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Sociometric Status and Social Behaviour of Boys with Learning Disabilities in a Special School in Zambia

A thesis

Submitted to the School of Graduate Studies and Research

at the University of Ottawa

by

Morgan Chanda Mulenga

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the Degree of Doctor of Philosophy

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ABSTRACT

The purpose of this study was to compare the sociometric status and social behaviour of boys with different subtypes of learning disabilities in a self-contained special school in Zambia. Participants were 112 Zambian boys, who had previously been identified as having a learning disability. Sociometric status and social behaviour were determined by sociometric choice and sociometric behaviour assessments, respectively, whereas subtypes of LD and aggression and attention deficits were determined based on the scores obtained on the WRAT3 and the IOWA-CTRS, respectively.

Results showed that there were no significant differences in sociometric status and social behaviour between boys with arithmetic disabilities (AD), reading disabilities (RD), and both arithmetic and reading disabilities (AD/RD). Many children with AD were actually indistinguishable from children with RD, on the basis of peer reports of social behaviour. The results also showed that children whose learning disabilities were accompanied by aggression and/or attention deficits received more negative nominations from their peers than boys without any of these problems.

A number of possible explanations for the lack of AD-RD differences in sociometric status and social behaviour in this study are offered. The findings may have been attenuated because of the special school-setting in which all children displayed atypical patterns of development. It was, however, interesting to note that the behavioral correlates of sociometric status appeared to be the same in this setting as those found with normally-achieving children in Western cultures. Implications and limitations of the present study as well as suggestions for future research are discussed.

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"Writing, at its best, is a very lonely life. Organizations for writers palliate the writer's loneliness but I doubt if they improve his writing. . . . For he does his work alone and if he is a good enough writer he must face eternity, or the lack of it, each day."

[Excerpt from Ernest Hemingway's 1954 Nobel Prize (Literature) acceptance speech.]

It is with sincere appreciation that I acknowledge the advice and encouragement of members of my thesis committee, Professors Philip Firestone, Robert Stelmack, Alastair Younger and Barry Schneider. I am especially grateful to Prof. Schneider for not only serving as a committee member, but also as my academic supervisor throughout my graduate school career. I richly enjoyed the years I spent as his student. His invaluable advice, concern, support and extraordinary patience are truly appreciated. I am also very appreciative of his unselfish giving of his time and resources. Thank you for being there for my three children.

My late mother, whom her children lovingly referred to as "ba Mukuka", deserves special mention for having instilled in me a thirst and respect for knowledge. She taught me to set my goals high, while knowing that no goal would be too high.

I would remiss if I did not take this opportunity to thank my three children, Abby, Kayuni and Mumba. They were deprived of my presence for the most part of my doctoral training, and yet they did not complain. I thank them for their understanding.

Finally, the completion of this project is also a tribute to my dear wife Jacqueline. She has provided boundless support, encouragement, love, and above all, patience. I gratefully and lovingly dedicate this thesis to her.

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CHAPTER I

INTRODUCTION

The Importance of Peer Relations

The role of childhood peer relations has received considerable attention in the developmental literature. There is extensive research indicating that children's peer relations provide unique and essential contributions to their social, emotional and cognitive development (Asher & Coie, 1990; Forman & Cazden, 1985; Murray, 1982; Panella & Henggeler, 1986). Peer relations also form the major context for the development of skills needed in successful social interactions (Hartup, 1983). They contribute to children's social supports and security, and to their self-concepts and feelings about themselves (Bukowski & Hoza, 1989).

During childhood, from about age six to 12 years, there is a gradual shift from family to peers as the primary reference group. The school, where most peer interactions take place, serves as the primary setting for this socialization process. Friendships not only provide the means through which children attain immediate enjoyment of school and recreational activities, but also provide unique opportunities for children to learn adaptive social behaviors not found in the non-egalitarian relationships that take place between adults and children (Hartup, 1983). Children provide each other with opportunities to understand social roles and norms that are not easily attained in any other way. Furthermore, it has been shown that positive peer relations are fundamental to the regulation of aggression (Patterson & Cobb, 1971) and to gender-role identification (Kobasigawa, 1968). Therefore, not only does interacting with one's peers become an

increasingly frequent activity; such interactions also enhance children's pleasure, mitigate their anxieties and help broaden their realm of experience as they gain knowledge about the social world in which they live (D'Andrea, 1983; Hartup, 1983).

Although positive peer relations are important to development, an alarming number of children are without such experiences. Not every child enjoys good peer relations. There are striking individual differences in the extent to which certain children may be accepted by their peers. In one of the earliest studies on peer relations, Gronlund (1959) found that approximately 6% of children from third to sixth grade had no friends and an additional 12% had only one friend. Another study by Hymel and Asher (1977) found that 11% of children studied received no friendship nominations and 22% received only one. Thus, some children tend to be well-regarded by their peers and enjoy many friendships, others are almost universally disliked and have no friends.

The negative consequences associated with lack of friendships or peer acceptance have been documented in a number of studies. Those with poor peer relations are at risk for a variety of adjustment problems later in life (Hartup, 1983; Kupersmidt, Coie & Dodge, 1990; Parker & Asher, 1987). Unpopular children are likely to be low achievers in school and continue to have academic, social, and emotional difficulties in adolescence and adulthood (Green, Forehand, Beck & Vosk, 1980; Margalit & Efrati, 1996). In a review of the literature relating peer relations in childhood to measures of future adjustment, Parker and Asher (1987) concluded that poorly accepted children are more likely to drop out of school, become juvenile and adult criminal offenders, and experience a higher incidence of adult psychopathology.

Research efforts in this area have included empirical investigation of risk factors associated with poor peer adjustment (e.g., Parker & Asher, 1987) and evaluations of intervention efforts aimed at helping children with problematic peer relations (Mize & Ladd, 1990). One of the areas of investigation has been the peer relations of children with learning disabilities (LD). Evidence accumulated since the early 1970's shows generally poor social acceptance of children with LD by their peers (Wiener, 1987; Kavale & Forness, 1996), poor social skills (Gresham & Reschly, 1986) and poor classroom adjustment (Bender & Smith, 1990).

Learning Disabilities

Within nearly every classroom all over the world there are some children who exhibit obvious signs of intelligence, but who, for few apparent reasons, fail to keep pace with their classmates in some academic endeavour. Some of these children may be restless and impulsive, have difficulty sustaining attention, or have aggressive tendencies, whereas others may be withdrawn, unmotivated, and display poor social skills (Dodge, 1983; Forness & Sinclair, 1990; Stone & La Greca, 1990). Although these children may differ from each other in many ways, they usually demonstrate a significant discrepancy between their school performance and what is expected of them, based on subjective and objective appraisals of their capabilities. They exhibit marked difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning or mathematical abilities (Hammill, Leigh, McNutt & Larsen, 1981). It is this heterogeneous population that is commonly referred to as children with learning disabilities (Lerner, 1985).

Children with learning disabilities have always existed, although in the past they were often described in more stigmatizing ways, such as "backward" or "feeble-minded" (Bennison, 1987). Undoubtedly, these children faced considerable frustration and ridicule in school because they were often dismissed by teachers as lazy, dumb, unmotivated, or too oppositional to learn (Carrier, 1987; Coles, 1987). Punitive practices were often utilized, because it was assumed that these children only needed to put forth more effort to succeed (Bennison, 1987).

Research Methodologies and LD

One of the major difficulties in conducting research involving children with LD is the selection of samples that adequately represent the population in question. Some variability in samples is inevitable because of the heterogenous behaviours and characteristics manifested by these individuals. However, variability is also usually due to researchers not specifying their selection criteria and sample characteristics carefully (Semrud-Clikeman & Hynd, 1990; Rosenberg et al., 1993). Depending upon the theoretical or conceptual framework of the researchers, much of the early research on LD made use of an experimental procedure described as a "contrasting groups" design (Fletcher, 1985). This method involved comparing an undifferentiated group of students identified as having LD with an equally undifferentiated group of normally-achieving students along variables believed to be relevant to their different academic performances. Use of this "contrasting groups" procedure presumed that the population of students with LD was homogenous, with all having similar underlying patterns of psychosocial,

cognitive and neuropsychological abilities and deficits. Due to the confounding effect on research findings resulting from the indiscriminate grouping of children with LD into one group, some researchers concluded that much of the early LD literature was of little or no practical utility (Harris, 1982; Fisk, Finnell & Rourke, 1985). Also, because of the diverse and varied focus of research, and the different ways in which children with LD were described, very few theories were agreed upon by most authorities in the field.

Lately, however, the diagnostic criteria used in eligibility decisions have mostly been based on a child having at least average intellectual functioning and a measured discrepancy between intelligence quotient (IQ) and academic achievement (Hammill, 1990; McLeskey, 1989; Mercer, Hughers & Mercer, 1985; Sleeter, 1987). The exclusionary clause, which specifies that a learning disability does not include learning deficiencies resulting primarily from sensory and/or motor impairments, mental retardation, emotional disturbance, or cultural/environmental disadvantage, has also become an important aspect of LD identification criteria.

Although there is more consensus than controversy when the broad dimensions of identification criteria are considered, disagreements still exist among researchers about how to interpret certain specific details of these criteria (Hammill, 1990; McNutt, 1986). For example, the discrepancy aspect of the criteria makes no reference to the grade-level of a student with LD. It is quite likely that the absolute value of a discrepancy between actual and expected achievement will vary depending on whether the child is in the first, third, or sixth grade. The use of these identification criteria therefore, has not resulted in the resolution of the issue.

Definition of Learning Disabilities

Just as serious as the sampling issue is the problem that each group of researchers had its own particular definition of learning disabilities. This resulted in marked limitations in early research on learning disabilities. For many years, after the term learning disability was first proposed by Kirk and Bateman (1962), professionals debated what it meant, to whom it referred, and whether it could be quantified through psychoeducational assessment (Algozzine & Ysseldyke, 1983; Frankenberger & Fronzaglio, 1991; Hammill, 1990; Riccio, Gonzalez & Hynd, 1994). Questions arose as to whether LD referred to all children who were under-achieving (Algozzine & Korinek, 1985) or only to those classified and placed in special programs. Some researchers maintained that the term referred only to those children whose under-achievement was the result of neurologically-based perceptual processing deficits (Cruickshank, 1983; Gaddes, 1985), whereas others suggested that LD could be used as a generic term for all mildly handicapped children and slow learners (Hallahan & Kauffman, 1977; Mann, Davis, Boyer, Metz & Wolford, 1983). The result was that vague definitions were often provided. Owing to a lack of agreement on a precise, operational definition of what constituted learning disabilities, to problems of measurement, and to arbitrariness in setting the boundaries of the disorder (e.g., Moats & Lyon, 1993), results from many early studies on learning disabilities were inconsistent and failed to increase an understanding of learning disabilities substantially, particularly in proportion to the amount of research effort devoted to it (Rourke, 1989; French, Ellsworth & Amoruso, 1995; Fletcher & Morris, 1986; Bruck, 1986).

In recent years, however, collaborative efforts of professional organizations and researchers in the United States and Canada, (Hooper & Willis, 1989) have produced definitions of LD that (a) recognize the heterogeneity of the syndrome; (b) presume central nervous system dysfunction; (c) denote the variation and degree of severity; and (d) state that LD may coexist with, but not be the direct result of other handicapping conditions (e.g., mental retardation, emotional disturbance) or environmental influences (e.g., cultural differences, poor instruction, etc.). In an extensive review of definitions of learning disabilities, Mercer, King-Sears and Mercer (1990) found many common elements, including cognitive functioning, processing deficits, achievement, ability-achievement discrepancy, neurological impairment, and exclusionary clauses. They concluded that definitions are becoming increasingly similar and are moving away from those involving social skills and neurological/processing components.

Learning Disabilities and Peer Relations

Research regarding the peer relations of children with LD has established that, as a group, they are less popular than their peers without LD. Children with LD receive fewer positive and more negative nominations from classmates on measures of peer acceptance and rejection (Bryan, 1974; Bryan & Bryan, 1978; Bursuck, 1989; Flicek & Landau, 1985; Garrett & Crump, 1980; Kistner & Gatlin, 1989; Haager & Vaughn, 1995; Scranton & Ryckman, 1979; Siperstein, Bopp & Bak, 1978). In addition, they receive lower overall scores on peer nominations of acceptance than students without LD (Bruininks, 1978a; Bruininks, 1978b; Bursuck, 1989; Gresham & Reschly, 1986; Sheare,

1978; Perlmutter, Crocker, Corday & Garstecki, 1983). Results from the majority of published studies indicate that the social status of children with LD falls from .75 to 1.00 standard deviations below the mean of the population without LD (Gresham, 1988; Gresham & Reschly, 1986; Kavale & Forness, 1996; Miguel, Forness & Kavale, 1996).

Consequently, the range of peer relations among students with LD has been examined using procedures developed in studies of nonhandicapped children for classifying children into sociometric status groups. Typically, this involves classifying children into popular, average, rejected, neglected, and controversial status groups. Of particular interest to many researchers has been determining the prevalence of rejected versus neglected sociometric status. The literature does not provide a clear picture as to whether rejected or neglected status is more common among children with learning disabilities. Kistner and Gatlin (1989), for example, found that more children with LD were rejected (29.5%) than neglected (4.5%). Only 13.6% of these children had popular peer status. Stone and La Greca (1990) found that about equal proportions of children with LD were classified as rejected (39%) and neglected (37%), whereas fewer had popular status (12%). Finally, Wiener, Harris and Shirer (1990) found only 12% of children with LD were rejected, whereas one third (34%) were neglected, with the number of popular children being very low (1%).

Although many children with LD are poorly accepted or rejected by their peers, there are also those who are well-regarded (Schumaker & Hazel, 1984; Dudley-Marling & Edmiaston, 1985). Some researchers have estimated that between 17% and 23% of children with LD are as well-accepted as their peers without LD (Gresham, 1988, 1992;

Swanson & Malone, 1992). Other studies put those figures even higher. For example, Siperstein et al. (1978) noted that 6 (27%) of their 22 participants with LD, received positive nominations from at least one third of their classmates.

In another attempt to examine the peer relations of children with LD, Stone and La Greca (Stone & La Greca, 1990; La Greca & Stone, 1990) employed sociometric procedures developed by Asher and Dodge (1986) and Asher and Wheeler (1985) in which children were classified into sociometric status groups based on positive and negative nominations. The results indicated that children with LD received fewer positive nominations from their same-sex classmates than did children without LD. The group with LD was found to be over-represented in the rejected and neglected status categories and under-represented in the popular and average status categories compared to students without LD. However, among children with LD, 12.2% were classified as popular and 4.9% were classified as being average sociometric status among their same-sex classmates. These results are consistent with a review of the literature on the sociometric status of children with LD in which it was reported that 17% of children with LD are as well-accepted as nonhandicapped children (Gresham, 1988).

Perlmutter and his associates (Perlmutter et al., 1983) examined the sociometric status of children with LD. They compared normally-achieving children with well-liked and disliked children with LD using scores derived from peer ratings of behaviour on the Adjustment Scales for Sociometric Evaluation of Secondary-School Students (ASSESS; Prinz, Swan, Liebert, Weintraub & Neale, 1978). They found that although students without LD were rated significantly higher overall, there was considerable variability in

the sociometric scores of students with LD. Over half of the students with LD attained at least average status among their peers without LD. Popular students with LD were rated by peers without LD as being more withdrawn than other students with LD and were seen as more independent than disliked students with LD (see pp. 13-18 for further discussion of the causes and correlates of peers' non-acceptance of children with LD). Popular students with LD were also more accurate than other children with LD in estimating how they were rated by their peers without LD. These results also showed that children with LD achieve a wide range of peer acceptance.

Recently, Kavale and Forness (1996) conducted a meta-analysis of 152 studies to investigate the magnitude and nature of social skills deficits among students with learning disabilities. Their pool of studies included formal procedures assessing social skills dimensions, such as rating scales, checklists and standardized tests. Informal procedures included a variety of sociometric techniques and various forms of structured observation. In each of these cases, assessments included teacher assessments, peer assessments and self-assessments by students with LD.

The results of this meta-analysis revealed that, on average, about 75% of students with LD could be differentiated from comparison samples through measures of social competence. Approximately the same level of differentiation was found across different raters (teachers, peers, and self) and across most dimensions of social skill. The teacher measures portrayed perceptions of a lack of academic competence on the part of students with LD, a lack of goal-directedness and attending behaviours as manifested in hyperactivity and distractibility, as well as infrequency of social interactions.

Effect size, however, was related to the type of measure used. For example, the Child Behaviour Checklist (Achenbach & Edelbrock, 1980) and the Classroom Behaviour Inventory (Schaefer & Edgerton, 1978) revealed ESs of 1.348 and 1.381, respectively. On the other hand, the Revised Behaviour Problem Checklist (Quay & Peterson, 1983) and the Conners' Teacher Rating Scale (Conners, 1973) revealed ESs of .372 and .354, respectively. These ESs indicate that in the first case, more than 9 out of 10 students with LD would be differentiated from students without LD, and that this level of differentiation would fall to only slightly more than 6 out of 10 students with LD if the last measure was used.

When students with LD assessed themselves, they too perceived academic skill deficits as well as lack of social problem-solving abilities as significant deficits. More than 7 out of 10 rated themselves as possessing social skill deficits on these two dimensions regardless of the type of measure used. The findings were, however, less consistent across measures of social competence. For example, the following social competence measures revealed ESs that ranged from .519 to .998: Test of Social Inference (Edmonson, deJung, Leland & Leach, 1974), ES = .519; Social Perception Behaviour Rating Scale (Maheady, Maitland & Sainato, 1984), ES = .723; and Four Factor Test of Social Intelligence (O'Sullivan & Guilford, 1976), ES = .998. These findings suggest that anywhere from 65% to 84% of students with LD could be distinguished on the basis of their performance on these measures. Although the authors did not report why such differences in ESs were observed among different teacher rating scales and the different measures used to obtain children's self-assessments, it is possible

that not only are test items in these instruments not identical, but may be tapping different aspects of social behaviour. Thus, they may not all be applicable for use in the population of children with LD.

When evaluated by their peers without LD, students with LD appeared to be defined primarily by reduced acceptance and greater rejection. These dimensions of reduced acceptance and greater rejection appeared to be associated with less interactions and lower status for students with LD, which in turn appeared to be related to their being less popular, less often selected as friends and viewed as less cooperative. And this was observed consistently across all measures used.

