LEARNING DISABILITIES AND ACADEMIC ACHIEVEMENT AMONGST SCHOOL CHILDREN IN ACCRA

BY

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DECLARATION

I do hereby declare that with the exception of references cited which have been duly acknowledged, this thesis, "Learning Disabilities and Academic Achievement among School Children in Accra" is an original research solely undertaken by me under the supervision of Prof. C.C. Mate-Kole and Prof. J. Y. Opoku, at the Department of Psychology, University of Ghana, Legon. This work is in partial fulfillment of the requirements for the award of the Master of Philosophy (M.Phil) Degree in (Clinical) Psychology. This thesis has not been presented in whole or part for any degree anywhere.

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DEDICATION

To my parents, siblings, cousins and best friend.

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LIST OF ACRONYMS

LD	--	Learning Disabilities
CLD	--	Children with learning disabilities
CWLD	--	Children without learning disabilities
COND	--	Children with other neurological disorders
MD	--	Mathematics Disability
RD	--	Reading Disability
MBD	--	Minimal Brain Dysfunction
NJCLD	--	National Joint Committee on Learning Disabilities
WRAT	--	Wide Range Achievement Test
GABS	--	Ghana Adaptive Behaviour Scale
TMT	--	Trails Making Test
ABS	--	Adaptive Behaviour Scale
RCPM	--	Ravens Colored Progressive Matrices
RSPM	--	Ravens Standard Progressive Matrices
APA	--	American Psychiatric Association
EFA	--	Education for All
ACLD	--	Association of Children with Learning Disabilities
U S	--	United States
BECE	--	Basic Examination Certificate Exam
WAEC	--	West Africa Examination Council

ABSTRACT

Learning disabilities (LD) may be one of the most common and serious pervasive childhood disabilities, with prevalence estimates between 2% and 10%. Yet, stakeholders, parents, teachers and the society at large know little concerning the effect of learning disabilities on school children in Ghana. The current study sought to bridge this gap by examining the impact of learning disabilities on academic achievement among school children in Accra. The study comprised of three groups; children with learning disabilities, children without learning disabilities and children with other neurological disorders. A total of 131 children were compared on measures of academic achievement, adaptive behaviour, problem behaviour, non-verbal intelligence and a cognitive flexibility Test. The results revealed significant groups differences. Specifically, children with learning disabilities scored lower on measures of academic achievement and non-verbal intelligence compared to children without learning disabilities, but higher than children with other neurological disorders. Other findings showed that the performance of children with learning disabilities was impaired on the part B of the cognitive flexibility Test but not on the part A. Further, children with learning disabilities as well as children with other neurological disorders showed evidence of lower social skills. Contrary to expectations, few significant differences were found between children with learning disabilities and children without learning disabilities on measures of problem behaviour. Implications for future research and for practice are discussed.

CHAPTER ONE
INTRODUCTION

Children perform poorly in school for many reasons. They may have low intelligence, a psychiatric disturbance, mental retardation, a poor learning environment and may have received little encouragement at home. They may a have sensory impairment (e.g. vision, hearing or physical handicaps) which seriously impairs their learning (Collins & Rourke, 2003). Although many explanations can be offered to explain why some students do not perform satisfactorily, a learning disability (LD) is often the reason (Carlson, 2005). Learning disabilities (LD) may be one of the most common and serious pervasive childhood disabilities, with prevalence estimates between 2% and 10% (American Psychiatric Association, 2000; Flisher, Malhotra, Nikopota & Patel, 2008).

Gaskin (1982) opined that at the most general level, any child who has great difficulty in achievement of academic standards required by school may be described as having a learning disability. In other words the term "Learning disability" has been considered a school-related problem in that it is first noticed when a child fails to learn academic material and requires school-based remediation to improve functioning (Cowardin, 1998). By far the most commonly noted characteristic of students with learning disabilities is their struggle with school work (Friend, 2008). The student posseses the requisite potential for particular academic activities, but has difficulty acquiring associated academic skills (Tanner, 2001). The LD tends to affect how much the student takes in, retains, or expresses information, hence impeding the child's ability to learn to read, write or do math (Mash & Wolfe, 2007). Most learning disabilities are manifested in areas of mathematics, reading, spelling, writing and listening (Wallace & McLoughlin, 1975). However, the present study focused on reading, mathematics and spelling disabilities.

Although learning disabilities initially concern performance in academic subjects, the ramifications of the disability extend into other spheres of the child's life (Bender & Wall, 1994; Shessel & Reiff, 1999; Siperstein, Bopp, & Bak, 1978). In addition to academic problems, empirical research suggests that children with LD are significantly more at risk of developing social and behavioural problems compared to their normally-achieving peers (Caletti & McLaughlin, 2003; Mishna & Muskat, 2004; Nowicki, 2003). For example, it is well documented that children with learning disabilities present with lower social skills (Gresham, Sugai, & Horner, 2001; Swanson & Malone, 1992; Vaughn, Elbaum, & Boardman, 2001), in addition to higher levels of behaviour problems compared to their non-LD counterparts (McConaughty & Ritter, 1985; McKinney, 1989: Vaughn, Zaragoza, Hogan & Walker, 1993).

Considering the fact that learning disabilities can have detrimental consequences on children, it is imperative that its real nature is examined and understood so that timely interventions can be applied.

Academic Achievement in Ghana

Without doubt, many school children face learning problems that lead to poor academic achievement. In Africa, at least 8 percent of the student population is not doing well (Abosi, 2007) and Ghana is no exception. For Ghana, low academic achievement continues to be a subject of discussion (Kniel & Kniel, 2007). In support of this, Wilmot (2001) found that 450 pupils from five randomly selected Ghanaian schools performed poorly on math achievement measures. Low math achievement scores were evident across sampled class levels (class 3, 4 and 6). Similarly, in a related study, a large proportion of Ghanaian children were unable to read or write to an acceptable level. And this was the observed trend across all grade levels (Kniel & Kniel, 2007). Likewise, results from the National Education Assessment (NEA - an indicator of

Ghana's education quality at the basic level, 2007) revealed that less than 25% of Ghana's youth reach proficiency levels for English, and 10% attain proficiency in mathematics (Preliminary Education Sector Performance Report, 2008).

In all, difficulties with school performance appear to be extensive in Ghana and other African schools (Abosi, 2007) regardless of the several interventions being initiated (e.g. Education For All, 2005). This poses a major challenge to the individual, the educational system and society at large. As a result, questions have been raised. Is the school system addressing all student academic needs appropriately? Why are some students performing well in school whilst others must struggle to achieve mediocre success? (Carlson, 2005)

Learning disabilities are one of the outcomes, of the search for the origins of children's educational failure (Collins & Rourke, 2003). While many factors may account for poor academic performance, learning disabilities have been earmarked as one of the common risk factors in developing countries (Flisher et al, 2008). But to the best of the researcher's knowledge, few African studies to date, have evaluated its significance on academic achievement (Abosi, 2007; Avoke & Yekple, 2006). Nevertheless, Avoke and Yekple (2006) have reported learning disabilities as the most prevalent type of school-related problem among other difficulties (i.e. hearing impairments, visual impairments) in Ghanaian schools. It therefore seems odd that little effort has been made to study this area.

Moreover, research conducted in the US and other developed countries suggest that elementary and middle school children with LD experience more academic deficits relative to their same-age peers without disabilities (Fuchs, Fuchs, Mathes, & Lipsey, 2000). In an attempt understand these differences, the field of learning disabilities emerged, with an aim to provide

services to students (Learning Disabled) who were not being adequately served by the general educational system (Lyon, 1996; Lyon, Fletcher, & Barnes, 2003).

Learning Disabilities

Since the inception of the area of learning disabilities, several definitions have evolved (Interagency Committee on Learning Disabilities, 1987; National Joint Committee on Learning Disabilities, 1998) to describe the concept of LD. One commonly reviewed definition is that postulated by the National Joint Committee on Learning Disabilities (NJCLD, 1998). NJCLD defined "learning disabilities" as a generic term referring to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical abilities. These disorders are intrinsic to the individual, presumed to be due to central nervous system dysfunction, and may occur across one's life span. Problems in self-regulatory behaviours, social perception, and social interaction may exist with learning disabilities but do not by themselves constitute a learning disability. Although learning disabilities may occur concomitantly with other handicapping conditions (for example, sensory impairment, mental retardation, serious emotional disturbance), or with extrinsic influences (such as cultural differences, insufficient or inappropriate instruction), they are not the result of those conditions or influences (National Joint Committee on Learning Disabilities, 1998; Swanson, 1991).

Offering a different definition, Torgesen (2002) refered to learning disabilities as problems acquiring academic knowledge and skills that are caused by disorders in basic psychological processes. These problems are caused by dysfunction of the central nervous system and have a strictly limited impact on cognitive development. According to Torgesen (2002), these processing weaknesses impede the acquisition of certain academic skills while

leaving many other cognitive abilities to develop normally.

Learning disabilities have been explained by a number of theories. These include among others, the psychological processing and information processing theories. For instance, the psychological processing theory is based on the idea that the mind contained certain basic learning processes whose efficient functioning is prerequisite for learning (Colbert, Elkins, Gunn, Muspratt & Wyatt-Smith, 2007). According to Lerner (1993), proponents of this theory viewed that psychological dysfunctions were related to a student's inability to learn. Fundamental to this psychological processing view is the assumption that students differ in their underlying abilities to process and use information and that a student's learning is affected by these differences (Lerner, 1993). On the basis of this theory, psychological processing tests have been developed (e.g., Developmental Test of Visual Perception, Frostig et al., 1964) to identify processing disorders. In addition, treatment programmes have been designed to remediate these processes, based on the assumption that if the underlying processes are fixed, learning problems would be ameliorated (Minskoff, 1975). However this concept of disorders in psychological processing also stimulated a lot of debate. In short, concerns were raised as to whether the psychological processing tests were reliable and valid (Colbert et. al, 2007; Lerner, 1993). The efficacy of the treatment programs was also questioned (Colbert et. al, 2007). Despite criticism, current definitions of LD (NJCLD, 1998; Torgesen, 2002), still recognize that the disability is intrinsic to the individual with LD (Lerner, 1993).

On the other hand, the information processing model of learning depicts the flow of information within a person's mind and memory systems (Lerner, 1993). Within this framework, learning disabled students, as well as their non disabled counterparts, are perceived as learning through various intervening stages of cognition such as encoding, organizing, storing, retrieving,

comparing, and generating information (Anglada, 2010; Swanson, 1987). These executive functions must be performed adequately by the brain for learning to take place. However, for a learning disabled child, brain dysfunction interferes with these cognitive abilities. It is assumed that executive functions are associated via neural networks with a variety of brain regions and involve multiple systems and may therefore be vulnerable to brain dysfunction (Reiter, Tucha & Lange, 2005). Consequently the LD brain receives and processes information differently. This does not imply that learning cannot take place. It however means that children with learning disabilities learn or demonstrate their knowledge differently compared to their peers (Anglada, 2010). Notably, the LD student's information-processing or thinking skills may be deficient (Friend, 2008).

Causes of Learning disabilities

The etiology of LDs has been attributed to several factors (i.e. genetic factors, organic and biological factors and environmental factors). Studies of twins have suggested that in some cases LDs are inherited (Hallgren, 1950; Norrie, 1959). Other research points to known organic and biological factors such as a central nervous system dysfunction (Hallahan & Kaufman, 1982). For example, LD is not only identified in childhood, it can also manifest itself later in life, due to a central nervous system dysfunction as evidenced in earlier studies with brain-injured soldiers (Gall, 1802; Goldstein, 1942). Although, the NJCLD definition of LD rules out extrinsic influences as a cause of LD, Abosi (2007) attributes a number of external factors as possible causes of LDs among African school children. These include, among other things, methods of class progression, class sizes, inadequate classroom management, lack of effective teachers in schools, and negative attitudes among some teachers toward children with disabilities.

Cultural Influences and Learning Disabilities

Africans in general are influenced by their beliefs, values, and culture (Abosi, 2007). As a matter of fact, the Ghanaian values academic achievement as evidenced by the efforts of government to enhance student academic performance and school accountability (Ampiah, Davis & Mankoe, 2006; Etsey, 2005; Gerhart, 2007; Katsiyannis, Zhang, Ryan & Jones, 2007). In addition, parents begin to reinforce the children's academic capabilities at a very young age, because of the strong competition that persists throughout their education. Hence, children are under a lot of pressure at school to perform (Tzeng, 2007). With such high value placed on academic skills in society, the child who fails to achieve as expected may develop feelings of personal inadequacy and become frustrated.

For parents, a child's poor academic performance can be very frustrating as some invest a great deal of money into their child's education. In Taiwan for instance, compulsory education from first to ninth grade is free. However, approximately 48 percent of the parents spend extra money, averaging NT$6,000 (New Taiwan dollar) per month, or about 10 percent of family income to send their fourth- to sixth-grade children to private cram schools on weekday evenings and weekends. Likewise in Ghana, though statistics are not available, majority of parents spend additional money for extra classes (arranged privately or by the schools throughout the week) to ensure that their wards are successful in school. It is observed that parents demand high grades from their children without any concerns as to whether the child is actually learning something (Coil, 2007).

In addition, the school system does not make things any easier for children with LD. Yekple (2008) observed that many of such students are sidelined. Teachers give them differential treatment. They are not called to answer questions in class. Besides this, they are made to sit at

the back of the class. Furthermore, teachers may not take their time in marking their written exercises. Unfortunately such children carry their problems from class to class each year with no solution. Others are retained in the same class without promotion, with little attempts made to find causative factors, for their poor performance (Sharma, 2004). Furthermore, schools are also under increasing pressure to raise academic standards and are therefore reluctant to admit and retain pupils whose presence could have a negative impact on their overall profile of results (Mamah, 2006; Ocloo & Subbey, 2008).

What makes it worse is the attitude that peers at school have towards them. They may be teased, called names, ostracized and humiliated by their peers. All these conditions leave children with learning disabilities in an inferior position. Specifically, in western literature, it has been hypothesized that as a consequence of school failure, parents, teachers, and peers express disapproval toward the child, who then begins to feel inferior or helpless. This leads to further academic failure and a cycle of pressure and subsequent negative feelings that may eventually lead to social and emotional problems (Bruck, 1986). In the words of Tzeng (2007, p.170) "Under this cultural atmosphere, imagine how stressed students with LD and their parents would be, and how laudably tolerant it would be for society to accept different paths of school advancement for students with LD".

Problem Statement

To date, the area of learning disabilities has not attracted sufficient attention from educational researchers in Ghana. As a matter of fact, there is a general paucity of research in this area in Africa. An overview of recent literature related to special education indicates African studies have focused primarily on visible impairments (i.e. physical handicap from cerebral palsy

and muscular dystrophies, visual impairments) to the neglect of LD's. Areas of interest include the physically disabled (Esiobu & Udeau, 2006), the hearing impaired (Babudoh, 2006; Cobbinah, Diedong & Offei, 2008; Kwame, 2006), the visually impaired (Asiamah, 2008; Mensah & Avoke, 2008; Ocloo & Dogbe, 2006), mental retardation (Amenuvor & Avoke, 2008). Few efforts have addressed issues concerning LD in Africa (Abosi, 2007; Ihenacho & Osuorji, 2006; Ikujuni, 2006; Lere, 2006; Yekple, 2008; Yekple & Avoke, 2006).

But with the knowledge of learning disabilities discussed so far, few would disagree that 5 percent or more of our school-age population experience difficulties with reading, mathematics and other skills that would be disruptive to academic achievement, or that the factors that led to the concept of LD have lost its salience. The concept of LD is valid and there are many children and adults whose learning is indeed the result of genuine learning disabilities (Fletcher, Lyon, Olson, Schulte, Shaywitz, Shaywitz, Torgesen, & Wood, 2001). Reasons for the learning problems experienced by children with LD are not easily discernible compared to children with other handicapping conditions (Kritsonis, Osterholm & Nash, 2007; Stage & Milne, 1996; Swanson & Willis, 1979). Thus, research is needed in Africa to explore issues concerning this invisible disability.

Moreover, previous research on LD has been conducted predominantly in developed countries (i.e. United States, Japan, Australia, Netherlands, and Germany) with very little data available on African studies. For instance, in a review of the book "Research and Global Perspectives in Learning Disabilities" McGrady (2002) reported that LD had received enormous research attention in developed countries worldwide, but McGrady (2002) noted with great surprise the lack of information in relation to African countries. This is not surprising given that learning disabilities is still a new concept in many developing countries (Ramaa, 2000).

Moreover, some people including professionals have not fully understood the concept of learning disabilities. In the words of Correia and Martins (2007, p.2):

> It is quite obvious that, in spite of the fact that specialists from all over the world have spent more than 40 years addressing the concept of learning disabilities (LD), there are still people who do not have the slightest idea of what it means, of what it is, and who try to justify, using for that matter disputable arguments, either an erroneous concept or an implausible interpretation of the concept. The situation is even more serious than expected because, among those who do not understand the concept, though they often use it, there are university professors, school professionals, psychologists, elementary and high school teachers, and parents.

Despite the lack of knowledge concerning this area, African researchers have placed emphasis on intervention strategies for this special group of children without gaining a better understanding of the concept as it prevails in the African context. For instance, there is continuous talk on the policy governing Inclusive Education for children with LD in Africa (Ihenacho & Osuorji, 2006; Ikujuni, 2006; Yekple & Avoke, 2006). Inclusive education implies that teachers would have to work in a context that is suitable to a diverse population of students (Ihenacho & Osuorji, 2006). This involves modifying their teaching strategies in order to address the needs of individual students (Boison, 2006). In the discussions of this policy, none of the African researchers offer guidelines on how LDs are assessed or identified in Africa (Ihenacho & Osuorji, 2006; Lere, 2006). Much of the information they present are limited to LD definitions and brief explanations of them, based on western studies. However, a better understanding of the concept will be obtained if LD issues are examined as they occur in Africa rather than interpreting diverse experiences from western studies. Until we have a more complete understanding of LD, we are not likely to develop effective interventions.

Notwithstanding the paucity of LD research in Africa, it is also important to learn from western studies to enhance our understanding of LD in Africa. Such studies have provided

convincing evidence of negative consequences associated with LD. In general, individuals with learning disabilities (LD) are reported to experience more difficulties with social competence compared to their non-LD peers (Gresham & Reschly, 1986; Haager & Vaughn, 1995; La Greca & Stone, 1990; Nowicki, 2003 Swanson, & Malone, 1992). Also there is accumulating evidence suggesting that a high incidence of problem behaviors exist amongst LD samples both in and out of school (e.g. Andreassen & Knivsberg, 2008; McConaughty & Ritter, 1985; Toro, Weissberg, Guare, & Liebenstein, 1990). This is not surprising, as Elliott, Segal, Juliano, Mandel and Hearne (2005) reported that unaddressed learning disabilities can also result in social/emotional and behavioural problems. A learning disability not only results in academic failure among children, but also affects their emotional, personality and social development, and even their lives at adulthood (Han, Wu, Yu, Yang, & Huang, 2005). According to Lerner (1993), in understanding the puzzle of learning disabilities the social, behavior and emotional realms are also important factors to study.

Based on the above stated problems, the focus of the current study was not on etiology but rather on identifying an operational definition of LD that was culturally sensitive. Various approaches used in identifying LD were explored. Overall, the approaches suggested the use of IQ-achievement discrepancies, low achievement, impairment in adaptive behavior and neuropsychological deficits as indicators of LD. These models all have merits but have not been spared criticism. Nevertheless, the adoption of the impairment model of learning disabilities emerged as appropriate. Within this framework, "low achievement" and associated "adaptive behavior functioning" were criteria used for the identification of LD. Further, IQ and neurological deficits factors were also examined, in an attempt to identify their relevance to LD

identification in Ghana. In addition, the academic, social and behavioural characteristics of learning disabled children were studied.

In all, this study was designed to understand and identify the real nature of learning disabilities in Ghana and was guided by the following aims and objectives:

Aims and objectives of the study

1. To assess the impact of learning disabilities and age on academic achievement amongst Ghanaian school children.
2. To examine gender differences on academic achievement amongst children with learning disabilities in Ghana.
3. To investigate the social competence of children with learning disabilities in Ghana.
4. To verify whether causal relationships exist between academic achievement areas for learning disabled students.
5. To determine if neurological deficits and non-verbal intelligence are predictive of learning disabilities in Ghana.

Relevance of study

This study is significant on several dimensions. As highlighted earlier, learning disabilities research has been dominated by Western literature. This study sought to bridge this gap by contributing to our knowledge on learning disabilities in Ghana. Greater knowledge will affect the behavior and practices of school management, teachers, parents and students.

With high value placed on academic achievement, there is the need to develop appropriate methods of assessment for LD children in Ghana, so that these children can be

identified and helped early enough. The outcome of this study could serve as useful information for developing assessment methods that are culturally suitable.

This study provides useful information on the extent to which findings from the west can be generalized to other African countries.

CHAPTER TWO
REVIEW OF LITERATURE

In the past few decades extensive literature has documented models that have evolved to explain the identification of learning disabilities and the concepts that surround it. This chapter evaluates some of these models, literature and related studies relevant to the conceptual framework of the current study. It begins by presenting a brief history of learning disabilities. Afterwards, four models of LD identification are reviewed, providing the theoretical structure and empirical background for the present study. Subsequently, it reviews relevant literature in the field of learning disabilities that will offer a foundation for understanding its scope. Finally, the chapter ends with the statement of hypotheses tested and operational definitions of the terms used in the current study.

Learning Disabilities: A Historical Perspective

Learning disabilities (LD) is not a new concept. Its origins can be traced to the United States, as far back as the early 1800s (Covington, 2004; Hallahan & Mercer, 2002). Early research studies had been keenly interested in how injuries to the brain affected adults' functioning (Cruikshank & Cruikshank, 1951; Gall, 1802; Goldstein, 1942; Hinshelwood, 1917; Orton, 1937; Strauss & Kephart, 1955; Strauss & Lehtinen, 1947; Strauss & Werner, 1943). This interest stimulated an enormous amount of research that led to the evolution of the field labeled "learning disabilities".

The earliest recognition of LD is assumed to have occurred in 1802. This was attributed to the work of Franz Joseph Gall, a German anatomist and physiologist. Gall explored the relationship between brain injury and mental impairment based on

observations he had made of brain-injured soldiers (Carlson, 2005). He observed that some of these soldiers lacked speech but were still able to provide their thoughts in writing; this revealed a prototype of strength and a weakness in oral and written language. Gall postulated that this outcome was a function of brain damage, the fact that the brain could selectively impair a particular language capability and not others.

Continuing research advanced the study of brain areas associated with speech and language. In the first quarter of the 20th century, there was a growing interest in the causes of reading disorders in individuals of normal intelligence. For example, James Hinshelwood (1895), an opthamologist investigated a condition he later categorized as *congenital word blindness* (Hallahan & Kauffman; 1997; Lerner, 2000). Hinshelwood had observed that a congenital lesion in the left angular gyrus impaired the ability to store and remember visual memory for letters and words. This he found to be consistent among a group of people who had severe reading problems but seemed otherwise intelligent without obvious visual impairments. He concluded that defective brain functions were responsible for the reading difficulties because he had seen the same type of problems in adults with brain tumors (Steenken, 2000).

Samuel Orton (1937), a specialist in neurology, extended the study of reading disabilities in his clinical studies. The studies were designed to test the hypothesis that reading deficits were a function of a delay or failure of the left cerebral hemisphere to establish dominance for language functions (Lyon, Fletcher, & Barnes, 2003). His findings were similar to that of Hinshelwood in that he observed in children with reading difficulties, the reversals of symbols, such as *b* and *d,* or words, such as *saw* and *was* (Kaufman, 2008). Orton drew the conclusion that the reading problems stemmed from disorders of memory. Both Hinshelwood and Orton presumed brain damage or dysfunction was tied directly to specific language disorders. Hence

they advocated assessment methods that strongly favoured remediation for children - specifically interventions that were aimed at improving a specific area of learning deficits such as reading and spelling (Hallahan & Mercer, 2002; Hill, 1990; Kaufman, 2008; Lyon, Fletcher, & Barnes, 2003). The work of Orton and Hinshelwood has been influential in shaping the LD field, and also in introducing descriptions of and interventions for reading disabilities (Lyon, Fletcher, & Barnes, 2003).

Contrary to the Orton and Hinshelwood approach, other researchers (Goldstein, Werner & Strauss) assumed that brain dysfunction found in persons with reading disabilities was as a result of an underlying perceptual processing disorder. For instance, Goldstein (1942) studied brain-injured soldiers returning from World War I, over several years. In his studies, he reported that patients displayed a consistent group of behaviours; many were hyperactive, easily distracted, and unable to read or write (Covington, 2004; Hallahan & Mercer, 2002; Kaufman, 2008). Subsequently, psychologist Heinz Werner and psychiatrist Alfred Strauss studied mentally retarded adolescents and observed the same kind of perceptual, mood, and learning disorders in this low-IQ population (mentally retarded adolescents) that Goldstein had found with brain-injured soldiers (Kaufman, 2008). Based on these findings, Werner and Strauss deduced that there was a distinction between mental retardation caused by brain injury and mental retardation that was familial. Further, they found that special education aimed at treating the observed perceptual and behavioural problems was effective with mental retardation due to brain injury but not with inherited mental retardation. This implied that some of these adolescents labeled "mentally retarded' were not retarded but rather shared some of the same symptoms with regard to learning difficulties (Colbert, Elkins, Gunn, Muspratt & Wyatt-Smith, 2007; Kaufman, 2008).

This line of study was also extended to the study of children with normal or near normal intelligence. These studies included children with known brain damage, such as cerebral palsy (Cruickshank, Bice, & Wallen, 1957), and, intriguingly, samples of children who evidenced learning and behaviour problems but did not show clinical signs of brain damage (Strauss & Kephart, 1955). The research outcome moved the field forward in a dramatic way. As it led to the establishment of a learning and behavior disability caused by minimal brain dysfunction (MBD) (i.e., not detectable through standard clinical procedures, but brain injury nonetheless) that was distinct from Mental Retardation (as cited in Kaufman, 2008). This label MBD described children who were not mentally retarded, hearing impaired or emotionally disturbed but had minimal brain damage (Duchan, 2001; Friend, 2008; Smith, 2007). However, Werner and Strauss were greatly criticized for their deductions, because there was no scientific evidence to support that brain damage existed in such children. Additionally, their reasoning was based only on the children's behaviour (Carlson, 2005). Nonetheless, the work of Werner and Strauss was further developed by Dolphin and William Cruikshank in the 1950's. William Cruikshank was one of the behavioural scientists who propelled the field away from a focus on etiology toward an emphasis on learner characteristics and educational interventions to address learning deficits (Hallahan & Mercer, 2002).

