)

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Professor D.M. Luiz
Supervisor
(Head of Department of Psychology, UPE)