In summary, studies of the level of peer acceptance of children with learning disabilities as compared to that of children without learning disabilities are consistent in the findings that children with learning disabilities are less well-liked by their peers without learning disabilities. They often receive fewer positive nominations on measures of peer acceptance. They receive more negative nominations on measures of peer rejection and lower scores on peer-reported social behaviours. In general, they get evaluated negatively very often and this is further demonstrated clearly through avoidance (of children with learning disabilities) behaviours.

Nevertheless, no coherent or consistent pattern of behavioral characteristics of children with LD has emerged from the literature. Whereas several studies have found children with LD to be less popular, more often rejected or ignored, and rated less positively than children with no LD by peers, other investigations have found that not all of these children fare poorly in these respects. The range of peer status of children with

learning disabilities has also been found to be as great as that seen in normally-achieving children. Some are well-accepted, popular and enjoy many friendships, others are moderately accepted, and others are actively disliked or rejected by their peers and have very few or no friends at all.

Causes of Low Peer Status in Children with LD

Several different hypotheses have been advanced to explain the relatively poor social status of children with LD. Reviewing the empirical support for the major causal hypotheses for the low peer status of children with learning disabilities, Wiener (1987), broke down the explanations according to: (1) the discrepancy hypothesis, (2) the psychological processing deficit hypothesis, (3) the strategic deficit hypothesis, and (4) the differential treatment hypothesis.

The discrepancy hypothesis. According to this hypothesis, children with LD are less accepted by their peers because they lack abilities that are valued by their peer group. Specifically, children with LD are low achievers. If achievement is valued by the peer group, children with LD may be rejected due to the discrepancy between their achievement and the expectations of the group. This hypothesis was proposed by Bryan (1974) to explain interaction effects found between achievement status, gender, and race. In this study, Bryan found that white girls with LD were less accepted and more rejected by their peers than white boys with LD or black children with LD. Bryan suggested that elementary-school-age girls may value achievement more than boys do and that white children may value achievement more than black children. There is some support for this

discrepancy hypothesis, but the evidence is equivocal. Children with learning disabilities who possess other talents or characteristics that are valued by the peer group, such as good athletic abilities or having "good looks", tend to be equally well-liked and accepted (Siperstein et. al., 1978).

The psychological processing deficit hypothesis. According to this view, the social interaction difficulties of children with LD are attributable to cognitive, perceptual, or linguistic deficits. The same disorders in one or more basic psychological processes that are assumed to manifest themselves in academic difficulties are also believed to manifest themselves in social difficulties. Considerable research has been conducted in an attempt to identify these processes and deficits. It has been found that children with LD tend to perform more poorly than children without LD on tests of social perception and social cognition. These children tend to make fewer correct inferences and more errors than children without LD in interpreting pictorially presented social situations (Bruno, 1981; Stiliadis & Wiener, 1989). They also perform more poorly on tests of their ability to decode nonverbal communications (Axelrod, 1982; Bryan, 1977; Jackson, Enright & Murdock, 1987), social problem-solving (Carlson, 1987), and identifying facial expressions (Wiig & Harris, 1974). Their conceptions of friendships have been found to be at a lower developmental level than children without LD (Hoyle & Serafica, 1988).

The strategic deficit hypothesis. This hypothesis is based on the assumption that the peer status of children with LD is correlated with specific strategies they use in social situations. These children are described as inactive learners who have not acquired specific strategies that are necessary for social interactions. They have difficulty in

attention, maintaining on-task behaviour, and choosing effective behavioral strategies in social situations. They have problems in initiating interactions, approaching others, resisting peer pressure, problem-solving, accepting and giving positive or negative feedback, and so on.

Gresham and Reschly (1986) found that peer interactions of children with LD were similar to peer interactions of unpopular normally-achieving children. For example, Dodge (1983) found that in play groups composed of unfamiliar children, popular normally-achieving children tended to use prosocial strategies whereas rejected children would use anti-social strategies. Similarly, Gresham and Reschly found that children with LD were characterized by significant deficits in interpersonal behaviours. These children were more aggressive, disruptive, and tended to ignore appropriate interpersonal interactions than children without LD, and thus behaved in an essentially anti-social manner similar to that of rejected children in general. Gresham and Reschly's results, however, did not indicate clearly that children with LD were inactive learners nor that popular children had a more active learning style. What these results showed was that perhaps children with LD had learned the strategies alright, but did not just use them appropriately. However, the results summarized by Wiener (1987) indicate that children with LD tend to behave differently from their peers without LD in social situations and that they tend to use ineffective behavioral strategies.

The differential treatment hypothesis. According to this view, the social difficulties of children with LD are a result of being labelled. Because they are labelled as having LD they are treated differently than children without LD by family members,

teachers, and peers and, as a consequence, they do not have opportunities to learn appropriate social behaviour. Various studies have found evidence to support this hypothesis (e.g., Bryan & Bryan, 1978; Tur-Kaspa & Bryan, 1995; Siperstein & Goding, 1983). For example, Siperstein and Goding found that Grade 7 teachers interacted significantly more often with children with LD than with children without LD. But this kind of interaction involved correcting the children with LD more often and displaying both more non-supportive verbal behaviour and negative nonverbal affective behaviour. They concluded that this differential treatment by teachers was a result of these children having been previously labelled as having LD.

Wiener (1987) concludes that none of the major hypotheses suffice by themselves to explain the low peer status of children with LD. As with normally-achieving children, there are likely to be different pathways to peer rejection and a variety of factors that mitigate against it. Wiener strives to tie together the four major hypotheses, using a model based on the principle of "mutual adjustment and accommodation among interactional partners in a reciprocal system". She assumes that peers attempt to control the excessive or inappropriate behaviours of classmates with LD by choosing not to seek contact with them or by acting aversively towards them. The causal chain ending with poor peer acceptance might extend from social perception, social cognitive, pragmatic, and metacognitive deficits to inappropriate social strategies, which, in turn, may lead to negative interaction patterns with family, teachers and peers, and eventually cycle back in the form of differential treatment of the child. Differential treatment may however, be directly elicited by the child being perceived to possess deviant characteristics.

There is also evidence suggesting that the low status of children with LD relates to conditions that are comorbid with LD, such as attention-deficit hyperactivity disorder (ADHD), withdrawal, and aggression (Landau & Moore, 1991; Loney, Kramer & Milich, 1981). It is widely accepted (e.g., Cantwell & Baker, 1991; McGee & Share, 1988) that many children with LD also have the overlapping condition of ADHD. Significant peer problems are known to be associated with both LD and ADHD and that boys with LD and ADHD have significantly greater peer rejection and less popularity than boys without ADHD (Flicek & Landau, 1985; Flicek, 1992). Children with ADHD for example, tend to display off-task, disruptive, and rule-violating behaviours in the classroom thereby increasing the probability of greater rejection (Cunningham, Siegel & Offord, 1985). It has been shown that children with LD and ADHD tend to engage in more negative and rejecting interactions with peers than children without ADHD or LD and are more likely to be ignored by peers (Bryan & Bryan, 1978). They exhibit fewer positive behaviours such as smiling, saying nice things to others and helping others (Gresham & Reschly, 1986) and they display less initiative in peer settings and more distracting nonverbal behaviours (La Greca & Mesibov, 1981). Children with ADHD have also been seen to be frequent targets of aggression and are more likely to return this aggression (Schneider, Ledingham, Byrne, Oliver & Poirier, 1985), compounding the problem further.

General agreement therefore, exists in the literature concerning the multiple causes of the problematic peer-relations of children with learning disabilities. On one hand, these difficulties may be linked to pre-existing deficiencies in the acquisition and use of skills needed in social interactions. On the other hand, social stigma following

from under-achievement and, in turn, differential treatment by others may expose children with learning disabilities to different peer experiences, including restricted opportunities for friendships and the acquisition of social skills. Differential treatment may induce feelings of being different and negative self-evaluations.

As research on the peer relations of children with LD accumulates, it is becoming increasingly clear that these children are a heterogeneous group with regard to their sociometric status, and that an adequate explanation and description of their social difficulties is yet to be elaborated. Some researchers have attempted to explain the variability in social status found in children with LD by considering social behaviour as a function of LD subtyping. Sorting out the different pathways to low peer status in children with LD is a complex process that, seemingly, would benefit from an attempt to identify subtypes within this population.

Thus, as an alternative to the contrasting-groups research designs, researchers studying LD subtypes have attempted to examine brain-behavior relations by dividing the children with LD into more homogeneous groups. Although research in the subtyping of LD acknowledges that each child with LD is unique, it operates on the premise that most children with LD can be classified into homogeneous groups on the basis of shared strengths and weaknesses in neuropsychological abilities (Rourke, 1989).

Subtypes of Learning Disabilities

Among the earliest researchers to determine the need for more specific differentiation among students with LD were Johnson and Myklebust (1967), who

maintained that there are distinctive subtypes of LD that have differing profiles of abilities and deficits. Other researchers have also urged that more homogenous subgroups need to be used in LD research (Kaufman, 1981; Naglieri, 1981; Satz & Morris, 1981; Rourke, 1989; Silver & Hagin, 1990).

As a result, particularly in recent years, identifying valid and reliable subgroups within the population of persons with LD has been one of the areas in which research efforts have focused. One of the reasons for this effort is the notion that advancement of knowledge of the features that define homogenous subgroups within the population of students with LD will allow for improved diagnostic procedures as well as the development of appropriate instructional strategies. As Lyon (1985) demonstrated, the differential assignment of students with LD to specific treatments based on subtypal features can lead to significantly improved academic progress as compared to controls.

McKinney (1984) noted the extensive literature that catalogued the various deficits associated to some extent with LD. Among these are: various neurologic signs, perceptual-motor impairments, disorders of attention, language and memory, and distractibility and impulsivity. Numerous researchers have also made it clear that no single feature or variable can account for the considerable variability found to appear among groups of students with LD (Kavale & Nye, 1986; Breen, 1986). Thus, the problem had become one of how to reduce heterogeneity in the conceptualizations of LD and to bring order to the field in the form of improved classification. Different ways of subtyping LD therefore, have become a popular way to describe the diversity within this population.

Subtyping research as it is currently practiced, strives to divide heterogeneous samples of children with LD into homogeneous subgroups based on their patterns of performance across a variety of tests or other measurements thought to be critical to the development of learning disabilities. The underlying assumption of these attempts is that a better understanding of the disorder will be achieved by carefully examining patterns of performance and separating children with LD into homogeneous subgroups (Siegel & Heaven, 1986). This approach is also aimed at addressing the problem of inconsistent research findings in this area. The effort to delineate homogenous subgroups of children with LD involves sorting subject characteristics into identifiable and reliable syndromes.

Among the many attempts to subgroup students with learning disabilities into homogenous clusters, two primary methods, the clinical-inferential and empirically-based approaches, account for most of these efforts (McKinney, 1984). Clinical-inferential studies result in conceptually-based typologies that reflect the investigators' a priori theoretical orientation and/or clinical impressions (e.g., Satz & Morris, 1981). In these studies, children are usually matched by visually comparing their performance on psychoeducational or neuropsychological tests. Internal scatter corresponding to a pattern suggested by a theory determines the diagnosis. In some cases, children are classified according to within-test discrepancies in their level of performance. This approach was used in many of the early studies on learning disabilities subtypes in the 1960s and 1970s.

On the other hand, a growing number of investigators have used multivariate classification techniques that result in empirically-based typologies. These studies fall into two groups that reflect the statistical method employed, that is, either Q-factor

analysis or cluster analysis (McKinney, 1984; Rourke, 1985; Fletcher & Satz, 1985). These techniques make use of technological capabilities to simultaneously analyze multiple variables to derive clusters of children based on patterns and levels of their performance on some measures. Whereas in the clinical-inferential studies, clinical judgment, theory, inspection of the data, and a priori criteria for subgroup inclusion are used, the empirically-based studies rely on statistical procedures to identify those children who show similar profiles along the measures taken. The following studies represent some of the attempts at classifying children with LD into homogeneous subgroups from both the clinical-inferential and empirical approaches.

Clinical approaches. Early pioneers in learning disabilities subtype research used clinical observations to identify subtypes of children with reading disabilities, often employing concepts from behavioral neurology. The clinical-inferential method began with a concept or theory on what defined the different subtypes. Tests of the relevant mental processing variables that were hypothesized to differentiate the subtypes were then administered to a sample of children with learning disabilities to study factors such as the prevalence of the different subtypes and the proportion of classified children.

For example, during the 1960s, a number of subtypes were proposed based on the theory that reading disorders could be attributed to deficient visual and auditory processes (Kinsbourne & Warrington, 1963, 1966; Bateman, 1968; Myklebust, 1967). Subsequent research on the classification of reading disorders in children tended to follow two lines. Some investigators focused on the reading process itself and classified children according to their performance deficits on academic tasks, whereas others focused on the

neuropsychological correlates of poor performance. The following are some of the earliest clinically-based subtyping studies.

Kinsbourne and Warrington (1963), used an a priori method to derive two small, but distinct clinical subtypes from a group of 13 students with reading disabilities based on discrepancies between verbal and performance intelligence quotients from the Wechsler Intelligence Scale for Children. Children belonging to subtype I (n = 6), revealed a larger PIQ of at least 20 points in comparison to the VIQ. Deficits in receptive and expressive language were also characteristic of this group, which was designated as "language retarded." The second group (n = 7), called the "Gerstmann group", had a significantly higher VIQ in relation to PIQ. They displayed higher rates of finger agnosia, left-right confusion, constructional difficulties, and arithmetic deficits.

Another early example of the clinical approach to classifying reading disorders is that of Johnson and Myklebust (1967), who described two subtypes of dyslexia based on their clinical experience. These were visual (visuospatial) and auditory (audiophonic) dyslexia. Visual dyslexia was seen as involving particular difficulty learning through the visual modality. Associated features included difficulty with visual discrimination, inversions and reversals of letters, and problems reproducing visually-mediated material. Auditory dyslexia was characterized as involving particular difficulty with auditory discrimination and the association of phonetic sounds with linguistic symbols.

Using the clinical-inferential method, Boder (1973) also attempted to subdivide a sample of 107 children with reading disabilities by examining their reading and spelling errors. The children ranged in age from 8 to 16 years. Although she reported little detail

concerning the exact method of classification, she emphasized a qualitative clinical approach that assessed children's learning styles in performing the task as well as their level of performance. Based on her clinical impressions of error patterns, Boder classified her sample into three subtypes. The largest subtype, representing over 60% of the students with reading disabilities, was classified as dysphonetic. These students were characterized as having poor phonetic decoding strategies, poor letter-sound integration, and weak auditory memory. They appeared to rely excessively on the visual patterns of words when reading and tended to read words globally rather than analytically. They made non-phonetic reading and spelling errors and could not decipher unfamiliar words.

A much smaller subtype, consisting of about 10%, was classified as dyseidetic. Unlike the first subtype, these children were described as "word-blind." These students were noted to have poor visual-perceptual abilities and weak visual-memory skills. Their reading and spelling errors, although significantly higher than normal readers, tended to be phonetically comprehensible (e.g., "bizness" for "business"). These students, however, had great difficulty in developing a sight vocabulary.

A third subtype, denoted as readers with dysphonetic-dyseidetic problems, and classified as alexic, consisted of students who showed the deficits seen in both of the other two subtypes. This was the most severely impaired group in terms of overall reading achievement. Students exhibited processing deficiencies in both visual-perception and phonetic decoding and typically were unable to develop either a sight or a phonic vocabulary. Prevalence of this subgroup was estimated to be about 22% among the group of students with reading disabilities.

It should be noted that the classification systems proposed by Johnson and Myklebust (1967) and Boder (1973), show marked similarities in the constructs they used to characterize the subtypes they derived. These subtypes appear to correspond to two main subtypes consistently identified in many other studies (e.g., Kolb & Wishaw, 1990). Characteristically, these subtypes consist of individuals having a disability in either visual-spatial analysis or linguistic-phonological processing. A third subtype, encompassing those having a combination of these deficits, is also often included, as in Boder's schema.

Subsequent research by a variety of researchers has provided mixed support for Boder's classification model. For example, in some studies support has been derived for the Boder dyslexic subtypes in terms of performance on visual-sequential memory tasks (Bayliss & Liversey, 1985) and dichotic listening (Obrzut, 1979). In contrast, however, Hooper and Willis (1989) found no difference among the Boder dyslexic subtypes on the simultaneous and sequential processing scales of the Kaufman Achievement Battery for Children (K-ABC).

Pirozollo (1979) proposed a somewhat similar subtype model using a battery of tests that included the Wechsler Intelligence Scale for Children-Revised (WISC-R), Raven's Progressive Matrices, and tests of linguistic skills. Using a sample of 24 male right-handed children, he described two distinct subtypes of dyslexia. One group was found to have distinct auditory-linguistic deficits relative to visual-perceptual strength, whereas the other subgroup showed visual-spatial deficits compared to verbal abilities. The two clinical groups were matched with control participants for age and full-scale IQ.

Pirozollo was one of the first investigators to hypothesize the existence of many learning disability subtypes, but he believed that these auditory-linguistic and visual-spatial subtypes probably represented the most common forms of learning disabilities.

A linguistic model for classifying reading disabilities was developed by Marshall (1984) based largely on the literature on acquired alexia in adults. Marshall proposed four basic subtypes: surface dyslexia, deep dyslexia, phonological dyslexia, and direct dyslexia. Surface dyslexia was described as difficulty with the visual aspects of word recognition. Good phonetic skills were typically seen, but the individual showed impairment in whole-word recognition and reading comprehension. These students were found to read better aloud than silently, which was interpreted as a reflection of inability to use the visual modality in the reading process.

The second subtype, that of deep dyslexia, was described as involving adequate reading of familiar words, but frequent semantic paralexias when reading aloud (e.g., substituting "car" for "automobile"). Despite problems with visual confusion, these individuals often made use of contextual cues and thus, tended to have adequate reading comprehension. The paralexic response appeared to be due to an incorrect visual-semantic association, even though the correct semantic category was accessed. Some researchers have speculated that the reading pattern of deep dyslexia is mediated primarily by the right cerebral hemisphere as opposed to the neurolinguistic processes associated with the left hemisphere (Hooper & Willis, 1989).

The third linguistic subtype proposed by Marshall (1984), that of phonological dyslexia, was characterized by severe deficiencies in converting the phoneme stimulus

into a grapheme representation. Such individuals would often add or delete prefixes or suffixes in their reading. Their oral vocabulary was typically normal. The fourth subgroup, direct dyslexics, showed average to above average oral reading for both regular and irregular words. Comprehension skills were markedly poor, however.