During the formative years of LD research, from approximately 1939 to 1960, there had been a paucity of research, very limited personnel, and no teacher education specifically oriented to LD as a discrete educational field. It was not until the early 1960's that a general awareness of this distinct group of children began to develop. Change came as a result of the pressure from parent groups who advocated for more educational attention to address the needs of the learning disabled. In addition, they stressed the need for a better definition (Bradford, Gottlieb & Zinkus,

1973). Parent groups had raised objection to the use of the labels "brain injury" and "minimally brain damaged" in addressing such children because of the condition of permanence it seemed to imply and the claim by professionals that it had little value in classification, description and teaching of children (Hallahan & Mercer, 2002).

In the year 1963, as part of an effort to move away from a medical conceptualization, Kirk introduced the term "learning disability" whilst addressing a group of concerned parents in Chicago. The meeting was to discuss the special needs of their children (Dombrowski, Kamphaus & Reynolds, 2004; Hallahan & Kauffman, 1982; Hallahan & Mercer, 2002; Lerner, 1993; Lyon, Fletcher, & Barnes, 2003). The term "learning disabilities" as defined by Kirk referred to a disorder in which one or more of the psychological processes involved in understanding or using language, spoken, or written, manifests itself in an imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations. Children excluded from the definition were those who had learning problems which were primarily the result of visual, hearing, or motor handicaps of mental retardation, of emotional disturbance, or of environmental, cultural, or economic disadvantage (Swanson & Willis, 1979). The term "learning disabled" was accepted and endorsed by the parents (Mercer, 1982) who later established the parent organization Association of Children with Learning Disabilities (ACLD) and began to make demands to the U.S government for their children's needs to be met.

Kirk's LD definition was from an educational perspective, focusing on the nature of the problem rather than on the hypothesized cause. Consequently, it served as the precursor for the US federal definitions and laws of the late 1960s and 1970s that proclaimed specific learning disabilities as a disorder that entitled special education services to anyone with an SLD diagnosis (Kaufman, 2008).

A review of African literature reveals no clarity in how this concept of LD developed in Ghana or Africa. Much of the literature available appears to have historical records on other special education categories (i.e. hearing impairments, visual impairment, mental retardation) but not LD (Avoke, 2001). Before the arrival of special education in Ghana in 1954, exceptional children had been discriminated against. Children with disabilities were treated with hostility and rejection. Much of the arguments concerning persons with disability were couched in religious and even superstitious terms (Avoke, 2001, p. 31). Majority of these beliefs and attitudes were largely based on ignorance, misconception, misinformation and lack of appropriate education on the matter (Babalola, 2006). In Africa, it was church organizations, missionary bodies, and nongovernmental organizations (NGOs) that introduced special education (Abosi, 2007). Such bodies influenced and facilitated the establishment of school systems for children with visible disabilities (i.e. the visual impairments). Whereas learning difficulties or other disabilities were not considered an issue or recognized at the time. Essentially, western literature created the awareness of LD in Ghana.

More or less the African general school system was established on the foundation of the "survival of the fittest." Only students who passed exams stood a chance of making progress in the school system (Abosi, 2007; Avoke, 2001). However, Yekple (2008) has argued that it would be naïve to think that only children with visible impairments face challenges in learning. As there are quite a number of children who may be having specific difficulties in learning that are not due to visible impairments. Hence there is an urgent call to give recognition to the field "learning disabilities" in Ghana.

Models for identification and assessment of LD

In the current study, our understanding of LD identification emerges from the complementary contributions of the IQ -Achievement Discrepancy, Low Achievement, Impairment and the Neuropsychological approaches to the assessment and identification of children with LD. The IQ-achievement discrepancy offers a good understanding of LD, by explaining that some children with no obvious intellectual deficits may not achieve as expected in academic work. The low achievement model helps to define the particular area of LD independent of one's potential or ability. On the other hand, the impairment model supports the use of adaptive behavior functioning as a criterion for LD identification. Finally, the neuropsychological approach helps to explain the relationship between neuropsychological deficits and LD. In the next few paragraphs, these four approaches are reviewed.

IQ-Achievement Discrepancy Model

The IO-achievement discrepancy model is noted in literature as the most widely used assessment method for identifying learning disabilities in public schools (Aaron, 1997; Fletcher et al, 2001; Fletcher et al, 2005; Reschly, 2004). This approach establishes that students identified as having learning disabilities demonstrate a significant difference between their potential and their performance (Smith, 2007). In other words, a substantial difference exists between their expected abilities (as estimated by intellectual performance) and their actual academic performance in one or more specific areas of functioning (Gordon, Lewandowski & Keiser, 1999). This perspective assumes that significantly low achievement, relative to IQ, can indicate the presence of a learning disability (Dombrowski, Kamphaus & Reynolds, 2004; Reschly, 2004). This discrepancy is based on two features: intellectual ability (potential) and

academic achievement (Dombrowski, Kamphaus & Reynolds, 2004). Ability is often assessed with an intelligence test (e.g. the Wechsler Intelligence Scales WISC, Wechsler, 1974), while achievement is frequently, but not exclusively, measured by any of the several standardized achievement tests, for example, the WRAT (Robertson & Wilkinson 2006; Tanner, 2001). There are pros and cons to the IQ-achievement discrepancy approach. One of its major assets seems to be that it is the most widely used criterion for identification of LD among school children (Aaron, 1997; Fletcher et al; 2001; Fletcher et al; 2005). It has spurred continuous research in this field by offering an understanding that some individuals with normal intelligence may have difficulty in some academic areas of functioning. For some prominent scholars (e.g. Kavale, 2002), this method is viewed as an appropriate measure of underachievement that forms part of a more comprehensive LD identification process.

However, the use of IQ-achievement discrepancy in the identification of students with LD has generated so much controversy (Keogh, 1993), because of the many problems (e.g. unreliable, invalid, and wait-to-fail effects) associated with it. These problems vary from psychometric, statistical, and conceptual problems to erroneous assumptions about the adequacy of an IQ score as an index of learning potential (Fletcher et al., 2001; Reynolds, 1974).

Psychometric problems concerning this model have been extensively studied and common areas of contention include the lack of reliability and validity. For instance, there is a considerable variation in how discrepancy is derived and operationalized (Davis, Adams, Gates & Cheramie, 1989; Fletcher et al., 2005; Haight, Burn, & Patriarca, 2002; Lyon, 1996). To illustrate this, Mercer, King-Sears and Mercer (1990) reported that in the United States, 86% of the states required some form of discrepancy as criteria for identifying LD. Notably, this discrepancy varies from state to state in terms of the magnitude (e.g., 1 *SD* vs. *1/2 SDs)* and the

basis for establishing the discrepancy (e.g., standard score comparison vs. regression-based).

In addition to this, the constructs IQ and achievement are bound to be invariably measured with some margin of error, since both constructs are measured by tests (IQ and achievement tests). In turn, the measurement error of the tests significantly influences the validity of this approach in identifying LD (Francis et al., 2005). Further, a more significant problem emerges when a pre-ordained cut-off point is determined (i.e. IQ scores equal to or above 80 on the WISC). Any cut-off point will be associated with considerable instability in classifications because of measurement errors. The truth is that no single score can perfectly capture a student's ability in a single domain (Lyon, Fletcher, & Barnes, 2003).

It has also been argued that the use of IQ tests is not useful in differentiating between children with and without learning problems (Fletcher et al, 2001; Mastropieri & Scruggs, 2002; Mellard, Deshler &, Barth, 2004). For instance, researchers have been unable to discriminate between students with a discrepancy and students with low reading achievement who have no discrepancy (Hallahan & Mercer, 2002). Rispens, Van Yperen, and Van Duijn (1991) explained that regardless of the classification model (with or without IQ) being applied to the same data, nearly the same number of children will be identified. In addition, evidence from a study by Ysseldyke, Algozzine, Shinn, and McGue (1982) showed a substantial degree of overlap between the test scores of learning disability and low achievement groups. This has raised serious concerns regarding the differential classification of poorly achieving students as either LD or non-LD (Fletcher et. al., 2001).

Other issues of concern relate to the use of IQ tests as a valid measure of intelligence. For instance, Jimenez, Siegel and Lopez (2003) state that an implicit part of the discrepancy definition of a learning disability is the assumption that intelligence can be measured

independently of academic achievement, because these constructs are presumed to exist as separate variables (Kavale, 2002). But, contrary to this notion, Siegel (1989, 2003) suggested that the IQ scores of children with LD may be spuriously low because these scores measure areas (e.g., factual knowledge, expressive language abilities, short-term memory) in which these children have academic deficits. Jimenez, Siegel and Lopez (2003) emphasized that a low IQ score could be the consequence of these academic difficulties and, therefore, may not be an accurate measure of the level of intelligence of the child.

In addition, Siegel (1989) suggested that the use of the discrepancy method puts children from different cultural or minority backgrounds at a disadvantage, as they may have both low IQ scores and reading scores and thus do not meet the criterion for a learning disability. The fact that a child comes from a lower social class family, and/or from a different ethnic groups is overlooked. Siegel (1989) emphasized that these factors could affect one's answers to at least some of the questions on the test leading to low IQ scores. Consequently, these children are not considered intelligent enough to benefit from remediation

Moreover, when discrepancy is employed "inappropriately" as the primary criterion for the identification of LD, this model may well harm more children than it helps (Fletcher et. al, 2001). In an explanation of this, Lyon (1996) argued that this model adopts a wait-to-fail policy as a significant discrepancy cannot be detected till about the age of 8 or 9. Thus early intervention is delayed until the gap becomes great enough for children to meet this criterion (Smith, 2007).

Another shortcoming of the discrepancy model concerns its lack of relevance to treatment (Brueggemann, Kamphaus & Dombrowski, 2008; Dombrowski, Kamphaus & Reynolds, 2004). It has been identified that intelligence tests are not necessary for the identification of children as

learning disabled. As such, measures do not indicate a child's aptitude for mastering academic skills, hence do not contribute to intervention planning (Fletcher, Foorman, Boudousquie, Barnes, Schatschneider, & Francis, 2002).

A perusal of the literature suggests that the IQ-achievement discrepancy places too much emphasis on the IQ level rather than on the specific academic needs of the children. Moreover intelligence tests are verbal in nature, thus children with good verbal skills would be at an unfair advantage compared to those with poor verbal skills. Therefore, it is more appropriate to use nonverbal IQ tests such as the Ravens Progressive Matrices (Sharma, 2004) which has been designed to de-emphasize cultural and academic content (Edwin, 2000). Moreover, the social and practical components of intelligence are more highly valued in Africans than cognitive components of thinking (Kniel & Kniel, 2007). For instance, Quan-Baffour (2006) recommends that learning at school should be linked to what actually happens in the child's life or community to assist learners achieve better education outcomes that are truely African. In contrast to the focus on the discrepancy approach, research on LD tends to propose alternative methods such as the low achievement approach (Francis, Fletcher, Stuebing, Lyon, Shaywitz, & Shaywitz, 2005).

Low Achievement Model.

Some researchers (e.g. Fletcher et. al., 2001) contend that LD is synonymous with underachievement, so it should be identified solely by achievement tests (Siegel, 1992). This model of assessment is consistent with Shepard's (1989) notion that LD is an inexplicable inability to learn and thus an effective assessment strategy is to start with the evidence of inadequate learning and test for other explanations for the problem.

Low achievement represents low academic functioning independent of ability and thus does not imply a particular causation (Gresham, MacMillan & Bocian, 1996). When the low

achievement method is used, especially in research, students are identified as learning disabled (LD) when they obtain a significantly low standard score (e.g. below the 25th percentile) on an achievement test (i.e. the Wide Range Achievement Test). Borderline achievement in a particular academic area on an achievement test (e.g. writing, reading, mathematics) determines the area of the learning disability (Martínez, 2002). For example, all children with reading disabilities, regardless of their measured intelligence, possess the same core deficit in word reading (Brueggemann, Kamphaus & Dombrowski, 2008). An asset of this approach is that it focuses on the academic functioning of a child with LD independent of one's ability or potential. This approach has been identified by some researchers (Francis et al., 2002; Stuebing, Fletcher, LeDoux, Lyon, Shaywitz, & Shaywitz, 2002) to have merit, but nonetheless carries many of the same psychometric problems of IQ-discrepancy. Like IQ-discrepancy models, low achievement definitions involve testing a student once and determining whether performance is below some preordained cut-off point. Fletcher, Coulter, Reschly, and Vaughn (2004) argued that such an approach cannot work because any test has measurement error and the specific cut-off point is inherently arbitrary.

Additionally, the low achievement model depends on a single indicator, an achievement score (Brueggemann, Kamphaus & Dombrowski, 2008), and this has raised several questions. For example, Smith (2007) argued that a low measure of achievement (low educational performance) not only describes students with learning disabilities but also includes low-achieving students who may or may not have disabilities. In response to this, some proponents of this model (e.g. Flectcher et. al, 2005) propose to identify LD on the basis of low achievement test scores as long as the student does not meet one of the exclusions (e.g., mental retardation) (Smith, 2007). The use of achievement markers has been shown to have a great deal of validity

when groups are formed such that the participants do not meet criteria for mental retardation and have achievement scores that are below the 25th percentile (Flectcher et. al, 2005).

The Impairment Model.

To avoid the arbitrariness associated with cut-off scores for such methods (IQ achievement discrepancy model and low achievement), Brueggemann, Kamphaus and Dombrowski (2008) suggested determining a level of academic achievement that is associated with significant functional impairment. The impairment model is based on the principles of academic and functional impairment. This method presumes core symptoms of below average academic achievement and associated impairment in other domains of functioning, including behavior and emotion, interpersonal relations, and self-care and fulfillment (Brueggemann, Kamphaus, & Dombrowski, 2008).

The impairment model of LD suggests criteria of below average academic achievement and the evidence of co-occuring functional impairment in adaptive functioning (Brueggemann, Kamphaus, & Dombrowski, 2008). The level of low achievement proposed by proponents (Brueggemann Kamphaus &Dombrowski 2008) of this model is based on existing research (Siegel, 1999; Stanovich, 1999; Vellutino, Scanlon & Lyon, 2000). These studies indicated that a cut-off score at approximately the 15th percentile was reliable and valid in identifying students with LD. Brueggemann, Kamphaus, and Dombrowski (2008) suggested that the 15th percentile ranking was appropriate for 1st to 3rd graders, while, a higher cut-off score at about the 25th percentile was more appropriate for fourth and fifth graders.

The functional impairment component has been established to be synonymous with adaptive behavior functioning (Brueggemann, Dombrowski & Kamphaus, 2008; Lewandowski, Lovett, Gordon & Antshel, 2006). Whereas measures of adaptive behavior previously were

utilized primarily to identify individuals with mental retardation, school psychologists practicing today may find these measures to be helpful for comprehensive assessment, intervention planning, and program evaluation for students with learning disabilities (Ditterline, Banner, Oakland, & Becton, 2008).

Adaptive behaviour is the effectiveness and degree to which an individual meets social/cultural standards of personal independence and social responsibility (Ditterline et. al., 2008; Gresham, & Elliott, 1989). This definition encompasses adaptive behavior capabilities in school, community, home and vocational environment (Weller, Strawser & Buchanan, 1985). Despite support from research, Doll and Horn (2008) have suggested that the "functional impairment in adaptive functioning" is poorly defined and called for further research in order to validate this model.

Nonetheless, there are studies to support that individuals with LD present with poor adaptive behavior in comparison to their non-handicapped peers. For example, Bender and Golden (1988) found that teachers' ratings for children with LD and children without LD differed significantly on subscales of adaptive behaviour. Scores for the LD group revealed less desirable adaptive behaviour compared to their peers. However, it is worth noting that many learning disabled subjects may be deficient in adaptive behaviour in comparison with their age peers of normal intelligence. Leigh (1987) compared the adaptive behaviour of 114 learning disabled (LD) subjects with large, nationally representative normative samples of normal intelligence and mentally retarded children and youth. The results showed that the LD sample had a lower adaptive behaviour mean score than that obtained by the normal intelligence group, but higher than that obtained by the mentally retarded group. The results of this study provide some insight into understanding LD, in that, both groups (LD and mentally retarded) may have

low achievement in common. Yet, adaptive behaviour reflects a pervasive deficit in mental retardation and a relatively narrow deficit in learning disabilities (Fletcher et. al., 2005). Literature acknowledges that adaptive skill deficits are more severe for those with coexisting and more severe disabilities (Ditterline et. al., 2008). In support of this, Fletcher et. al. (2005) noted that a major difference between learning disabilities and mental retardation is founded on adaptive behaviour.

In the current study, adaptive behaviour as a criterion for establishing LD was based on the home living and community and self care skills of the students. Social skills were not used as part of the adaptive behaviour criterion for establishing LD, as some researchers have criticized it use (Gresham & Elliott, 1989). Some researchers are of the view that social skills deficits are not as a direct result of LD but rather low achievement (Coleman, McHam & Minett, 1992; Gresham, MacMillan & Bocian, 1996). According to Coleman, McHam and Minett (1992) children with social skills deficits share with the LD population the common feature of academic deficits, which have been shown repeatedly to be linked to social status.

The Neuropsychological Model.

From historical records to present, the essential role of neuropsychology has been keenly highlighted in LD literature (Collins & Rourke, 2003; Davis, Adams, Gates & Cheramie, 1989; Neufeld & Takacs, 2006; Reitan, 1964). For instance, Reitan (1964) had been concerned with psychological characteristics of brain-injured individuals rather than with the specific diagnosis of brain injury and tests to ascertain if there was injury. Also, an array of studies has endorsed the strong relationship between LDs and neuropsychology (Kaufman, 2008). For example, neuroanatomical investigations of brain morphology have provided strong evidence suggesting

differences exist between the brains of individuals with dyslexia (or reading disability) and those without problems in reading. Additionally, in autopsy studies, unusual cerebral symmetries have been found in normal brains that differ in individuals with reading disabilities (Fiedorowicz, Benezra, MacDonald, McElgunn, Wilson, & Kaplan, 2002). Other neurological indicators include functional anomalies in left hemisphere language systems, dysfunctional right hemisphere processes, and impaired magnosystems (see Collins & Rourke, 2003; Rourke, 2005). Such evidence supports that learning disabilities may be detected on the basis of measures of neuropsychological impairment (Davis, Adams, Gates & Cheramie, 1989; Espy & Cwik, 2004; Reitan & Wolfson, 2003; Reitan & Wolfson, 2008).

In contrast to other strategies (e.g. IQ-achievement discrepancy) the neuropsychological approach allows for a more direct assessment of the deficits presumed underlying the learning disability. It can assess a child's educational cognitive skills or higher order information processing skills based on specific deficits (Goldstein & Reynolds, 1999). For example neuropsychological testing allows one to accurately assess executive skills, which is critical in identifying the child's strengths and weaknesses. Moreover, executive functioning is a better indicator of a child's ability than an intelligence test and provides more information for developing effective and efficient interventions (Miller, 2006).

According to Davis et. al. (1989) there are disadvantages with the neuropsychological approach, in that only a few clinicians may have sufficient training in extensive neuropsychological assessment. Furthermore, the use of an entire neuropsychological test battery is not likely to be an efficient way to screen for learning disabilities. Davis et. al. (1989) suggested an alternative would be to develop a shortened battery of neuropsychological tests that

could be administered quickly, but be able to discriminate accurately between the performance of learning-disabled and normal children. The Trail Making Test comes highly recommended.

The Trail Making Test is a brief neuropsychological test from the Halstead-Reitan Battery (a comprehensive neuropsychological battery of tests) commonly used in the investigations of children with learning disabilities (Espy & Cwik, 2004). For example, Davis et. al. (1989) found that learning-disabled children performed poorly compared to normal children on the Trail Making Test (Part B). The Trail Making Test part B is known as a good general indicator, because its cognitive demands include visual scanning, visual-motor coordination and visual-spatial ability adequate enough to understand an on-going basis the alternating pattern of numbers and letters (Bradford, 1992). In support of this, significant differences were found between reading disabled and non-reading disabled school-aged on only the Part B of the Trails Making Test (Espy & Cwik, 2004).

Assessment of Learning Disabilities in Ghana

Overall, literature reviewed was based on studies done in European and developed countries. A search for African literature on the above approaches (IQ -achievement discrepancies, low achievement, impairment and the neurological approach) provided little information. Most African researchers did not offer criteria on how LDs are assessed or identified within the African context (Babalola, 2006; Ikujuni, 2006; Lere, 2006; Yekple & Avoke, 2006). Some researchers appeared to suggest the use of the IQ-achievement model when they acknowledged that an apparent characteristic of LD was a significant difference in the child's achievement in some areas compared to overall intelligence or intellectual potential. (Ihenacho & Osuorji, 2006; Lere, 2006).

In the absence of government guidelines to assess learning disabilities, some professionals (psychologists, therapists, and teachers) have developed their own proceedures. But, the scope of their work is a function of the resources available (King de Larrarte, 1993).Though not documented, the assessment of LD at the Clinical Psychology Unit of the Accra Psychiatry Hospital is based on low academic achievement (as measured by WRAT), average or above average non-verbal intelligence (as measured by Ravens Progressive Matrices) and adaptive behaviour skills. Similar to western literature, the possibility of mental retardation, emotional imbalance, visual impairments, hearing impairments as causes for low achievement have to be ruled out. However, these decisive factors are vaguely defined and may vary in how they are established from one clinician to another. Thus, there is the need for more research to validate this model.

Based on reviewed literature, the current study proposed the use of the "low achievement" and "associated adaptive behaviour" components in identifying LD. The rationale for choosing this criterion is that low academic achievement is a problem for some Ghanaian school children but not all of them (Abosi, 2007; Preliminary Education Sector Performance Report, 2008). Furthermore, LD requires evidence of inadequate learning and the ruling out of other explanations for the problem (NJCLD, 1998; Shepard, 1989). In addition, there is evidence to support the notion that individuals with LD present with poor adaptive behavior in comparison to their non-handicapped peers, but score higher in adaptive behavior skills compared to other special children groups (i.e. the mentally retarded) (Bender & Golden, 1988; Leigh, 1987). Moreover, Africans have placed a strong emphasis on adaptive behavior (social and practical components of intelligence) for coping with the expectations of the society (Kniel & Kniel, 2007). Further, IQ and neurological deficits factors were also explored. In an attempt to identify

if these indicators are of significance in the identification of LD among an African sample.

To the author's knowledge, there is no available African literature on the relationship between social and behavioural outcomes in LD. Therefore, a few western theories (Learned helplessness and the Susceptibility rationale) that give explanation for these happenings are discussed briefly in the next few pages:

Learned Helplessness

Children with learning disabilities (LD) often have problems that go far beyond those experienced in reading, writing, math, memory, or organization (Broatch, 2004). For many LD students may lack the motivation to learn as a result of chronic academic failure. Year after year of frustration and failure at school can negatively affect students' motivation and convince them that there is nothing they can do to be successful (Smith, 2007) producing a state of learned helplessness. Martin Seligman (Seligman, 1975) proposed that learned helplessness occurs when people conclude that unpleasant or aversive stimuli cannot be controlled. For example, some students demonstrate learned helplessness by giving up on a task before they even try. They may do this because they have failed at so many school tasks that they would rather not begin the work than fail again (Friend, 2008). Put somewhat differently, learned helplessness increases the likelihood of poor performance. Students who expect failure are less likely to be motivated to learn or to expend the effort it takes to learn (Pearl, 1982; Switzky & Schultz, 1988). They can appear to others as "passive" or not actively involved in their learning. They do not ask questions, seek help, or read related material to learn more. These characteristics tend to compound their disabilities (Smith, 2007).

Broatch (2004) reported that despite the child's efforts and adult promptings to try harder, children with LD may receive little positive feedback. In addition, their academic struggles and

failures are often met with disapproval by teachers, peers, and parents. Such disapproval can take the form of negative labeling of a child as "slow," "lazy,"or "dumb." Rather than developing a sense of pride in their accomplishments, children with LD may end up in a quagmire of frustration and shame.

Kirk and Chalfant (1984) characterized learned helplessness among other things as "the belief that failures are caused by personal deficiencies and successes are due to external events beyond the child's control. Their interpretation is based on comparative studies of learning disabled and non learning disabled children. Such studies have found that LD children take less personal responsibility for overall academic outcome (Aponik & Dembo, 1983; Hallahan, Gajar, Cohen, & Tarver, 1978) and success outcomes (Aponik & Dembo, 1983; Chapman & Boersma, 1979; Donahue, Pearl & Bryan, 1980) than did NLD children (Luchow, Crowl, & Kahn, 1985).

In the light of this, Tsatsanis, Fuerst and Rourke (1997) proposed that an association exists between a learning disability and experiences of frustration and failure, negative attributions, increased anxiety, lowered self-esteem, and less successful social interaction. Furthermore these difficulties are thought to produce a self-perpetuating cycle of failure that leads the child with LD on a spiral of cognitive and psychosocial decline. Consequently, the preponderance of this research supports a view that the learning disability is the basis for obtained differences between children with and without LD on psychosocial measures (Rourke & Fuerst, 1991).

For example, Greenham (1999) reported that the repeated academic failures experienced by a child with LD results in psychosocial maladjustment, including poor interpersonal relationships as well as internalizing and externalizing behaviours (Bryan, 1981; Rutter, Tizard, & Whitmore, 1970). Irrespective of whether failure is attributed to external or internal sources,

evidence clearly establishes that these attributions undermine motivation, limit interest patterns, heighten negative affect and retard intellectual growth. For instance, Bryan, Burstein, and Ergul (2004) inferred that problems with social skills affect the other 75 percent of these individuals by negatively influencing their self-concept, their ability to make friends, their interactions with others, and even the way they approach schoolwork. This theory provides a framework for understanding how students interpret achievement outcomes. In addition, it has relevance for intervention and teacher practices (Canino, 1981).

The Susceptibility Rationale Model

The susceptibility rationale explains that learning disabilities may have a deleterious impact on a child's academic, behavioural, and social development. According to this theory it is partly because youth shape their self images based upon peer and social interactions that occur in both formal and informal situations (Cowardin, 1998). In accordance with the susceptibility rationale, Larson (1988) states that youth with learning disabilities are seen as having an increased risk because they are "low" in social skillfulness. Non-LD peers are thought to be better in social settings at home and school by being better equipped to apply judgment and control (Stewart, 2006). Hoke (2004) opined that the ability to adaptively manage stressors and its associated affect is linked with lower levels of psychopathology and more well-developed social skills.

In spite of these explanations, both theories are based on Western literature and therefore may only be relevant only in the settings in which they were developed. However, there is some local literature to support that in Africa, persons with disabilities may experience psychological consequences such as frustration, aggression, and low self esteem as a result of labeling leading

to stigmatization (Okonkwor, 2006). Okonkwor explained that a person's thoughts and feelings about his abilities and relationships with others determine how one achieves goals in life. Further he explains that a negative self appraisal may create a problem which may have little or no relationship to the degree of demonstrated impairment. In addition, he emphasized that negative public attitudes can affect the behavior of a disabled child. Such attitudes include intolerance of the able population, rejection and labeling (Diedong, 2006).

In the following pages literature related to the academic, social and behavioural characteristics of LD students are reviewed and discussed.

Learning Disabilities and Academic Achievement

Learning disabilities such as reading disabilities (dyslexia), writing disabilities (dysgraphia) and mathematics disabilities (dyscalculia) are key causes of academic underachievement among school children (Karande, Sawant, Kulkarni, Galvankar & Sholapurwala, 2005). For example, research conducted in the US and other developed countries suggested that elementary and middle school children with LD experience more academic deficits relative to their same-age peers without disabilities (Fuchs et. al., 2000).

Reading disabilities (RD) is the most prevalent type of learning disability, affecting 80% of children with LD (Karande et. al, 2005; Lerner, 1989; Lyon, 1996; Martin, Martin, & Carvalho, 2008). A child with a reading disability has difficulty with his or her ability to learn and remember written words. This in turn affects the child's ability to read, spell and write (Paediatr, 1999). Consequently these reading deficits impede the development and the acquisition of many other academic skills such as mathematical reasoning skills, knowledge on science, social studies and English (Lerner, 1989).

Although the prevalence of mathematic disabilities is much lower than reading disabilities, approximately 4-8% of the school-age population is affected (Fuchs, Powell, Hamlett, Fuchs, Cirino & Fletcher, 2008). Children with mathematics disabilities (MD) can demonstrate deficits in arithmetic calculation, mathematics reasoning, or both (Lyon, 1996). Like RD, MD is also a significant obstacle to academic achievement and is associated with life-long difficulties at the workplace (Fuchs et. al, 2008).

Although, children with a single LD may experience academic difficulties, children with combined disabilities are more likely to face more academic difficulties. For instance, research hints that children with combined MD and RD are at greater risk for impairment compared to their peers with MD only (Fuchs & Fuchs, 2002; Hanich, Jordon and Kaplan, 2002; Jordan & Hanich, 2003).

Hanich, Jordon and Kaplan (2002) examined the reading and mathematics progress of 180 children, spanning 2nd and 3rd grades. Initially, 4 achievement groups were identified: difficulties in mathematics but not in reading (MD only), difficulties in mathematics as well as in reading (MD-RD), difficulties in reading hut not in mathematics (RD only), and normal achievement in mathematics and in reading. When IQ, income, ethnicity, and gender were held constant, the MD-only group progressed in mathematics at a faster rate than MD-RD group. In reading, the RD-only and MD-RD groups progressed at about the same rate. Reading abilities were found to influence the children's progress in mathematics. However mathematics abilities do not appear to influence children's progress in reading.

Similar results were found a year later. Jordan and Hanich (2003) followed the reading and mathematics achievement and specific mathematical competencies of 74 children over four time points during second and third grades. The children were classified into one of four groups:

moderate mathematics deficiencies but normal reading (MMD-only); moderate mathematics and reading deficiencies (MMD/MRD); moderate reading deficiencies but normal mathematics (MRD-only); and normal achievement in reading and mathematics (NA). Although the MMD-only and the MMD/MRD groups started out at the same level in mathematics, the MMD-only group surpassed the MMD/MRD group over time. A parallel pattern in reading was not observed for the MRD-only and MMD/MRD groups, with children in both groups performing at consistently low levels. Weaknesses in fact retrieval and estimation characterized children with MMD, with or without RD. The MMD-only group showed an advantage over the MMD/MRD group in problem solving. Jordan and Hanich (2003) concluded that reading and language strengths help children compensate for deficiencies in selected areas of mathematics.

Studies reviewed (Hanich, Jordon & Kaplan, 2002; Jordan & Hanich, 2003) provide evidence that children with MD and RD are at a greater risk for impairment compared to children with MD only. The children with MD had normal reading achievement and this appeared to help in some areas of mathematics, giving them an urge over their MD and RD counterparts. For instance the MD group performed better in problem solving (Jordan & Hanich, 2003).

In support of the reviewed research, Fuchs and Fuchs (2002) studied 18 fourth graders with a mathematical disability and 22 matched students with both mathematical and reading difficulties. Reading discrepancies were found to interfere with arithmetic or mathematical problem solving. The problem-solving performance of students decreased as the language structure of the presented problems became more complex (e.g., number of words, sentence complexity and length) and as the number of operations needed to arrive at an answer increased.

Fletcher et al. (2002) explained that children with reading disabilities often have problems with math, especially if their language is more pervasively impaired - such children

may have special difficulty with mathematical word problems. The language problems appear to disrupt their maths (Geary, 1993). Additionally, such children may forget number facts and procedures necessary for the successful execution of mechanical or computational arithmetic Fletcher et al (2002).

It is not always the case that children with single disabilities have an advantage over their peers with combined disabilities. For instance, the RD-only (with normal mathematics achievement) and MD-RD groups progressed at about the same rate in reading. Although, the children's reading abilities influenced the children's progress in mathematics, the reverse was not seen for the children's progress in reading.

A number of LD research studies have indicated a co-morbidity of reading and math disabilities (e.g. Conners & Schulte, 2002; Knopik, Alarcón & DeFries, 1997; Knopik & DeFries, 1999; Lewis, Hitch & Walker, 1994). Lewis, Hitch, and Walker (1994) estimated the co-occurrence of reading and deficits mathematics amongst an epidemiological sample (n = 1206) of British schoolchildren to be 2.3%. Similarly, Dirks, Spyer, Lieshout and Sonneville (2008) found a co-occurrence of 7.6% for combined reading and arithmetic disabilities among 799 Dutch school children in fourth and fifth grade. Twin studies have also supported the covariance between reading and mathematics deficits (Conners & Schulte, 2002; Knopik, Alarcón & DeFries, 1997; Knopik & DeFries, 1999; Light & DeFries, 1995).

Our focus, in the present study, concerns the relationships that may exist between reading, spelling and mathematic deficits. Altogether, studies have suggested co morbidity between reading and mathematical deficits in children. However, widespread research tends to focus more on reading disabilities and mathematic disabilities, than on spelling disabilities (e.g. Martin, Martin, & Carvalho, 2008; Shapiro, 1996). Few studies have paid attention to spelling

disabilities. But the assessment of spelling disabilities is equally important as it represents the source of difficulty for children with LD who have problems involving written expression (Fletcher et. al., 2002). For instance, in a study of 12 fourth- and sixth-grade students with LD Graham (1990) found that children with LD had more difficulties in the mechanics of writing than a control group of students without LD.

Additionally, there is evidence to suggest that a relationship exists between mathematics and spelling disabilities. Ostad (1998) analyzed the relationship between mathematics and spelling difficulties. In an analysis of cross-sectional data of pupils in 2nd, 4th and 6th grade, Ostad (1998) found that approximately half of the pupils with difficulties in mathematics also had difficulties in spelling. The observed co morbidity was primarily connected to pupils representing the most prevalent cases with spelling difficulties.

From literature, correlations appear to be true between math and reading deficits as well as math and spelling difficulties. Additionally, reading deficits are reported to influence spelling (Lerner, 1989; Paediatr, 1999). It would be important to confirm if such relationships exist as the patterns of interaction would be helpful in the remediation of LD students.

Age and Learning Disabilities.

A learning disability can affect all manner of persons (preschoolers, elementary children, adolescents and adults). For example, the US Department of Education (1991) identified statistics of children with specific LDs at different age levels ranging from age 6 through to 21 with the number of children with LD increasing rapidly from age 6 to 11 and gradually decreasing until age 18. According to Lerner (1993), the impact of learning disabilities becomes more evident at some stages of life than others. In other words, learning disability characteristics

may be manifested in different ways as children with LD progress through various developmental stages during their primary or secondary education or as they encounter different curricular or environmental demands (Deshler, 1978). For instance, adolescents with LD compared to younger children with LD experience more significant changes in the school environment as they make the transition from primary to junior high school. Such changes include the quest for independence, an increase in the number of peers and teachers in the course of the day, peer group pressures and higher academic expectations (Geisthardt & Munsch, 1996; Lerner, 1993; Mercer, 1982).

In support of Lerner (1993), Seo, Abbott & Hawkins (2008) reported that problems experienced during elementary school years are found to often persist or become worse in adolescence. The demands of junior school work, the turmoil of adolescence and continued academic failure may also contribute to intensify the learning disability. The impact of a learning disability tends to increase as more demands are placed on academic skills (Stage & Milne, 1996).

Gender and learning disabilities.

Gender's influence on the prevalence of LD (it is higher for boys than for girls) has been an issue that has preoccupied researchers for several years. According to the U.S. Department of Education (1998) males and females make up roughly equal proportions of the school age population; however males tend to account for approximately two-thirds of all students in special education. Three times as many boys are classified as having an LD than females (US department of Education, 1996). In an early study Cone, Wilson, Bradley and Reese (1985) revealed that males outnumbered females by a 3:1 ratio across primary, elementary and

secondary levels. Similar results were found in a study by McLeskey (1992) where male's outnumbered females by approximately 3 to 1 for the total sample.

Badian (1999) reported that male students with LD performed significantly better on listening and reading comprehension measures compared to their females counterparts. Likewise, Vogel (1990) in a review of literature for learning disabilities (LD) population, reported that system-identified females with LD were found to be lower in IQ, have more severe academic achievement deficits in some aspects of reading and math, and are somewhat better in visual-motor abilities, spelling, and written language mechanics than males with LD. In mathematics, consistent findings indicated superiority in mathematical reasoning in males with LD. Royer, Tronsky, Chan, Jackson, and Marchant (1999) proposed that men and boys are favoured in mathematical abilities due to a sex-related difference in the speed of arithmetical fact retrieval. In practice, girls identified as having learning disabilities as a group usually have more severe academic deficits than boys (Friend, 2008; Lerner & Kline, 2006). Despite Vogel's findings, she gave warning that one must be cautious in interpreting findings as results may differ from LD sample to sample.

Other studies have reported no difference in academic measures for females and males with LD (Ryckman, 1981; Share & Silva, 2003). Ryckman (1981) examined gender differences between 27 girls and 75 boys on psychological, academic, and cognitive-style measures. All students were enrolled in a program for severely learning disabled children. LD girls were found to be verbally inferior, less capable of abstract thinking, more field dependent, and more impulsive than the boys. However, no differences were obtained on measures of academic or perceptual-motor skills. Consistent with Ryckman (1981) findings, Share and Silva (2003) also found the incidence rate for reading difficulties to be equivalent for males and females.

Across reviewed studies, significant gender differences exist with regard to LD prevalence, males consistently outnumbering females (Cone, Wilson, Bradley & Reese, 1985; McLeskey, 1992; US Department of Education, 1996). Also researchers have supported gender differences on academic performance (Badian, 1999; Vogel, 1990). In contrast, other researchers have reported similar academic performances for both LD males and females (Ryckman 1981; Share & Silva, 2003). Santrock (2008) attributed gender differences to referral bias. More males than females are identified as having LD (Smith, 2007; US Department of Education, 1996). In Ryckman study the bulk of the sample was made up of boys.

To the author's knowledge there is no literature on the effect of LD on academic achievement in Ghana. However, there is some evidence to suggest that gender differences exist within the general Ghanaian population on academic achievement (Preliminary Education Sector Performance Report 2008). In 2007, 39 percent of the candidates had aggregate 31-60 with 27 percent having aggregate 31-40; 9 percent aggregate 41 – 50 and 2 percent aggregate 51-60 in the Basic Examination Certificate Exams (BECE) (Preliminary Education Sector Performance report , 2008). In an analysis, the proportion of students obtaining an aggregate score of 6 – 30 revealed that girls in some regions are achieving significantly less than boys. According to special tabulations by West Africa Examination Council (WAEC), in terms of percentages, it was clear that girls in the northern regions lagged behind the boys in achievement, while the girls in central and eastern region were close to parity. In Greater Accra, however, the girls appeared to perform better than boys by a margin of 0.18%. On the whole, BECE results of all ten regions of Ghana indicated that boys surpassed females by a 24.16% margin. There is no evidence to support that the poor performance on the BECE can be attributed to LD. However, based on the

BECE results for 2007 more girls than boys appeared to have academic difficulties (Preliminary Education Sector Performance Report 2008).

Similar results were obtained in a related African study. Boothroyd and Chapman (1987) examined gender differences in English and mathematics achievement in grades 1, 2 and 3 across three instructional approaches used in Liberia. The results of the analyses indicate that boys generally outperformed girls in both mathematics and English.

Wilmot (2001) examined the mathematics achievements of 450 boys and girls in a Ghanaian primary school. Pupils for the study were selected from three grades (three, four, and six). These students were tested on mathematics syllabus that had been taught in class. It was noted that the boys in each class performed slightly well, on the average, than their female counterparts across the three classes. However, it was only the boys in class 6 that performed significantly better in mathematics achievement compared to the girls. Wilmot (2001) observed that gender differences in mathematics achievement appeared to differ significantly in favor of boys in upper grade levels.

Findings from these studies are mixed (Boothroyd & Chapman 1987; Preliminary Education Sector Performance Report 2008; Wilmot, 2001). However, in general, research suggests more girls than boys have academic difficulties. It is not clear why these differences exist. On the other hand it would be illogical to attribute these academic differences to LDs with no evidence to support it. For this reason, further research is needed to validate this notion. To eliminate the gender bias factor observed in many LD studies, an approximate number of equivalent females and males will be employed in this study.

Neuropsychology and Learning Disabilities

Neuropsychology is the study of the relationship between the brain and behavior (Goldstein & Reynolds, 1999). In this discipline, it is believed that executive functioning controls and coordinates cognitive operations (Miller, 2006). Some of these executive functions include learning, planning, organization, abstract thinking, and response inhibition (Duff, Schoenberg, Scott, & Adams, 2005). Studies with young children have shown executive function deficits are present in children with reading and math disabilities (McLean & Hitch, 1999; Swanson, 1999). For instance, White, Moffitt, and Silva (1992) found that arithmetic-disabled children performed poorly on Trails Making Test (Reitan, 1958). The Trails Making Test measured the capacity to coordinate performance on two or more separate tasks, the ability to switch retrieval strategies, the skill to attend selectively to different inputs and the ability to activate and manipulate information in long-term memory (Baddeley, 1996; McLean & Hitch, 1999). Research indicates that children with lower mathematical ability have more difficulty shifting between tasks (Bull, Johnston & Roy, 1999; Rourke, 1993).

Additionally, Reiter, Tucha and Lange (2005) found that children with reading disabilities also demonstrated impairments in a variety of executive functions. Reiter, Tucha and Lange (2005) assessed 42 children with reading disabilities and 42 non-reading disabled children using a neuropsychological test battery on a variety of executive functions. The test battery consisted of standardized tests examining the assessment of working memory, concept formation, inhibition, flexibility, problem solving and fluency functions. Comparison between the test performance of non-dyslexic children and children with dyslexia revealed obvious difficulties of children with dyslexia in tests measuring working memory. Inhibition was impaired in children with dyslexia in more demanding tests, but not in simple ones. Furthermore,

children with reading disabilities displayed impairments of both verbal and figural fluency functions. However, problem solving seemed to be partially impaired. Findings suggested that children with dyslexia also demonstrated impairments in a variety of executive functions.

In the Netherlands, van der Sluis, de Jong and van der Leij (2004) studied the executive functions of inhibition and shifting in arithmetic-disabled children, reading-disabled children, reading plus arithmetic-disabled children, and controls (N = 74). Measures involved the rapid naming of objects, digits, letters, or quantities with or without additional task requirements that reflected inhibition or shifting. Also, the Making Trails task was administered. For tasks without executive demands, arithmetic-disabled children were slower in the naming of digits and quantities, whereas reading-disabled children were slower in the naming of digits and letters. For the executive tasks, arithmetic-disabled children as well as reading plus arithmetic-disabled children were impaired on the Making Trails task and on an object naming task that required both inhibition and shifting. Reading-disabled children exhibited no problems in executive functioning. Furthermore, it was shown that reading plus arithmetic-disabled children experienced the combination of problems that characterize children with a single learning deficit. For the executive tasks, arithmetic-disabled children as well as reading plus arithmetic-disabled children were impaired on the Making Trails task.

Reviewed studies have reported poor executive functioning in samples of children with mathematics disabilities (van der Sluis, de Jong & van der Leij, 2004; White, Moffitt, & Silva 1992). Likewise, Reiter, Tucha and Lange (2005) found that children with reading disabilities also demonstrated impairments in a variety of executive functions. In contrast, van der Sluis, de Jong and van der Leij (2004) found no evidence of impairment in executive functions for reading disabled children, although they found executive function deficits for combined disabilities in

math and reading. Notably, the findings of this study are limited. For instance, sample compositions differed across studies. For example, while, van der Sluis, de Jong and van der Leij (2004) used 74 arithmetic-disabled children, reading-disabled children, reading plus arithmetic-disabled children, and controls, Reiter, Tucha and Lange (2005) used 84 reading disabled and controls). Further, the studies were conducted in different countries (Germany, Netherlands and the U.S). In general, the studies appeared to support a relationship between poor executive functioning and mathematics deficits than reading deficits. Hence there is a need for more research in this area to validate this relationship.

Learning Disabilities and Social competence

Many individuals with LD have difficulty achieving social competence (Bryan, Burstein, & Ergul, 2004). The term "social competence" means the ability to perceive and interpret social situations, generate appropriate social responses, and interact appropriately with others. According to Elksnin and Elksnin (2004), social competence is an evaluative term based on the judgment of a child's social abilities by peers, teachers, parents and others. In general, individuals with learning disabilities (LD) are reported to experience more difficulties with social competence compared to their non-LD peers (Gresham & Reschly, 1986; Haager & Vaughn, 1995; La Greca & Stone, 1990; Nowicki, 2003; Swanson, & Malone, 1992). For the purpose of this study we shall focus on two areas of social competence; social skills and problem behaviours.

Social skills are the specific skills used in social situations. They include, but not exclusively, cooperating with others, being helpful, initiating and responding to social interactions and exhibiting self-control (Elksnin & Elksnin, 2004; Greenham, 1999). Problem

behaviours refer to negative or inappropriate behaviors, including the lack of skills in initiating and sustaining positive social relationships, acting more aggressively, exhibiting more negative verbal and nonverbal behaviours. Bursuck, (1989) found that students with LD were less accepted, had fewer friends, and were perceived by their peers and teachers as exhibiting more negative behaviours and less prosocial behaviours.

Continuing research suggests that children with LD are significantly more at risk of developing social and behavioural problems compared to their normally-achieving peers (Caletti & McLaughlin, 2003; Mishna & Muskat, 2004; Nowicki, 2003). For instance, in a recent meta-analysis of research since 1990, Nowicki (2003) found children with LD to be less socially competent than controls. In Nowicki's study, children with learning disabilities were compared to children designated as low in academic achievement and those classified as average to high in academic achievement. Comparisons with average to high achieving classmates resulted in medium to large effect sizes for teachers' perceptions of social competence, peer preference ratings, positive peer nominations, global self worth, and self-perceptions of scholastic performance. A second set of comparisons with children designated as low in academic achievement yielded moderate effect sizes for teachers' perceptions of social competence and for peer social preference ratings. Nowicki (2003) concluded that children with learning disabilities are at a greater risk for social difficulties compared to average to high achieving children. In addition, children with learning disabilities and their low-achieving classmates did not appear to have accurate self perceptions of social acceptance.

Toro et. al (1990) compared 86 children with learning disabilities (LD) with 86 matched children without learning disabilities (NLD) on three domains of variables: social problem-solving skill, teacher-rated school behaviour and competence, and family background. The LD

and the NLD groups differed on variables in all three domains. More specifically, the children with LD were able to generate fewer alternatives for solving social problem situations, showed less tolerance for frustration and less adaptive assertiveness, and had more overall classroom behaviour problems and less personal and social competence in a variety of areas as rated by teachers.

Similar results were obtained in a longitudinal study. Vaughn, Zaragoza, Hogan, and Walker (1993) investigated the social skills and behaviour problems of three groups of students (10 students per group) from kindergarten through third grade: learning disabilities (LD), low achievement (LA), and average/high achievement (A/HA). Social skills and behavior problem rating scales were completed by teachers on all students during kindergarten through third grade. The results indicated that students in the LD and LA group exhibited significantly lower social skills and higher levels of behaviour problems than their A/HA peers, but no significant differences for either measure were found between the LD and LA groups.

In the same way, Coleman, McHam and Minett (1992) reported few differences between the social competencies of children with LD and other children who have comparable academic difficulties, but have not been disagnosed as learning disabled. These results were also true for Blacks, Hispanics and Anglos across teacher, parent and peer judges. Deficiency in dimensions of social competence was apparent regardless of who was rating the student (Coleman, McHam & Minett, 1992).

Furthermore, Gresham, MacMillan and Bocian (1996) studied children with learning disabilities (LD), low achievement (LA), or mild mental retardation (MMR). These three groups were compared on 41 measures of ability, academic achievement, social skills, problem behaviour, academic engaged time, perceptual-motor skills, and school history. Comparisons

among the three groups showed relatively large differences on measures of aptitude and achievement, with the LD group scoring higher on measures of cognitive ability than the LA and MMR groups and the LA group showing higher tested academic achievement than the LD and MMR groups. Teacher ratings of academic competence showed similar levels of functioning for the LD and LA groups. No differences among the groups were found on measures of social skills, problem behaviours, or academic engaged time, or on most indices reflecting school history.

The rippling effect of social skill deficits were exemplified as La Greca and Stone (1990) examined the nature of social difficulties encountered by children with LD. La Greca and Stone (1990) reported results consistent with previous studies revealing that children with LD obtain significantly lower scores in social skills relative to their nondisabled peers. Children with LD were found to be disproportionately over-represented in the rejected and neglected social groups, and under-represented in the popular and average groups. Over half of the total LD sample was classified into one of the low social status categories, with approximately equal numbers in the rejected and neglected groups.

Additional evidence to support that social skill difficulties are challenges for children with LD is illustrated in previous meta-analysis (Kavale & Forness, 1996; Swanson, & Malone, 1992). Swanson and Malone (1992) reported that children with learning disabilities (LDs) were less liked and were more likely to be rejected than normal-achieving children. In addition, the results showed that children with LDs were more likely to be rated as aggressive and immature, to suffer personality problems, and to have difficulty attending compared to their non-handicapped peers. Equally, Kavale and Forness (1996) in a meta-analysis of 152 studies found that about a three quarter (75%) of the students with LD could be differentiated from their non-

LD peers across dimensions of social skills. Theses observed differences were found to be consistent across different evaluators (teachers, peers and the LD students themselves).

The difficulty with social skills coupled with low achievement and distracting classroom behaviour appears to influence the social status of those with learning disabilities (Smith, 2007). However, some researchers have offered different views (Bloom, Karagiannakis, Toste, Heath, & Konstantinopoulos, 2007; Dudley-Marling & Edmiaston, 1985; Sabornie & Kauffman, 1986). A review of published investigations on the social status among learning disabled children, adolescents and adults showed that contrary to prevailing assumptions not all or even most learning disabled persons are held in low esteem by their teachers, peers (Dudley-Marling & Edmiaston, 1985). In fact some learning disabled students were found to be popular. Therefore Dudley-Marling and Edmiaston (1985) concluded that the learning disability group may merely be at greater risk for attaining low social status. Consistent with this assumption, Sabornie and Kauffman (1986) reported more optimistic findings for LD children. No significant difference was found in the social status of 46 mainstream learning disabled high school students and 46 non handicapped peers. Both studies are obsolete as they were conducted over 20 years ago. Therefore, one has to be cautious in relating it to present times.

In a more recent study, Bloom, Karagiannakis, Toste, Heath, and Konstantinopoulos (2007) explored the differences in the rated social skills of elementary-aged students at risk for emotional/behavioural disorders (E/BD) based on severity of academic difficulties. Teachers nominated students at-risk for E/BD who were classified into four groups of academic difficulty based on the Wide Range Achievement Test-3. Students, parents, and teachers completed the Social Skills Rating System. Teachers' ratings indicated that academic strengths did not significantly affect perceptions of students' social competence; all children were rated with

notable social skills deficits. Specifically, no significant difference was found between the academic difficulty groups for teacher ratings of social skills, which indicated that teachers viewed all students as having social skill deficits, regardless of level of academic achievement. The above study compared students at different levels of academic difficulty and not specifically LD students. Therefore results have to be interpreted with caution.

Other studies also provide support indicating that problem behaviours are common among LD participants (Andreassen & Knivsberg, 2008; McConaughty & Ritter, 1985; McKinney, 1989; McLeskey, 1992). For example, McConaughty and Ritter (1985) obtained parents' reports on behavioural problems for 123 learning disabled boys aged 6—11 who were referred for a psychoeducational assessment at the Center for Disorders of Communication at the University of Vermont. One parent of each boy completed the Child Behavior Checklist developed by Achenbach and Edelbrock (1983). On average, the parents of LD boys reported significantly more behaviour problems than normative samples of parents. On the behavior problem scales, the LD boys had significantly higher scores for both "externalizing" and "internalizing" types of problems, including problems related to depression, uncommunicativeness, obsessive-compulsive behaviours, social withdrawal, hyperactivity, aggressiveness and "delinquency." Similarly in a longitudinal study, McKinney (1989) summarized a program of research on the behavioral characteristics of children with learning disabilities (LD) compared to average achievers. Over a 3-year period beginning in the first and second grades, McKinney found that children with LD displayed a persistent pattern of maladaptive classroom behavior that distinguished them from average achieving peers. Additionally this behavior was associated with continued underachievement over time. In a large

scale study (McLeskey, 1992), a multidisciplinary team identified that 15% of LD students had behavior problems with significant differences across the three group levels.

In general, literature reviewed establishes that LD children have problems with social competence. Although, some researchers (e.g. Coleman, McHam & Minett, 1992) appeared to include Blacks, Anglo and Hispanic children in their study sample, none of the studies have examined the social competence of an African LD sample. The current study examined social competence in an African sample as cultural differences may produce different results.

Additionally, the much criticized IQ-achievement discrepancy approach was a widely used criterion for identifying LD subjects in the reviewed studies which clearly hinders the comparability of the findings to this present study. Likewise, a whole range of instruments that were not culturally sensitive were utilized (i.e. WISC). In the current study, however, all instruments used in the LD identification process have been standardized in Ghana.