Some concerns regarding the comprehensiveness of the linguistically-based subtyping system of Marshall (1984) have been expressed due to the apparent exclusion of reading disability subtypes that may not involve components of language dysfunction. Although the most commonly reported subtype is characterized by auditory-linguistic deficits, the second-most common among the three broad subtypes are characterized by visual-perceptual deficits followed by the third subtype consisting of those showing a combination of these deficits (Hooper & Willis, 1989).

In a series of studies, Rourke and his associates (Rourke & Finlayson, 1978; Rourke & Strang, 1978; Strang & Rourke, 1983), examined three subgroups from a population of students with learning disabilities selected according to an a priori criterion based on academic performance. Group R-S-A was composed of students showing equally deficient skills in reading, spelling, and arithmetic. Group R-S was deficient in reading and spelling, but had stronger skills in arithmetic. Group A was singularly deficient in arithmetic.

Using rigorous diagnostic criteria, Rourke and Finlayson (1978) clinically grouped 45 children with average intelligence, ages 9 to 14, who were referred for neuropsychological evaluation. They analyzed patterns of performance of these children on various reading measures. A child with LD who obtained a score less than or equal to

the 25th percentile on the Wide Range Achievement Test (WRAT) Reading subtest and at or above the 30th percentile on the Arithmetic subtest qualified as a child with reading disabilities (RD), and one who obtained a score less than or equal to the 25th percentile on the WRAT Arithmetic subtest and at or above the 30th percentile on the Reading subtest qualified as a child with arithmetic disabilities (AD). Based on these criteria, three subtypes were identified. Subtype 1 consisted of 15 children who scored at least 2 years below expected grade-level placement on the WRAT Reading, Spelling, and Arithmetic subtests. Subtype 2 consisted of 15 children who scored below the 15th percentile on WRAT Reading and Spelling, where both of these scores were at least 1.8 years below the WRAT Arithmetic score. Subtype 3 consisted of 15 children who demonstrated the opposite pattern from Subtype 2 (that is, WRAT Reading and Spelling grade-level equivalents exceed WRAT Arithmetic by at least 2 years).

After grouping the students solely along these achievement measures, these researchers compared the participants on numerous dependent measures. Groups R-S-A and R-S showed normal visual-perceptual-organizational skills, psychomotor, tactile-perceptual, and nonverbal concept-formation abilities. Using the Wechsler Intelligence Scale for Children (WISC), Verbal IQ was found to be significantly lower than Performance IQ and relatively low scores were exhibited on measures of linguistic and auditory-perceptual abilities. Students in Group A were found to show just the reverse pattern, having well-developed auditory-perceptual and verbal skills, together with relatively deficient visual-perceptual-organizational skills. Also, Performance IQ was significantly lower than Verbal IQ among Group A students. Rourke and Strang (1978)

demonstrated further validity for these subtypes by comparing their performances on a battery of motor, psychomotor, and tactile-perceptual tasks.

Rourke and Finlayson (1978) emphasized the importance of looking at the overall pattern of achievement across academic subjects, rather than simply the level of performance, in selecting members of the respective groups. They pointed out that both Groups R-S and A showed similarly low arithmetic skills. Had these groups been combined into one group simply labelled "deficient in arithmetic skills", then the marked differences they showed in verbal and visual-spatial abilities would have been masked.

The students in Group A, unlike those in Groups R-S and R-S-A, appear to have deficiencies in calculation due to underlying deficiencies in visual-spatial-organization and integration (Rourke & Finlayson, 1978). Pennington (1991) makes a similar distinction in observing that students having pronounced difficulties in math, together with poor reading and spelling, appear to have problems with memorizing math facts and understanding word problems as a result of reading problems. Those having marked learning problems confined to math appeared to have trouble understanding the basic concepts of math.

In much of their subsequent research, Rourke and his associates did not include Group R-S-A because they believed this group was composed of several different subtypes of children with learning disabilities. Instead, they concentrated their attention primarily on comparisons between Group A and Group R-S because they believed that these groups represented distinct and uniform subtypes. Also, the contrasting cognitive profiles of these two groups were believed to accentuate and clarify the underlying

difficulties that can lead to marked impairment specifically in mechanical arithmetic. Groups A and R-S showed virtually identical levels of performance on the WRAT Arithmetic subtest, but markedly different levels of performance in word recognition and spelling skills. Given the contrasting performance profiles shown by these two groups on additional measures, Strang and Rourke (1985) concluded that these groups perform poorly in arithmetic for very different reasons.

In another study involving these two groups, Rourke (1989) found differences on a wide range of variables. Noting the performance pattern characteristic of Group A participants, Rourke proposed that their strengths emanate from underlying assets in phonemic hearing, segmentation, and blending, which lead to a relatively strong ability to match phonemes and graphemes within a system of codified rules. This is believed to account for their very strong word recognition skills and the finding that Group A's spelling ability is characterized by a high degree of adherence to phonetic rules. As reported by Sweeney and Rourke (1985), over 95% of misspelled syllables produced by this group were phonetically accurate (e.g., "nacher" for nature), compared to a level of 75% phonetic accuracy in misspellings among normal students.

The weakness Group A students display on tasks of mechanical arithmetic is believed to reflect underlying deficits in visual-spatial-organizational and psychomotor skills. In addition to scoring poorly on those tasks emphasizing visual-spatial-organization, Group A students also showed qualitative errors consistent with this interpretation. For example, as Strang and Rourke (1985) noted, frequent errors in mechanical arithmetic were observed among Group A students involving poor spatial-

organization. Misalignment of numbers in columns and directionality problems were seen, as well as misreading of mathematical signs. Graphomotor problems were also evident; the student's written numbers were difficult to read. There was evidence of poor judgment, since Group A students attempted problems that were clearly beyond their capabilities or gave obviously incorrect answers (e.g., where the answer in a subtraction problem was larger than any number in the presenting problem). It must be noted, however, that there was no control group or normative data employed for comparison along these qualitative measures. Therefore, it is unclear to what extent these types of errors are also present among normal learners or in other learning disability subtypes.

Numerous clinically-based subtyping systems have also been proposed that are somewhat more complex than the relatively simple dichotomies described thus far. For example, Denckla (1981) using a battery of language tests encompassing skills in memory vocabulary, and naming, derived six subtypes of language impairment in a sample of 52 students with learning disabilities. Those said to have "anomic" disorders showed poor naming, but with normal comprehension and repetition. A related subgroup showed anomic features with repetition deficits. Dysphonemic sequencing disorders characterized a third group showing poor repetition with phonemic substitutions and missequencing. A fourth subtype, showing poor sentence repetition and verbal-paired-associate learning, was designated as "verbal memory disordered." Denckla also found two mixed subtypes, a right hemisyndrome with mixed language disorder and a mixed subtype manifesting subnormal repetition, and impaired comprehension, phonemic memory, and sequencing.

Siegel and Heaven (1986) also proposed a classification scheme of children into three types of LD, namely, reading disability (RD), arithmetic/written work disability (AD), and attention deficit disorder (ADD). The subtypes differentiated by academic achievement in Siegel and Heaven's scheme were derived from an approach similar to the one outlined by Johnson and Myklebust (1967) and by Rourke and his associates (e.g., Rourke, 1985, 1991; Rourke & Finlayson, 1978; Rourke & Strang, 1983). These may be summarized as follows: Children with a reading disability have difficulty recognizing words, reading non-words, associating sounds with letters, and processing and producing language. Children with an arithmetic/written work disability have a constellation of problems, including low scores on written tests of arithmetic, short-term memory problems, difficulty with eye-hand coordination. They have difficulty with written work and learning the times tables. Finally, individuals with an attention deficit disorder have problems of attention and concentration, impulsivity, and often difficulties with peers and immature social behaviour (Siegel & Heaven, 1986). The authors, however, did not explain the rationale for including attention deficit disorder as a distinct LD subtype in their classification scheme, when others clearly do not. Although they viewed ADD as a subtype on its own, they also pointed out that this disorder can occur in combination with any of the other subtypes.

The studies described thus far illustrate the range of student samples and variables used to develop learning disability subtypes. Despite the many differences between studies, clinical approaches have typically delineated among students with reading disabilities a subgroup characterized by language deficits and a subgroup characterized by

visual-perceptual deficits. To a lesser degree, separate groups with global deficits or no apparent underlying cognitive deficits are also frequently found (Satz & Morris, 1981). There is no doubt that these studies have clinical and heuristic value, but they also show some weaknesses in experimental design that limit some of the conclusions that might be derived from them.

Empirical approaches. The second approach to subtyping research is the most recent and involves the use of multivariate empirical classification procedures in grouping individuals who perform similarly over several different measures. The difference between the empirical approach and the clinical approach lies in the way subtypes are formed. The empirical approach does not depend upon a priori theories or clinical-inferential thinking about the existence of specific subtypes. Instead, empirical techniques like Q-factor analysis and cluster analysis are used to define subtypes that are then validated with external measures of theoretical and practical relevance such as socio-demographic, neurological/historical, and academic variables.

The empirical classification methodology allows researchers to look for relationships among a complex array of variables that potentially influence the severity and specificity of learning problems. Typically, data are collected from measures administered to samples with LD and then analyzed using either Q-factor or cluster analysis. These two approaches usually begin with the selection of variables or attributes that are considered as possibly relevant to the phenomena being studied. The capabilities afforded by computerized technology allow the investigator to consider simultaneously numerous variables in searching for groupings of participants that are relatively

homogenous in terms of both profile pattern and elevation. The goal is to minimize profile differences within subgroups and maximize profile differences between subgroups.

The Q-factor technique is conceptually similar to traditional factor analysis (some times called the R-technique). However, the Q-factor technique involves the factor analysis of correlations among participants rather than among tests, which is the usual practice in R-factor studies. The Q-factor analysis results in factors that describe groups of similar individuals rather than groups of similar tests. For example, some researchers first classify participants according to their reading deficits and then assess linguistic and neuropsychological correlates, whereas others first classify their participants on neuropsychological measures and then seek neurological and educational correlates. Cluster analysis, on the other hand, is a technique that successively matches children based upon their responses across an array of variables in an effort to increase group homogeneity while decreasing group overlap.

Studies using empirical classification methods have designated subgroups of students with LD using measures of achievement, cognitive, and linguistic variables. Petrauskas and Rourke (1979) derived four subtype patterns using a neuropsychological battery administered to 133 students with reading disabilities and 27 normal readers. Six categories of functioning were assessed, including tactile-perceptual, sequencing, motoric, visual-spatial, auditory-verbal, and abstract-conceptual domains. The first subtype contained the largest percentage of participants and was characterized by auditory-verbal and language-related deficits. These youngsters showed lower reading

and spelling skills relative to math skills. The second subtype showed deficits in visual sequencing, finger agnosia, and overall academic deficits. This subtype also displayed relative weakness on the Wechsler Arithmetic, Coding, Information, and Digit Span subtests (i.e., the "ACID pattern"). The third distinct subtype displayed right-sided sensory and motor deficits, together with impairment in expressive speech and visual-motor coordination. The fourth subtype reflected essentially a normal neuropsychological profile. The authors speculated that the first three subtypes represented, respectively, dysfunctions involving the left hemisphere as follows: (a) the temporal lobe, (b) the temporal-parietal-occipital regions, and (c) the frontal regions.

Another study in which linguistic variables in an empirically-based method was used is that of Feagans and Appelbaum (1986). Using a battery of tests designed to assess syntax, semantics, comprehension, and complexity of language used to paraphrase, they identified six subtypes among 55 six- and seven-year-old students with learning disabilities. The first subtype was found to have normal syntactic abilities despite otherwise below average linguistic skills. The second subtype showed superior semantic skills, but an inability to paraphrase or understand narrative information. The third subtype showed excessive talking, but was generally unable to use complex speech. The fourth subtype had better narrative than syntax and semantic skills, whereas the fifth subtype showed relatively normal language patterns. The sixth subtype showed superior syntax and semantic skills, together with otherwise normal language skills.

A study by Doehring and Hoshko (1977) involved a sample of 34 children with reading disabilities who were given a battery of reading-related measures (letters, words,

syllables, and sentences) that assessed visual and auditory-visual matching, oral reading, and visual scanning. Q-factor analysis of this sample yielded three subtypes. Subtype 1 consisted of children with an oral problem. They were described as poor in word, phrase, and sentence reading with near normal silent reading. Subtype 2 had children with an intermodal association problem. These were described as poor in matching spoken and printed letters, words and syllables. Subtype 3 consisted of children with sequential relation problems. These were described as poor in visual-auditory matching of words and syllables compared to letters.

A relatively small number of studies using achievement variables are also found in the research literature on empirical classification methods, as compared to the much larger number of such studies employing clinical-inferential models of subtyping. DeLuca, Del Dotto, and Rourke (1987) used clustering techniques to group 256 children with disabilities in math into four homogenous subtypes. The first subtype was distinguished by mild deficits in tactile-perception, conceptual flexibility and some components of expressive language. Intact functioning was noted, however, in nonverbal problem-solving, motor skills, and visual-perceptual-organization. The second subtype showed deficits in visual-motor speed and coordination, verbal fluency and verbal memory. The third subgroup was characterized by deficiencies in nonverbal problem-solving and processing. These students showed average to above average reading skills together with poor arithmetic calculation skills. The final subtype showed mild difficulties with verbal expression and manipulation of concrete symbolic materials. Reading ability was intact despite deficits in spelling and arithmetic.

Breen (1986), using a sample of 90 school-identified students with LD, derived three subgroups based on the students' scores on the reading and math subtests of the Woodcock Johnson Psychoeducational Battery (Woodcock & Johnson, 1977). Following the procedure of Rourke and Finlayson (1978), Breen (1986) defined three groups as follows: (1) high math/low reading scores group, (2) high reading/low math scores group, and (3) low reading and low math scores group. The groups, although formed using a clinical method, were then compared on other tests of cognitive and visual-motor skills using multiple regression to determine whether group membership would predict their performance on these additional measures. Breen reported that using subtypes derived according to this method did not result in substantial differences between groups along the dependent measures used. Rather, the subgroups showed considerable overlap.

Breen suggested that the difference between his findings and those of Rourke and Finlayson may have been due to the use of different measures of academic achievement. Breen used a math measure that included mechanical calculation and applied problems (word problems) and a reading measure that assessed both phonetic decoding and comprehension skills. Rourke and Finlayson, on the other hand, selected groups based on scores from the WRAT, which included only mechanical calculation and word pronunciation subtests as measures of math and reading, respectively. It appears therefore, that derivation of subgroups based on performance profiles along the more specific measures of academic skills from the WRAT was superior to subgrouping procedures that used more general achievement measures, at least in terms of finding distinctive subgroups that differed on the particular additional measures used.

Peer Relations Problems as a Function of Subtype

A number of reasons have been offered in an attempt to explain why the peer relations of children with LD may vary by subtype. Wiener and Harris (1993) found that children with AD characterized by ADHD were more likely to be rejected by their peers than those with RD; children with ADHD were viewed as more aggressive, disruptive and dependent than children with RD. Denckla (1981) reported that many children referred to learning disabilities clinics for difficulties in arithmetic and/or visual-spatial skills also had difficulties in social skills. She hypothesized that this constellation of deficits was the result of right hemisphere dysfunction. Denckla's conceptualization of a right hemisphere dysfunction is similar to subtypes identified by other investigators, notably Weintraub and Mesulam (1983), who termed it "developmental learning disability of the right hemisphere". Voeller (1986) called it "right-hemisphere deficit syndrome", and Rourke (1989) referred to it as "nonverbal learning disability".

Over the last two decades, Rourke and his colleagues (Porter & Rourke, 1985; Rourke, 1989; Rourke & Finlayson, 1978) have developed a comprehensive model of nonverbal learning disabilities. The objective of this model is to explain how patterns of central processing abilities and deficits can predispose children to predictably different patterns of social and academic learning disabilities (Rourke, 1989). The development of the model began as a systematic study of learning disability subtypes. In early studies, it was shown that children with learning disabilities grouped solely on the basis of patterns of academic performance also exhibited distinct neuropsychological profiles (Rourke & Finlayson, 1978; Strang & Rourke, 1985).

Two subtypes which have been found consistently in Rourke's studies (Rourke, 1988) are the verbal learning disability and the nonverbal learning disability subtypes, denoted as Groups R-S and A, respectively. Children in the verbal learning disability exhibit poor psycholinguistic skills, but show well-developed abilities in visual-spatial organizational, tactile-perceptual, psychomotor, and nonverbal problem-solving. Their reading and spelling skills are very poor, while their mechanical arithmetic skills are somewhat better. Children in the nonverbal learning disability exhibit impairments in visual-spatial-organizational, tactile-perceptual, psychomotor, and nonverbal problem-solving skills but show clear strengths in some psycholinguistic skills. Their primary academic difficulty involves mechanical arithmetic.

According to Rourke, an apparent difficulty for Group A children in social settings is processing and integrating novel stimuli, which results in marked impairment in their development and maintenance of social relationships. Evidence from numerous studies (e.g., Badian & Ghublikian, 1983; Ozols & Rourke, 1985; Rourke & Fuerst, 1991) indicates that these youngsters typically have difficulty in understanding the nonverbal cues of body language and facial expression. They also tend to rely excessively on routinized social relations, and display a "flat" or stereotyped quality in their speech. Their deficient nonverbal reasoning abilities prevent them from interpreting correctly novel situations where flexible problem-solving may be called for (Strang & Rourke, 1983). Such situations are quite complex and present a large number of verbal and nonverbal cues that must be perceived. The individual then must present appropriate nonverbal messages (e.g., standing at an appropriate distance from others) for social

relations to proceed smoothly. Conversely, Group R-S has been found to perform normally on nonverbal problem-solving tasks and they also tend to have far better social skills (Loveland, Fletcher & Bailey, 1990; Ozols & Rourke, 1985, 1991).

The study by Loveland, Fletcher and Bailey (1990) was a systematic attempt to determine whether the type of learning disability (arithmetic disability versus both reading and arithmetic disability) interacts differently with the type of communication task (i.e., verbal versus nonverbal, and receptive versus expressive). Twenty five children with LD viewed videotapes in which either a narrator told a story (verbal receptive condition) or puppet actors acted out the same story (nonverbal receptive condition). The children were then asked to either describe (verbal expressive condition) or enact (nonverbal expressive condition) the story. In addition, they were asked to verbally interpret the emotions and motives of characters in the stories. In general, children with arithmetic disabilities (AD) had more difficulty with nonverbal aspects of the story tasks. Children with reading and arithmetic disabilities (RAD) had difficulty with both verbal and nonverbal aspects of the tasks, although their performance on some nonverbal tasks was better than that of the group with AD.