Secondly, study samples appeared to be gender biased (Coleman, McHam & Minett, 1992; Haager & Vaughn, 1995; Toro et. al, 1990). For example, Toro et. al (1990) examined 86 LD children. Out of this sample 66 were males and the remaining 20 females. Coleman, McHam & Minett (1992) used 108 males and 62 females. Haager & Vaughn (1995) investigated 29 males and 15 females. In all, there appeared to be a predominance of males making up the final samples. Our study sought to investigate a LD sample that had approximately an equal balance of males and females. Based on the premise that teachers are very important in students' lives, they were asked to contribute their unique perspective regarding various aspects of students' behaviour (Sideridis, Antoniou & Padeliadu, 2008). However, research findings regarding the effectiveness of teachers in rating students' attributes and behaviors have been largely inconclusive (Epstein, Cullinan & Nieminen, 1984). For that matter, apart from the teachers

contributing data, the present study obtained information regarding the participant from an extra source, parents or guardians.

Finally, majority of the studies involved comparisons between children with LD and children without LD or average to high achieving children (McKinney, 1989; Nowicki, 2003; Toro et. al, 1990). Vaughn et. al (1993) on the other hand included a low achievement group and Gresham, MacMillan and Bocian (1996) a mild mental retardation (MMR) sample. Unlike studies mentioned above, this study extends previous studies by including children with other neurological disorders as a control group.

Statement of Hypotheses

Based on the studies reviewed, the following hypotheses were formulated and tested in the present study:

Hypothesis 1

Literature reviewed (Deshler, 1978; Lerner, 1993; McLeskey, 1992; Mercer, 1982; Stage & Milne, 1996) presupposed that, the pattern of academic difficulty experienced by the LD child is a function of age. It was therefore hypothesized that:

a. Children without learning disabilities will perform better on academic achievement than children with learning disabilities and children with other neurological disorders across all age levels.

Research studies have indicated gender differences may significantly affect the academic achievement of LD children (Badian, 1999; Vogel, 1990). In Ghana it appears that more girls than boys face academic difficulties (Preliminary Education Sector Performance Report 2008; Wilmot, 2001). It was therefore hypothesised that:

b. Male children with learning disabilities will obtain higher academic achievement scores than their female counterparts with learning disabilities.

Hypothesis 2

According to research, children with LD tend to score higher on adaptive behavior scales compared to children with mentally retardation, but present with lower adaptive skills compared to their non-handicapped peers (Bender & Golden, 1988; Leigh, 1987). To justify adaptive behavior as a valid criterion for identification of LD, it was hypothesized that "children without learning disabilities group will score higher on adaptive behavior measures compared to the children with learning disabilities group and children with other neurological disorders group".

Hypothesis 3

Literature suggests that correlations exist between reading and math deficits as well as math and spelling difficulties (Fletcher et. al, 2002; Fuchs & Fuchs, 2002; Hanich, Jordon & Kaplan, 2002; Jordan & Hanich, 2003; Ostad, 1998; Paediatr, 1999). Besides this, reading deficits are reported to influence spelling achievement (Paediatr, 1999; Lerner, 1989). Based on this it was hypothesised that "there will be a positive correlation between reading achievement scores and mathematic achievement/spelling scores."

Hypothesis 4

Children with LD signify problems with social competence (Bursuck, 1989; Caletti & McLaughlin, 2003; Mishna & Muskat, 2004; Nowicki, 2003; Toro et. al, 1990). Specifically, research shows that social skill difficulties are common place in LD samples (Kavale & Forness,

1996; La Greca & Stone, 1990; Swanson, & Malone, 1992). However, a few researchers have expressed otherwise (Dudley-Marling & Edmiaston, 1985; Sabornie & Kauffman, 1986). In that not all children with LD have social skill difficulties. To verify if Ghanaian LD children have accompanying social skill deficits it was hypothesized that

a. "Children with learning disabilities will score lower on the social skills compared to other children without learning disabilities".

In addition, high counts of problem behaviours appeared to be a common feature among LD samples in comparison with their peers (Andreassen & Knivsberg, 2008; McConaughty & Ritter, 1985; McKinney 1989; Swanson, & Malone, 1992; Toro, Weissberg, Guare & Liebenstein, 1990). Thus it was hypothesised that

b. "Children with learning disabilities will exhibit more problem behaviors than children without learning disabilities".

Hypothesis 5

Studies reviewed (Espy & Cwik, 2004; Reiter, Tucha & Lange, 2005; Reitan & Wolfson, 2003) inform that non-disabled peers perform better on the Trials Making test in comparison to their learning disabled counterparts. In view of that, it was hypothesized that

a. Children without learning disabilities will perform better on the Trail Making Test part B than children with learning disabilities".

Studies have reported poor executive functioning in samples of children with mathematics disabilities as evidenced by performance on the Trails Making Test B (Bull, Johnston & Roy, 1999; Reiter, Tucha & Lange, 2005; Rourke, 1993; van der Sluis, de Jong and van der Leij,

2004; White, Moffitt, & Silva 1992). In general, studies support a relationship between poor executive functioning and mathematics deficits rather than reading deficits. Based on this, it was postulated that

> b. Children with low scores on mathematic achievement subtest will perform poorly on the Trail Making Test Part B.

Hypothesis 6

The use of IQ tests as a means to measure the potential or ability of students has been largely criticized (e.g. Jimenez, Siegel & Lopez, 2003; Siegel, 1989; 2003).Therefore the present study sought to use an alternative measure of IQ to assess the reasoning ability of Ghanaian LD children in comparison with their peers. It was hypothesized that "children without learning disabilities will have higher scores on the Ravens progressive matrices compared to children with learning disabilities and children with other neurological disorders".

Operational Definitions

The ultimate goal behind operationalizing the term "learning disabilities" and other related concepts for this study is to enhance replication and the generalization of research findings to other samples with similar characteristics (Swanson, 1991). For the purpose of the present investigation, common terms used throughout the study are presented below:

Academic Achievement. In the context of this study, academic achievement refers to the total sum of scores obtained on the mathematics, spelling and reading subtests of WRAT4.

Academic achievement in reading, spelling and mathematics are the individual scores attained on the reading, spelling and mathematics subtests of the WRAT4 respectively.

Class levels. These represent the class level of each participant e.g. class 2 – class level 2, JHS 3 – class level 9.

Age levels: This definition represents four age ranges. 6 to 8, 9 to 11, 12 to 14, 15 and above.

Gender: This refers to the sex difference between males and females. The terms sex and gender, will be used interchangeably in this study, as in related studies to refer to being female or male.

Social Competence. This represents the teachers and parents judgment of a child's social skills and problem behaviours as measured by the Ghana Adaptive Behaviour Scale (Kniel & Kniel, 2007) and the Adaptive Behaviour Scale (ABS) School Edition (Lambert, Windmiller, Tharinger & Cole, 1981).

Social skills: represents teachers and parents judgment of how well the child is able to interact harmoniously with him/her and others as defined by the social skills subscale of the Ghana Adaptive Behaviour Scale (Kniel & Kniel, 2007).

Problem behaviours: this refers to teachers and parents judgments the child's negative behavior as measured by the Adaptive Behaviour Scale (ABS) School Edition (Lambert, Windmiller, Tharinger & Cole, 1981).

Adaptive behaviour: this refers to the behavior of the child as measured by the Home Living and community subscale and the selfcare skills subscale of the Ghana Adaptive Behavior Scale.

Executive Function: a person's level of higher order thinking as measured by the Part B of the Trails Making test.

The three group samples (children with learning disabilities, children without learning disabilities, and children with other neurological disorders) used were each operationalized by specific criteria (see chapter 3).

CHAPTER THREE
METHODOLOGY

This chapter describes the methodology employed in the current study. The chapter begins with a description of the research design, target population and group samples, the materials used in the study and data collection procedure.

Research Design.

The current study was carried out in two stages. The first phase of the investigation employed a cross-sectional study approach which involved 96 teacher referred children of ages ranging from 7 – 15. The choice of design is suitable as this study sought to analyze learning disabilities by considering a cross-section of the school population at one point in time (within three months). In addition, the class level of participants ranged from class two (2) to Junior High School three (3). Class one (1) pupil were exempted because at the time of the study, the Ghana school calendar had just commenced a new academic year and class one students were at the time adapting to their new school environment. Considering time and financial constraints, this choice of design could not have been more appropriate compared to a longitudinal study that would have required more time and resources. For comparison purposes, the second part of the study adopted an experimental approach involving children with learning disabilities, children without learning disabilities and children with other neurological disorders.

Sampling Method.

In this study, three sample groups were defined on the basis of various outlined criteria.

Children with Learning Disabilities. The resultant sample for the children with learning disabilities group was drawn in three stages. First, four (4) primary basic and junior high schools were conveniently sampled taking into consideration proximity to the researcher. Two of the

selected schools were private and the other two public. Afterwards, potential students were selected using a random stratified sampling procedure with class as strata to enhance the likelihood that each class level would be represented in the sample. In total, 96 students were selected from the lower primary, upper primary and junior high school class levels.

Approximately 45 of these students were female and 51 male. Their ages ranged between 7-15, with a mean age of 10.97 and a standard deviation of 2.3. Children with learning disabilities were selected based on the following:

Inclusion criteria

1. The child should be able to understand and communicate in the English language.
2. The child should have one or more of the following: Wide Range Achievement-4 (Wilkinson & Robertson, 2006) subtest scores in reading/spelling/mathematics equal to or below the 25th percentile, according to Ghanaian age norms.
3. The child should obtain an average/above average score on both the Self Care Skills and Home Living and Community Skills each of the Ghana Adaptive Scale (Kniel & Kniel, 2007).

Exclusion criteria

1. Children who did not meet the above stipulated criteria.
2. Children with other neurological disorders.
3. Children who could not communicate in the English language.
4. Children who were not Ghanaian nationals.
5. Children who were ill or absent from school within the study time frame.
6. Children who had visual or hearing problems.

Out of the 96 participants 70 met the criteria, comprising 36 males (51.4%) and 34 (48.6%) females. Ages ranged between 7 - 15 years with a mean age of 11.5 and standard deviation of 2.22. Of the 70 participants, 24 (34.3%) were enrolled in a public school and the remaining 46 (65.7%) in a private school. The highest percentage of participants (18.6%) was realized in class level 5 with the lowest percentage identified in class level 9 (see Appendix A). Out of the 70 participants, 38 (54.3%) had a disability in all three subjects (reading, spelling and mathematics). The remaining sample was unevenly distributed in the other 5 disability subtypes (see Appendix A).

For ease of statistical analysis in the second phase of the study, a selective sample of 50 students formed the resultant group of children with learning disabilities. An equal number of 50 children without learning disabilities were matched based on gender and age level to constitute the control group.

Children without Learning Disabilities

Inclusion criteria:

1. The child should be able to understand and communicate in the English language.
2. The child should have Wide Range Achievement-4 (Wilkinson & Robertson, 2006) subtest scores in reading, spelling and mathematics above the 25th percentile, according to Ghanaian age norms.
3. An average/above average score on both the self care skills and home living and community skills each of the Ghana Adaptive Scale (Kniel & Kniel, 2007).

Exclusion criteria:

1. Children who did not meet the above stipulated criteria
2. Children who were not Ghanaian nationals.
3. Children who were ill or absent from school within the study time frame.
4. Children who had visual or hearing problems.

Children with other Neurological Disorders

Inclusion criteria:

The third group was selected from children who had already been diagnosed with a neurological disorder by a health professional. Because a clinical population was required, choosing sites where these children were readily accessible was a fundamental consideration. (i.e. individuals who were either established in a special institution (Dworwulu Special School, the special wing for students with special needs at the Madina cluster of schools and children who had visited the Clinical Psychology Unit of the Accra Psychiatric Hospital for consultation during the data collection period).

Exclusion criteria:

1. Children who did not meet the above stipulated criteria
2. Children who could not communicate in the English language.
3. Children who were not Ghanaian nationals.
4. Children who were ill or absent from school within the study time frame.
5. Children who had severe speech, visual, hearing, motor problems.

Participants who met the criteria for one of the three diagnostic groups out lined above were included in the sample.

Background Characteristics of Group Samples

In all, samples for the study were drawn from a population of basic primary and junior high schools, special schools and the Accra Psychiatric Hospital all within the Accra metropolitan area. A sample of 131 children was included in the study. All participants were between ages 6 and 19 years of age with a mean age of 11.73 and a standard deviation of 2.7. Out of the 131 participants, 50 were children with learning disabilities, 50 were children without learning disabilities, and 31 were children with other neurological disorders.

An equal number of males (25) and females (25) were found in the CLD and CWLD group samples. However in the COND group 15 were male and 16 female (see Appendix A for group sample demographics).

Table 1: Mean Age for children with learning disabilities, children without learning disabilities and children with other neurological disorders

Variable	*CLD* *N=50* *Mean(SD)*	*CWLD* *N=50* *Mean(SD)*	*COND* *N=31* *Mean(SD)*	*Total* *N=131* *Mean(SD)*
Mean Age	11.18 (2.27)	11.16 (2.38)	13.32 (3.11)	11.73(2.7)

Note: CLD = Children with Learning Disabilities

CWLD = Children without Learning Disabilities

COND = Children with Neurological Disorders

Instruments

The instruments used in the current study included: (a) The LD Questionnaire - (Adaptive Behaviour Scale School Edition, 1981; Health Technology, 2005; McLeskey, 1992; NJCLD, 1998; Lyon, 1996; Taggart, Cousins & Milner, 2007), (b) the Wide Range Achievement Test 4 (Wilkinson & Robertson, 2006), (c) the Ghana Adaptive Behaviour Scale (Kniel & Kniel, 2007), (d) the Adaptive Behaviour Scale (ABS) School Edition (Lambert, Windmiller, Tharinger & Cole, 1981), (e) the Raven's Progressive Matrices (Raven, 1936) and (f) the Trails Making Test (TMT) (Reitan, 1958). The instruments are described briefly in the next few pages.

The Learning Disabilities (LD) Questionnaire. This questionnaire was developed by the current researcher based on readings (Adaptive Behaviour Scale School Edition, 1981; Health Technology, 2005; McLeskey, 1992; NJCLD, 1998; Lyon, 1996; Taggart, Cousins, & Milner, 2007). This individually administered questionnaire consisted of 16 items that were designed to elicit information from the teachers concerning the referred student. This questionnaire had 3 sub sections. The first sub sections contained 12 items that covered general questions on school performance and other behavioural characteristics of the child. Items were structured on a 5-point Likert scale with ratings from "strongly disagree" to strongly agree". All but 2 of these items (3 and 11) were positive statements. The second sub section contained one item that assessed if the participant had repeated one or more classes. To this question, the respondent had to answer "yes" or "no". The last sub section involved items that assessed teacher ratings of the student's performance in reading, spelling and mathematics. This consisted of 4 point ratings: "excellent", "good", "average" and "poor".

Scoring: For the first sub-section, the 5-point likert scale; "strongly disagree", "disagree", "neither agree nor disagree", "agree" and "strongly agree" attracted scores of 0, 1, 2,

3, and 4 respectively. The 2 positive items (items 3 and 11) were scored in reverse direction. There were 12 items, and going by this, the least score a respondent could have was = 0, and the highest =48. In the second section the answers "no" and "yes" are scored 0 and 1 respectively. In the last section, teacher's ratings of excellent, good, average and poor were scored 3, 2, 1 and 0 respectively. Pilot study results from the current study using Cronbach's alpha showed a reliability of 0.71.

The Wide Range Achievement Test 4 (WRAT4) is the latest version of the Wide Range Achievement Test developed by Robertson and Wilkinson (2006). This test measured the participants' level of academic achievement. In its original form, it consists of four subtests that measure the basic academic skills of Reading, Spelling, Sentence comprehension and math computation (Wilkinson & Robertson, 2006). For the purpose of this study, three out of the four subtests were used. The sentence comprehension subtest was excluded. This is because during the standardization of the WRAT 4 in Ghana, sentence comprehension scores among the Ghanaian normative research sample were found to be relatively low compared to the other subtests. This reflected the inappropriateness of the test within this cultural setting (Ofori-Atta & Sefa-Dedeh, 2008).

The Wide Range Reading subtest. This subtest consisted of 70 items that measured letter and word decoding through letter and word recognition. The maximum possible score for the wide range reading achievement test was 70.

The Wide Range Spelling Achievement Subtest. This subtest consisted of 57 items that measured the student's ability to encode sounds into written form . The maximum possible score for the Wide Range Spelling Test was 57.

The Wide Range Math Computation Achievement subtest. This subtest consisted of 55 items that measured the student's ability to perform basic mathematics computations through counting, identifying numbers, solving simple oral problems, and calculating written mathematics problems. A maximum score of 55 was possible on the Math Computation subtest of the WRAT.

The academic achievement for each participant in each subject was calculated by adding the scores obtained on each subtest of reading, spelling and mathematics. Total academic achievement was the total sum of the reading, spelling and mathematics scores. Psychometric adequacy of WRAT 4 is evidenced in the work of Robertson and Wilkinson (2006) who report median coefficient alpha subtest reliability coefficients, by age range from 0.87 to 0.93.

Ghana Adaptive Behaviour Scale (GABS). This scale was established by Kniel and Kniel (2007). It measures 6 areas of adaptive behavior, home and living skills, social skills, self care skills, motor skills, communication skills and functional academic skills. However, in this current research 3 (home and living skills, social skills and self care skills) out of the 6 subscales were isolated for use. The communication and motor skills scale were excluded in order to reduce the workload of parents and teachers in completing the scales. The decision to exclude them was based on their indirect bearing to the focus of the current study. The functional academic skills scale was not included because functional academic skills were equally being assessed by the WRAT4. Descriptions of the scales used are as follows:

The Home Living and Community skills subscale. This subscale gives a descriptive overview of the manner in which the child coped with requirements in the home and community. It consisted of 24 items that covered dimensions of travel, orientation and leisure time activities. In addition, it included domestic duties, following instructions, shopping and dealing with money

and safety behavior. The Home Living and Community skills subscale has an internal consistency coefficient (Cronbach Alpha) of 0.932 (Kniel & Kniel, 2007). In this current study, pilot study results recorded a Cronbach's alpha of 0.85.

Self Care skills Subscale. The Self care skill subscale measured the manner in which the child attends to his/her personal hygiene and presents a pleasing appearance (Kniel & Kniel, 2007). It had 24 items that covered dimensions of toileting, meals, personal hygiene and dressing. The Self care skills subscale has an internal consistency coefficient (Cronbach Alpha) of 0.938 (Kniel & Kniel, 2007). From the pilot study, the "Self Care Skills Scale" had a Cronbach's alpha of 0.63.

Social Skills Subscale. On this scale, the manner in which the child was able to interact harmoniously with him or herself and others was assessed. It consisted of 24 items that covered the awareness of social norms (Kniel & Kniel, 2007). This covered dimensions of responsibility and consideration for others, dealing with conflicts and prosocial behavior. The Social skills subscale has an internal consistency coefficient (Cronbach Alpha) of 0.936. From the pilot study, the "Social Skills Subscale" recorded a Cronbach's alpha value of 0.75.

For each of the subscales, respondents (teachers and guardians) had to rate the child as follows (scores awarded to each response are indicated): "Always, can do it each and every time" =2, "Sometimes or with assistance"=1, "Never does it even with assistance"=0, "Unknown, if behavior cannot be observed" = 0 and "non existent, if certain experiences are not possible"=0. No marks were awarded to the last three response statements. A total maximum score of 48 is possible on each of the subscales. Scores obtained by ratings of the student's teacher and guardian were scored and recorded separately. The final score was obtained by calculating an average score. The level of competence in each domain was obtained by calculating the relative

mastery level. This was calculated by dividing the number of points achieved (raw score) by the maximum number of points possible (48 points) and multiplying this value by 100.

Adaptive Behavior Scale (ABS) School Edition (Lambert, Windmiller, Tharinger & Cole, 1981). Problem behaviors were assessed using the ABS Part 2. It provided measures of adaptive behavior related to personality and behavior disorders. On this scale eleven domains were employed that measured the following: aggressiveness, antisocial versus social behavior, rebelliousness, trustworthiness, withdrawal versus involvement, mannerisms, and interpersonal manners, acceptability of vocal habits, acceptability of habits, activity level, symptomatic behavior and the use of medication. In all, it comprised 39 items to which the respondent had to respond to ratings of "frequently", "occasionally" or "none of the above".

In scoring, the item values of 2, 1 and 0 were assigned to ratings of frequently, occasionally and none of the above respectively. The total score for each sub domain was calculated. With the exception of the medication sub domain, the sum of all sub domain totals formed the score for problem behaviors. Lambert et al. (1981) established that the reliability (internal consistency) for the adaptive behavior scale ranged from 0.71 to 0.97. .From the pilot study, the Adaptive Behavior Scale had a Cronbach's alpha of 0.84.

The Raven's Progressive Matrices. This is a non-verbal measure of intelligence designed to de-emphasize cultural and academic content (Edwin, 2000). This test was originally developed by Raven in 1936. In this study both the Ravens Colored Progressive Matrices (Ravens, 2001) and the Ravens Standard Progressive Matrices (Ravens, 1976) were used. The former is appropriate for children between ages 6 to 11 and the latter for individuals 12 and above. Although developed with norms on British and American populations, the Raven's Coloured Progressive Matrices test (CPM) is internationally recognized as a culture fair test of non-verbal

intelligence for young children (Raven, Court & Raven, 1990). Both the Raven's Coloured and Standard Progressive Matrices (CPM) test are used extensively across a wide variety of settings in Ghana (Pantang Hospital, Accra Psychiatric Hospital, Korle Bu Teaching Hospital, University of Education, Winneba) and in other African countries (South Africa, Tanzania, Nigeria, etc).

The Coloured Progressive Matrices (CPM), a simpler version of the Ravens Progressive Matrices test (Kunda, McGreggor, & Goel, 2009), comprised three sets of twelve problems and Standard Progressive Matrices, five sets of twelve problems. On the CPM, each item is printed with a brightly coloured background, making the test more appealing for children (Bass, 2000). The participants either pointed their response out or wrote the corresponding number of their response on their answer sheet.

Scoring. One mark is awarded for every correct response. The total score is the total number of correct responses. A maximum score of 36 and 60 can be obtained on the CPM and SPM respectively. Both CPM and SPM are known to be valid. As cited by Bass (2000) standardization studies have recorded the retest reliability of the Raven's CPM to be .90 over the whole range of development (Raven, Court & Raven, 1990). A split-half reliability estimate of .90 has also been obtained, with no differences found between ethnicity (Anglo, Black and Hispanic) or gender in a study conducted by Jensen in 1974 (cited in Raven, Court & Raven, 1990). In a subsequent study by Carlson and Jensen (1981), the split half reliability estimate of .85 was established; with the estimates at ages 6, 7 and 8 generating estimates of .65, .86 and .85 respectively. The reliability (internal consistency and test–retest stability) for the SPM has also an alpha of 0.88 for total scores.

Trails Making Test (TMT). The Trail Making Test was established by Reitan (1958). Over the years, it has been used in the investigation of children with learning disabilities (Espy &

Cwik, 2004). The trail making test assessed the executive functioning of the students. It consisted of two parts, A and B (Narhi, Rasanen, Metsapelto, & Ahonen, 1997). This is a test of speed and thus the stress was on the importance of time and efficiency (Alsworth, 1997). Part A consisted of encircled numbers from 1-25 randomly spread on a sheet of paper. After the child completes a sample of the test, he/she is instructed to begin at the number 1 and to locate and draw a pencil line to 2, then to 3, and so on until reaching the number 25. Part B was more complex than A because it required the student to connect numbers and letters in an alternating pattern (1-A-2-B-3-C, etc.) in as little time as possible. The child begins at 1, locates and draws a line to A, then to 2, then to B, and so on until completing the test (Pham, Vanderstukken,, Philippot, & Vanderlinden, 2003). If an error was made whilst carrying out the task, the examiner points it out to the student for correction and had them return to and continue from the correct location while the clock remains running. Scoring involves correcting errors the participant makes, when they are made, so that the test can be completed without error. The time used to complete each part of the TMT was recorded for each participant separately. Cangoza B. Karakocb, E. & Seleklerb K.(2009) have reported test–retest reliability and inter-rater reliability coefficients for time scores of Parts A and B as 0.78, 0.99 and 0.73, 0.93, respectively. Spreen and Strauss (1998) have also reported reliability coefficients for the trails making test ranging from 0.60 to 0.90.

Procedure

Pilot Study

The pilot study was done two weeks prior to the actual data collection to test the reliability of the selected instruments. The pilot study was conducted in a public school. Thirty

participants were conveniently selected by their class teachers to participate in the pilot study. Written consent was obtained from their parents. All but three participants returned their consent forms. Two participants withdrew from taking part in the research for personal reasons. A final sample of 25 (consisting of 11 females and 14 males) were given consent to participate. Guardians and the class teachers were both administered the following: Home Living and Community Scale, Self Care Skills Scale, Adaptive Behavior Scale and the Social Skills Scale. The learning disabilities questionnaire was only administered to the teachers in addition to the other scales. Five of the participants had partially filled scales returned and thus were excluded from the analysis.

The 16- item questionnaire that elicited information on the child's school performance and other behavioral characteristics had a Cronbach's alpha value of 0.71. From the pilot study, the "Home Living and Community Scale" subscale of the GABS recorded a Cronbach's alpha of 0.85; the "Self Care Skills Scale" had a Cronbach's alpha of 0.63; the Adaptive Behavior Scale had a Cronbach's alpha of 0.84 and the "Social Skills Scale" recorded a Cronbach's alpha value of 0.75. These figures suggested that the scales were reliable enough to be used for the actual data collection because the internal consistency of scale items had been established. This indicated the scales appropriateness for the Ghanaian population.

Main Study

The researcher received ethical approval from the Department of Psychology before the start of the study. Prior permission was also sought from all four school authorities and subsequently consent was obtained from the guardians of potential participants. Guardians were asked to sign a consent form (see Appendix) granting permission for their ward to participate in

this study. All participants were assured of confidentiality and were given the chance to withdraw their child's participation. Consent to participate was high across all schools, ranging from 75 per cent to 83 per cent. Selected individuals not given approval to participate were replaced.

The first part of the study was aimed at collecting data for the identification of children with learning disabilities. Oral instructions were given to the teachers of the four schools to refer students with poor academic performance based on school assessment records. For convenience, testing for children with good academic performance was done concurrently. Assessment with the selected children was scheduled and took place at stipulated periods as designated by the school authorities. Assessment took place in the child's individual school. To maintain constant testing conditions for all children, quiet and serene venues were used such as the science laboratory, library and classrooms which were not in use at the time of testing.

The research team was introduced to potential participants at each school and with every new group of 6. The mission and purpose of the research was explained (with the clinical sample, assistance had to be sought from the teachers). Questions asked by curious participant were all answered before the start of testing. The participants were assured that the test was not part of the school curriculum, and would in no way affect their school results. It was further explained that representatives of every class (except those in Grade 1) in the school would be asked to complete the same test. Confidentiality and anonymity of their responses were also assured with further emphasis on the fact that the study was purely being used for academic purposes.

Students completed the reading, spelling and mathematics subtests of the WRAT 4, Ravens Progressive Matrices, and the Trails Making Test which were administered by the

principal researcher and two trained research assistants. Testing of the participants was done individually and also in small groups of 6 depending on the test. Clear instructions for each test were repeatedly given to avoid any confusion or doubt as to what they were expected to do. Participants were expected to carry out assigned tasks independent of each other. To avoid peer influence, students were not allowed to discuss the test among themselves.

Scales were administered independently to both the class teacher and guardians of the selected students. After testing was done, each participant was given a form (containing the Ghana Adaptive Behavior subscales (GABS) and the Adaptive Behavior Scale (ABS) part 2) to be completed the by their guardians. The principal researcher personally distributed forms containing the questionnaire, GABS and ABS to teachers of the selected students.

Administration of the tests and scales was a slow and difficult process, considering the number of tasks assigned and amount of information that was sought from both teachers and guardians. There were instances when teachers delayed participants in coming in for the assessment due to a class assignment, sporting activity, break time and so on. In some cases, assessment had to stop halfway so the participants could go for a snack. In a day, approximately 12 participants could be assessed. Returning of the forms to be filled was a big challenge. On the whole, the testing, administering and collecting forms took a period of three months. Afterwards, data collected was analyzed.

CHAPTER FOUR
RESULTS

The results of the study are presented in this chapter. All analyses were conducted using the Statistical Package for the Social Sciences (SPSS V16) for Windows. A series of analyses of variance were computed. Children with learning disabilities (CLD), children without learning disabilities (CWLD) and children with other neurological disorders (COND) were compared on academic achievement, non-verbal intelligence, adaptive behavior, social skills, problem behaviours and performance on the Trails Making Test measures. The group means for these measures, and the *F* statistics associated with group effects, are presented in tables. Significant effects were followed by Tukey's post hoc analysis. In addition, a sequence of independent sample t-tests and Pearson Product Moment correlations were conducted. All analyses were conducted at the 0.05 level of significance.

Analyses of Data

Hypotheses 1a was analyzed using the Two-way analysis of variance. Hypothesis 1b and 5a were analyzed using the independent sample t-tests. Hypothesis 3 and 5b were analyzed using the Pearson Product moment Correlation coefficient. Finally, Hypothesis 2, 4a, 4b and 6 were also analyzed with the one-way analysis of variance.

Learning Disabilities and Academic Achievement

Hypothesis 1a predicted that "children without learning disabilities will perform better on total academic achievement than children with learning disabilities and children with other neurological disorders across age levels." To test this hypothesis, a two-way ANOVA was employed. The results are summarized in Table 2 below:

Table 2: A summary of ANOVA results and Post Hoc Analysis for Group Type, Academic Achievement and Non Verbal Intelligence.

Measures	*CLD (n=50)* Mean(SD)	*CWLD (n=50)* Mean(SD)	*COND (n=31)* Mean(SD)	*df*	*f*	*P*
Academic Achievement	82.20 (22.08)[a]	123.28 (26.86)[b]	10.77 (15.98)[ab]	2, 119	192.24	0.00
Non Verbal Intelligence	23.48 (10.30)[a]	32.24 (11.49)[b]	6.00 (5.18)[ab]	2, 128	67.87	0.00

CLD = Children with Learning Disabilities

CWLD = Children without Learning Disabilities

COND = Children with Neurological Disorders

[a]All children without learning disabilities means are significantly different from corresponding children with learning disabilities means.

[b]Significantly different from children with learning disabilities means.

Note. Means with different superscripts are significantly different at $p < .05$ according to Tukey's HSD test.

The ANOVA results showed a significant main effect on total academic achievement for group type, $F_{(2, 119)} = 192.24$; $p<0.01$. This indicated that the three group types differed on their total academic achievement performance. The group type x age level interaction effect also indicated a significant difference, $F_{(6, 119)} = 3.17$; $p<0.01$ (See Appendix A). This result indicated that significant differences exist on the performance of academic achievement depending on the group type and age level of the child.

As expected, post hoc comparisons using the Tukey HSD test showed significant differences on academic achievement between the three groups and four age levels. The results imply that the academic achievement mean score for children without learning disabilities was significantly different from children with learning disabilities and children with other neurological disorders. However, the academic achievement mean score for children with learning disabilities was significantly different from children with other neurological disorders.

The age level effect of the three groups on academic achievement also showed that differences were not apparent at every age level. For a summary of the means and standard deviations for age levels according to group type see table in appendix A. For post hoc analysis for age level see table in appendix A. The results indicated that all paired comparisons showed significant differences, with the exception of age levels 9-11 and 12-14. These results partially confirm hypotheses 1a.

Learning Disabilities and Non-Verbal Intelligence

The study hypothesized that children without learning disabilities would score higher on the Ravens Progressive Matrices compared to children with learning disabilities and children with other neurological disorders. A one-way ANOVA was conducted to test for differences between the three groups. There were significant group differences at the $p<0.01$ for non-verbal intelligence amongst the three groups {$F(2, 128) = 67.87$; $p<0.01$} (see Table in Appendix A). A post hoc analysis showed that children with LD scored lower on the Ravens Progressive Matrices Test compared to children without LD, but higher compared to the Children with other neurological disorders. This outcome supports hypothesis 6. A summary of the one way ANOVA and Post Hoc results are summarized in table 2 above.

Learning Disabilities and Gender Differences

Hypothesis 1b sought to explore gender differences on academic achievement amongst the LD sample. An Independent Sample t-Test was conducted to test for differences between the two experimental groups (LD males and LD females) on academic achievement measures. Table 3 shows a summary of the means and standard deviations on the various measures for the two groups and the subsequent independent t-test that were performed. No significant gender differences were observed for all academic achievement measures. This outcome refutes hypothesis 1b.

Table 3: Summary results of the Independent Sample t-Test comparing the gender differences in all three domains of academic achievement.

Measures	*Male* *N=36*	*Female* *N=34*	*T*	*df*	*P*
	Mean (SD)	*Mean (SD)*			
Reading Achievement	31.25(11.89)	31.03(10.24)	.083	68	.934
Spelling Achievement	26.44(8.21)	27.00(7.92)	.288	68	.774
Mathematics Achievement	45.28(35.00)	46.50(39.38)	-.137	68	.891
Academic Achievement	70.42(30.03)	69.56(28.65)	.122	68	.903

Adaptive Behaviour

Hypothesis 2 predicted that "children without learning disabilities group will score higher on adaptive behavior measures compared to the children with learning disabilities group and children with other neurological disorders group." A one way ANOVA was employed to test for significant differences on measures of Home living and community skills and Self Care Skills The results are summarised in Table 4.

ANOVA results indicated that both Home living and community skills $\{F(2, 128) = 167.16, p<0.01\}$ and Self Care Skills $\{F(2, 128) = 28.43, p<0.01\}$ showed significant group differences at the 0.05 significance level. A post hoc analysis showed that no significant difference was found between children with learning disabilities and children without learning disabilities in self care skills. In contrast, a significant difference was realized between the children with other neurological disorders group and the former two groups. However, a significant difference was realized between the two groups (CLD and CWLD) for home and community living skills. CLD had lower mean scores on home and community living skills measures compared to their CWLD peers. Nonetheless their (CLD) home and community living skills were superior to that of their COND counterparts. This indicated that CLD and CWLD groups had similar self care skills, but differed in relation to home and living community skills. Table 4 shows the summary of ANOVA results and Post Hoc comparisons of the Adaptive behavior measures. These results partially supports hypothesis 2.

Social Skills.

Hypothesis 4 predicted that "Children with learning disabilities will score lower on the social skills compared to other children without learning disabilities". A One –Way ANOVA was conducted to test for group differences. Overall, there were significant differences among the three groups for social skills, $F_{(2, 128)} = 31.314$, $p<0.01$. Further, a post hoc test analysis showed that the CWLD group (M=42.84, SD=5.34) scored higher on social skills measures than both the CLD (M=33.20, SD= 7.65) and COND (M=29.35, SD=11.71) groups. However, no significant differences between the CLD and COND groups were observed.

In summary, children with LD exhibited significantly poorer social skills than their CWLD peers, though there were no significant differences in social skills between the CLD and COND groups. This result supports hypothesis 4a. Table 4 shows the summary of ANOVA and Post Hoc analyses for the social skills measure.

Table 4: A summary of ANOVA and Post Hoc Comparisons of Means for Home living and community skills, Self care skills and Social Skills Measures for children with learning disabilities, children without learning disabilities and children with other neurological disorders.

Adaptive Behavior	*CLD (n=50) Mean(SD)*	*CWLD (n=50) Mean(SD)*	*COND (n=31) Mean(SD)*	*f df=2,128*	*P*
HLCS	41.56 (5.24)[a]	45.42(3.77)[b]	19.74(10.35)[ab]	167.156	0.00
SCS	44.52 (4.35)	46.98(2.21)	37.68 (9.39)[b]	28.429	0.00
SS	33.20 (7.65)	42.84(5.34)[b]	29.35(11.71)	31.314	0.00

Note. Means with different superscripts are significantly different at $p < .05$ according to Tukey's HSD test.

[a] All children without learning disabilities means are significantly different from corresponding children with learning disabilities means.

[b] Significantly different from children with learning disabilities means.

CLD = Children with Learning Disabilities

CWLD = Children without Learning Disabilities

COND = Children with Neurological Disorders

HLCS =Home living and community skills

SCS= Self care skills.

SS=Social Skills

Problem Behaviour. Hypothesis 4b predicted that "children with learning disabilities would exhibit more problem behaviors than children without learning disabilities. In all, significant group differences were found on all measures of problem behaviours with the exception of the inappropriate interpersonal manners measure ($F_{(2, 128)} = 2.725$; $p > 0.069$).

A post hoc test analysis of the behavior categories showed the COND group scores were significantly higher on the symptomatic behavior measure than the CLD and CWLD groups. However, the CWLD group's scores were significantly lower (indicating lower levels of symptomatic behavior) than that of the CLD group. Table 5 shows a summary of the results.

In addition, differences on measures of hyperactive tendencies, acceptability of habits, mannerisms, disturbing vocal or speech habits, aggressiveness, antisocial behaviour score, trustworthiness and rebelliousness between the CLD and CWLD groups were not statistically significant. However, large and significant differences were found on these measures in comparison with the COND group. Contrary to the former observed patterns on behaviour categories, no significant differences were found between some pairwise comparisons (CLD-COND and CLD-CWLD) on the withdrawal measure. On the other hand, a significant difference on the withdrawal measure was found between the CWLD and COND pairwise comparison. Finally, significant group differences were found on the total problem behavior measure. $F_{(2, 128)} = 27.75$; $p<0.01$ (see appendix). A post hoc analysis showed that both the CLD (M=12.40, SD=18.53) and CWLD (M=3.68, SD= 7.99) group's problem behavior mean scores were significantly lower (indicating lower levels of behavior problems) than those of the COND (M=35.68, SD=29.51) group. In summary, out of the eleven problem behavior domains only the symptomatic measure showed a significant difference between the CWLD and COND group.

Table 5 shows a summary of the ANOVA and Post Hoc analyses of the various problem behavior measures.

Table 5: Post Hoc Comparisons of Means for problem behaviors measures for children with LD, children without LD and children with other neurological disorders.

Measures	CLD (n=50)	CWLD (n=50)	COND (n=31)	*f* 2, 128	*p*
SYB	3.02(3.54)[a]	0.78(1.39)[b]	5.84(6.19)[ab]	16.969	0.00
HYT	0.40(0.83)	0.28(1.07)	1.61(2.04)[b]	11.498	0.00
AOH	0.90(2.14)	0.14(0.45)	2.10(2.17)[b]	12.498	0.00
IIM	0.16(0.47)	0.30(1.45)	0.74(1.21)	2.725	0.07
MAN	0.30(0.61)	0.06(0.42)	0.77(1.41)[b]	7.227	0.00
DVOSH	0.28(0.61)	0.00(0.00)	0.77(1.06)[b]	14.264	0.00
WD	1.10(1.98)	0.36(1.14)	2.13(3.07)[b]	7.119	0.00
TW	0.18(0.60)	0.04(0.20)	2.06(2.66)[b]	25.163	0.00
REB	1.60(3.55)	0.12(0.52)	3.52(5.36)[b]	9.504	0.00
ANB	2.92(4.57)	5.69(1.46)	11.61(10.32)[b]	23.751	0.00
AGG	1.54(4.50)	0.14(0.40)	4.52(7.14)[b]	9.329	0.00
TBP	12.40(18.53)	3.68(7.99)	35.68(29.51)[b]	27.75	0.00

Tukey ($p < 0.05$) Note. Means with different superscripts are significantly different at $p < .05$ according to Tukey's HSD test. [a] All children without learning disabilities means are significantly different from corresponding children with learning disabilities means. [b] Significantly different from children with learning disabilities means. Note. PB= Problem behavior; SYB= Symptomatic behavior; HYT= Hyperactive tendencies; AOH= Acceptability of habits; IIM= Inappropriate interpersonal manners; MAN= Mannerisms; DVOSH=Disturbing vocal or speech habits; WD=Withdrawal; TW=Trustworthiness ; REB=Rebelliousness; ANB=Antisocial behavior; AGG= Aggressiveness ; TPB=Total Problem behavior

Performance on the Trail Making Test

Hypothesis 5a predicted that children without learning disabilities would perform better on the Trail Making Test part B compared to children with learning disabilities. Table 6 shows a summary of the means and standard deviations on the various measures for the two groups and the subsequent independent t-tests analyses that were performed. Significant group differences were observed on the part B [$t_{(98)} = 2.867$, $p < .05$] and B-A measures [$t_{(98)} = 2.721$, $p < 0.01$]. Children without LD performed significantly better on both the TMT part B and B-A measures compared to their counterparts "children with LD." However, group differences on the TMT part A were not statistically significant [$t_{(98)} = 2.867$, $p > 0.595$]. In summary, performance on TMT part A was similar for both groups. However, children with LD took much longer to complete the TMT part B compared to their peers. This outcome supports hypothesis 5a.

Table 6: Summary Results of the Independent Sample t-Test comparing performance on the Trails Making Test (TMT) between children with LD and children without LD.

Test	*CLD* *N=50*	*CWLD* *N=50*	*t*	*df*	*p*
	Mean (SD)	*Mean (SD)*			
TMT A	1.79(0.88)	2.16(4.80)	-.534	98	.595
TMT B	4.92(2.95)	3.39(2.33)	2.867	98	.005**
TMT B – A	3.15(2.51)	1.94(1.87)	2.721	98	.008**

CLD = Children with Learning Disabilities

CWLD = Children without Learning Disabilities

Note. TMT A= Trails Making Test Part A

TMT B= Trails Making Test Part B

TMT B-A= Trails Making Test Part B-A.

** Means are significantly different at $p < .01$ according to Tukey's HSD test.

Inter-correlations between Academic Achivement Variables

Hypothesis 3 predicted that "there will be a positive correlation between reading achievement scores and mathematic achievement/spelling scores". The hypothesis was tested with the Pearson's Product Moment Correlation Coefficient Test. Summary of the results can be found in Table 7 below.

Consistent with previous research, the current study results indicated that reading academic achievement was significantly related to spelling academic achievement {$r = 0.97$, $p<.01$}. Additionally, the results established a significant relationship between reading academic achievement and mathematics academic achievement {$r = 0.90$, $p<.01$, two tail}. In addition to this there was a significant relationship between spelling and mathematics {$r = 0.92$, $p<.01$}. This implies that reading academic achievement scores, mathematic academic achievement and spelling academic achievement scores are significantly related to each other. This result supports hypothesis 3.

Similarly, Hypothesis 5b predicted that "children with low scores on mathematic achievement subtest will perform poorly on the Trail Making Test Part B". This hypothesis was tested with the Pearson's Product Moment Correlation Coefficient Test. A summary of the results can be found in Table 7 below. The results showed that mathematic academic achievement was significantly related to performance on the TMT Part B. This implies that low scores on the mathematic academic achievement subtest significantly affect a child's performance on the on the TMT Part B. This result confirms hypothesis 5b.

Table 7: Pearson Correlation coefficients between Reading Academic Achievement, Spelling Academic Achievement and Mathematics Academic Achievement and Trails Making Test Part B.

	1	2	3	4	5
RA (1)	-	-	-	-	-
SA (2)	.97**	-	-	-	-
MA (3)	.90**	.92**	-	-	-
TAA (4)	.98**	.99**	.95**	-	-
TMT B (5)	-.60**	-.60**	-.51**	-.60**	-

**. Correlation is significant at the 0.01 level (2-tailed).

Note. RA= Reading Achievement

SA=Spelling Achievement

MA=Mathematics Achievement

TAA=Total Academic Achievement

TMT B= Trails Making Test Part B.

Other Findings

Inter-correlations between Measured Variables

The relationship among the variables studied was examined among the three groups investigated. The Pearson Product Moment correlation coefficient was used to test the significance and strength of the association between the measured variables; reading achievement, spelling achievement, mathematics achievement, total academic achievement, non-verbal intelligence, Trails Making Test Part B, Trails Making Test Part B-A, teachers rating of child in reading, teachers rating of child in spelling; teachers rating of child in mathematics. A summary of the results are show in Table 8.

Reading academic achievement was significantly related to non-verbal intelligence ($r=.79$, $p<.01$), Trails Making Test Part B-A ($r=.55$, $p<.01$), teachers rating of child in reading ($r=.84$, $p<.01$), teachers rating of child in spelling ($r=.82$, $p<.01$), teachers rating of child in mathematics ($r=.69$, $p<.01$). However, there was no significant relationship between reading academic achievement and Trails Making Test Part A ($r=-.01$, $p>.05$).

Spelling academic achievement was significantly correlated to non-verbal intelligence ($r=.77$, $p<.01$), Trails Making Test Part B ($r=-.60$, $p<.01$), Trails Making Test Part B-A ($r=-.54$,$p<.01$) teachers rating of child in reading ($r=.82$,$p<.01$), teachers rating of child in spelling ($r=.80$, $p<.01$) and teachers rating of child in mathematics ($r=.66$, $p<.01$). However, there was no significant relationship between spelling academic achievement and Trails Making Test Part A ($r=.01$, $p>.05$).

Mathematic academic achievement was significantly correlated to non-verbal intelligence ($r=.82$, $p<.01$), Trails Making Test Part B ($r=-.51$, $p<.01$), Trails Making Test Part B-A ($r=-.46$, $p<.01$) teachers rating of child in reading ($r=.78$,$p<.01$), teachers rating of child in spelling

(r=.76, p<.01) and teachers rating of child in mathematics (r=.70, p<.01). However, there was no significant relationship between mathematics academic achievement and Trails Making Test Part A (r=.03, p>.05).

Total academic achievement was significantly correlated to reading academic achievement (r=.98, p<.01), spelling academic achievement (r=.99, p<.01), mathematics academic achievement (r=.95, p<.01), non-verbal intelligence (r=.81, p<.01), Trails Making Test Part B (r=.-.60, p<.01), Trails Making Test Part B-A (r=-55,p<.01), teachers rating of child in reading (r=.83, p<.01), teachers rating of child in spelling (r=.81,p<.01) teachers rating of child in mathematics (r=.70, p<.01). However, there was no significant relationship between total academic achievement and Trails Making Test Part A (r=.00, p>.05).

In sum, the findings showed significant correlations among all but one of the measured variables. Specifically, all correlations were statistically significant with the exception of correlations with Trails Making Test A. Generally all the relationships observed were positive. However, inverse relationships were observed for all correlations between the Trails Making Test Part B, part B-A and the other measured variables.

Table 8: Pearson Correlation coefficients between Academic Achievement, Non-Verbal Intelligence Trails Making Test and Teacher Ratings of the children in Reading, Spelling and Mathematics

	1	2	3	4	5	6	7	8	9	10	11
RA (1)	-	-	-	-	-	-	-	-	-	-	-
SA (2)	.97**	-	-	-	-	-	-	-	-	-	-
MA (3)	.90**	.92**	-	-	-	-	-	-	-	-	-
TAA (4)	.98**	.99**	.95**	-	-	-	-	-	-	-	-
NVI (5)	.79**	.77**	.82**	.81**	-	-	-	-	-	-	-
TMT A (6)	-.01	.01	.03	.00	-.06	-	-	-	-	-	-
TMT B (7)	-.60**	-.60**	-.51**	-.60**	-.37**	.05	-	-	-	-	-
TMT B-A (8)	-.55**	-.54**	-.46**	-.55**	-.32**	.03	.96**	-	-	-	-
TRCR (9)	.84**	.82**	.78**	.83**	.68**	.05	-.33**	-.33**	-	-	-
TRCS (10)	.82**	.80**	.76**	.81**	.68**	-.02	-.27**	-.27**	.935**	-	-
TRCM (11)	.69**	.66**	.70**	.70**	.55**	.02	-.19	-.20*	.802**		-

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Note. RA= Reading Achievement; SA=Spelling Achievement; MA=Mathematics Achievement; TAA=Total Academic Achievement; NVI=Non-verbal intelligence. TMT A= Trails Making Test Part A; TMT B= Trails Making Test Part B; TMT B-A= Trails Making Test Part B-A. TRCR =Teachers rating of children in reading; TRCS =Teachers rating of children in Spelling; TRCM =Teachers rating of children in mathematics.

Results for LD students who have repeated one or more classes: The results of this study also revealed that 37(52.9%) of the 70 LD students initially selected in the first phase of the study had repeated one class or more. The remaining 33 (47.1%) had not repeated a class at all (see Table in Appendix A). In addition to this a cross tabulation of age range and teacher responses showed that the mass of students that have been retained in one class or more were in the 12 -14 years Age level (see Table in Appendix A).

Summary of Findings

The current study results confirmed 5 out of the nine hypotheses tested. Two were partially supported and two refuted. First of all, hypothesis 3 that stated that "there will be a positive correlation between reading academic achievement scores and mathematic academic achievement/spelling academic achievement scores" was supported. Secondly, hypothesis 4a that predicted "Children with learning disabilities will score lower on the social skills compared to other children without learning disabilities" was supported. Thirdly, hypothesis 5a that predicted "Children without learning disabilities will perform better on the Trail Making Test part B than children with learning disabilities" was supported. Fourthly, hypothesis 5b that predicted "Children with low scores on mathematic achievement subtest will perform poorly on the Trail Making Test Part B" was supported. Finally, hypothesis 6 that predicted "children without learning disabilities will have higher scores on the Ravens progressive matrices compared to children with learning disabilities and children with other neurological disorders" was supported.

However, hypothesis 1a that predicted "Children without learning disabilities will perform better on academic achievement than children with learning disabilities and children with other neurological disorders across all age levels" was partially confirmed. Besides this hypothesis 2

that predicted "children without learning disabilities will score higher on adaptive behavior measures compared to children with learning disabilities and children with other neurological disorders group" was also partially confirmed. Furthermore, hypothesis 1b that predicted Male children with learning disabilities will obtain higher academic achievement scores than their female counterparts with learning disabilities was refuted. Additionally hypothesis 4b that predicted "Children with learning disabilities will exhibit more problem behaviors than children without learning disabilities" was also refuted.

CHAPTER FIVE

DISCUSSION

The study aimed at understanding the academic, social and behavioural characteristics of children with learning disabilities amongst Ghanaian school children. It examined gender and age differences on academic achievement. Further the relevance of non-verbal intelligence and neuropsychological deficit measures in the identification of LD were investigated. Having presented the results of the proposed hypotheses in the previous chapter, this chapter focuses on a discussion of the present findings with reference to previous studies. Study limitations, recommendations for practice and further research are discussed.

Summary of Findings

Children with learning disabilities (CLD), children without learning disabilities (CWLD) and children with other neurological disorders (COND) were compared on measures of academic achievement, adaptive behavior skills, problem behaviors, non-verbal intelligence and performance on the Trails Making Test. Comparisons among the three groups showed significant differences on measures of academic achievement and non-verbal intelligence. The results specifically indicated that children with learning disabilities (LD) scored lower on measures of academic achievement and non-verbal intelligence compared to children without LD but relatively higher compared to children with other neurological disorders. In addition, age level and the combined effect of age level and LD was found to have an impact on the child's academic achievement.

Further, the results of the current study showed no significant gender differences for all academic achievement mean scores (reading, spelling and mathematics) amongst the LD sample.

However the results indicated that significant positive inter-correlations between reading, spelling and mathematics achievement mean scores exist across the three groups. Specifically the results indicated that reading achievement mean scores were positively and significantly associated with math and spelling achievement mean scores and vice versa. Similarly, spelling achievement mean scores were significantly correlated to math achievement mean scores and vice versa.

Additionally, a significant negative correlation was found between the performance on TMT Part B and mathematic achievement, spelling achievement and reading achievement mean scores. Significant and positive correlations were also found to exist between mathematic, spelling, reading scores and teachers ratings of the child in reading, spelling and mathematics. Other findings showed that CLD performance was impaired on the Trails Making Test B but not on TMT A. specifically, children with LD took a significantly longer time to complete the Trail Making Test Part B compared to their CWLD peers.

Further, CLD showed evidence of significantly lower social skills compared to their CWLD counterparts. CLD functioning with regard to social skills was comparable to that of COND. Contrary to expectations, few significant differences were found between CLD and CWLD group on measures of problem behaviours. Specifically, CLD differed significantly from CWLD only in relation to symptomatic behavior mean scores. With respect to other problem behaviour mean scores (hyperactive tendencies, acceptability of habits, mannerisms, disturbing vocal or speech habits, aggressiveness, antisocial behavior, withdrawal, trustworthiness and rebelliousness) CLD and CWLD experienced comparable behavioural difficulties. However, these groups differed significantly from COND in relation to these problem behaviours. Nevertheless, no significant differences were identified for inappropriate interpersonal manners

between the three groups (CLD, CWLD and COND). In all, no significant differences were found between CLD and CWLD group on the total number of problem behaviours. Nevertheless, the COND experienced more problem behaviours.

Academic Achievement.

Results from this investigation provide further support that children with LD are at greater risk for academic difficulties compared to their non-handicapped peers. This outcome is consistent with the findings of Fuchs et al. (2000) who reported that elementary and middle school children with LD experienced more academic deficits relative to their same-age peers without disabilities. A possible explanation for the present findings comes from the learning process in relation to the information processing model. According to this model, a learning disability interferes with the learning of certain academic skills while many other cognitive abilities develop normally (Anglada, 2010). This implies that children with learning disabilities learn or demonstrate their knowledge differently compared to their peers (Anglada, 2010). This is because their information-processing or thinking skills may be deficient (Friend, 2008).