Another study in which comparisons were made between children with nonverbal learning disabilities and those with verbal learning disabilities was conducted by Ozols and Rourke (1985). They used four social awareness tasks. Two of these tasks were predominantly nonverbal, with one measuring the ability to select the appropriate nonverbal gesture based on information from a story, and the other measured the ability to select the appropriate facial expression based on information from a story. One of the

other two verbal tasks measured the ability to describe a feeling portrayed in visual representations of social situations, whereas the other measured the ability to make inferences about the reasons for the feelings portrayed in different social situations. Their results showed that children with poor visual-spatial and math skills performed significantly worse than children with psycholinguistic and reading deficits on the nonverbal tasks, but significantly better on the verbal tasks.

Voeller (1986) also studied a group of children selected on the basis of neurological evidence of right-hemisphere dysfunction. She found that this group of 15 children exhibited a number of social skills deficits, including atypical prosody (i.e., high pitched rates of speech, low pitched voice or monotonous, robot-like intonations), gesturing deficits, and insensitivity. She reported that 13 of these children had poor peer relations. As a group, these children performed below the level expected for their nonhandicapped peers on measures of visual and auditory affect recognition.

Another finding consistent with these was obtained by Badian and Ghublikian (1983), who showed that children with poor mathematical computation skills received lower ratings on the Personal-Social Behaviour section of the Pupil Rating Scale (Myklebust, 1971) than children without difficulties in computation. Eight aspects of behaviour were rated by the Pupil Rating Scale: attention, organization, new situations, responsibility, cooperation, social acceptance, assignments, and tactfulness. The children with deficits in math were given lower ratings on five of these behaviours: attention, responsibility, organization, assignments and new situations. Like Rourke, Badian and Ghublikian suggested that the children's weaknesses in math, social functioning, and

attention-organization could be symptoms of the same underlying cerebral dysfunction. A summary of the studies outlined above is presented in Table 1.

Peer relations of children with LD become even more pronounced when they have additional diagnoses such ADHD (Riccio, Gonzalez & Hynd, 1994). Children with ADHD have pervasive problems getting along with other people. They display negative, disruptive behaviours not only with authority figures, but also with their same-aged peers. It has been documented in a number of studies that these children are impulsive, bossy, inattentive, intrusive, aggressive, and disruptive around peers, and that these behaviours elicit extreme nominations of dislike from peers on measures of peer acceptance and rejection (Pelham & Bender, 1982; Frederick & Olmi, 1994). This rejection can occur even following a brief encounter with unfamiliar age-mates. In situations that require communication with peers, children with LD and ADHD have evidenced difficulties shifting roles from sender to receiver, and have exhibited a higher rate of ignoring peer questions and greater frequencies of talkativeness relative to children without LD (Whalen, Henker, Collins, McAuliffe & Vaux, 1979). Their disruptiveness may also increase levels of negative, off-task behaviours in classroom settings (Campbell, Endman & Bernfeld, 1977).

In a study designed at examining how students without LD would react to the expectation of being paired with a peer with ADHD to work on a cooperative task, Harris, Milich, Johnston and Hoover (1990) investigated the negative reputation of children with LD and ADHD. Several significant findings emerged, including less reciprocity in interactions, fewer positive characteristics attributed to the child with ADHD, and the

Table 1.

Previous Studies Comparing Social Relations of Children with Various LD Subtypes

Author & Year	n	Age	Subtypes	Measures Used	Findings
Badian & Ghublikian, 1983	22	Grade 7 & 8	Low math & low reading groups	Personal-social behaviour of the Pupil Rating Scale	Low math < low on reading, attention, responsibility, organization, assignments and new situations
Loveland, Fletcher & Bailey, 1990	25	8-13 yrs	AD & RAD	Verbal and nonverbal videotaped scenarios	AD < RD with non-verbal materials; RD < AD with verbal materials
Ozols & Rourke, 1985	14	8-11 yrs	AD & RD	Four social awareness tasks from "Toward Affective Development"	AD < RD with non-verbal materials, e.g., gesturing & facial expressions
Strang & Rourke, 1983	30	9-14 yrs	AD & RD	Halstead Category Test	AD < RD on nonverbal concept formation tasks
Wiener & Harris, 1993	90	9-12 yrs	AD, RD, AD/RD & ADHD	Sociometric choice assessment, sociometric assessment of behaviour, WISC-R, WRAT-R, WRMT & CTRS	RD < ADHD & AD (rejection); RD < ADHD (aggressive, disruptive & dependent); RD < AD (dependent)

Note: WRMT = Woodcock Reading Mastery Tests; CTRS = Conners' Teacher Rating Scale.

perception that the task was more difficult with a partner with ADHD than with a child without ADHD. Thus, the mere expectation by children without LD of working with a child with ADHD was strong enough to affect their attribution for success and clearly had a negative influence on interactions with the other child. Not only do the above mentioned findings indicate that other children are sensitive to behavioral characteristics that interfere with social interaction, but also highlight the social status and behavioral variability within the population of children with LD.

Rationale for the Present Study

Previous research has demonstrated that not only are children with learning disabilities less well-accepted and more rejected by their peers than normally-achieving children (e.g., Wiener, 1987; Swanson & Malone, 1992), but that adult observers rate them lower in other aspects of social competence as well, including social skills (e.g., Gresham & Reschly, 1986), classroom adjustment (e.g., Bender & Smith, 1990), and absence of behaviour problems (e.g., McConaughy & Ritter, 1986). Children with learning disabilities have also been shown to generate less appropriate strategies and goals in solving hypothetical social problems (Carlson, 1987; Oliva & La Greca, 1988).

Whereas there is some evidence for problematic peer relations among children with learning disabilities, no coherent or consistent pattern of behavioral and personality characteristics of these children has emerged from the literature. Although some studies have found these children to be less popular and more often rejected than children with no learning disabilities, other investigators have found that not all of these children fare

poorly in these respects. The range of their peer status has been found to be as great as that seen in children without learning disabilities. Some are well-accepted, popular and enjoy many friendships, others are moderately accepted, whereas others are actively disliked or rejected and have no friends.

Secondly, for many years, research in this area neglected the heterogeneity of these children. In the majority of studies, investigators assumed that children with learning disabilities exhibited a homogenous pattern of peer-relations characteristics. Consequently, an undifferentiated group of children with LD was compared with an equally undifferentiated group of normally-achieving children on measures of peer acceptance and/or peer rejection. These studies may have obscured potentially meaningful within-group differences (Tsatsanis, Fuerst & Rourke, 1997). But as research on the peer relations of children with LD accumulates, it is becoming increasingly clear that these children are a heterogeneous group.

Thirdly, the criteria used to identify and describe children as having learning disabilities were often inconsistent. Some studies defined LD on the basis of the local school district's criteria, while other studies used teacher's perceptions without additional information or assessment, whereas others did not even mention the criteria used to select their samples.

Fourthly, some of the studies were not "ecologically valid." In other words, they generally failed to assess the social behavior of children with LD who were educated in self-contained settings where most of these children's peer interactions take place. This failure ultimately impeded efforts to understand the peer relations of these children in

their typical environments. Some of the researchers who made this attempt did so with students based in self-contained special education classes, but who joined regular classes for several hours per week (e.g., Coben & Zigmond, 1986).

Finally, the role of the socio-cultural contexts in which peer relations of children with LD occur has not been considered in most studies. The majority of studies on the peer relations of children with LD have been conducted in Western countries. Very little is known about peer relations of these children in other cultures. Research efforts should also be devoted at trying to determine whether these findings apply cross-culturally.

The primary objective of this study therefore, was to compare the sociometric status and social behaviour of Zambian boys[1] with different subtypes of LD. Specifically, this study was aimed at examining how children with LD interact with each other and the nature of these interactions. A lot has been documented about how children with LD are perceived by their normally-achieving counterparts. However, little is known about how children with LD perceive their peers who also have LD, particularly in a setting where these children interact exclusively with each other. It was therefore, necessary to explore whether children with different subtypes of LD would differ in their sociometric status and social behaviour in a setting where they constitute the entire population.

The second objective was to determine the extent to which sociometric status and peer-reported social behaviours are related to the presence or absence of attention deficit and/or aggression problems in some of the children with LD. As already reviewed, it has

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[1]The decision to include only boys in this study was based on several considerations (see pp. 52 for a detailed discussion).

been suggested by some researchers that significant problems in peer relations of children with LD may be related to conditions that are comorbid with LD, such as attention deficit disorder and aggression problems (Landau & Moore, 1991; Wiener & Harris, 1993; Flicek, 1992; Riccio, Gonzalez & Hynd, 1994; Siegel & Heaven, 1986).

Also, it was also important to examine whether the peer relations of Zambian boys with various subtypes of learning disabilities, occur in much the same way as it does among North American children with LD. This is especially important in that although children's peer relations have been documented mostly in North America, there are some indications that these friendships apply cross-culturally (Chen, Rubin & Sun, 1992; Schneider, 1993), and just the fact that the evaluation of social behaviour may be influenced by cultural values and social conventions (Gresham, 1986; Rubin, 1990). Thus, in trying to fully understand human behaviour, it is important that it be studied from a global perspective and in various socio-cultural contexts in which it occurs. Given the cultural complexities of human life and the importance of cultural variables in shaping human behaviour, psychological theories on human behaviour built exclusively on Western data probably under-represents the state of the art as it exists internationally and may not be adequate in explaining human behaviour in non-Western cultures.

Hypotheses

The following four hypotheses were assessed:

Hypothesis 1. Boys with AD will receive significantly more negative nominations on peer-reported social behaviours than boys with RD.

Hypothesis 2. The proportion of boys with AD in the rejected sociometric status will be greater than that of boys with RD.

Hypothesis 3. Boys with attention deficit or aggression problems will receive significantly more negative nominations on peer-reported social behaviours than boys without any of these problems.

Hypothesis 4. The proportion of boys with either attention deficit or aggression problems in the rejected sociometric status will be greater than that of boys with no attention deficit or aggression problems.

To explore these hypotheses, seven research questions were posed as follows:

1. Is there a significant difference in social behaviour, as determined by peer reports, between boys classified as having RD, AD, or both AD/RD?

2. Is there a significant difference in social behaviour, as determined by peer reports, between boys with and boys without attention deficit?

3. Is there a significant difference in social behaviour, as determined by peer reports, between boys with and boys without aggression problems?

4. Is there a significant difference in social behaviour within the special school setting between the various sociometric status groups?

5. Is there a significant difference in social status between boys with AD or RD?

6. Is there a significant difference in social status between boys with and boys without attention deficit?

7. Is there a significant difference in social status between boys with and boys without aggression problems?

The Zambian Educational System

Zambia, once known as Northern Rhodesia, being a former British colony, is a member of the British Commonwealth, that became independent on October 24, 1964. It is a landlocked country in south-central Africa, bordered on the south by Zimbabwe, Botswana and Namibia; on the south-east by Mozambique; on the east by Malawi; on the north-east by Tanzania; on the north-west by Zaire; and on the west by Angola. In size, the country is about 752,614 sq km (290,586 sq miles). Most of Zambia's population of approximately 10 million people (based on 1997 estimates) is of Bantu origin. Other significant ethnic groupings include white settlers and Asian immigrants.

According to the constitution of 1973, Zambia is a republic, with a president and a unicameral legislature elected to 5-year terms. A one-party state was declared in 1972, but the constitution was amended in December 1990 to permit multiple political parties. A draft constitution introduced in 1991 proposed restricting the president to two 5-year terms. The cabinet holds executive decision-making powers. In the absence of a secondary tier of state or provincial governments, the central government has a powerful impact on the country's institutions and the day-to-day lives of the people. Accordingly, any institution, including education, can at any time be significantly affected by government policy.

The education system in Zambia is centralized. Funds are provided by the central government through the Ministry of Education. Primary and secondary school teachers are trained in government universities and colleges, and curriculum content and standards are determined nationally. The system has developed primarily on the basis of trends in

other countries, especially England. British settlers imposed on Zambia, as a colony of the United Kingdom, a system of schooling that was as similar as possible to that back "home". Education was free, secular and compulsory. It was during the British colonial rule that a comprehensive primary, secondary, and tertiary education system evolved.

The contemporary education system in Zambia provides, theoretically, free, universal education for all children, covering primary and secondary schooling. In practice, however, not every child is afforded this opportunity. First, there is the initial problem of access to schooling at the primary level. Every year, a significant number of children eligible for Grade-1 enrolment are left out due to limited spaces in schools (Kaluba, 1986; Serpell, 1993). At the individual level, this problem often looks manageable as there is always another chance to enrol an over-age child in school. A few parents of the high-income group often bypass this Grade-1 registration bottleneck by enrolling their children initially in the fee-paying private schools. Low-income parents cannot afford this expensive route; they must therefore, be contented with trying a second time the following year. This is possible because the official age entry-requirement of seven years is difficult to enforce very strictly. In the absence of official birth certificates in most cases, sworn affidavits of birth, which many parents present during registration, have proven to be a very unreliable measure of children's ages. Consequently, a huge backlog of over-age children who cannot get into school has emerged.

There is also a problem of access to secondary schools for many. The number of students who pass the highly competitive Grade-7 examinations are very few in relation to primary school students leaving the sector each year. This is considered the most

dreadful bottleneck by many parents. This apprehension is genuine and stems from both social and economic considerations. Social mobility, for instance, is still very much dependent initially on the level of schooling attained, especially secondary education. Despite the ever declining labour market for secondary school certificate holders, there is still tremendous economic importance attached to access to secondary schools and obtaining a certificate thereafter. This is because school certificates constitute one of the most important screening and recruitment tools for both direct employment and post-secondary education. A good certificate can enable one to compete for the few training places in the tertiary sector.

The social consequences of having a large number of primary school leavers who are not at secondary school nor in gainful employment begin to be felt after the Grade-7 examinations, both at the individual and national level. While parents suffer anxieties, the children experience severe frustrations and feelings of despair at carrying the tag of "failure" or "drop-out". The government is equally concerned about this problem's social and economic implications, particularly in the urban areas. Correspondingly, the pressure for access to schooling at the secondary level has had far-reaching consequences in the school system. One of these has been the widespread unethical practice of tampering with public examination papers (mainly Grade 7) at various points.

Further restrictions on enrolment of students are imposed at Grade 9. Students are required to write another nationally-determined examination before proceeding to Grade 10. After all these "filters", a significantly large number of all students who initially enroll for Grade 1 do not make it to Grade 10 (Serpell, 1993).

Special education in Zambia. As with general education, the development of special education in Zambia has been influenced by ideas and practices imported from other countries. A reasonable range of special education provisions has evolved for students who have speech, hearing, visual, or physical disabilities. However, until a few years ago, virtually no systematic programs existed for students with LD. Initially, LD were not perceived as a problem deserving serious consideration. Compared to other educational problems such as how to deal with limited access to Grade 1 by many children, the LD problem seemed secondary.

Special education programs for children with LD have been developed, mainly in the urban areas. These are mostly funded by international donor agencies through the parent advocacy group known as the Zambia Association for Children and Adults with Learning Disabilities (ZACLD). Through these programs, reasonable facilities have been made available for children with LD.

Assessment and placement of children with LD. The assessment of children with LD in Zambia is an arduous task. This is primarily due to a lack of adequate and appropriate assessment instruments. Some of the instruments that have often been used include the Stanford-Binet and the Wechsler Intelligence Scale for Children-Revised (WISC-R). It is worth mentioning here that there are no Zambian norms for either of these tests. Thus, the use of these tests involves comparing a Zambian child with children upon whom the norms were established. Furthermore, determining whether or not there is a significant discrepancy between a child's achievement level and his or her potential, is always difficult to ascertain due to lack of standardized achievement instruments.

CHAPTER II

METHOD

Participants

Participants were 112 boys in grades 4, 5, and 6, aged between 10 and 13 years. They were sampled from special education classes for students with learning disabilities in Lusaka, Zambia. These had previously been identified as manifesting learning problems requiring remediation. Of the 133 students that initially agreed to participate, only 121 met the criteria for participation. Nine more were excluded because they later indicated their unwillingness to continue as participants.

The decision to include boys only in this study was primarily based on several considerations. First, boys are known to comprise about four-fifths of children identified with learning disabilities (e.g. Perlmutter et al., 1983). Second, the research literature on children's friendships and social interactions indicates that from kindergarten through early adolescence, there tends to be gender segregation in social interactions, although the setting (e.g., playground) may affect this to some extent (Gottman, 1986). Third, the psychometric properties of at least one of the measures employed (the IOWA Conners' Teacher Rating Scale) are well-established for boys in this age group. Finally, over 65% of the children from the schools where the study was conducted were boys.

Eligibility

Because of the lack of universally-accepted criteria for identifying children with learning disabilities, the criteria followed in a number of studies in the United States and

Canada were adopted for this study. Thus, in order to be included in this study, these boys were required to meet the following criteria: (a) a full-scale IQ (FSIQ) greater than or equal to 75[2] on the Wechsler Intelligence Scale for Children-Revised (WISC-R), (b) low academic achievement (at least 1 standard deviation below the mean), based on the child's standard score in at least one of the subtests of the Wide Range Achievement Test - 3rd Revised Version (WRAT3), (c) a demonstrated and significant discrepancy (at least 1 standard deviation) between ability and achievement. Ability was based on the child's FSIQ, and (d) evidence that the learning problems were not due to factors such as mental retardation, emotional disturbance, and sensory or physical handicaps.

The WISC-R IQ scores for participants, were readily available from their school records. A summary of the WISC-R and ability-achievement discrepancy scores are presented in Table 2. Academic functioning was assessed using the WRAT3. Class teachers provided information concerning whether any of these students had other handicaps, such as hearing, visual, or emotional disturbance.

Demographic Information

Information on parents' occupational and educational background was obtained from school records. Parental socio-economic status (SES) was classified into three levels, high, medium and low. In the absence of a standard method for classifying SES in Zambia, high SES was assigned to parents or guardians who (a) were business owners,

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[2]A number of studies have been conducted with children with IQs as low as 70 (e.g., Humphries & Bone, 1993; Burd, Kauffman & Kerbeshian, 1992; Braden, 1987; Brenton & Gilmore, 1976), although many others use higher cutoffs.