Additionally, the present study found that although children with LD may have academic difficulties, their academic achievement is not so deficient compared to that of children with other neurological disorders. In the case of the learning disabled child, some but not all cognitive functions are impaired. For instance, in this current study it was observed that out of 70 students with LD only 13 students had a disability in mathematics and not in spelling or reading. A learning disability does not imply learning does not take place. Instead, it suggests that children with learning disabilities learn or demonstrate their knowledge in a different manner compared to their peers (Anglada, 2010).

Learning Disabilities, Age and Academic Achievement

In general, all age levels differed significantly on academic achievement performance for all the three groups, with the exception of the 9-11 and 12-14 age level groups that presented with similar results in academic achievement. Similar results on academic achievement for age levels 9-11 and 12-14 possibly suggested both age levels possess similar characteristics that affect academic achievement evenly. More importantly, these findings hint that the age level of the LD child appears to have an effect on his or her academic achievement. Furthermore, present data suggested that the combined effect of age and LD had an impact on the child's academic achievement. Current statistics from this investigation showed that in comparison to children without LD, the academic deficits of LD students increased progressively with age level but decreased at age level 15 and above.

The present findings were to some extent in line with Stage and Milne's (1996) notion that impact of a learning disability tends to increase as more demands are placed on academic skills. In part, the results supported the notion that adolescents with LD compared to younger children with LD experience more significant challenges in academic work (Lerner, 1993; Geisthardt & Munsch, 1996; Mercer, 1982; Seo, Abbott, & Hawkins 2008). For instance, Seo, Abbott and Hawkins (2008) reported that problems experienced during elementary school years are found to often persist or become worse in adolescence. Seo, Abott and Hawkins further emphasized that the demands of junior school work, the turmoil of adolescence and continued academic failure may also contribute to intensify the learning disability. Going by this, it was unexpected that observed academic deficits would decline rather than increase at age level 15 and above. However, a good explanation lies in the fact that a smaller number of subjects (3) made up, age level 15 in comparison to the other age levels.

Learning Disabilities, Academic Achievement and Gender.

The results from the present study indicated no significant differences on academic achievement measures between male and female LD children. These findings support previous studies (Ryckman 1981; Share & Silva, 2003) that considered the same level of academic difficulty for both males and females with LD. For instance, Ryckman's (1981) study identified no gender differences on academic measures. However, these results contradicted Badian's (1999) study which reported that male students with LD performed significantly better on listening and reading comprehension measures compared to their females counterparts. Likewise, the results differ from Vogel's (1990) findings that reported that females with LD have more severe academic achievement deficits in some aspects of reading and mathematics, and are somewhat better in, spelling than males with LD. Moreover, Vogel (1999) claim that LD males were superior in mathematical reasoning was not supported.

Furthermore, the current results contradict findings from Ghanaian and African studies that suggested more girls than boys have academic difficulties (Boothroyd & Chapman 1987; Preliminary Education Sector Performance Report 2008; Wilmot, 2001). Perhaps the results differ because those studies were based on the general school populations. However, based on the present results it is concluded that Ghanaian females with LD and males with LD experience about equal academic difficulties.

Inter-Correlations between Academic Achievement Variables.

Results presented significant positive inter-correlations between reading, spelling and mathematics achievement. These findings mean that strong links exist between reading, spelling and mathematics. On the whole, the present results confirm that a reading disability may indeed

affect the child's ability to spell or do mathematic's (Lerner, 1989; Paediatr, 1999). For instance, the findings provide additional support to Fletcher et al findings (2002), in that children with reading disabilities may often have problems with mathematics, especially if their language is more pervasively impaired, as language problems are thought to disrupt mathematics (Geary, 1993). These findings are also consistent with Ostad's (1998) study findings that found a relationship to exist between mathematics and spelling disabilities. In all, the results support that a disability in one academic area can affect other areas of academic achievement.

Learning Disabilities and Neuropsychology. Other findings indicated some significant differences in performance on the Trails Making Test. No significant differences were found between the CLD and CWLD groups on their performance on Trails Making Test A. However, children with LD took a significantly longer time to complete the Trail Making Test Part B compared to their CWLD peers. As predicted, the Trails Making Test B was able to discriminate between children with LD and children without LD. This outcome was consistent with Davis et al (1989) study in which learning-disabled children performed poorly compared to normal children on the Trail Making Test (Part B). An explanation for this outcome is that performance on the TMT B requires the use of executive functions, which in the case of a child with LD, are impaired. Therefore the ability to complete the task in the fastest time possible is impeded. These results also confirm Bradford's (1992) assumption that The Trail Making Test part B is a good general indicator, because its cognitive demands include visual scanning, visual-motor coordination and visual-spatial ability adequate enough to understand an on-going basis the alternating pattern of numbers and letters. Based on these current results, only the part B of the TMT is a good screening tool for screening children with LD in Ghana.

Additionally a significant negative correlation was found between the performance on TMT Part B and mathematic achievement scores. As hypothesized, the longer it took to complete the TMT B, the lower the mathematic achievement scores obtained. This recognition was consistent with previous studies (Bull, Johnston, & Roy, 1999; Rourke, 1993: van der Sluis, de Jong and van der Leij, 2004; White, Moffitt, & Silva 1992). The general conception was that children who had lower mathematical ability had more difficulty in shifting between tasks (which is an executive function). As well, performance on the TMT Part B was negatively correlated with both spelling and reading achievement. These findings offer support to Reiter, Tucha and Lange's (2005) study in that poor executive functioning as evidenced by performance on the TMT B is also associated with difficulties in reading. Again the explanation for poor executive functioning is explained by the presence of a learning disability that interferes with executive functions.

Learning Disabilities and Adaptive Behaviour.

Findings from the present study indicated significant group differences on adaptive behavior, albeit not fully in support of the predictions. Although, both groups (CLD and CWLD) appeared to function at the same level in terms of self care skills, the CLD group differed significantly on home living and community skills compared to the CWLD group. However, CLD were found not to be so impaired on the home living and community skills as compared to COND. These findings were consistent with Fletcher et al. (2005) view on adaptive behavior in that mental retardation (a neurological disorder) is associated with a pervasive impairment in adaptive behaviour. While, LD is associated with a narrow impairment in adaptive behavior. The present findings however, failed in part to support earlier studies (Bender & Golden, 1988; Leigh, 1987). For instance both studies, found out that CLD and CLWD differed significantly on

adaptive behaviour skills. On the other hand, this study presents evidence to suggest that self care skills are the same for CLD and CWLD but differ from that associated with COND. Nevertheless, in support of their studies (Bender & Golden, 1988; Leigh, 1987) CLD appeared to have impairment, only in the domain of home and community skills. This finding supported Brueggemann, Kamphaus and Dombrowski (2008) assertion that CLD have a functional impairment in adaptive behavior functioning. However, the results point to the fact that some but not all adaptive behavior domains may be impaired.

Learning Disabilities and Social Skills. The current Investigations found that children with LD (CLD) had relatively poor social skills than their CWLD peers. These findings further provide support for previous studies (Kavale & Forness, 1996; Swanson, & Malone, 1992; Toro et. al, 1990; Vaughn, Zaragoza, Hogan, and Walker, 1993), while it also contradicted findings reported in previous studies (Dudley-Marling & Edmiaston, 1985) that not all children with LD were prone to be judged with a low status. In addition it did not support findings that suggested no significant differences in relation to the social status of 46 mainstream learning disabled high school students and 46 non handicapped peers (Sabornie & Kauffman, 1986). These results confirm that non-LD peers are thought to be better in social settings at home and school by being better equipped to apply judgment and control (Stewart, 2006). On the contrary, children with LD have difficulty in interacting harmoniously with themselves and others (i.e. dealing with conflicts). This tends to affect the establishment and maintenance of successful relationships with adults and peers. For instance, based on a meta-analysis of 39 studies, children with learning disabilities (LDs) were found to be less liked and were more likely to be rejected than were normal-achieving children (Swanson & Malone, 1992).

However, no significant differences where found on social skill measures between the

CLD and COND groups. Both groups were found to have similar levels of social skill difficulties. These results are consistent with Gresham, MacMillan and Bocian's (1996) findings that children with learning disabilities (LD), low achievement (LA), or mild mental retardation (MMR) have similar social skills. This finding offers insight to the nature of LD, in that, besides children with low achievement and mild mental retardation, children with LD are more likely to function in a comparable manner to children with other neurological disorders with regard to social skills difficulties.

Learning Disabilities and Problem Behaviours. In this investigation, more optimistic results were found with regard to problem behaviors associated with LD students. Contrary to predictions, both groups of children (CLD and CWLD) were found to present with similar rates of problem behaviour. Findings pointed out that in Ghana, COND may present with more problem behaviours compared to CLD and CWLD. This finding failed to support previous reported outcomes that high counts of problem behaviours were a common feature amongst LD samples compared to their non-handicapped peers (Andreassen & Knivsberg, 2008; Swanson & Malone, 1992; McConaughty & Ritter, 1985; McKinney 1989; Toro, Weissberg, Guare & Liebenstein, 1990). These research findings contradict McConaughty and Ritter (1985) findings that found that concluded LD boys had more problems of social withdrawal, hyperactivity, aggressiveness and delinquency, the present results indicated similar withdrawal, hyperactivity, aggressiveness and antisocial problems amongst CLD and CWLD.

Nonetheless, a few significant differences were identified. In Ghana, children with LD are more likely to overestimate their own abilities, react poorly to criticism, poorly to frustration, demand excessive attention or praise, seem to feel persecuted, have hypochondriacal tendencies

and show other signs of emotional instabilities than their CWLD peers. These results suggest that an association may exist between a learning disability and these problem behaviours mentioned above. Moreover they highlight typical problem behaviours a Ghanaian LD child may experience.

It is not certain why LD students experience these problem behaviours (i.e. overestimating their own abilities) and not the ability of others. This area would require further research for clarification. However, CLD may react poorly to criticism and frustration because they lack the ability to manage stressors (Hoke, 2004). Year after year of frustration and failure at school can negatively affect students' motivation and convince them that there is nothing they can do to be successful (Smith, 2007), producing a state of learned helplessness. Additionally, they may feel persecuted because of the attitudes parents, teachers and peers have towards them. For example, Okonkwor (2006) explained that negative public attitudes can affect the behavior of a disabled child. Moreover, according to Broatch (2004), children with LD may receive little positive feedback despite their continuous effort. Their academic struggles and failures are met with disapproval by teachers, peers, and parents. Such disapproval can take the form of negative labeling of a child as "slow," or "lazy. So instead of developing a sense of pride in their accomplishments, children with LD may end up in a quagmire of frustration and shame (Broatch, 2004). In addition, Tsatsanis, Fuerst and, Rourke (1997) reported that their experiences of frustration, failure, negative attributions, and less successful social interaction can produce a self-perpetuating cycle of failure that leads the child with LD on a spiral of cognitive and psychosocial decline. Furthermore, these children become helpless and may seek for other means (hypochondriacal tendencies) other than academic achievement to gain attention from their parents and teachers.

To some extent these results point to the fact that the social competence of students with LD in Ghana may be impaired. This is because they may encounter more social skill difficulties than their CWLD peers. On the other hand the problem behaviours they present with appear to be usual for Ghanaian primary and high school children.

Learning Disabilities and Non-Verbal Intelligence. As predicted, a significant difference in non-verbal intelligence was observed between the three groups. Children with LD had lower scores in non-verbal intelligence compared to children without LD. Yet they scored better on the Ravens Progressive Matrices in comparison with their neurological counterparts. This finding suggests the fact that the impact of a LD could also affect one's performance on a non-verbal IQ test. Although this IQ measure was void of areas such as factual knowledge, expressive language abilities, short-term memory (Jimenez et al., 2003) the LD group performance was poor.

Overall the results seemed to suggest low non-verbal intelligence for children with LD compared to children without LD. However, the observed deficit was not comparable to that associated with children with other neurological disorders.

Although not predicted in the current study, a significant positive correlation was found to exist between performance on the Raven Progressive Matrices and academic achievement. This provides reason to assume that academic deficits may be related to the non-verbal intelligence of children with LD.

Other findings showed that majority (54.3%) of the children identified with LD had disabilities in all three subject areas. Additionally, contrary to the usual trend in literature more mathematics disabilities were prevalent than reading disabilities. What is more is that a teacher's ratings of the students in reading, spelling and mathematics were significant and positively correlated to the child's reading, spelling and mathematics achievement. This gives an indication

that teacher ratings of the children in the various areas of achievement studied were more or less consistent with the students' actual performance on academic achievement measures.

Finally, majority of the children identified with LD were reported to have repeated one class or more. This finding is similar to that of Mc Leskey's (1992) who identified that 58% of the students with learning disabilities had repeated a class prior to being identified.

Implications of the Research

The conclusions of the study reinforce the findings of previous studies carried out in the western and other developed communities. It contributes to local literature by documenting the academic, social and behavioral characteristics of learning disabilities amongst the Ghanaian school children investigated. These findings have suggested both similarities and differences between the present study and findings reported in western-based literature. Among the major findings, children with LD may have more academic difficulties compared to their non-handicapped peers. In addition academic difficulties were found to increase with age, implying that if unchecked at a younger age, they may have remarkably damaging effects in later years. Thus these findings point to an urgent need to identify children with LD in Ghana as early as possible.

Moreover, based on this study a disability in one area of academic achievement can affect other areas of academic achievement. It is likely that an improvement in the academic area with deficits can enhance improvement in the other affected academic areas. Therefore, there is a need to identify the specific learning disability so that specific areas can be targeted for remediation.

These findings have important implications for assessment as clearly a child with LD may be differentiated from children without LD on the basis of academic achievement, social skills and non-verbal intelligence. On the other hand, children with LD are superior to children

with other neurological disorders on several measures (i.e. adaptive behavior, academic measures, non-verbal intelligence, etc), creating a lucid distinction between these two groups.

In addition, based on the current findings, the trail making test can be used as a quick and concise tool for screening of academic deficits as executive functioning skills are associated with mathematics, reading, writing, learning, memory, and planning (Miller, 2006) and have been found to be a good predictor of performance in school (McLean and Hitch, 1999; Gathercole & Pickering, 2000).

Traditional and religious beliefs, in addition to present day attitudes within the community may influence the perception of learning disabilities in Ghana. Therefore this study serves as an important source of knowledge to educate the society on the realities associated with this disability.

In addition, there is a need for a general attitudinal change towards individuals with poor academic performance as their academic difficulties may be the result of a genuine learning disability. In order to minimize the impact of the disability, parents and teachers can take a cue from the findings of this study. Every, teacher should be trained to be able to identify obvious indicators of LD. Children suspected to be at risk should be referred to a psychologist to confirm the presence of an LD and identify problem areas that would require remediation. More importantly, educators have to realize that students learn differently, thus LD students must be taught in ways in which they learn best. Effective educators need to recognize that if learning is to take place in their classrooms, their first task is to create a safe environment in which all students feel secure, comfortable, and motivated to learn (Brooks, 2004). Parents and teachers alike would have to empathize with such students and avoid using labels that accuse and blame the individual. A positive attitude from the teachers would affect the way in which their peers

perceive them (Brooks, 2004). With a strong support system, LD students can be helped to become more motivated, successful, hopeful, and resilient.

Considering the fact that children with LD may have obvious social skill deficits and some identified problem behaviours, it is recommended that government include in their school structure, trained psychologists who can offer appropriate services that can help improve upon their social competence difficulties.

Limitations and Directions for Future Research

This study yielded valuable information regarding the nature of learning disabilities across a variety of age levels related to academic, social and behavioral outcomes. However, the limitations of this study need to be discussed. As is true for most exploratory studies in a society where such studies do not exist, there are various areas that could limit its generalization. First, one limitation of the study is the methodology employed. Because data was collected from schools in Accra, this study may not be able to generalize its findings to other schools outside Accra. One way to improve on this study is to replicate the study in the other nine regions in Ghana.

In addition, there is concern about the reliance on the cross-sectional design. This is because the direction of causality cannot be determined, because data was collected at a single point in time. For example, it may be found that, over time, LD has a strong relationship with the frequency of problem behaviours. This method seemed appropriate at the time due to the lack of financial resources and time constraints. Future research should consider employing longitudinal methods that would are more suited for establishing cause-effect relationships among variables.

Another challenge lay in the small sample size obtained during the first phase of the

study and subsequently the difficulty in obtaining an adequate number to make up the clinical group. This therefore, may limit its representativeness, and hence the generalizations of the findings reported in this study. It is recommended that future studies in this area should be conducted on a larger scale. Consequently, caution is suggested in generalizing findings from this study to other learning disabled populations (especially western and developed countries), as the criterion for defining the learning disability groups may be different.

Another concern was the study's dependence on teachers reported data. Although attempts were made to validate reported data by obtaining the same piece of information from parents, there is no guarantee that all the information provided by both sources are "true." Prospective researchers should also consider multiple sources of information e.g. interviews with the participants, self reports, anecdotal records, school reports etc. over a longer period of time. This study required an overwhelming amount of information from pupils, teachers and parents this was not received well by some individuals (teachers and parents). This aspect of the study prolonged data collection as constant follow ups on returned scales had to be made. Other pieces of important information concerning the child such as medical and developmental history were absent. Forthcoming research should consider developing a study that could be factored into the school programme in that data collection is seen as a normal school activity and this goes to further emphasize the need for a longitudinal study. The purpose of a longitudinal study would be to examine the continuity of the responses and to observe changes that occur over time (Zikmund, 1997). Apart from studying African children, there is also a need for clinical studies to be conducted on African adults who are learning disabled (Ramaa, 2000). This would enhance our understanding of this field.

The findings and conclusions of the study are a reflection of the characteristics associated with the Ghanaian LD children investigated. Research in this area is yet to receive its due recognition in Ghana. The absence of solid research implies an unawareness of LD as a subject of special importance. Professionals, educators and researchers alike are desperately needed to further advance the knowledge obtained in the current study. It is necessary that the academic, social and behavioral needs of this special group are served appropriately. In the words of Carlson (2005, p.17) "Without caring and inquisitive people willing to seek out new horizons, there can be no new intervention theories. We've come a long way, but we're not there yet."

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APPENDICES

Appendix 'A' – Tables

Table 1: Age and Age Levels of Children with Learning Disabilities

Characteristic	Frequency	Percent	Cumulative Percent
Age of child			
7	1	1.4	1.4
8	8	11.4	12.9
9	8	11.4	24.3
10	5	7.1	31.4
11	10	14.3	45.7
12	15	21.4	67.1
13	5	7.1	74.3
14	13	18.6	92.9
15	5	7.1	100.0
Age level	**Frequency**	**Percent**	**Cumulative Percent**
6 - 8	9	12.9	12.9
9 - 11	23	32.9	45.7
12 - 14	33	47.1	92.9
15 and above	5	7.1	100.0

Table 2: Gender, Type of School and Class Level of Children with Learning Disabilities

Gender	Frequency	Percent	Cumulative Percent
Male	36	51.4	51.4
Female	34	48.6	100.0
Type of school			
Public	24	34.3	34.3
Private	46	65.7	100.0
Class level			
2	7	10.0	10.0
3	7	10.0	20.0
4	8	11.4	31.4
5	13	18.6	50.0
6	12	17.1	67.1
7	9	12.9	80.0
8	9	12.9	92.9
9	5	7.1	100.0
Total	70	100.0	Total

Table 3: Distribution of Learning Disabilities Subtype

LD Subtype	Frequency	Percent	Cumulative Percent
RO	4	5.7	5.7
RS	6	8.6	14.3
RM	4	5.7	20.0
RSM	38	54.3	74.3
SO	2	2.9	77.1
SM	3	4.3	81.4
MO	13	18.6	100.0
Total	70	100.0	

Note. RO=Reading Only

RS= Reading and Spelling

RM=Reading and Mathematics

RSM=Reading, Spelling and Mathematics

SO=Spelling Only

SM=Spelling and Mathematics

MO= Mathematics Only.

Table 4: Frequencies of Demographic Characteristics for the Sample by Group and Total

Variable	*Frequency*		
	CLD N=50	*CWLD N=50*	*COND N=31*
Mean Age	11.18 (2.27)	11.16 (2.38)	13.32 (3.11)
Age level			
6 - 8	9	9	3
9 - 11	16	16	3
12 - 14	22	22	10
15 and above	3	3	15
Gender			
Male	25	25	15
Female	25	25	16

Note: CLD = Children with Learning Disabilities

CWLD = Children without Learning Disabilities

COND = Children with Neurological Disorders

Table 5: *Summary of Means and Standard Deviations for Age levels according to group type.*

Measures	*CLD (n=50)*	*CWLD (n=50)*	*COND (n=31)*	*Total (N=131)*
	Mean(SD)	Mean(SD)	Mean(SD)	Mean(SD)
Age level				
6 - 8	63.44 (13.76)	89.00 (19.49)	1.67 (2.89)	65.57(33.02)
9 - 11	90.38 (23.60)	120.13 (24.25)	1.33 (2.31)	96.34 (39.81)
12 - 14	81.45 (19.61)	139.45 (17.32)	13.40(16.84)	92.48(49.66)
15 AND ABOVE	100.33 (19.01)	124.33 (18.72)	12.73 (17.80)	41.19 (49.62)
Total	82.20 (22.08)	123.28 (26.86)	10.77 (15.98)	80.98 (48.77)

Table 6: A Summary of Two-Way ANOVA results for Group Type and Age level on Academic Achievement

Source	Sum of Squares	df	Mean Square	*F*	*F*crit	*P*
Group type	143892.73	2	71946.36	192.24	3.07	0.00
Age level	9310.73	3	3103.58	8.29	2.68	0.00
Group type * age level	7112.26	6	1185.38	3.17	2.17	0.01
Error	44536.63	119	374.26			
Total	1168246.00	131				

P<0.05

Table 7: Post Hoc Analysis for Age level

(I) age level	(J) age level	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
6 - 8	9 – 11	-30.7714*	5.33993	.000	-44.6857	-16.8571
	12 – 14	-26.9101*	4.97519	.000	-39.8739	-13.9462
	15 AND ABOVE	24.3810*	5.97022	.000	8.8243	39.9376
9 - 11	6 – 8	30.7714*	5.33993	.000	16.8571	44.6857
	12 – 14	3.8614	4.19807	.794	-7.0776	14.8003
	15 AND ABOVE	55.1524*	5.33993	.000	41.2381	69.0667
12 - 14	6 – 8	26.9101*	4.97519	.000	13.9462	39.8739
	9 – 11	-3.8614	4.19807	.794	-14.8003	7.0776
	15 AND ABOVE	51.2910*	4.97519	.000	38.3271	64.2549
15 AND ABOVE	6 – 8	-24.3810*	5.97022	.000	-39.9376	-8.8243
	9 – 11	-55.1524*	5.33993	.000	-69.0667	-41.2381
	12 – 14	-51.2910*	4.97519	.000	-64.2549	-38.3271

Based on observed means.

The error term is Mean Square(Error) = 374.257.

*. The mean difference is significant at the .05 level.

Table 8: A summary of results for One-Way ANOVA for performance on the Ravens Progressive Test

	Sum of Squares	df	Mean Square	F	Fcrit	Sig.
Between Groups	13226.57	2	6613.28	67.87	3.07	0.00
Within Groups	12471.60	128	97.43			
Total	66051.91	130				

P<0.01

Table 9: Results of the Independent Sample t-Test comparing the gender differences in all three domains of academic achievement.

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
academic achievement in reading	Equal variances assumed	.339	.563	.083	68	.934	.22059	2.65915	-5.08566	5.5268
	Equal variances not assumed			.083	67.440	.934	.22059	2.64772	-5.06366	5.50483
academic achievement in spelling	Equal variances assumed	.105	.747	-.288	68	.774	-.55556	1.92954	-4.40589	3.29478
	Equal variances not assumed			-.288	67.966	.774	-.55556	1.92755	-4.40197	3.29085
academic achievement in mathematics	Equal variances assumed	.204	.653	-.137	68	.891	-1.22222	8.89370	-18.96933	16.52489
	Equal variances not assumed			-.137	65.983	.891	-1.22222	8.92399	-19.03963	16.59519
total academic achievement in all three subjects	Equal variances assumed	.493	.485	.122	68	.903	.85784	7.02295	-13.15624	14.87193
	Equal variances not assumed			.122	67.992	.903	.85784	7.01341	-13.13724	14.85292

Table 10: A summary of one-way ANOVA results for Self Care Skills and Home and Community Skill measures.

Adaptive Behavior Measures		Sum of Squares	df	Mean Square	F	Sig.
Total score for self care skills	Between Groups	1693.399	2	846.700	28.429	.000
	Within Groups	3812.234	128	29.783		
	Total	5505.634	130			
Total score for home living and community skills	Between Groups	13718.358	2	6859.179	167.156	.000
	Within Groups	5252.435	128	41.035		
	Total	18970.794	130			
Total social skills score	Between Groups	4100.061	2	2050.031	31.314	.000
	Within Groups	8379.817	128	65.467		
	Total	12479.878	130			

$P<0.01$

able 11: Post Hoc Comparisons of Means for Home living and community skills, Self care skills and Social Skills Measures for children with learning sabilities, children without learning disabilities and children with other neurological disorders

ependent Variable	(I) diagnosis of the child	(J) diagnosis of the child	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
al score for home ing and mmunity skills	Children with LD	Children without LD	-3.86000*	1.28117	.009	-6.8980	-.8220
		other neurological cases	21.81806*	1.46437	.000	18.3456	25.2905
	Children without LD	Children with LD	3.86000*	1.28117	.009	.8220	6.8980
		other neurological cases	25.67806*	1.46437	.000	22.2056	29.1505
	other neurological cases	Children with LD	-21.81806*	1.46437	.000	-25.2905	-18.3456
		Children without LD	-25.67806*	1.46437	.000	-29.1505	-22.2056
otal score for self care skills	Children with LD	Children without LD	-2.46000	1.09148	.066	-5.0482	.1282
		other neurological cases	6.84258*	1.24756	.000	3.8843	9.8009
	Children without LD	Children with LD	2.46000	1.09148	.066	-.1282	5.0482
		other neurological cases	9.30258*	1.24756	.000	6.3443	12.2609
	other neurological cases	Children with LD	-6.84258*	1.24756	.000	-9.8009	-3.8843
		Children without LD	-9.30258*	1.24756	.000	-12.2609	-6.3443
otal social skills score	Children with LD	Children without LD	-9.64000*	1.61824	.000	-13.4773	-5.8027
		other neurological cases	3.84516	1.84965	.098	-.5409	8.2312
	Children without LD	Children with LD	9.64000*	1.61824	.000	5.8027	13.4773
		other neurological cases	13.48516*	1.84965	.000	9.0991	17.8712
	other neurological cases	Children with LD	-3.84516	1.84965	.098	-8.2312	.5409
		Children without LD	-13.48516*	1.84965	.000	-17.8712	-9.0991

.Tukey HSD - The mean difference is significant at the 0.05 level.

Table 12: A summary of one-way ANOVA results for problem behavior categories.