(b) were employers, and (c) those in administrative, managerial and professional occupations. In the medium SES were those parents in lower-level administrative and clerical occupations. Low SES included parents and guardians who were (a) manual workers, (b) marketeers, (c) students, and (d) unemployed or without previous job experience. Thirty two (29%) of all parents belonged to the high SES group, 59 (53%) belonged to the medium SES group, whereas 21 (19%) belonged to the low SES group.

Parental education ranged from university graduate to middle level primary education (Grade 5). Of all parents, 10 (9%) had a college or university education, 75 (67%) had completed some kind of secondary level education (Forms 1 to 5; equivalent to Grades 8 to 12), and 27 (24%) had basic education ranging from Grades 5 to 7.

Table 2.

Summary of WISC-R and Ability-Achievement Discrepancy Scores of the Study Sample

n = 112	Mean	Standard Deviation	Min	Max
Age	11_a-11_b	0_a-09_b	10_a-06_b	13_a-08_b
WISC-R (FSIQ)	89.26	8.68	76	119
WISC-R (VIQ)	84.59	8.26	77	120
WISC-R (PIQ)	99.26	10.94	72	127
Discrepancy Scores	1.46	.33	1.02	2.22

Note: Age $_a$in years; $_b$in months.

Measures

For participant classification purposes, the Blue form of the Wide Range Achievement Test - 3rd Revised Version (WRAT3) and the IOWA Conners' Teacher Rating Scale (IOWA-CTRS, Loney & Milich, 1982) were utilized. Sociometric status of boys with LD was assessed using Coie, Dodge and Coppotelli's (1982) positive and negative composite nomination sociogram. A set of behavioral descriptions previously used by Coie et al. (1982) were utilized to assess the social behaviour of these boys.

The Wide Range Achievement Test-3rd Revised Version (Wilkinson, 1993)

The WRAT3 was utilized first, in obtaining academic achievement scores for children with LD, and second, in classifying these children by LD subtype, namely, arithmetic disabilities (AD), reading disabilities (RD) or both arithmetic and reading disabilities (AD/RD). Using the criteria proposed by Rourke and his associates (e.g., Rourke & Strang, 1983), children with AD in this study consisted of those that performed at or below the 25th percentile on the Arithmetic subtest and at or above the 30th percentile on the Reading and Spelling subtests. Children with RD were those that performed at or below the 25th percentile on the Reading and Spelling subtests, and at or above the 30th percentile on the Arithmetic subtest. Children with AD/RD were those that had performed at or below the 25th percentile on the Reading, Spelling and Arithmetic subtests.

Psychometric properties of the WRAT3. This is a revision of the WRAT-R. It is the seventh edition of the original 1936 test. Like the earlier versions, the WRAT3

contains three subtests: Reading (recognizing and naming letters and words), Spelling (writing symbols, names, and words), and Arithmetic (solving oral problems and written computations). A stratified U.S. national sampling plan was used for the standardization of the WRAT3. (As discussed later, I also conducted a pilot study to determine the viability of these norms in Zambia). A total of 4,433 participants, about 193 participants in each of the 23 age groups from 5 to 75 years, composed the sample. Age, gender, ethnicity, regional residence, and socio-economical level were included in the stratification variables. Unlike previous editions, the WRAT3 has two equivalent forms (Blue and Tan) which can be administered individually, used as pre-and post-tests or combined for a more comprehensive evaluation of reading, spelling and arithmetic.

Several indices of the reliability of the WRAT3 were reported in the test manual. First, coefficient alphas, measuring the internal consistency, for each of the 23 age groups were examined. The median test coefficient alphas ranged from .85 to .95 over the nine WRAT3 tests (i.e., Reading Combined, Reading Blue, Reading Tan, Spelling Combined, Spelling Blue, Spelling Tan, Arithmetic Combined, Arithmetic Blue and Arithmetic Tan). For the three Combined tests, the range was from .92 to .95.

Second, reliability of the WRAT3 was examined using alternate form (Blue and Tan) correlations. For Reading, there was a range of correlations over the age groups of .87 to .99 with a median correlation of .92. Spelling had a range of correlations of .86 to .99 with a median of .93. The Arithmetic had a range of .82 to .99 with a median of .89. The total sample correlations on raw scores for Reading, Spelling and Arithmetic were .98, .98 and .98, respectively.

Third, internal consistency was examined using the Rasch Person Separation Indices. The range of the Person Separation Indices on the nine WRAT3 tests were from .98 to .99. Finally, the stability of the WRAT3 was measured by the test-retest method. Corrected stability coefficients ranged from .91 to .98 on the nine tests of the WRAT3 given to a sample of 142 individuals from the norm group between the ages of 6 and 16. Standard score performances were used to develop stability coefficients. The WRAT3 manual also reported one study in which the WRAT3 was compared with the WISC-III. The sample consisted of 100 children with a mean WISC-III full-scale IQ of 110.7. Correlations of combined Blue and Tan forms ranged from .57 between WISC-III FSIQ and WRAT3 Arithmetic to .66 between WISC-III FSIQ and WRAT3 Reading and Spelling. A correlation of .49 between the Wechsler Adult Intelligence Scale-Revised (WAIS-R) FSIQ and WRAT3 Spelling was reported. Also reported was a correlation of .60 between WAIS-R FSIQ and WRAT3 Arithmetic. In a study of referred children by Vance and Fuller (1995), correlations of .68 between WISC-III FSIQ and WRAT3 Spelling, and .82 between WISC-III FSIQ and WRAT3 Arithmetic were reported. In another study by Smith, Smith and Smithson (1995), correlations of combined Blue and Tan that ranged from .58 between WISC-III FSIQ and WRAT3 Spelling, to .66 between WISC-III FSIQ and WRAT3 Arithmetic were also reported.

The IOWA Conners' Teacher Rating Scale (Loney & Milich, 1982)

The IOWA-CTRS, which was derived from items of the original CTRS, is commonly utilized when a clear distinction between aggressive and hyperactive

symptomatology is required (Barkley, 1988a). The scale was constructed by correlating individual items on the Conduct Problems and Hyperactivity factors with medical charts to derive ratings of hyperactivity and aggression (Loney, Langhorne & Paternite, 1978). The resultant 5-item Inattention/Overactivity factor (IO) and 5-item Aggression factor (A) included only those items which correlated with chart ratings of one factor and not the other. "Aggression", in these studies did not refer to physical attacks against others so much as to a constellation of negative temperament (e.g., temper outbursts) and oppositional and defiant behaviours (e.g., quarreling, refusing to cooperate, acting "smart", Barkley, 1988b).

The behavioral items on the IOWA-CTRS are numerically weighted according to a 4-point scale system of "not at all", "just a little", "pretty much", and "very much". These responses are assigned credits of 0 to 3 points, respectively, with the higher values indicating more severe symptomatology. A total score is obtained by summing across all items, and factor scores are derived by summing the credits across only those items loading on factors of interest.

In the present study, students with attention deficit were those that obtained a standardized inattention (IO) score of equal to or greater than 1 standard deviation above the mean. A student was considered aggressive if his standardized aggression (A) score on the IOWA-CTRS was equal to or greater than 1 standard deviation above the mean. This was referred to as the teacher-rated aggression score.

Psychometric properties of the IOWA-CTRS. The original CTRS has been shown to be a valid and reliable assessment instrument. Conners (1973) reported test-retest

reliability coefficients between .70 and .90 across all factors scores. Inter-rater reliability between teachers was .92 for the total score (Vincent, Williams, Harris & Duvall, 1977). Achenbach and Edelbrock (1983) reported good concurrent validity between the CTRS and the Child Behaviour Checklist. Loney and Milich (1982) demonstrated that the mixture of aggressive conduct items together with restlessness and inattentiveness, produces heterogeneous samples of mixed aggressive-hyperactive-inattentive children when the CTRS instrument is used for subject selection.

However, the psychometric properties of the IOWA-CTRS are not as well-established as the original CTRS. Nevertheless, some studies (e.g., Loney & Milich, 1982; Loney, 1987) have reported acceptable levels of reliability and validity from the original and subsequent validation samples. The IOWA-CTRS displays good discriminant validity in its ability to distinguish between clinic and nonclinic populations and to predict observed classroom behaviours for a school-age sample of clinic-referred boys (Milich & Fitzgerald, 1985; Milich & Landau, 1988). Milich and Fitzgerald (1985) and Milich and Landau (1988) found that discrimination between the teacher IO and A factors was best in large-group classroom activities demanding student participation while the teacher was presenting lessons (versus small-group work or individual work). The internal consistency reliability within the original classroom sample of 120 boys was .87 for the IO subscale and .85 for the A subscale (Loney & Milich, 1982). These are comparable to those obtained with the clinic sample which were .80 and .87 for the IO and A subscales respectively. One-week stability coefficients for the classroom sample were .89 and .86 for the IO and A subscales respectively.

In a replication/validation study by Pelham, Milich, Murphy and Murphy (1989), ratings on the IOWA-CTRS were obtained on 608 boys and girls from kindergarten to 6th grade in two different schools. Similar psychometric properties as Loney and Milich (1982) were reported in this study. Scores, however, decreased with age. Older children obtained lower mean scores than did younger children.

Sociometric Choice Assessment

Sociometric status classification of children with LD was determined following procedures described by Coie et al. (1982). This measure was adopted because peer nomination measures have been shown to be reliable and valid with 9-12 year-old children (Hartup, 1983). Two scores representing positive and negative nominations were obtained. These were like-most (LM) and like-least (LL). The raw scores, which were standardized within classrooms, were used to derive social preference (SP) and social impact (SI) scores. The SP scores were the standardized LM minus the standardized LL scores. The SI scores were the standardized LM plus the standardized LL scores. The SP and SI scores were also standardized within classrooms so that equivalent status classifications could be employed across grade-levels. These scores were then used to classify participants into distinct sociometric status groups. Popular children were defined as those receiving a standardized SP score greater than 1.0, a standardized LM score greater than 0, and a standardized LL score less than 0. Rejected children were those children who received a standardized SP score less than -1.0, a standardized LM score less than 0, and a standardized LL score greater than 0. Average status children were

those whose standardized SP and SI scores were between -0.5 and 0.5. Neglected children were those that received a standardized SI score of less than -1.0 and standardized LM and LL scores of less than 0. The controversial group consisted of children who received a standardized SI score greater than 1.0 and standardized LM and LL scores of greater than 0. The final category labelled "other", comprised of children whose scores did not fit any of the above criteria.

Psychometric properties of the sociometric choice measures. Sociometric choice measures offer a relatively reliable and valid measure of children's peer group status. Test-retest reliability coefficients have been reported for positive nomination measures ranging from .76 and .84 over 8 weeks (Busk, Ford & Shulman, 1973) to .52 at 1 year and .42 at 2 years (Roff, Sells & Golden, 1972). The stability of negative nominations has generally been reported to be lower, ranging from .65 at 12 weeks (Coie et al., 1982) to .38 at 1 year and .34 at 2 years. Poteat, Ironsmith and Bullock (1986) also reported seven-week stability coefficients that ranged between .74 and .79 for positive nominations and between .62 and .66 for negative nominations. Gresham and Stuart (1992) reported moderate stability ranging from .45 to .60 with like-least nomination scores being the most stable and social impact scores being the least stable. Positive and negative peer nominations have been found to be moderately negatively related, indicating that peer acceptance and peer rejection may be independent dimensions (Asher & Hymel, 1981; Coie et al., 1982). Positive and negative nomination measures have also been shown to demonstrate predictive validity in distinguishing socially skilled from unskilled children (Asher & Dodge, 1986; Coie et al., 1982).

Sociometric Assessment of Behaviour

A set of six behavioral descriptions for which children nominated their peers were adopted from Coie, Dodge and Coppotelli's (1982) study. These were used to obtain peer reports of cooperative behaviour, disruption, shyness, fighting, leadership, and help-seeking. Peer reports of these behaviours were used to provide some understanding of the reputation of each child among the peer group. A child was considered to have aggression problems if he scored at least one standard deviation above the mean on the "fights" and "disrupts" items of the behavioral descriptions. This is referred to herein as the peer-reported aggression score. A complete description of each of these items is presented in Appendix F.

Psychometric properties of sociometric assessments of behaviour. Peer nominations of social behaviour have also demonstrated adequate psychometric properties. Coie et al. (1982) reported statistically significant test-retest reliabilities ranging from .46 to .88 for the six behavioral items over a 12-week interval. Test-retest reliability coefficients have also been reported for other nomination measures ranging from .84 (sociability) to .92 (aggression) (Milich, Landau, Kilby & Whitten, 1982) and from .53 to .82 on seven general behavioral traits of "activity", "overt aggression", "fearfulness", "socialness", "stability", "surgency", and "competence" of the Peer Nomination Technique (Walker, 1967). Michelson and Wood (1982) reported test-retest correlations of between .44 and .70, and split-half correlations of between .63 and .77 on the Children's Assertive Behavior Scale (CABS). Internal consistency of .78 to .80 and 4-week test-retest reliabilities of .66 to .86 were also reported.

Procedure

Five informed consent letters were prepared for this task. The first letter was addressed to the Permanent Secretary, followed by one to principals of participating schools. Others were addressed to classroom teachers, who were requested to complete a teacher rating scale; to the parents of students with LD; and the last one, which was read orally in class, was addressed to the students.

The project began by seeking permission from the Permanent Secretary of the Ministry of Education and the principals at the participating primary schools. Written descriptions, nature, purpose and procedures of the study were sent to the principals, followed by a face-to-face interview with me. Their assistance in identifying potential participants and provision of relevant information about each of the participating children were also requested.

Once the study had been explained to the principals and the teachers, and their consent obtained, arrangements were made to meet potential participants. To recruit these children, I read an informed consent letter to them in class, and those who were willing to participate were given letters to take to their parents or guardians.

Parents and guardians of potential participants were contacted by letters taken to them by their children who had consented to taking part in the study. The letters included detailed descriptions of the study, procedures and a consent form, to indicate their willingness to let their children participate in the study.

Class teachers were asked to fill out the IOWA-Conners Teacher Rating Scale (IOWA-CTRS) regarding each of the participating children's behaviour in school.

Classifications of participants based on the IOWA-CTRS scores are presented in Table 3. The WRAT3 and sociometric measures were administered by me in a counter-balanced order. I administered each of these measures individually in a private room where children were assured about the strict confidentiality of their responses to the interview.

Administering these tests individually to these boys was aimed at helping to minimize discomfort or embarrassment over any child's reading difficulties. The sociometric questionnaires were read to the children as a way of ensuring that first, no misunderstanding arose due to reading difficulties and second, as a way of helping children to maintain their attention to the task. This also afforded me the opportunity to exercise a degree of control over impulsive or overly deliberate response styles. Approximately one hour for each child was required to complete the administration of the research instruments.

Table 3.

Number and Percentages of Boys with Attention Deficit and Aggression Problems

Diagnostic Categories	n	Percent
Attention Deficit Only	13	11.60
Aggression Only	6	5.40
Attention Deficit & Aggression	19	17.00
LD-only	74	66.10

WRAT3 Zambian Distribution Scores

Because there were no WRAT3 norms established for the Zambian population, I decided to collect additional data from Zambian boys attending regular classes who were also of equivalent ages to the research sample. The WRAT3 Blue form was used to collect data from 178 boys in Grades 4, 5, and 6. The students were between 11 and 14 years of age. None of them had previously been classified through the school system's formal psychological assessment as having a learning disability. A summary of the descriptive statistics of the WRAT3 Zambian distribution scores is presented in Table 4.

Raw scores of the 112 students in the study sample were converted into percentile ranks, first by using the WRAT3 norm tables and second, by using tables constructed from the Zambian distribution scores. Raw scores, standard scores and percentile ranks of the 112 boys with LD are presented in Table 5. Actual achievement levels of the three comparison groups (i.e., AD, RD and AD/RD) are presented in Table 6.

Table 4.

Descriptive Statistics for WRAT3 using Zambian Distribution Scores

n = 178	Mean	Standard Deviation	Min	Max
Age (yrs-months)	11-05	1-03	9-06	13-11
Reading Score	32.52	3.90	23.00	43.00
Spelling Score	29.04	4.71	15.00	41.00
Arithmetic Score	29.61	4.39	15.00	39.00

Table 5.

Descriptive Statistics for WRAT3 Scores of the Study Sample

n = 112	Mean	Standard Deviation	Min	Max
Age	11-11	9 Months	10-06	13-08
WRAT3 Reading:				
1. Raw Scores:	33.79	3.73	27	42
2. Standard Scores:				
a) US	89.34	9.20	75	109
b) ZA	88.63	16.85	56	125
3. Percentile:				
a) US	27.07	19.07	5	73
b) ZA	31.13	28.59	0	95
WRAT3 Spelling:				
1. Raw Score:	28.50	4.14	21	38
2. Standard Scores:				
a) US	90.33	9.71	75	112
b) ZA	87.47	13.98	65	121
3. Percentile:				
a) US	29.34	20.69	5	79
b) ZA	27.12	25.35	1	92
WRAT3 Arithmetic:				
1. Raw Score:	32.02	3.73	25	40
2. Standard Scores:				
a) US	91.17	10.62	73	108
b) ZA	89.67	14.06	57	117
3. Percentile:				
a) US	31.74	22.24	4	70
b) ZA	31.03	26.46	1	87

Note: US = scores based on US norms; ZA = scores based on Zambian distribution.

Table 6.