Problem behavior categories		Sum of Squares	df	Mean Square	F	Sig.
Total score for symptomatic behavior	Between Groups	492.552	2	246.276	16.969	.000
	Within Groups	1857.754	128	14.514		
	Total	2350.305	130			
Total score for hyperactive tendencies	Between Groups	38.703	2	19.351	11.498	.000
	Within Groups	215.435	128	1.683		
	Total	254.137	130			
Total for acceptability of habits	Between Groups	73.274	2	36.637	12.498	.000
	Within Groups	375.230	128	2.931		
	Total	448.504	130			
Total score for Inappropriate interpersonal manners	Between Groups	6.692	2	3.346	2.725	.069
	Within Groups	157.155	128	1.228		
	Total	163.847	130			
Total score for mannerisms	Between Groups	9.795	2	4.897	7.227	.001
	Within Groups	86.739	128	.678		
	Total	96.534	130			

Table 12:A summary of one-way ANOVA results for problem behavior categories(Continued).

		Sum of Squares	df	Mean Square	F	Sig.
Total score for withdrawal	Between Groups	60.008	2	30.004	7.119	.001
	Within Groups	539.504	128	4.215		
	Total	599.511	130			
Total score for trustworthiness	Between Groups	90.890	2	45.445	25.163	.000
	Within Groups	231.171	128	1.806		
	Total	322.061	130			
Total score for rebelliousness	Between Groups	221.711	2	110.855	9.504	.000
	Within Groups	1493.022	128	11.664		
	Total	1714.733	130			
Total antisocial behavior score	Between Groups	38.703	2	19.351	11.498	.000
	Within Groups	5805.455	128	45.355		
	Total	7959.908	130			
Total score for aggressiveness	Between Groups	368.795	2	184.398	9.329	.000
	Within Groups	2530.182	128	19.767		
	Total	2898.977	130			

Table 12: A summary of one-way ANOVA results for problem behavior categories(Continued).

		Sum of Squares	df	Mean Square	F	Sig.
Total score for disturbing vocal or speech habits	Between Groups	11.478	2	5.739	14.26	.000
	Within Groups	51.499	128	.402		
	Total	62.977	130			
Total score for total problem behaviors	Between Groups	19976.254	2	9988.127	27.75	.000
	Within Groups	46075.654	128	359.966		
	Total	66051.908	130			

Table 13:Results of the Independent Sample t-Test comparing performance on the Trails Making Test (TMT) between children with LD and children without LD.

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
time used in completing the trail making A test	Equal variances assumed	1.230	.270	-.534	98	.595	-.36840	.69045	-1.73857	1.00177
	Equal variances not assumed			-.534	52.183	.596	-.36840	.69045	-1.75377	1.01697
time used in completing the trail making B test	Equal variances assumed	4.490	.037	2.867	98	.005	1.52480	.53185	.46936	2.58024
	Equal variances not assumed			2.867	92.975	.005	1.52480	.53185	.46865	2.58095
time difference between completion of part B and part A	Equal variances assumed	5.020	.027	2.721	98	.008	1.20540	.44304	.32620	2.08460
	Equal variances not assumed			2.721	90.577	.008	1.20540	.44304	.32530	2.08550

Table 14: Class retention of the LD student: The student has repeated one or more classes.

		Frequency	Percent	Valid Percent	Cumulative Percent
	No	33	47.1	47.1	47.1
	Yes	37	52.9	52.9	100.0
	Total	70	100.0	100.0	

Table 15: A Cross tabulation of age level and teacher responses on retention

		The student has repeated one or more classes		Total
Count		no	yes	
Age level	6 – 8	6	3	9
	9 – 11	12	11	23
	12 – 14	11	22	33
	15 AND ABOVE	4	1	5
Total		33	37	70

Table 16: Raw Scores - Descriptive Statistics for measured variables

Group type of the child		N	Minimum	Maximum	Mean	Std. Deviation
Children with LD	Age of the individual	50	7.00	15.00	11.1800	2.26500
	Age level	50	.00	3.00	1.3800	.85452
	Gender of the individual	50	1.00	2.00	1.5000	.50508
	type of school	50	1.00	2.00	1.5600	.50143
	class level of the individual	50	2.00	9.00	5.0400	1.99959
	diagnosis of the child	50	1.00	1.00	1.0000	.00000
	academic achievement in reading	50	11.00	55.00	30.8200	12.01137
	academic achievement in spelling	50	11.00	43.00	24.8600	8.14414
	academic achievement in mathematics	50	14.00	35.00	26.0800	4.66354
	total academic achievement in all three subjects	50	45.00	124.00	82.2000	22.08333
	non verbal intellingence	50	9.00	50.00	23.4800	10.29809
	time used in completing the trail making A test	50	.15	3.44	1.7922	.86635
	time used in completing the trail making B test	50	2.09	13.57	4.9156	2.95222
	time difference between completion of part B and part A	50	.59	11.07	3.1456	2.51234
	total social skills score	50	20.00	48.00	33.2000	7.65320
	total score for home living and community skills	50	27.00	48.00	41.5600	5.23785
	total score for self care skills	50	28.00	48.00	44.5200	4.35300
	total score for aggressiveness	50	.00	26.00	1.5400	4.50039
	total antisocial behavior score	50	.00	29.00	2.9200	4.56625
	total score for rebelliousness	50	.00	22.00	1.6000	3.55137
	total score for trustworthiness	50	.00	3.00	.1800	.59556
	total score for withdrawal	50	.00	9.00	1.1000	1.98206
	total score for mannerisms	50	.00	3.00	.3000	.61445
	has inappropriate interpersonal manners	50	.00	2.00	.1600	.46773
	has disturbing vocal or speech habits	50	.00	2.00	.2800	.60744

	total for acceptability of habits	50	.00	12.00	.9000	2.14047
	total score for symtomatic behavior	50	.00	14.00	3.0200	3.54268
	problembehavior	50	.00	113.00	12.4000	18.53293
	Valid N (listwise)	50				
Children without LD	age of the individual	50	6.00	15.00	11.1600	2.38499
	age range	50	.00	3.00	1.3800	.85452
	gender of the individual	50	1.00	2.00	1.5000	.50508
	type of school	50	1.00	2.00	1.5600	.50143
	class level of the individual	50	2.00	9.00	5.8800	2.27354
	diagnosis of the child	50	2.00	2.00	2.0000	.00000
	academic achievement in reading	50	19.00	68.00	50.8400	12.34762
	academic achievement in spelling	50	16.00	50.00	37.4600	9.23660
	academic achievement in mathematics	50	22.00	51.00	34.9800	6.73550
	total academic achievement in all three subjects	50	57.00	166.00	1.2328E2	26.86021
	non verbal intellingence	50	10.00	55.00	32.2400	11.49012
	time used in completing the trail making A test	50	.34	35.00	2.1606	4.80471
	time used in completing the trail making B test	50	1.00	12.07	3.3908	2.32974
	time difference between completion of part B and part A	50	.14	8.63	1.9402	1.87145
	total social skills score	50	26.00	48.00	42.8400	5.33896
	total score for home living and community skills	50	35.00	48.00	45.4200	3.76932
	total score for self care skills	50	38.00	48.00	46.9800	2.20843
	total score for aggressiveness	50	.00	2.00	.1400	.40457
	total antisocial behavior score	50	.00	40.00	1.4600	5.68998
	total score for rebelliousness	50	.00	3.00	.1200	.52060
	total score for trustworthiness	50	.00	1.00	.0400	.19795
	total score for withdrawal	50	.00	7.00	.3600	1.13856
	total score for mannerisms	50	.00	3.00	.0600	.42426

	has inappropriate interpersonal manners	50	.00	9.00	.3000	1.44632
	has disturbing vocal or speech habits	50	.00	.00	.0000	.00000
	total for acceptability of habits	50	.00	2.00	.1400	.45221
	total score for symptomatic behavior	50	.00	5.00	.7800	1.38932
	Problem behavior	50	.00	51.00	3.6800	7.99091
	Valid N (listwise)	50				
other neurological cases	age of the individual	31	6.00	19.00	13.5161	3.10774
	age range	31	.00	3.00	2.1935	.98045
	gender of the individual	31	1.00	2.00	1.5161	.50800
	type of school	31	.00	.00	.0000	.00000
	class level of the individual	0				
	diagnosis of the child	31	3.00	3.00	3.0000	.00000
	academic achievement in reading	31	.00	26.00	4.9032	7.78184
	academic achievement in spelling	31	.00	17.00	2.1613	4.52472
	academic achievement in mathematics	31	.00	24.00	3.7097	5.24210
	total academic achievement in all three subjects	31	.00	53.00	10.7742	15.97855
	non verbal intellingence	31	.00	14.00	6.0000	5.18331
	time used in completing the trail making A test	0				
	time used in completing the trail making B test	0				
	time difference between completion of part B and part A	0				
	total social skills score	31	15.00	48.00	29.3548	11.70911
	total score for home living and community skills	31	4.00	44.00	19.7419	10.34720
	total score for self care skills	31	19.00	48.00	37.6774	9.38931
	total score for aggressiveness	31	.00	27.00	4.5161	7.14083
	total antisocial behavior score	31	.00	38.00	11.6129	10.32369
	total score for rebelliousness	31	.00	27.00	3.5161	5.35955

total score for trustworthiness	31	.00	11.00	2.0645	2.65751
total score for withdrawal	31	.00	14.00	2.1290	3.07400
total score for mannerisms	31	.00	6.00	.7742	1.40735
has inappropriate interpersonal manners	31	.00	5.00	.7419	1.21017
has disturbing vocal or speech habits	31	.00	4.00	.7742	1.05545
total for acceptability of habits	31	.00	9.00	2.0968	2.16572
total score for symptomatic behavior	31	.00	22.00	5.8387	6.18653
Problem behavior	31	4.00	118.00	35.6774	29.50524
Valid N (listwise)	0				

Appendix "B"

Instruments used.

Consent Form

The Wide Range Achievement Test 4 (WRAT4)

The Wide Range Reading subtest

The Wide Range Spelling Achievement Subtest.

The Wide Range Math Computation Achievement subtest.

The Raven's Progressive Matrices

The LD Questionnaire

Trails Making Test (TMT)

Part A

Part B

Ghana Adaptive Behavior Scale (GABS).

Social Skills Subscale

The Home Living and Community skills subscale

Self Care skills Subscale

Adaptive Behavior Scale (ABS) School Edition

AGES 7 OR YOUNGER: Administer Part 1: Letter Reading first, followed by Part 2: Word Reading. Discontinue testing if a Participant has responded incorrectly to 10 consecutive items (*10 RULE*).

AGES 8 OR OLDER: Administer Part 2: Word Reading first. Discontinue the Word Reading section if the Participant has answered 10 consecutive items incorrectly (*10 RULE*). If the Participant has correctly answered 5 or more items on the Word Reading section before meeting the discontinue criterion, do not administer the preliminary Letter Reading section. If the Participant did not answer at least 5 items correctly on the Word Reading section, then administer Part 1: Letter Reading (*5 RULE*).

Part 1: Letter Reading Administration Instructions

After handing the Participant the Blue Word Reading List, say, **I want you to look at the letters on this line.** (Point to the row of letters at the top of the card.) **Read to me the letters one by one across the line.** After the Participant has finished, say, **That's all. Now let's do something different.**

A (1) B (2) O (3) S (4) E (5) R (6) T (7) H (8) U (9) P (10) I (11) V (12) Z (13) J (14) Q (15)

Part 2: Word Reading Administration Instructions

After handing the Participant the Blue Word Reading List, say, **Look at each of these words carefully.** (Point to the words.) **Read the words across the page so I can hear you. When you finish the first line, go right on to the second line, and so on down the page until you finish or I tell you to stop. Read slowly and say the words clearly.** Allow 10 seconds for the Participant to respond to each word. If there is no response, [illegible] say, **OK, try the next one.** If you did not hear a word clearly, say, **I could not hear you clearly. Please say the word again just as you did the first time.** When the Participant has finished the Word Reading section, say, **That's all. Good job. Thanks. Now we are going to do something else.**

1. **cat** kat
2. **in** in
3. **book** buuk
4. **tree** tree
5. **how** how
6. **animal** an-ĭ-măl
7. **hair** hair
8. **spell** spel
9. **even** ee-vĕn
10. **size** sīz
11. **finger** fing-gĕr
12. **felt** felt
13. **laugh** laf
14. **straight** strayt
15. **stretch** strech
16. **split** split
17. **lame** laym
18. **bulk** bulk
19. **knowledge** nol-ij
20. **abuse** ă-byoos, -byooz
21. **ceiling** see-ling
22. **diagram** dī-ă-gram
23. **doubt** dowt
24. **collapse** kŏ-laps
25. **gigantic** ji-gan-tic
26. **contemporary** kŏn-tem-pŏ-rer-ee
27. **contagious** kŏn-tay-jŭs
28. **exterior** ik-steer-i-ŏr
29. **horizon** hŏ-rī-zŏn
30. **triumph** trī-ŭmf
31. **alcove** al-kohv
32. **tranquility** trang-kwil-i-tee
33. **efficiency** i-fish-ĕnt-see
34. **inquisitive** in-kwiz-i-tiv
35. **bibliography** bib-li-og-ră-fee
36. **municipal** myoo-nis-ĭ-păl
37. **unanimous** you-nan-ĭ-mŭs
38. **discretionary** di-skresh-ŏ-ner-ee
39. **seismograph** sīz-mŏ-graf
40. **benign** bi-nīn
41. **itinerary** ī-tin-ĕ-rer-ee
42. **heresy** her-ĕ-see
43. **usurp** yoo-surp, -zurp
44. **stratagem** strat-ă-jĕm
45. **pseudonym** soo-dŏ-nim
46. **irascible** i-ras-ĭ-bĕl
47. **heinous** hay-nŭs
48. **poignant** poin-yănt
49. **disingenuous** dis-in-jen-yoo-ŭs
50. **covetousness** kuv-ĕ-tŭs-nes
51. **omniscient** om-nish-ĕnt
52. **oligarchy** ol-i-gahr-kee
53. **egregious** i-gree-jŭs
54. **assuage** ă-swayj
55. **terpsichorean** turp-si-kŏ-ree-ăn

Letter Reading Raw Score	___/15
Word Reading Raw Score*	___/55
Word Reading Total Raw Score	___/70

Next administer the Sentence Comprehension subtest, if applicable.
*Use this value for determining starting point on Sentence Comprehension subtest.

SPELLING SUBTEST

AGES 7 OR YOUNGER: Administer Part 1: Letter Writing first, followed by Part 2: Spelling. The Spelling section must be administered individually for participants ages 7 and younger. On the Spelling section, the test should be discontinued after the Participant spells 10 consecutive words incorrectly (*10 RULE*).

AGES 8 OR OLDER: Administer Part 2: Spelling first. Discontinue if 10 consecutive errors have been made (*10 RULE*). If the Participant has correctly spelled 5 or more items on the Spelling section before meeting the discontinue criterion, the preliminary Letter Writing section should not be administered. If the Participant does not spell at least 5 words correctly on the Spelling section, then administer Part 1: Letter Writing (*5 RULE*).

SPELLING SUBTEST

Part 2. Spelling

1. _____	16. _____	31. _____
2. _____	17. _____	32. _____
3. _____	18. _____	33. _____
4. _____	19. _____	34. _____
5. _____	20. _____	35. _____
6. _____	21. _____	36. _____
7. _____	22. _____	37. _____
8. _____	23. _____	38. _____
9. _____	24. _____	39. _____
10. _____	25. _____	40. _____
11. _____	26. _____	41. _____
12. _____	27. _____	42. _____
13. _____	28. _____	
14. _____	29. _____	
15. _____	30. _____	

Letter Writing Raw Score	/15
+	
Spelling Raw Score	/42
Spelling Total Raw Score	/57

MATH COMPUTATION SUBTEST

Part 2: Math Computation

Write all answers in simplest form

1. $1 + 1 =$ ____	2. $\begin{array}{r} 5 \\ -\ 1 \\ \hline \end{array}$	3. Write the missing number: 28, 29, ____, 31, 32	4. $8 - 4 =$ ____	5. $2 + 7 =$ ____
6. $\begin{array}{r} 9 \\ +\ 3 \\ \hline \end{array}$	7. $8 -$ ____ $= 5$	8. $\begin{array}{r} 32 \\ 24 \\ +\ 40 \\ \hline \end{array}$	9. $\begin{array}{r} 36 \\ -\ 15 \\ \hline \end{array}$	10. $3 \times 4 =$ ____
11. $\begin{array}{r} 68 \\ +\ 23 \\ \hline \end{array}$	12. $6 \div 2 =$ ____	13. $\begin{array}{r} 33 \\ -\ 17 \\ \hline \end{array}$	14. $\begin{array}{r} 229 \\ 5{,}048 \\ +\ 63 \\ \hline \end{array}$	15. $\begin{array}{r} 17 \\ \times\ 4 \\ \hline \end{array}$
16. $\begin{array}{r} 724 \\ -\ 597 \\ \hline \end{array}$	17. Round 357 to the nearest ten. Answer ____	18. $\frac{15}{5} =$ ____	19. $\frac{1}{3} + \frac{1}{3} =$ ____	20. $2\frac{1}{2} + 1\frac{1}{2} =$ ____
21. Solve for x: $31 + x = 50$ $x =$ ____	22. $3\overline{)14}$	23. $4.73 \times 10 =$ ____	24. $9\overline{)4527}$	25. $\begin{array}{r} 823 \\ \times\ 45 \\ \hline \end{array}$

Part 2: Math Computation

Write all answers in simplest form

26. $\begin{array}{r} 38 \\ \times\ 2.4 \\ \hline \end{array}$	27. $2 - \_\_\_\_ = \frac{1}{4}$	28. $\frac{1}{4} \times \frac{1}{2} = \_\_\_\_$	29. Solve for n: $4n - 3 = 29$ $n = \_\_\_\_$	30. $\frac{2}{5}$ of 35 = ____
31. .042 = ____ %	32. Solve for s: $\frac{25}{100} = \frac{s}{8}$ $s = \_\_\_\_$	33. $\begin{array}{r} 6.05 \\ \times\ 12.7 \\ \hline \end{array}$	34. 15% of 160 = Answer ____	35. $\begin{array}{r} 6\frac{1}{4} \\ 1\frac{5}{8} \\ +\ 4\frac{1}{2} \\ \hline \end{array}$
36. $27\overline{)384}$	37. $\frac{3}{10} + \frac{3}{4} = \_\_\_\_$	38. $\begin{array}{r} 10\frac{1}{4} \\ -\ 7\frac{2}{3} \\ \hline \end{array}$	39. Write as a fraction in simplest form: .075 = ____	40. Simplify: $\frac{r^3 - 5r - 6}{r + 1}$ Answer ____

___/15	+	___/40	=	___/55
Oral Math Raw Score		Math Computation Raw Score		Math Computation Total Raw Score

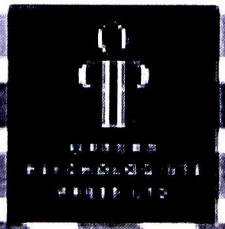
3 5 6 17 41

3

STANDARD PROGRESSIVE MATRICES

SETS A, B, C, D & E

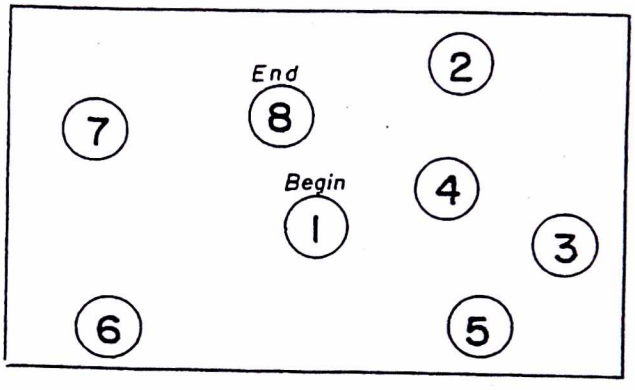
Prepared by J C Raven

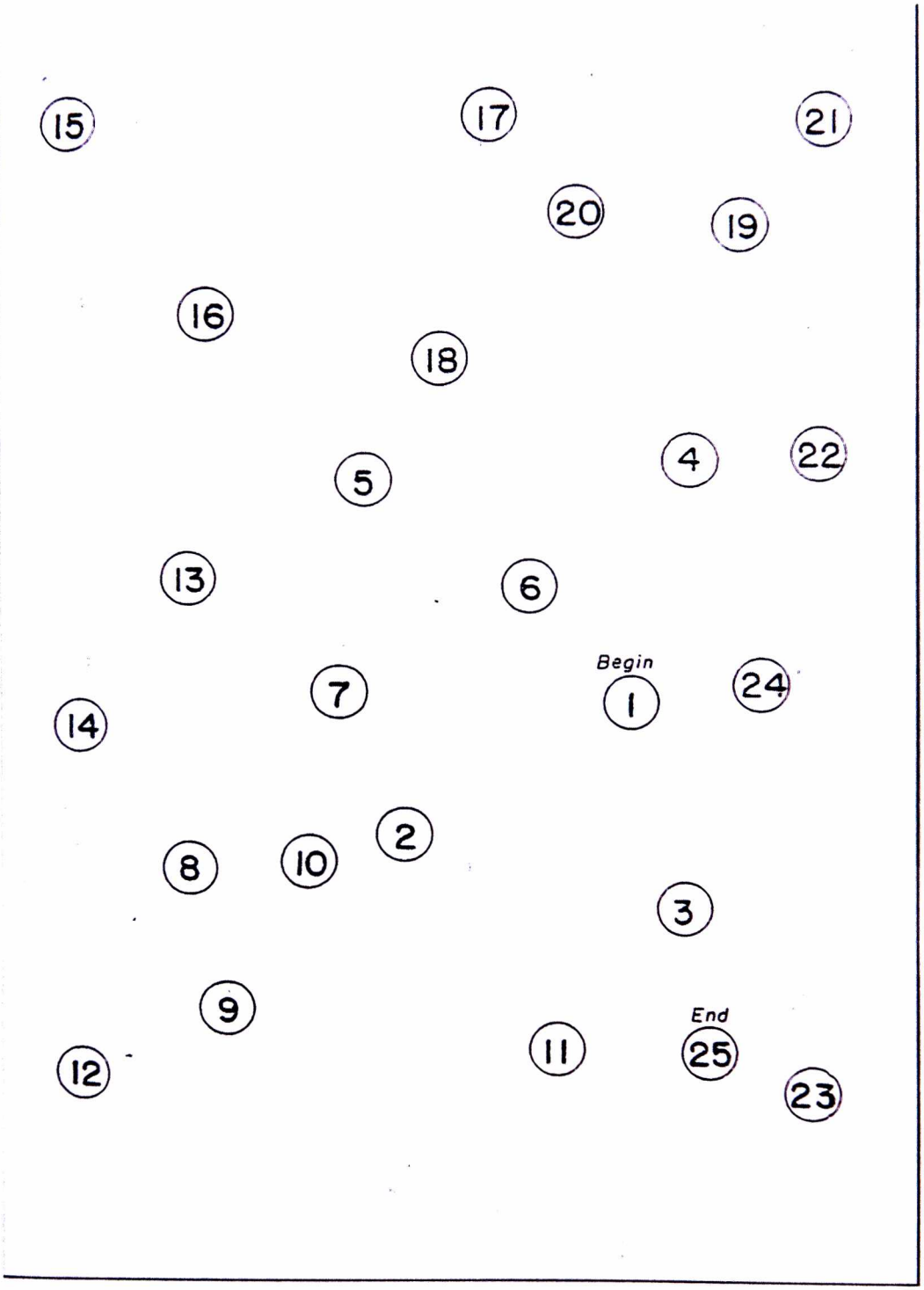


TRAIL MAKING

Part A

SAMPLE

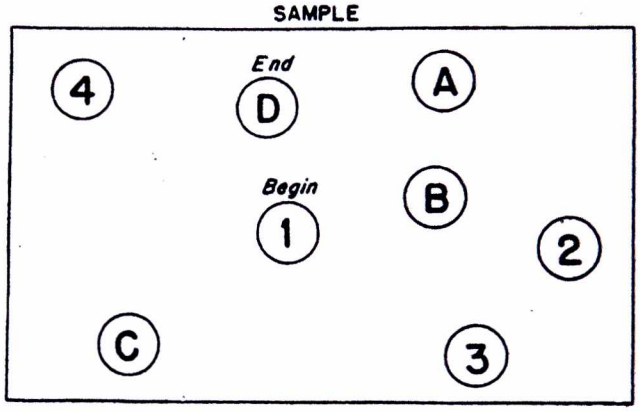


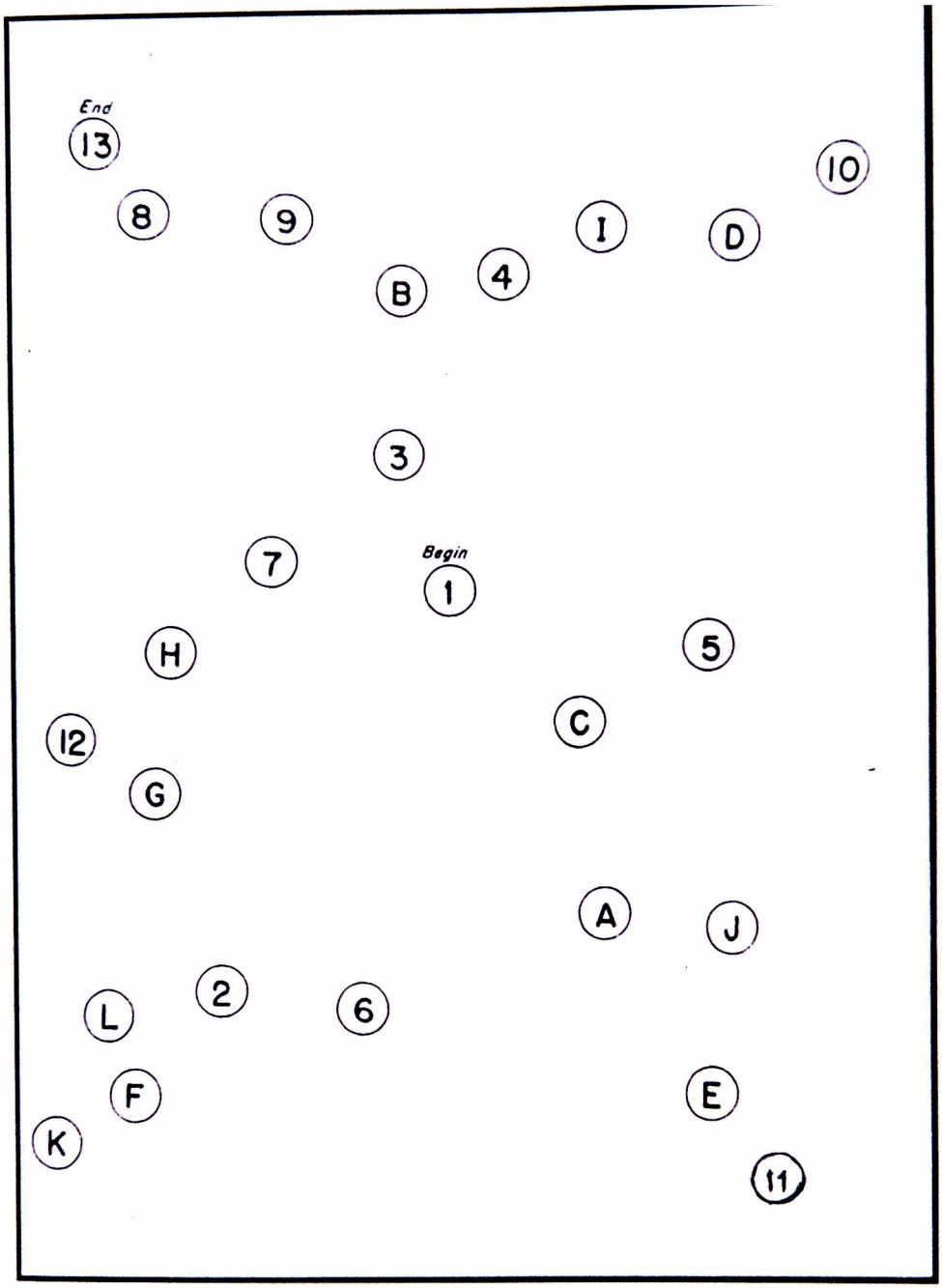


TRAIL MAKING

Part B

SAMPLE





LEARNING DISABILITY AND ACADEMIC ACHIEVEMENT AMONG SCHOOL CHILDREN IN ACCRA

i. Name of Child_____

ii. Gender: Male _____ Female _____ iii. Date of Birth _____ iv. Age_____

v. Occupation of parents: Father _____ Mother _____

vi. Type of School: Private _____ Public _____ Class level _____

Please tick options that best apply to the student named above.