WRAT3 Achievement Levels of the Comparison Groups

Subtype	n	WRAT3 Subtests		Mean	Standard Deviation	Min	Max
			Raw scores	37.36	2.24	34	42
		Reading:	Std scores	98.55	5.33	92	109
			Percentiles	46.15	13.68	30	73
			Raw scores	32.36	2.65	28	38
AD	47	Spelling:	Std scores	100.13	5.62	92	112
			Percentiles	50.36	14.38	30	79
			Raw scores	28.55	1.82	25	32
		Arithmetic:	Std scores	81.45	4.55	73	89
			Percentiles	11.67	5.77	4	23
			Raw scores	30.75	1.79	27	34
		Reading:	Std scores	81.96	4.17	75	89
			Percentiles	12.21	5.49	5	23
			Raw scores	25.44	2.22	21	31
RD	57	Spelling:	Std scores	83.09	4.30	75	90
			Percentiles	13.86	5.70	5	25
			Raw scores	34.96	2.36	30	40
		Arithmetic:	Std scores	100.11	6.01	92	108
			Percentiles	50.26	15.30	30	70
			Raw scores	34.50	.76	34	36
		Reading:	Std scores	87.88	1.81	84	89
			Percentiles	20.88	3.31	14	23
			Raw scores	27.63	2.88	23	30
AD/RD	8	Spelling:	Std scores	84.38	5.37	75	90
			Percentiles	16.13	7.24	5	25
			Raw scores	31.38	1.60	28	33
		Arithmetic:	Std scores	84.63	5.32	73	89
			Percentiles	16.50	6.65	4	23

CHAPTER III

RESULTS

Two separate statistical analyses were performed. The first set was on LD subtypes based on the WRAT3 North American norms. The second set, presented in Appendix H, was on LD subtypes based on the Zambian distribution scores of the WRAT3. Results of these statistical analyses showed that the pattern of findings using the two different bases of classification was almost identical. Thus only results of LD subtypes based on the WRAT3 norms are discussed in this section.

The results are presented in three parts. In the first part are the results of the multivariate analyses of variance (MANOVAs) with unique adjustment as needed for unequal cell sizes. These MANOVAs were performed in order to determine if significant differences in social behaviour existed between the various diagnostic groups.

MANOVAs were also performed on equalized cell sizes. Cells were equalized by random deletion of cases as recommended by Tabachnick and Fidell (1996). These are presented in Appendix I. In cases where significant F ratios emerged, univariate analyses of variance (ANOVAs) followed by Tukey's honestly significant different test (Tukey-HSD), were used to test for group differences. In the second part of the Results section, Chi-square analyses were used to investigate if relationships existed between peer status and the various diagnostic groups. Finally, In order to determine the relative strength of two independent (predictor) variables of attention deficit and aggression on the dependent (criterion) variable of like-least nomination, two sequential multiple regression analyses were performed.

Analytical Strategy

Prior to conducting the statistical analyses, distributions were checked to ensure that the basic assumptions of correlational analysis (i.e., linearity and normality) were met. All variables were checked for outliers by examining the range of z scores for each of the dependent variables. No participant's z scores were beyond three standard deviations from the mean. The range of z scores are listed in Table 7. Normality was checked by examining skewness (symmetry of the distribution) and kurtosis (peakness) of all dependent variables. As Table 7 shows, skewness and kurtosis were found to be within the acceptable range of -1.50 to 1.50 (Tabachnick & Fidell, 1996).

Table 7.

Descriptive Statistics for Social Competence Variables

Variables	n	M	SD	Range of z - scores	Skewness	Kurtosis
Cooperates	112	3.00	3.84	-.96 - 2.43	1.15	-.17
Disrupts	112	3.00	3.82	-.87 - 2.52	1.24	.11
Shy	112	3.00	3.11	-1.11 - 2.87	1.29	1.19
Like-Most	112	3.00	3.71	-.83 - 2.49	1.01	-.50
Seeks Help	112	3.00	3.45	-1.01 - 2.70	1.32	.72
Fights	112	3.00	3.84	-.87 - 2.74	1.27	.40
Leader	112	3.00	3.69	-.94 - 2.72	1.18	.10
Like-Least	112	3.00	3.99	-.86 - 2.32	1.11	-.36

Intercorrelations of Dependent Variables

Pearson product-moment correlations were computed to determine the nature and strength of the relationships between dependent variables. These correlations are listed in Table 8. The major correlates of like-most nomination were cooperation and leadership, whereas the major correlates of like-least nomination included disruption, fighting, attention deficit and aggression. These strong correlations tend to show that participants in this study had clear ideas about the correlates of peer rejection and peer acceptance.

AD, RD, and AD/RD Effects

The first research question was aimed at determining whether there was a significant difference in social behaviour, as determined by peer reports, between Zambian boys with LD classified as AD, RD, and AD/RD. To answer this question, multivariate analysis of variance (MANOVA) was performed on the peer-reported behaviour scores. Results of the MANOVA, using Wilks' criterion, with LD subtypes (i.e., AD, RD and AD/RD) as the independent variables, and peer-reported social behaviors (i.e., cooperates, fights, shy, seeks help, disrupts, and leader) as the dependent variables, revealed that there were no significant differences between the three subtypes of LD in terms of peer reported social behaviours, $F(12,208) = .94$, $p = .50$ (see Table 9). Because of the small number of children falling in the AD/RD subtype (only 8), another MANOVA was performed comparing children with AD and RD only. Results of this analysis also revealed no significant difference between these two groups of children in peer-reported social behaviours, $F(6,97) = 1.05$, $p = .40$ (see Table 10).

Table 8.

Pearson Product Moment Correlations of the Sociometric Choice, Peer-Reported Social Behaviour and IOWA-CTRS Variables

	A	B	C	D	E	F	G	H	J	K
Cooperates (A)	1.00									
Disrupts (B)	-.20	1.00								
Fights (C)	-.28*	.85**	1.00							
Seeks Help (D)	-.24	.15	.20	1.00						
Leader (E)	.83**	-.25*	-.28*	-.26*	1.00					
Like-Most (F)	.92**	-.18	-.26*	-.22	.83**	1.00				
Like-Least (G)	-.29*	.90**	.86**	.23	-.38**	-.28*	1.00			
Shy (H)	-.22	-.34**	-.31**	-.25*	-.21	-.26*	-.34**	1.00		
ADD (J)	-.30**	.60**	.95**	.14	-.32**	-.27*	.64**	-.07	1.00	
Aggression (K)	-.42**	.74**	.73**	.19	-.39**	-.40**	.78**	-.25*	.57**	1.00

Note: ADD = attention deficit.

*$p < .01$. **$p < .001$.

Table 9.

Descriptive Statistics for Peer-Reported Social Behaviours by LD Subtype (AD, RD & AD/RD)

			Peer-reported Behaviours					
	n		cooperates	disrupts	fights	seeks help	leader	shy
		M	.03	-.04	-.12	.02	.08	-.18
AD	47	SD	.99	.92	.82	1.05	1.03	.80
		Min	-.96	-.84	-.87	-1.01	-.94	-1.11
		Max	2.43	2.18	2.28	2.65	2.72	2.39
		M	.02	.01	.04	.03	-.04	.11
RD	57	SD	.98	1.00	1.03	.94	.96	1.05
		Min	-.96	-.87	-.87	-1.01	-.94	-1.11
		Max	2.23	2.52	2.74	2.70	2.50	2.87
		M	-.30	.14	.41	-.31	-.20	.21
AD/RD	8	SD	.91	1.22	1.40	.83	.82	1.27
		Min	-.96	-.79	-.66	-.91	-.94	-.86
		Max	1.89	2.42	2.48	1.50	1.40	2.64

Note: AD = boys with arithmetic disabilities; RD = boys with reading disabilities.

Table 10.

Descriptive Statistics for Peer-Reported Social Behaviours by LD Subtype (AD & RD)

			Peer-reported Behaviours					
	n		cooperates	disrupts	fights	seeks help	leader	shy
AD	47	M	.03	-.04	-.12	.02	.08	-.18
		SD	.99	.92	.82	1.05	1.03	.80
		Min	-.96	-.84	-.87	-1.01	-.94	-1.11
		Max	2.43	2.18	2.28	2.65	2.72	2.39
RD	57	M	.02	.01	.04	.03	-.04	.11
		SD	.98	1.00	1.03	.94	.96	1.05
		Min	-.96	-.87	-.87	-1.01	-.94	-1.11
		Max	2.23	2.52	2.74	2.70	2.50	2.87

AD = boys with arithmetic disabilities; RD = boys with reading disabilities.

Attention Deficit Effects

In order to answer the second research question, in which I sought to determine if significant differences in social behaviour existed between boys with and boys without attention deficit (independent variables), a MANOVA comparing these two groups on the social behaviour variables (dependent variables) was performed. Descriptive statistics for these variables are presented in Table 11. A significant multivariate F for groups was observed, $F(6,105) = 13.50$, $p < .001$, indicating that boys with attention deficit received significantly lower nominations on peer-reported social behaviour variables than boys without attention deficit.

Table 11.

Descriptive Statistics for Peer-Reported Social Behaviours of Boys with and Boys without Attention Deficit

			Peer-reported Behaviours					
	n		cooperates	disrupts	fights	seeks help	leader	shy
		M	$-.45_a$	$.93_a$	$.95_a$	.06	$-.44_a$	.12
		SD	.51	1.12	1.02	.83	.55	1.08
ADD	32	Min	-.96	-.79	-.58	-1.01	-.94	-1.11
		Max	1.45	2.52	2.74	2.12	2.06	2.87
		M	$.17_b$	$-.37_b$	$-.38_b$	-.02	$.17_b$	.05
LD	80	SD	1.07	.60	.65	1.03	1.06	.93
		Min	-.96	-.87	-.87	-1.01	-.94	-1.11
		Max	2.43	1.97	2.21	2.70	2.72	2.77

Note: ADD = boys with attention deficit; LD = boys with no attention deficit.
Means with different subscripts are significantly different.

Aggression Effects

The third research question was developed to examine if significant differences existed in peer-reported social behaviours between boys with and boys without aggression problems. Descriptive statistics for these variables are presented in Tables 12 and 13. MANOVAs revealed that the two groups significantly differed from each other, $F(6,105) = 23.43$, $p < .001$ and $F(4,107) = 11.05$, $p < .001$, in terms of teacher-rated and peer-reported aggression scores, respectively. Specifically, boys with aggression problems received lower overall scores than boys without aggression problems.

Table 12.

Descriptive Statistics for Peer-Reported Social Behaviours of Boys with and Boys without Aggression Problems (Teacher-Rated Aggression)

			Peer-reported Behaviours					
	n		cooperates	disrupts	fights	seeks help	leader	shy
		M	$-.56_a$	1.31_a	1.28_a	.22	$-.57_a$	-.37
		SD	.28	.95	.88	.94	.30	.81
AGG	25	Min	-.96	-.73	-.87	-.90	-.94	-1.11
		Max	.32	2.52	2.74	2.12	.26	2.87
		M	$.16_b$	$-.38_b$	$-.37_b$	-.06	$.16_b$	.11
LD	87	SD	1.05	.58	.63	.98	1.04	1.00
		Min	-.96	-.87	-.87	1.01	-.94	-1.11
		Max	2.43	1.74	2.48	2.70	2.72	2.77

Note: AGG = boys rated aggressive by teachers; LD = boys with no aggression problems.

Means with different subscripts are significantly different.

Table 13.

Descriptive Statistics for Peer-Reported Social Behaviours of Boys with and Boys without Aggression Problems (Peer-Reported Aggression)

			Peer-reported Behaviours			
	n		cooperates	seeks help	leader	shy
		M	$-.51_a$	.35	$-.58_a$	$-.54_a$
AGG	29	SD	.36	.90	.24	.32
		Min	-.96	-.90	-.94	-1.11
		Max	.73	2.12	.00	.32
		M	$.18_b$	-.12	$.20_b$	$.19_b$
LD	83	SD	1.06	.98	1.05	1.06
		Min	-.96	-1.01	-.94	-1.11
		Max	2.43	2.70	2.72	2.87

Note: AGG = boys nominated for aggression by peers; LD = boys with no aggression problems. Means with different subscripts are significantly different.

Attention Deficit and LD Effects

In order to determine whether there was a significant relationship between the type of learning disability (i.e., AD or RD) and attention deficit, on one hand, and social behaviour on the other, a MANOVA between groups formed both on the basis of LD and attention deficit was performed (see Table 14). There was a significant multivariate main effect for groups, $F(18,269) = 4.07$, $p < .001$. Univariate analyses of variance for the main effect of attention deficit/LD revealed that there were significant differences on three of the six dependent variables. Groups differed on: disruption, fighting, and leadership

Table 14.

Descriptive Statistics for Peer-Reported Social Behaviours of Participants by LD Subtype and Attention Deficit Status

			Peer-reported Behaviours					
	n		cooperates	disrupts	fights	seeks help	leader	shy
		M	-.39	1.02	.74	.07	-.28	-.17
AD/		SD	.50	1.00	.94	.87	.79	1.01
ADD	12	Min	-.96	-.79	-.57	-.79	-.77	-1.11
		Max	.73	2.18	2.28	2.12	2.06	2.39
		M	.17	-.40	-.41	.26	.21	-.18
AD	35	SD	1.08	.54	.53	1.11	1.09	.73
		Min	-.96	-.84	-.87	-1.01	-.94	-1.04
		Max	2.43	1.70	1.45	2.65	2.72	2.24
		M	-.43	.78	.94	.50	-.52	-.36
RD/	18	SD	.56	1.22	1.05	.80	.32	1.21
ADD		Min	-.81	-.74	-.58	-1.01	-.94	-1.11
		Max	1.45	2.52	2.74	1.85	.31	2.87
		M	.23	-.34	-.37	.18	.18	.18
RD	39	SD	1.07	.63	.71	1.01	1.06	.99
		Min	-.96	-.87	-.87	-1.01	-.94	-1.11
		Max	2.23	1.97	2.21	2.70	2.50	2.77

Note: AD = boys with arithmetic disabilities; RD = boys with reading disabilities; ADD = boys with attention deficit.

variables. The results of Tukey's HSD pairwise comparisons, presented in Table 15, show that boys with either AD or RD, accompanied by attention deficit received more negative nominations than boys with either AD or RD only.

Table 15.

ANOVA Summary: Peer-Reported Social Behaviours of Participants by LD Subtype

	Groups					
Dependent Variables	AD/ ADD (n=12)	AD (n=35)	RD/ ADD (n=18)	RD (n=39)	F(3,100)	Significant Post hoc Comparisons: Tukey-HSD Test ($p < .05$)
Disrupts	1.02 (1.00)	-.40 (.54)	.78 (1.22)	-.34 (.63)	18.41**	AD < RD/ADD; AD < AD/ADD; RD < RD/ADD, RD < AD/ADD.
Fights	.74 (.94)	-.41 (.53)	.94 (1.05)	-.37 (.71)	19.84**	AD < RD/ADD; AD < AD/ADD; RD < RD/ADD; RD < AD/ADD.
Leader	-.28 (.79)	.21 (1.09)	-.52 (.32)	.18 (1.07)	3.15*	RD/ADD < AD.

Note: Standard deviations are reported in parentheses; ADD = boys with attention deficit.

*$p < .05$. **$p < .001$.

Aggression and LD Effects

The relationship between learning disability subtype and aggression, on one hand, and social behaviour on the other was also explored. Four groups of boys with learning disabilities were compared to each other as follows: (1) those with both arithmetic disabilities (AD) and aggression problems; (2) boys with arithmetic disabilities (AD) only; (3) boys with reading disabilities (RD) and aggression problems; and (4) boys with reading disabilities (RD) only. Summaries of the descriptive statistics for the variables under consideration are presented in Tables 16 and 17, in terms of teacher-rated and peer-reported aggression scores, respectively. Results revealed significant multivariate main effects for groups, $F(18,269) = 5.91$, $p < .001$, in terms of teacher-rated aggression scores, and $F(12,257) = 3.43$, $p < .001$, in terms of peer-reported aggression scores.

Univariate analyses revealed significant differences on the following variables: cooperation, disruption, fighting, and leadership, for teacher-rated aggression. Tukey's HSD pairwise comparisons (see Table 18) indicate that boys with arithmetic disabilities and reading disabilities who also manifested aggression problems, were seen less favourably by their peers than boys without aggression problems. Specifically, these boys were seen as less cooperative, disruptive, had fighting tendencies, and were less chosen as leaders by their peers. The same trend was observed when peer-reported aggression was considered in combination with learning disabilities. These data, which revealed significant group differences on cooperation, leadership, and shyness variables, are presented in Table 19.

Table 16.

Descriptive Statistics for Peer-Reported Social Behaviours of Participants Classified by LD Subtype and Teacher-Rated Aggression

			Peer-reported Behaviours					
	n		cooperates	disrupts	fights	seeks help	leader	shy
		M	-.60	1.39	1.13	.27	-.50	-.38
		SD	.23	.70	.79	1.11	.34	.59
AD/AGG	9	Min	-.96	-.29	-.57	-.79	-.77	-.86
		Max	-.24	2.18	2.28	2.12	.26	1.11
		M	.18	-.38	-.41	-.42	.22	-.13
AD	3	SD	1.04	.58	.48	1.04	1.10	.84
	8	Min	-.96	-.84	-.87	-1.01	-.94	-1.11
		Max	2.43	1.57	1.55	2.65	2.72	2.39
		M	-.56	1.19	1.29	.23	-.60	-.29
RD/AGG	1	SD	.32	1.12	.98	.90	.27	.97
	4	Min	-.81	-.73	-.87	-.90	-.94	-1.11
		Max	.32	2.52	2.74	1.85	.00	2.87
		M	.21	-.37	-.37	-.37	.14	.25
RD	4	SD	1.05	.58	.64	.96	1.03	1.06
	3	Min	-.96	-.87	-.87	-1.01	-.94	-1.11
		Max	2.23	1.74	2.21	2.70	2.50	2.77

Note: AD = boys with arithmetic disabilities; RD = boys with reading disabilities; AGG = boys rated aggressive by teachers.

Table 17.

Descriptive Statistics for Peer-Reported Social Behaviours of Participants Classified by LD Subtype and Peer-Reported Aggression

			Peer-reported Behaviours			
	n		cooperates	seeks help	leader	shy
		M	-.43	.38	-.55	-.49
		SD	.48	1.00	.19	.33
AD/AGG	11	Min	-.96	-.79	-.77	-.86
		Max	.73	2.12	-.26	.32
		M	.17	-.92	.28	-.79
AD	36	SD	1.07	1.05	1.11	.87
		Min	-.96	-1.01	-.94	-1.11
		Max	2.43	2.65	2.72	2.39
		M	-.58	.33	-.61	-.55
RD/AGG	15	SD	.28	.87	.25	.33
		Min	-.81	-.90	-.94	-1.11
		Max	.32	1.85	.00	.00
		M	.23	-.78	.17	.35
RD	42	SD	1.06	.96	1.03	1.13
		Min	-.96	-1.01	-.94	-1.11
		Max	2.23	2.70	2.50	2.87

Note: AD = boys with arithmetic disabilities; RD = boys with reading disabilities; AGG = boys nominated aggressive by peers.

Table 18.

ANOVA Summary: Peer-Reported Social Behaviours of Participants by Teacher-Rated Aggression and LD Subtype

	Groups					
Dependent Variables	AD/ AGG (n=9)	AD (n=38)	RD/ AGG (n=14)	RD (n=43)	F(3,100)	Significant Post hoc Comparisons: Tukey-HSD Test ($p < .05$)
Cooperates	-.60 (.23)	.18 (1.04)	-.56 (.32)	.21 (1.05)	4.04*	RD/AGG < RD.
Disrupts	1.39 (.70)	-.38 (.58)	1.19 (1.12)	-.37 (.58)	34.73**	AD < RD/AGG; AD < AD/AGG; RD < RD/AGG; RD < AD/AGG.
Fights	1.13 (.79)	-.41 (.48)	1.29 (.98)	-.37 (.64)	36.10**	AD < AD/AGG; AD < RD/AGG; RD < AD/AGG; RD < RD/AGG.
Leader	-.50 (.34)	.22 (1.10)	-.60 (.27)	.14 (1.03)	3.69*	RD/AGG < AD.

Note: Standard deviations are reported in parentheses. AGG = teacher-rated aggression.

*$p < .05$. **$p < .001$.

Table 19.

ANOVA Summary: Peer-Reported Social Behaviours of Participants by LD Subtype and Peer-Reported Aggression

	Groups					
Dependent Variables	AD/ AGG (n=11)	AD (n=36)	RD/ AGG (n=15)	RD (n=42)	F(3,100)	Significant Post hoc Comparisons: Tukey-HSD Test (p < .05)
Cooperates	-.43 (.48)	.17 (1.07)	-.58 (.28)	.23 (1.06)	3.89*	RD/AGG < RD.
Leader	-.55 (.19)	.28 (1.11)	-.61 (.25)	.17 (1.03)	4.89**	RD/AGG < RD, AD.
Shy	-.49 (.33)	-.08 (.87)	-.55 (.33)	.35 (1.13)	5.15**	RD/AGG < RD; AD/AGG < RD.

Note: Standard deviations are reported in parentheses. AGG = peer-reported aggression.

*p < .05. **p < .005.

Combined Attention Deficit, Aggression and LD Effects

The variables of attention deficit, aggression and learning disabilities were combined to produce the following four groups: (1) those with AD, aggression problems and attention deficit, (2) those with AD only, (3) those with RD, aggression problems and attention deficit, and (4) those with RD only. When all these variables were considered together (see Tables 20 and 21), significant multivariate main effects for groups emerged, $F(18,221) = 8.16$, $p < .001$ and $F(18,230) = 18.48$, $p < .001$, in terms of teacher-rated and peer-reported aggression scores, respectively.

Table 20.

Descriptive Statistics for Peer-Reported Social Behaviours of Participants by LD Subtype, Attention Deficit, and Teacher-Rated Aggression

			Peer-reported Behaviours					
	n		cooperates	disrupts	fights	seeks help	leader	shy
		M	-.62	1.34	1.04	.08	-.49	-.36
AD/		SD	.24	.80	.90	1.00	.37	.68
ADD/	7	Min	-.96	-.29	-.57	-.79	-.77	-.86
AGG		Max	-.24	2.18	2.28	2.12	.26	1.11
		M	.21	-.52	-.52	-.44	.25	-.16
AD	33	SD	1.09	.23	.27	1.08	1.10	.75
		Min	-.96	-.84	-.87	-1.01	-.94	-1.04
		Max	2.43	.00	.29	2.65	2.72	2.24
		M	-.55	1.30	1.47	.35	-.56	-.26
RD/		SD	.36	1.08	.84	.86	.29	1.08
ADD/	11	Min	-.81	-.73	-.58	-.79	-.94	-1.11
AGG		Max	.32	2.52	2.74	1.85	.00	2.87
		M	.30	-.44	-.56	.37	.26	.23
RD	36	SD	1.08	.45	.58	1.02	1.08	1.01
		Min	-.96	-.87	-.87	-1.01	-.94	-1.11
		Max	2.23	1.57	2.21	2.70	2.50	2.77

Note: AD = boys with arithmetic disabilities; RD = boys with reading disabilities; AGG = boys rated aggressive by teachers; ADD = boys with attention deficit.

Table 21.

Descriptive Statistics for Peer-Reported Social Behaviours of Participants by LD Subtype, Attention Deficit, and Peer-Reported Aggression

	n		Peer-reported Behaviours			
			cooperates	seeks help	leader	shy
		M	-.41	.20	-.55	-.49
AD/ADD/		SD	.52	.91	.18	.37
AGG	9	Min	-.96	-.79	-.77	-.86
		Max	.73	2.12	.26	.32
		M	.21	-.44	.25	-.16
AD	33	SD	1.09	1.08	1.10	.75
		Min	-.96	-1.01	-.94	-1.04
		Max	2.43	2.65	2.72	2.24
		M	-.58	.29	-.60	-.60
RD/ADD/		SD	.32	.84	.27	.31
AGG	12	Min	-.81	-.78	-.94	-1.11
		Max	.32	1.85	.00	.00
		M	.30	-.19	.26	.23
RD	36	SD	1.09	1.01	1.08	1.01
		Min	-.96	-1.01	-.94	-1.11
		Max	2.23	2.70	2.50	2.77

Note: AD = boys with arithmetic disabilities; RD = boys with reading disabilities; AGG = boys nominated aggressive by peers; ADD = boys with attention deficit.

Univariate analyses of variance revealed significant group differences on the following variables: disruption and fighting (aggression based on teacher-ratings, see Table 22). Significant group differences were also observed on three variables as follows: cooperation, leadership, and shyness (aggression based on peer-reports, see Table 23). These results also reveal that boys whose LD was accompanied by attention deficit and aggression problems, received significantly more negative nominations from their peers than boys with either AD or RD only.

Table 22.

ANOVA Summary: Peer-Reported Social Behaviours of Participants by Attention Deficit, Teacher-Rated Aggression and LD Subtype

	Groups					
Dependent Variables	AD/ ADD/ AGG (n=7)	AD (n=33)	RD/ ADD/ AGG (n=11)	RD (n=36)	F(3,83)	Significant Post hoc Comparisons: Tukey-HSD Test ($p < .05$)
Disrupts	1.34 (.80)	-.52 (.52)	1.30 (1.22)	-.44 (.69)	52.25*	AD < RD/ADD/AGG; AD < AD/ADD/AGG; RD < RD/ADD/AGG; RD < AD/ADD/AGG.
Fights	1.04 (.90)	-.52 (.27)	1.47 (.84)	-.46 (.58)	50.03*	AD < AD/ADD/AGG; AD < RD/ADD/AGG; RD < AD/ADD/AGG; RD < RD/ADD/AGG.

Note: Standard deviations are reported in parentheses. AGG = teacher-rated aggression; ADD = boys with attention deficit.

*$p < .001$.

Table 23.

ANOVA Summary: Peer-Reported Social Behaviours of Participants by LD Subtype, Attention Deficit and Peer-Reported Aggression

	Groups					
Dependent Variables	AD/ADD/ AGG (n=9)	AD (n=33)	AGG (n=12)	RD/ADD/ RD (n=36)	F(3,86)	Significant Post hoc Comparisons: Tukey-HSD Test (p < .05)
Cooperates	-.41 (.52)	.21 (1.09)	-.58 (.32)	.30 (1.09)	3.34*	RD/ADD/AGG < RD.
Leader	-.55 (.18)	.25 (1.10)	-.60 (.27)	.26 (1.08)	3.97*	RD/ADD/AGG < RD.
Shy	-.50 (.37)	-.16 (.75)	-.60 (.31)	.23 (1.01)	4.29**	RD/ADD/AGG < RD.

Note: Standard deviations are reported in parentheses. AGG = peer-reported aggression; ADD = boys with attention deficit.

*p < .05. **p < .01.

Sociometric Status Effects

The fourth research question dealt with differences in peer-reported social behaviour between the various sociometric status groups (see Table 24). A significant multivariate main effect for sociometric status group was found, $F(18,266) = 34.92$, $p < .001$. All univariate effects for status were also significant. The results of Tukey's HSD pairwise comparisons, which are presented in Table 25, show that popular children received high scores for cooperation and leadership, and low scores for disruption,

fighting, help-seeking and shyness. In contrast, rejected children received high scores for disruption and fighting and low scores for cooperation, leadership and shyness.

Table 24.

Descriptive Statistics for Peer-Reported Social Behaviours of Sociometric Status Groups

			Peer-reported Behaviours					
	n		cooperates	disrupts	fights	seeks help	leader	shy
		M	1.56	-.41	-.45	-.41	1.45	-.37
		SD	.49	.27	.32	.37	.72	.64
Popular	25	Min	.24	-.79	-.87	-1.01	-.54	-1.11
		Max	2.43	.24	.29	.34	2.72	.86
		M	-.54	1.58	1.51	.38	-.61	-.55
Rejected	23	SD	.28	.57	.44	.94	.21	.32
		Min	-.81	.00	.87	-.90	-.94	-1.11
		Max	.32	2.52	2.48	2.12	-.23	.32
		M	-.59	-.63	-.59	-.22	-.33	.78
		SD	.27	.18	.20	.92	.43	1.13
Neglected	28	Min	-.96	-.87	-.87	-.91	-.94	-.86
		Max	.32	-.24	.00	2.36	.62	2.87
		M	-.25	-.39	-.27	.48	-.29	.10
Other	27	SD	.75	.57	.79	1.08	.82	1.05
		Min	-.96	-.87	-.87	-1.01	-.94	-1.11
		Max	1.75	1.45	2.31	2.34	1.81	2.77

Table 25.

ANOVA Summary: Peer-Reported Social Behaviours by Sociometric Grouping

	Groups					
Dependent Variables	Popular (n=25)	Rejected (n=23)	Neglected (n=28)	Other (n=27)	F(3,99)	Significant Post hoc Comparisons: Tukey-HSD Test (p < .05)
Cooperates	1.56 (.49)	-.54 (.28)	-.59 (.27)	-.25 (.75)	107.79**	NEG, REJ < POP; OTH < POP.
Disrupts	-.41 (.27)	1.58 (.57)	-.63 (.18)	-.39 (.57)	139.12**	NEG, POP < REJ; OTH < REJ.
Fights	-.45 (.32)	1.51 (.44)	-.59 (.20)	-.27 (.79)	94.81**	NEG, POP < REJ; OTH < REJ.
Seeks Help	-.41 (.37)	.38 (.94)	-.22 (.92)	.48 (1.08)	3.67*	POP < REJ
Leader	1.45 (.72)	-.61 (.21)	-.33 (.43)	-.29 (.82)	60.82**	REJ, NEG < POP; OTH < POP.
Shy	-.37 (.64)	-.55 (.32)	-.78 (1.13)	.10 (1.05)	12.06**	REJ < OTH; REJ, POP < NEG; OTH < NEG.

Note: Standard deviations are reported in parentheses.

*p < .05. **p < .001.

Sociometric Status of Children with LD

To answer the fifth research question, which was posed to determine if significant differences in sociometric status existed between boys with arithmetic disabilities and

boys with reading disabilities, a MANOVA was computed comparing these two groups on the variables of like-most, like-least and social preference nominations. Descriptive statistics for these variables are presented in Table 26. No significant differences in sociometric status were observed between boys with AD and boys with RD, $F(3,100) = .12$, $p = .948$.

Table 26.

Descriptive Statistics for Like-Most, Like-Least and Social Preference Scores by LD Subtype (AD & RD)

Diagnostic Categories	n	Like-Most	Like-Least	Social Preference
AD	47	.04 (.97)	-.02 (.97)	.03 (.96)
RD	57	.03 (.99)	-.01 (.96)	.02 (.98)

Note: Standard deviations are reported in parentheses.

A Chi-square analysis also showed no significant relationship between learning disability subtype and peer rejection, χ^2 (1) = .27, $p = .604$ (See Table 27). Eight (17.0%) boys with arithmetic disabilities were in the rejected sociometric status group compared to 12 (21.1%) boys with reading disabilities.

These results show that there were as many boys with AD in the rejected sociometric status group as boys with RD. However, unlike previous studies in which larger proportions of children with AD were found to be in the rejected category, this study found the proportion of boys with RD in the rejected category to be larger than that of boys with AD.

Table 27.

Distribution of LD Subtypes in the Rejected Sociometric Status

Diagnostic Categories	n	Rejected	Not Rejected
AD	47	8 (17.0)	39 (83.0)
RD	57	12 (21.1)	45 (78.9)

Note: Percentages are reported in parentheses.

Sociometric Status of Children with Attention Deficit or Aggression Problems

The sixth research question was developed in order to determine whether there was a significant difference in sociometric status between boys with and boys without attention deficits. A MANOVA comparing these two groups on the like-most, like-least and social preference variables was performed. A significant multivariate F for groups (see Table 28) was observed, $F(3,108) = 27.60$, $p < .001$, indicating that boys with

attention deficit received significantly lower nominations for like-most and social preference, and higher nominations for like-least.

Table 28.

Descriptive Statistics for Like-Most, Like-Least and Social Preference Scores by Attention Deficit Disorder

Diagnostic Categories	n	Like-Most	Like-Least	Social Preference
ADD	32	$-.35_a$ (.62)	1.01_a (1.07)	$-.85_a$ (.80)
LD	80	$.14_b$ (1.06)	$-.40_b$ (.56)	$.34_b$ (.82)

Note: Standard deviations are reported in parentheses. Means with different subscripts are significantly different.

Table 29.

Distribution of Boys with and Boys without ADD in the Rejected Sociometric Status

Diagnostic Categories	n	Rejected	Not Rejected
ADD	32	17 (53.1)	15 (46.9)
LD	80	6 (7.5)	74 (92.5)

Note: Percentages are reported in parentheses.

A Chi-square analysis also showed that there was a significant relationship between attention deficit and peer rejection, $\chi^2(1) = 29.16$, $p < .001$. A summary of these results is presented in Table 29.

The impact of aggression on sociometric status was examined by considering the seventh research question in which I sought to determine if there a significant difference in sociometric status between boys with and boys without aggression problems. Results of the MANOVA revealed significant differences between these boys in terms of like-most, like-least and social preference nominations, $F(3,108) = 37.71$, $p < .001$ (see Table 30). There was also a predictable relationship between aggression and peer rejection, $\chi^2(1) = 44.43$, $p < .001$ (see Table 31).

Table 30.

Descriptive Statistics for Like-Most, Like-Least and Social Preference Scores by Aggression Problems

Diagnostic Categories	n	Like-Most	Like-Least	Social Preference
AGG	25	$-.52_a$ (.35)	1.29_a (.84)	-1.13_a (.52)
LD	87	$.15_b$ (1.05)	$-.37_b$ (.65)	$.32_b$ (.82)

Note: Standard deviations are reported in parentheses. Means with different subscripts are significantly different.

Table 31.

Distribution of Boys with and Boys without Aggression Problems in the Rejected Sociometric Status

Diagnostic Categories	n	Rejected	Not Rejected
AGG	25	17 (68.0)	8 (32.0)
LD	87	6 (6.9)	81 (93.1)

Note: Percentages are reported in parentheses.

Sociometric Status of Children with Attention Deficit and Aggression Problems

Sociometric status of boys with LD who exhibited either attention deficit, aggression problems, both attention deficit and aggression problems, or none (LD-only), were examine. A multivariate analysis of variance revealed a significant difference between these four groups on the variables of like-most, like-least and social preference, $F(9,258) = 14.29$, $p < .001$. Descriptive statistics for these variables are presented in Table 32. Tukey's HSD pairwise comparisons (see Table 33) indicate that boys with either attention deficit, aggression problems or both, received significantly lower like-most and social preference nominations, and higher like-least nominations than boys without any of these problems.

Table 32.

Descriptive Statistics for Like-Most, Like-Least and Social Preference Scores by Aggression Problems

Diagnostic Categories	n	Like-Most	Like-Least	Social Preference
ADD	13	-.22 (.86)	.48 (1.17)	-.43 (.95)
AGG	6	-.77 (.11)	1.01 (.84)	-1.12 (.53)
ADD/AGG	19	-.44 (.37)	1.37 (.84)	-1.13 (.53)
LD	74	.21 (1.07)	-.52 (.34)	.46 (.73)

Note: Standard deviations are reported in parentheses.

The Relative Strength of Attention Deficit and Aggression as Predictors

In order to determine the relative contributions of two independent (predictor) variables of attention deficit and aggression on the dependent (criterion) variable of like-least nomination, sequential multiple regression analyses were performed. This was based on the assumption that a linear relationship existed between the dependent variable and the two independent variables (whose intercorrelation was .57). First, the relationship between aggression and like-least nomination was examined, followed by an examination of the relationship between attention deficit and like-least nomination.

Table 33.

ANOVA Summary: Like-Most, Like-Least and Social Preference Scores by Attention Deficit and Aggression Problems

	Groups					
Dependent Variables	ADD (n=13)	AGG (n=6)	ADD/ AGG (n=19)	LD (n=74)	F(3,108)	Significant Post hoc Comparisons: Tukey-HSD Test ($p < .05$)
Like-Most	-.22 (.86)	-.77 (.11)	-.44 (.37)	.21 (1.07	4.29*	ADD/AGG < LD.
Like-Least	.48 (.95)	1.01 (.53)	1.37 (.53)	-.52 (.73)	56.66**	LD < ADD, AGG; LD < ADD/AGG. ADD < ADD/AGG.
Social Preference	-.43 (.95)	-1.12 (.53)	-1.13 (.53)	.46 (.73)	31.95**	ADD/AGG < ADD; ADD/AGG < LD; AGG < LD; ADD < LD.

Note: Standard deviations are reported in parentheses. AGG = aggression; ADD = attention deficit.

*$p < .01$. **$p < .001$

The order in which the variables entered the multiple regression equation and the corresponding multiple regression coefficients are presented in Tables 34 and 35. In the analysis summarized in Table 34, aggression entered the equation at Step 1 and attention

deficit at Step 2. In the analysis described in Table 35, variables were entered in a reverse order with attention deficit entering the equation at Step 1, whereas aggression entered the equation at Step 2. In both of these tables, R^2 shows the amount of variance in the criterion variable, like-least, which can be explained by the predictors already entered. Both tables show that the regression model yielded a multiple R of .81 and R^2 of .66 at the second step, indicating that 66% of the variance in like-least nomination could be accounted for by the linear combination of aggression and attention deficit.