#	Item	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	The student is not performing as expected in one or more areas of school learning based on the school continuous assessment.					
2	Low academic performance continues and does not seem to respond to the teaching provided in the classroom.					
3	Possible causes for academic problem such as poor vision, poor hearing have been ruled out.					
4	The student has an emotional problem like depression					
5	The student has an emotional problem like anxiety					
6	The student has a behavioral problem such as disruptive and abusive character					
7	The student acts younger than children his or her age.					
8	The student feels hopeless.					
9	The student appears less interested in school.					
10	The student fights with other children.					
11	The student acts in accordance with school regulations.					
12	The student appears to be unhappy					

13. The student has repeated one or more classes (yes /no)

14. Please rate the student's performance in the following subjects

Subject	Excellent	Good	Average	Poor
Reading	☐	☐	☐	☐
Spelling	☐	☐	☐	☐
Mathematics	☐	☐	☐	☐

Name of Child_____

LD AND ACADEMIC ACHIEVEMENT

There are three measures in this section assessing Social skills, Home Living and community Skills and Self care skills. Please rate the following items as they apply to your ward according to the following scale:

2 = always, can do it each and every time
1= sometimes or with assistance
0 = never does it even with help
u = Unknown, if behavior cannot be observed
n = non existent, if certain experiences are not possible (i.e. such as lack of electricity at home)

Item	SOCIAL SKILS	2	1	0	u	n
1	Takes care of others belongings (If he/she uses some ones book , how does he treat it)					
2	Greets other verbally or by gestures					
3	Is happy or proud if he/she has achieved something, even without praise from others.					
4	Makes sure not loose his/her things					
5	Says " please", "thank you' and "sorry"					
6	Can defend himself/herself in a calm way if unfairly treated					
7	Helps others if necessary					
8	Shares with others (Does he share his/her belongings with friends, how often does he/she do it)					
9	Can recognize feelings (when some one is happy, sad, angry)					
10	Can cooperate in a group without quarrelling					
11	Follows the rules of a game (If no one notices does he cheat at games)					
12	Gives borrowed objects back without being reminded					
13	Knows church hymns, traditional songs, and school songs, and sings with others					
14	Behaves correctly and shows the necessary respect at ceremonies (How does he/she behave if the flag is raised? How does he/she sit at church?					
15	Follows advice by elders (When was the last time an elder gave him/her advice? What did he/she say? Did he/she follow his advice)					
16	Can accept criticism and suggestions without becoming angry or annoyed					
17	Tries to meet expectation in different situations such as being a "friend", visitor, "pupil", or "host"					
18	Excuses himself/herself for false and unjust accusations(If he/she have said something wrong about someone)					
19	Follows school rules or other standards of conduct (how often in the last month has he/she been punished for not doing what they were told)					
20	Respects the given time limits for recreation or break time at school					
21	Is on time					
22	Does his/her share of the work (Does as much work as hi/her brothers and sister? What exactly does he/she do? How often does he/she do it?					
23	Can keep secrets or confidential information					
24	Proposes solution in group conflicts (such as sticking to the rules of the game) (If his/her brothers and sister quarrel when playing together, what does he/she do?					
	Total raw score					

	HOME LIVING AND COMMUNITY SKILLS	2	1	0	u	n
1	Can he/she find their way home from school alone					
2	Can concentrate on a task for at least five minutes					
3	Collects trash and disposes of it on request					
4	Does small errands in familiar surroundings					
5	Concentrates for 15 minutes on a given task					
6	Knows the correct price of at least three objects					
7	Crosses the roads in the neighborhood looking to both sides and waiting for passing cars before crossing					
8	Can buy things small objects locally					
9	Washes own clothing					
10	Participates in organized games like football or ampe					
11	Participates in leisure time activities with friends without being accompanied by adults					
12	Knows the value of coins					
13	Can put coins in order of their value					
14	Exchange an amount of coins in another (Five 10p into 50p)					
15	If given 50p to buy bread for 25p he/she is able to make change					
16	Uses pointed objects (knives, scissors, needles) Safely					
17	Can light candle and place in a safe place					
18	Makes own bed and changes the sheets regularly					
19	Avoids dangers of electrical objects					
20	Knows the name of his hometown, neighborhood, his street and house					
21	Avoids danger of pointed and sharp objects					
22	Can use stove without danger for heating food or water(Is he/she allowed to use stove for heating something without someone else watching over him/her.					
23	Can cook a simple meal like porridge					
24	Washes and irons clothing					
	Total raw score					

	Self Care Skills	2	1	0	u	n
1	Can distinguish between things that are safe to eat and drink and those that are dangerous					
2	Unbuttons his clothing					
3	Puts on a shirt buttoning the buttons correctly					
4	Unzips clothing					
5	Drinks from a cup held in one hand without spilling					
6	Washes hands and face with soap and dries them with towel					
7	Cleans his teeth using a chewing stick or tooth brush					
8	Eats using the correct hand or a spoon without spilling food of dirtying his face					
9	Wipes himself/herself using toilet paper, bits of paper or washing himself appropriately					
10	Puts his shoe on the correct foot without help					
11	Dresses without help and with everything in place (no shirt tail hanging out all buttons and zippers closed etc.					
12	Combs and brushes hair					
13	Takes a bath without help and washes his body with soap					
14	Wipes and cleans shoes when needed					
15	Uses toilet or an appropriate site independently					
16	Controls his bladder during the night (Has he/she wet their bed during the night)					
17	Eats in a socially accepted manner (i.e. sits properly at the table, does not spit out orange seeds etc)					
18	Can pour something to drink without spilling the content					
19	Washes, rinses and dries hair					
20	Cleans and washes his/her plates after haven eaten					
21	Has clean and neat appearance (no strong odor, skin or clothing are clean.					
22	Keeps the toilet area clean					
23	Cleans and cares for fingernails					
24	Chooses clothing appropriate for the situation (School uniform, church clothing etc.					
	Total raw score					

LEARNING DISABILITY AND ACADEMIC ACHIEVEMENT AMONG SCHOOL CHILDREN IN ACCRA

The following Questions apply to your ward please check or write as required.

SECTION A2

i. Name of Child_____

ii. Gender: Male _____ Female _____

iii. Age _____

iv. Type of School: Private _____ Public _____

v. Class level _____

SECTION B2

Please select each statement that applies to the student being assessed and circle the "1" if the behavior occurs occasionally or the "2" if it occurs frequently. Circle the "0" for "Does none of the above" where appropriate.

Please use the space for "other" when the following applies:

1 The student has behavior problems related to those circled.

2 The student has behavior problems that are not covered by any of the examples listed

The behavior listed under "other" must be a specific example of the behavior problem stated in the item

	Damages Personal Property		
Item 58	Rips, tears. or chews own clothing	1	2
	Soils own property	1	2
	Tears up own magazines, books, or other possessions	1	2
	Does none of the above	0	0
	Other (Specify)	1	2

Please turn page over for questions

Part Two

DOMAIN 10

Aggressiveness

		Occasionally	Frequently	
ITEM 57	**Threatens or Does Physical Violence**			
	Uses threatening gestures	1	2	
	Causes injury to others indirectly	1	2	
	Spits on others	1	2	
	Pushes, scratches, or pinches others	1	2	
	Pulls others' hair, ears, etc.	1	2	
	Bites others	1	2	
	Kicks, strikes, or slaps others	1	2	
	Throws objects at others	1	2	
	Chokes others	1	2	
	Uses objects as weapons against others	1	2	
	Hurts animals	1	2	
	Does none of the above	0	0	☐
Other (specify)		1	2	☐
ITEM 58	**Damages Personal Property**			
	Rips, tears, or chews own clothing	1	2	
	Soils own property	1	2	
	Tears up own magazines, books, or other possessions	1	2	
	Does none of the above	0	0	☐
Other (specify)		1	2	☐
ITEM 59	**Damages Others' Property**			
	Rips, tears, or chews others' clothing	1	2	
	Soils others' property	1	2	
	Tears up others' magazines, books, or personal possessions	1	2	
	Does none of the above	0	0	☐
Other (specify)		1	2	☐

		Occasionally	Frequently
ITEM 60	**Damages Public Property**		
	Tears up magazines, books, or other public property	1	2
	Is overly rough with furniture (kicks, mutilates, knocks it down, etc.)	1	2
	Breaks windows	1	2
	Stuffs toilet with paper, towels, or other solid objects that cause an overflow	1	2
	Does none of the above	0	0
Other (specify)		1	2
ITEM 61	**Has Violent Temper or Temper Tantrums**		
	Cries and screams	1	2
	Stamps feet while banging objects or slamming doors	1	2
	Stamps feet while screaming and yelling	1	2
	Throws self on floor while screaming and yelling	1	2
	Does none of the above	0	0
Other (specify)		1	2

DOMAIN 10 TOTAL	
Aggressiveness (Add items 57–61)	

DOMAIN 11
Antisocial vs. Social Behavior

		Occasionally	Frequently
ITEM 62	**Teases or Gossips About Others**		
	Gossips about others	1	2
	Tells untrue or exaggerated stories about others	1	2
	Teases others	1	2
	Picks on others	1	2
	Makes fun of others	1	2
	Does none of the above	0	0
Other (specify)		1	2
ITEM 63	**Bosses and Manipulates Others**		
	Tries to tell others what to do	1	2
	Demands services from others	1	2
	Pushes others around	1	2
	Causes fights among others	1	2
	Manipulates others to get them in trouble	1	2
	Does none of the above	0	0
Other (specify)		1	2

		Occasionally	Frequently
ITEM 64	**Disrupts Others' Activities**		
	Is always in the way	1	2
	Interferes with others' activities (by blocking passage, etc.)	1	2
	Upsets others' work	1	2
	Knocks around articles that others are working with (puzzles, card games, etc.)	1	2
	Snatches things out of others' hands	1	2
	Does none of the above	0	0
Other (specify)		1	2
ITEM 65	**Is Inconsiderate of Others**		
	Keeps temperature in public areas uncomfortable for others (opens or closes window, changes thermostat, etc.)	1	2
	Turns TV, radio, or phonograph on too loud	1	2
	Makes loud noises while others are reading	1	2
	Talks too loudly	1	2
	Sprawls over furniture or space needed by others	1	2
	Does none of the above	0	0
Other (specify)		1	2
ITEM 66	**Shows Disrespect for Others' Property**		
	Does not return borrowed items	1	2
	Uses others' property without permission	1	2
	Loses others' belongings	1	2
	Damages others' property	1	2
	Does not recognize the difference between own and others' property	1	2
	Does none of the above	0	0
Other (specify)		1	2
ITEM 67	**Uses Angry Language**		
	Uses hostile language ("stupid jerk," "dirty pig," etc.)	1	2
	Swears, curses, or uses obscene language	1	2
	Yells or screams threats of violence	1	2
	Verbally threatens others, suggesting physical violence	1	2
	Does none of the above	0	0
Other (specify)		1	2

DOMAIN 11 TOTAL	
Antisocial vs. Social Behavior (Add items 62–67)	

DOMAIN 12
Rebelliousness

		Occasionally	Frequently
ITEM 68	**Ignores Regulations or Regular Routines**		
	Has negative attitude toward rules but usually conforms	1	2
	Has to be forced to go through waiting lines (lunch lines, ticket lines, etc.)	1	2
	Violates rules or regulations (eats in restricted areas, disobeys traffic signals, etc.)	1	2
	Refuses to participate in required activities (work, school, etc.)	1	2
	Does none of the above	0	0 ☐
Other (specify)		1	2
ITEM 69	**Resists Following Instructions, Requests, or Orders**		
	Gets upset if given a direct order	1	2
	Plays deaf and does not follow instructions	1	2
	Does not pay attention to instructions	1	2
	Refuses to work on assigned subject	1	2
	Hesitates for long periods before doing assigned tasks	1	2
	Does the opposite of what was requested	1	2
	Does none of the above	0	0 ☐
Other (specify)		1	2
ITEM 70	**Has Impudent or Rebellious Attitude Toward Authority**		
	Resents persons in authority (teachers, group leaders, etc.)	1	2
	Is hostile toward people in authority	1	2
	Mocks people in authority	1	2
	Says that he or she can fire people in authority	1	2
	Does none of the above	0	0 ☐
Other (specify)		1	2
ITEM 71	**Is Absent from or Late for Assigned Places or Activities**		
	Arrives late at required places for activities	1	2
	Fails to return when supposed to (after going to toilet, running an errand, etc.)	1	2
	Leaves place of required activity without permission (work, class, etc.)	1	2
	Is absent from routine activities (work, class, etc.)	1	2
	Stays out late at night	1	2
	Does none of the above	0	0 ☐
Other (specify)		1	2

		Occasionally	Frequently
ITEM 72	**Runs Away or Attempts to Run Away**		
	Attempts to run away from school grounds	1	2
	Runs away from group activities (picnics, etc.)	1	2
	Runs away from school grounds	1	2
	Does none of the above	0	0 ☐
Other (specify)		1	2
ITEM 73	**Misbehaves in Group Settings**		
	Interrupts group discussions by talking about unrelated topics	1	2
	Disrupts games by refusing to follow rules	1	2
	Disrupts group activities by making loud noises or by acting up	1	2
	Does not stay in seat during class, lunch, or other group sessions	1	2
	Does none of the above	0	0 ☐
Other (specify)		1	2

DOMAIN 12 TOTAL ☐☐
Rebelliousness
(Add Items 68–73)

DOMAIN 13
Trustworthiness

		Occasionally	Frequently
ITEM 74	**Takes Others' Property Without Permission**		
	Takes others' belongings if not kept in place or locked	1	2
	Takes others' belongings from pockets, purses, drawers, etc.	1	2
	Takes others' belongs by opening or breaking locks	1	2
	Does none of the above	0	0 ☐
Other (specify)		1	2
ITEM 75	**Lies or Cheats**		
	Twists the truth to own advantage	1	2
	Cheats in games, tests, assignments, etc.	1	2
	Lies about situations	1	2
	Lies about self	1	2
	Lies about others	1	2
	Does none of the above	0	0 ☐
Other (specify)		1	2

DOMAIN 13 TOTAL ☐☐
Trustworthiness
(Add Items 74 & 75)

DOMAIN 14
Withdrawal vs. Involvement

		Occasionally	Frequently	
ITEM 76	**Is Inactive**			
	Sits or stands in one position for a long period of time	1	2	
	Does nothing but sit and watch others	1	2	
	Falls asleep in a chair	1	2	
	Lies on the floor all day	1	2	
	Does not seem to react to anything	1	2	
	Does none of the above	0	0	☐
Other (specify)		1	2	
ITEM 77	**Is Withdrawn**			
	Seems unaware of surroundings	1	2	
	Is difficult to reach or contact	1	2	
	Is apathetic and unresponsive in feeling	1	2	
	Has a blank stare	1	2	
	Has a fixed expression	1	2	
	Does none of the above	0	0	☐
Other (specify)		1	2	
ITEM 78	**Is Shy**			
	Is timid and shy in social situations	1	2	
	Hides face in group situations (parties, informal gatherings, etc.)	1	2	
	Does not mix well with others	1	2	
	Prefers to be alone	1	2	
	Does none of the above	0	0	☐
Other (specify)		1	2	

DOMAIN 14 TOTAL
Withdrawal vs. Involvement
(Add Items 76–78)

DOMAIN 15
Mannerisms

		Occasionally	Frequently	
ITEM 79	**Has Stereotyped Behaviors**			
	Drums fingers continually	1	2	
	Taps feet continually	1	2	
	Has hands constantly in motion	1	2	
	Slaps, scratches, or rubs self continually	1	2	
	Waves or shakes parts of the body repeatedly	1	2	
	Moves or rolls head back and forth	1	2	
	Rocks body back and forth	1	2	
	Paces the floor	1	2	
	Does none of the above	0	0	☐
Other (specify)		1	2	
ITEM 80	**Has Peculiar Posture or Odd Mannerisms**			
	Holds head tilted	1	2	
	Sits with knees under chin	1	2	
	Walks on tiptoes	1	2	
	Lies on floor with feet up in the air	1	2	
	Walks with fingers in ears or with hands on head	1	2	
	Does none of the above	0	0	☐
Other (specify)		1	2	

DOMAIN 15 TOTAL
Mannerisms
(Add Items 79 & 80)

DOMAIN 16
Appropriateness of Interpersonal Manners

		Occasionally	Frequently	
ITEM 81	**Has Inappropriate Interpersonal Manners**			
	Talks too close to others' faces	1	2	
	Blows on others' faces	1	2	
	Burps at others	1	2	
	Kisses or licks others	1	2	
	Hugs or squeezes others	1	2	
	Touches others inappropriately	1	2	
	Hangs onto others and does not let go	1	2	
	Does none of the above	0	0	☐
Other (specify)		1	2	

DOMAIN 16 TOTAL
Appropriateness of Interpersonal Manners
(Enter Item 81)

DOMAIN 17
Acceptability of Vocal Habits

		Occasionally	Frequently	
ITEM 82	**Has Disturbing Vocal or Speech Habits**			
	Giggles hysterically	1	2	
	Talks loudly or yells at others	1	2	
	Talks to self loudly	1	2	
	Laughs inappropriately	1	2	
	Makes growling, humming, or other unpleasant noises	1	2	
	Repeats a word or a phrase over and over	1	2	
	Mimics others' speech	1	2	
	Does none of the above	0	0	☐
Other (specify)		1	2	

DOMAIN 17 TOTAL
Acceptability of Vocal Habits
(Enter Item 82)

DOMAIN 18
Acceptability of Habits

		Occasionally	Frequently	
ITEM 83	**Has Strange and Unacceptable Habits**			
	Smells everything	1	2	
	Inappropriately stuffs things in pockets, shirts, dresses, or shoes	1	2	
	Pulls threads out of own clothing	1	2	
	Plays with things he or she is wearing (shoe strings, buttons, etc.)	1	2	
	Saves and wears unusual articles (safety pins, bottle caps, etc.)	1	2	
	Hoards things, including food	1	2	
	Does none of the above	0	0	☐
Other (specify)		1	2	
ITEM 84	**Has Unacceptable Oral Habits**			
	Drools	1	2	
	Grinds teeth audibly	1	2	
	Spits on the floor	1	2	
	Bites fingernails	1	2	
	Chews or sucks fingers or other parts of the body	1	2	
	Chews or sucks clothing or other inedibles	1	2	
	Eats inedibles	1	2	
	Puts everything in mouth	1	2	
	Does none of the above	0	0	☐
Other (specify)		1	2	
ITEM 85	**Removes or Tears Off Own Clothing**			
	Tears off buttons or zippers	1	2	
	Inappropriately removes shoes or socks	1	2	
	Undresses at the wrong times	1	2	
	Does none of the above	0	0	☐
Other (specify)		1	2	
ITEM 86	**Has Other Eccentric Habits and Tendencies**			
	Is overly particular about places to sit or sleep	1	2	
	Stands in a favorite spot (by window or door, etc.)	1	2	
	Sits by anything that vibrates	1	2	
	Is afraid to climb or descend stairs	1	2	
	Does not want to be touched	1	2	
	Screams if touched	1	2	
	Does none of the above	0	0	☐
Other (specify)		1	2	

DOMAIN 18 TOTAL
Acceptability of Habits
(Add Items 83–86)

DOMAIN 17
Acceptability of Vocal Habits

		Occasionally	Frequently
ITEM 82	**Has Disturbing Vocal or Speech Habits**		
	Giggles hysterically	1	2
	Talks loudly or yells at others	1	2
	Talks to self loudly	1	2
	Laughs inappropriately	1	2
	Makes growling, humming, or other unpleasant noises	1	2
	Repeats a word or a phrase over and over	1	2
	Mimics others' speech	1	2
	Does none of the above	0	0
Other (specify)		1	2

DOMAIN 17 TOTAL
Acceptability of Vocal Habits
(Enter item 82)

DOMAIN 18
Acceptability of Habits

		Occasionally	Frequently
ITEM 83	**Has Strange and Unacceptable Habits**		
	Smells everything	1	2
	Inappropriately stuffs things in pockets, shirts, dresses, or shoes	1	2
	Pulls threads out of own clothing	1	2
	Plays with things he or she is wearing (shoe strings, buttons, etc.)	1	2
	Saves and wears unusual articles (safety pins, bottle caps, etc.)	1	2
	Hoards things, including food	1	2
	Does none of the above	0	0
Other (specify)		1	2
ITEM 84	**Has Unacceptable Oral Habits**		
	Drools	1	2
	Grinds teeth audibly	1	2
	Spits on the floor	1	2
	Bites fingernails	1	2
	Chews or sucks fingers or other parts of the body	1	2
	Chews or sucks clothing or other inedibles	1	2
	Eats inedibles	1	2
	Puts everything in mouth	1	2
	Does none of the above	0	0
Other (specify)		1	2
ITEM 85	**Removes or Tears Off Own Clothing**		
	Tears off buttons or zippers	1	2
	Inappropriately removes shoes or socks	1	2
	Undresses at the wrong times	1	2
	Does none of the above	0	0
Other (specify)		1	2
ITEM 86	**Has Other Eccentric Habits and Tendencies**		
	Is overly particular about places to sit or sleep	1	2
	Stands in a favorite spot (by window or door, etc.)	1	2
	Sits by anything that vibrates	1	2
	Is afraid to climb or descend stairs	1	2
	Does not want to be touched	1	2
	Screams if touched	1	2
	Does none of the above	0	0
Other (specify)		1	2

DOMAIN 18 TOTAL
Acceptability of Habits
(Add items 83–86)

DOMAIN 19
Activity Level

		Occasionally	Frequently
ITEM 87	**Has Hyperactive Tendencies**	1	2
	Talks excessively	1	2
	Will not sit still for any length of time	1	2
	Constantly runs or jumps around the room	1	2
	Moves or fidgets constantly	1	2
	Does none of the above	0	0
Other (specify)		1	2

DOMAIN 19 TOTAL
Activity Level
(Enter item 87)

DOMAIN 20
Symptomatic Behavior

		Occasionally	Frequently
ITEM 88	**Tends to Overestimate Own Abilities**	1	2
	Does not recognize own limitations	1	2
	Has too high an opinion of self	1	2
	Talks about future plans that are unrealistic	1	2
	Does none of the above	0	0
Other (specify)		1	2
ITEM 89	**Reacts Poorly to Criticism**		
	Does not talk when corrected	1	2
	Withdraws or pouts when criticized	1	2
	Becomes upset when criticized	1	2
	Screams and cries when corrected	1	2
	Does none of the above	0	0
Other (specify)		1	2
ITEM 90	**Reacts Poorly to Frustration**		
	Blames own mistakes on others	1	2
	Withdraws or pouts when thwarted	1	2
	Becomes upset when thwarted	1	2
	Throws temper tantrums when does not get own way	1	2
	Does none of the above	0	0
Other (specify)		1	2
ITEM 91	**Demands Excessive Attention or Praise**		
	Wants excessive praise	1	2
	Is jealous of attention given to others	1	2
	Demands excessive reassurance	1	2
	Acts silly to gain attention	1	2
	Does none of the above	0	0
Other (specify)		1	2

		Occasionally	Frequently
ITEM 92	**Seems to Feel Persecuted**		
	Complains of unfairness, even when equal shares or privileges have been given	1	2
	Says, "Nobody loves me"	1	2
	Says, "Everybody picks on me"	1	2
	Says, "People talk about me"	1	2
	Says, "People are against me"	1	2
	Acts suspicious of others	1	2
	Does none of the above	0	0
Other (specify)		1	2
ITEM 93	**Has Hypochondriacal Tendencies**		
	Complains about imaginary physical ailments	1	2
	Pretends to be ill	1	2
	Acts sick after illness is over	1	2
	Does none of the above	0	0
Other (specify)		1	2
ITEM 94	**Has Other Signs of Emotional Instabilities**		
	Changes mood for no apparent reason	1	2
	Complains of bad dreams	1	2
	Cries out while asleep	1	2
	Cries for no apparent reason	1	2
	Seems to have no emotional control	1	2
	Vomits when upset	1	2
	Appears insecure or frightened in daily activities	1	2
	Talks about people or things that cause unrealistic fears	1	2
	Talks about suicide	1	2
	Does none of the above	0	0
Other (specify)		1	2

DOMAIN 20 TOTAL
Symptomatic Behavior
(Add items 88–94)

DOMAIN 21
Use of Medications

		Occasionally	Frequently
ITEM 95	**Use of Prescribed Medication**	1	2
	Uses tranquilizers	1	2
	Uses sedatives	1	2
	Uses anticonvulsant drugs	1	2
	Uses stimulants	1	2
	Uses none of the above	0	0
Other (specify)		1	2

DOMAIN 21 TOTAL
Use of Medications
(Enter item 95)