Table 34 shows that after Step 1, with aggression in the equation, $R^2 = .60$, $F(1,110) = 167.13$, $p < .0001$. After Step 2, with attention deficit added to the prediction of like-least nomination, $R^2 = .66$, $F(2,109) = 105.87$, $p < .0001$. Although nearly all of the variance in the linear equation had been accounted for at step 1 (60%) by aggression, attention deficit also contributed significantly to the regression. The change in R^2 between steps 1 and 2 was significant ($R^2_{ch} = .06$, $F_{ch}(1,109) = 18.31$, $p < .0001$).

Table 35 shows that after Step 1, with attention deficit in the equation, $R^2 = .41$, $F(1,110) = 77.02$, $p < .0001$. After Step 2, with aggression added to the prediction of like-least nomination, $R^2 = .66$, $F(2,109) = 105.87$, $p < .0001$. Here, aggression was able to account for 15% of the variance. A significant R^2 change between step 1 and step 2 was also observed ($R^2_{ch} = .25$, $F_{ch}(1,109) = 79.65$, $p < .0001$). These results show that both of these variables (attention deficit and aggression), which are highly correlated with like-least nomination (.64, for attention deficit and .78 for aggression, see Table 8), are powerful predictors of peer rejection. However, of the two variables, aggression was the stronger predictor.

Table 34.

Summary Table for Multiple Regression with Aggression Entered First

Step	Variable Entered	Multiple R	R^2	Adjusted R^2	Overall F	Significance
1	Aggression	.78	.60	.60	167.13	$p < .0001$
2	Attention Deficit	.81	.66	.65	105.87	$p < .0001$

Table 35.

Summary Table for Multiple Regression with Attention Deficit Entered First

Step	Variable Entered	Multiple R	R^2	Adjusted R^2	Overall F	Significance
1	Attention Deficit	.64	.41	.41	77.02	$p < .0001$
2	Aggression	.81	.66	.65	105.87	$p < .0001$

CHAPTER IV

DISCUSSION

The primary goal of this study was to examine the sociometric status and social behaviour of Zambian boys with different subtypes of learning disabilities in two self-contained special schools. As already reviewed, research regarding the peer relations of children with LD has established that, as a group, they are less popular than their normally-achieving peers. They often receive significantly less nominations of peer acceptance and significantly more nominations of peer rejection than their normally-achieving counterparts. They also receive significantly more negative nominations on peer-reported social behaviours than children without LD. However, research findings have also shown that not all children with LD fare poorly in their social status. The range of their sociometric status is probably as great as that seen in normally-achieving children (i.e., some are quite popular, some are neglected, and others are actively disliked and rejected). Although children with LD appear to be quite heterogeneous with respect to their sociometric status, little is known about how children with LD perceive one another, particularly in a setting where these children interact exclusively with each other. This was one of the aims of this study, to examine how boys with LD view their fellow students who also have LD.

Review of Hypotheses and Summary of Findings

Based on past research findings which, as already reviewed, have shown that children with specific arithmetic disabilities experience greater difficulty in social

situations as compared to children with reading disabilities, two specific hypotheses related to this observation were made. The first hypothesis predicted that boys with arithmetic disabilities (AD) would receive significantly more negative nominations on peer-reported social behaviours than boys with reading disabilities (RD), whereas in the second hypothesis, it was predicted that the proportion of boys with AD in the rejected sociometric status will be greater than that of boys with RD.

Results of this study revealed no significant differences between the two groups of boys on peer-reported social behaviours. Many boys with AD were indistinguishable from boys with RD in terms of peer-reported social behaviour scores. The results also showed that there was no significant relationship between peer rejection and LD subtype. Although there was no significant difference in the proportions of boys with AD and RD in the rejected sociometric status group, the proportion of boys with RD in the rejected sociometric status category was larger than that of boys with AD. This observation is inconsistent with observations made in some previous studies in which larger proportions of children with AD tended to be in the rejected status category, in comparison to that of children with RD. Thus, the results of this study appear not to support findings from previous studies that had shown AD-RD group differences in the most extensively studied areas of children peer relations, namely, peer sociometric status and peer-reported social behaviours.

The predictions made in the third and fourth hypotheses were that boys with attention deficit or aggression problems will receive significantly more negative nominations on peer-reported social behaviours than boys without any of these problems,

and that the proportion of boys with either attention deficit or aggression problems in the rejected sociometric status will be greater than that of boys with no attention deficit or aggression problems, respectively. Consistent with these predictions, results of this study showed that boys whose learning disabilities were accompanied by either aggression or attention deficit problems or both, received significantly more negative nominations from their peers. They were seen as less cooperative, more disruptive, had fighting tendencies, and were less frequently chosen as leaders. Peer rejection was also significantly related to these behavioral characteristics. Thus, these results showed that both attention deficit and aggression problems were powerful predictors of peer rejection. Of the two, however, aggression was the stronger predictor. This is consistent with past findings from a variety of sources (e.g., peers, teachers, parents and direct observations) in which it has been shown that not only is aggression the strongest single correlate of peer rejection, especially among boys (Coie, Dodge & Kupersmidt, 1990; Coie & Koeppl, 1990; Wiener & Harris, 1993), but that it also leads to subsequent peer rejection, both in short-term play group studies and in multiple-year longitudinal studies (Coie & Dodge, 1983).

Another important finding in this study was that sociometric status was closely associated with certain behavioral characteristics. For example, boys who received high scores on the cooperation and leadership variables, and low scores on the disruption, fighting, help-seeking and shyness variables, were also in the popular sociometric status group. In contrast, boys who received high scores on the disruption and fighting variables, and low scores on the cooperation, leadership and shyness variables, were very often in the rejected sociometric status category.

These results however, must be interpreted with caution because of the number of analyses conducted. Although a power test showed that the number of participants that were obtained for this study was adequate, there was a risk of alpha slippage due to the repeated analyses that were performed. Nevertheless, the findings for attention deficit and aggression remained significant even after the Bonferroni correction.

AD-RD Differences in Social Behaviour and Sociometric Status

There may be several reasons for the findings obtained. Differences in social behaviour and sociometric status between children with AD and RD will be discussed first. The tendency for children who show deficits in mechanical arithmetic to obtain low peer status and significantly more negative nominations on social behaviours has been attributed to their deficiencies in psychological processing such as poor social perception or role-taking (e.g., Stiliadis & Wiener, 1989, Stone & La Greca, 1990).

Rourke (1989) has described one of the LD subtypes as involving a nonverbal learning disability (NLD). Although children with NLD may not be equated with children with AD in this study, studies have shown that their main academic problems involve mechanical arithmetic (Rourke & Fuerst, 1991). According to the neuropsychological perspective espoused by Rourke, the visual-perceptual deficits that are characteristic of children with NLD, which lead to difficulties with academic subjects like geometry, likewise lead to problems identifying and recognizing faces, affect, and other subtle nonverbal identifiers important in social interaction. The poor problem solving and hypothesis testing which impede these children in higher-order science and mathematics

courses also render them incapable of appropriately interpreting and responding to novel situations. Their tactile-perceptual and psychomotor problems which hinder athletic endeavours similarly prevent them from carrying out affectional encounters smoothly. Rourke (1988) postulates that repeated unsuccessful attempts to understand and respond adequately in a social environment eventually lead to internalized forms of psychopathology, social withdrawal, and even to social isolation of these children.

Drawing from Goldberg and Costa's (1981) model of inter-hemispheric interaction in adults, Rourke (1995) asserts that the types of deficits exhibited by children with NLD suggest right hemisphere involvement. He explains that problem-solving, ability to deal with novel situations, and accurate processing of multi-sensory information are skills which require intact inter-hemispheric integration. Inter-hemispheric integration is believed to be governed by the right hemisphere. Given that problem solving and ability to deal with novelty are notably deficient in many children with NLD, Rourke (1995) hypothesized that children with NLD suffer from (1) deficient right-hemispheral systems, or (2) insufficient access to initially intact right hemispheres. To support his theory, Rourke points out that children who have suffered from lesions to the right hemisphere or dysfunction of white matter due to disease or neurotoxicity (e.g., children with significant removal of tissue from the right hemisphere or with congenital absence of the corpus callosum) closely resemble children with NLD in the type of neuropsychological and socio-emotional syndromes they display.

Several explanations can be extended to explain the lack of AD-RD differences in social behaviour and sociometric status in this study. First, the setting may have been an

important determinant of the outcome of this study. Unlike previous studies in which comparisons were made between students with learning disabilities and normally-achieving students, this study was done in self-contained special schools. Comparisons were made between groups of boys with different subtypes of learning disabilities who interacted exclusively with each other during school hours. It is possible therefore, that the setting attenuated the effects. The social climate in these settings may be such that they allow for increased acceptance of one another among these children. For example, teachers may be more tolerant of pupils with atypical patterns of social behaviour because that is what they have become accustomed to. Also, because of the nature and structure of the setting, peers may not be as demanding as peers in other settings for appropriate social behaviour. Consequently, some behaviours that might lead to problematic peer relations in regular schools or classes might simply be ignored, minimized or not noticed completely.

Second, the procedures that were used to derive sociometric status and social behaviour scores included obtaining positive and negative nominations which were then standardized within classrooms, following standard formulae. This was done so that equivalent status classifications could be employed across grade-levels. The conversion of participants' scores into standard scores may have caused the most accepted children to be categorized as popular. It is possible that they may or may not have been categorized as popular in another setting, such as in a regular school. Similarly, youngsters who fell at the midpoint of the sociometric choice scores in this study might have fallen at the negative extreme within a regular school setting.

The third reason is that perhaps children with RD may be equally prone to disturbed interpersonal relationships as those with AD. Some studies have revealed impaired social functioning in an LD subgroup distinctly different from children with AD (e.g., Cantwell & Baker, 1985; Luria, 1961; Richman & Eliason, 1992). Because the type of cognitive and academic deficits demonstrated by children with RD indicate left-hemisphere involvement, their neurocognitive patterns they posses may also lead to problems in social interaction. It is quite possible therefore, that some aspects of a child's ability to interpret and respond in interpersonal situations may be disrupted by a language deficit, since language plays an increasingly crucial role in a child's socialization (Luria, 1961). For example, problems with language comprehension may lead to deficits in verbal mediation. Poor verbal mediation has been linked to impulsivity, attention deficit, and lack of self-control (Luria, 1961). Thus, children with expressive language disorders may act out because of the frustration that results when they are unable to express themselves among peers. This conclusion is also consistent with the observation made by Rourke and Fuerst (1991), who indicated that although children with NLD have been characterized by difficulties in social situations, this is not meant to imply that children with a language-deficient pattern will never experience such social problems.

In short, it is unclear as to whether the lack of confirmation of previous research findings is due to the peculiarities of the sample used in this study, the setting in which the study took place, the methodology employed or to the fact that children with AD and RD each have their own deficits that make them prone to disordered social functioning. These reasons are speculative but could easily be tested in a future study.

Caution must however, be exercised when interpreting results concerning AD-RD differences. Although it is possible to classify children with LD into distinct arithmetic and reading disability subtypes, there may be considerable overlap in terms of academic, social and neuropsychological abilities and deficits that these children exhibit in the real world. Thus, researchers attempting to identify LD subtypes are often encouraged to corroborate the data used in assigning subjects to LD subtypes by using measures that are not identical to or highly correlated with the measures initially used to identify the LD subtypes (Rourke, 1989).

Self-Contained Classes as a Setting for Studying Social Behaviour in LD

As already mentioned, previous researchers studying the peer relations of children with learning disabilities have made comparisons between these children and normally-achieving children. Very few studies have made attempts at comparing the sociometric status of children with learning disabilities in exclusively self-contained special classes or schools. Some of the researchers that have made this attempt have done so with students based in self-contained special education classes, but who joined regular classes for several hours per week (e.g., Coben and Zigmond, 1986). Results from the current study therefore, appear to have important implications for the sub-group of children with learning disabilities who are educated in self-contained special settings.

Nevertheless, the parameters of these settings limit their potential in the study of peer relations of children with learning disabilities. One of the most important issues in learning disabilities research has been an attempt at trying to understand and explain why

children with learning disabilities have relatively poor social status compared to normally-achieving children. Different causal hypotheses have been advanced from different theoretical perspectives. Although these hypotheses can easily be tested in research comparing the peer status of children with learning disabilities in regular classrooms, it would be particularly difficult to test some of them in a self-contained special setting. For example, as introduced earlier, the discrepancy hypothesis states that children with learning disabilities are less accepted by their peers because they lack in one of the abilities valued by their peer group, namely, achievement. In other words, children with learning disabilities are low achievers and because they are low achievers, they get rejected due to this discrepancy between their achievement and the expectations of their peers (Wiener, 1987). The difficulty in testing this hypothesis in a self-contained setting lies in the fact that in such a setting, all the children have learning disabilities and therefore, are all low achievers. This hypothesis may be more testable in a situation where children with learning disabilities are integrated in regular classrooms because in such settings children with learning disabilities often get pulled out for remedial sessions. The act of pulling students out of their classrooms in this manner may make them appear discrepant in the eyes of their peers. Because this is unlikely to happen in a self-contained setting, the circumstances under which these children may be made to appear discrepant may not exist. Explanations for the low sociometric status of some students in studies such as the present one cannot be based on the discrepancy hypothesis. The low peer status of some of the students does not seem attributable to their low achievement, which characterizes the entire peer group to a greater or lesser extent.

Another hypothesis that would be particularly difficult to test in a self-contained special setting is the differential treatment hypotheses (Wiener, 1987). In this hypothesis, it is suggested that the social difficulties of children with learning disabilities are a result of being labelled. Because they are labelled as having learning disabilities, they are treated differently than children without learning disabilities. However, in a self-contained setting, all the children have learning disabilities, they are similarly labelled. Therefore, it is unlikely that the relatively poor sociometric status of any of these children is a result of being treated differently on account of their labels.

Reasons for Studying LD in Self-Contained Settings

The passage of Public Law 94-142 (The Education for All Handicapped Children Act of 1975) in the United States has had a significant impact in the field of learning disabilities. Because of the anticipated advantages of mainstreaming of children with learning disabilities, and despite the fact that these anticipated positive benefits do not always accrue (e.g., children with learning disabilities not always getting accepted by their peers in the regular classroom), little research effort has been invested in finding out the processes in self-contained classrooms.

Because the setting itself may not be the primary issue of importance, but what happens in those settings, a case can be made for more research efforts in self-contained settings. This case is predicated on the assumption that self-contained classes are otherwise advantageous to at least some children with learning disabilities. This may be true. For example, the important role a teacher plays in a self-contained setting can be

determined and compared to the role played by another teacher in an integrated setting. It is perhaps more likely than not, that teachers of self-contained classrooms can provide continuity across disciplines because they have the opportunity to combine work in different areas and correlate concepts.

Furthermore, self-contained classrooms usually have small enrolments. Thus, they probably maintain a highly personalized atmosphere. The relatively small number of individuals assigned to one teacher may make it possible for him/her to become subjectively concerned with each student's welfare. Teachers may know what each student is doing on a particular day or time and may be able to detect signs of distress or of work deterioration. The immediate detection of special needs may lead to rapid remedial efforts.

The special school is also the social reality for many children with learning disabilities even in developed countries. For example, the province of Ontario in Canada, has two residential schools for children with learning disabilities (Trillium in Milton and Jules Léger in Ottawa). Reference is often made to the existence of self-contained classes for children with learning disabilities in the United States even in the literature published in the last few years (e.g., Guterman, 1995; Lopez- Reyna, 1996), and also in Israel (e.g., Eshel, Katz, Gilat & Nagler, 1994), as well as in Germany (e.g., Brunsting-Muller, 1995), and in England (e.g., Martlew & Hodson, 1991). For children with learning disabilities, fellow students with learning disabilities in the special setting constitute their most meaningful peer group. Therefore, if their peer relations are to be studied, it is imperative that researchers do so within the special school setting.

The current body of literature is inadequate and has yielded ambiguous findings in terms of information on the effects of placing children with learning disabilities in special classes, there is need for more research in this area. Suggestions have been made from a number of studies for example, that special schools and special classes tend to reinforce atypical social behaviour. This is based on the premise that in these settings, children primarily experience atypical social behaviour and associate only with deviant peers (Kaplan & Kaufman, 1978). It is assumed that these children cannot be expected to learn desirable behaviour in such settings (Stainback & Stainback, 1980).

This explanation is supported in part by findings from previous studies that have attempted to explore the relationship between aggressive behaviour and popularity. One of these studies was conducted by Schneider and Byrne (1987), who explored the relationship between likability and aggression in a children's treatment centre. In the first of their two studies, Schneider and Byrne found that more aggressive boys, especially older boys, tended to be rated as more likeable. The authors were, however, unable to replicate these findings in their second study. Madden and Slavin (1983) argued that the negative behaviours of children in special settings also tend to be reinforced in part by the way teachers react when such behaviours occur. They reasoned that special class teachers often ignore or tend to consider certain behaviours acceptable that regular class teachers would not. This indifference by teachers, helps to perpetuate the continued occurrence of these inappropriate behaviours.

The evidence in support of the view that special settings do indeed reinforce inappropriate behaviours is equivocal. In fact, it has been shown that some children in

special settings can adequately develop social networks and affiliations that foster prosocial behaviour (Hallenbeck & Kauffman, 1995). The findings of this study also lend support to this view. A strong link between poor peer status and negative or disruptive social behaviours were clearly demonstrated. Children with learning disabilities who manifested disruptive behaviours such as aggressiveness and impulsiveness were perceived more negatively by their peers than boys without any of these problems. This link between the propensity for aggressive and/or disruptive behaviour in some children with learning disabilities and lowered sociometric status is also consistent with past research findings with regular-school populations (e.g., Coie et al., 1982; Dubow, 1988; Eron & Huesmann, 1984) in which it was shown that children with aggression and attention deficit problems were often in the rejected sociometric status category and consistently received negative nominations from their peers on measures of social behaviour. It has been shown in this study that being in a special school did not appear to affect the way children with learning disabilities perceived maladaptive behaviours. They did not reinforce these behaviours, rather they rejected those who exhibited such behaviours, as would peers in a regular school.

Finally, the need for more studies on children with learning disabilities in self-contained classes has also to do with the question of whether mainstreaming, as implemented in Western nations can work in developing nations such as Zambia. Although this is not a thesis about the advantages and disadvantages of mainstreaming, it is important to try and highlight some of the problems that would render mainstreaming in countries like Zambia unworkable.

Mainstreaming. Mainstreaming or integration, has traditionally meant placing children with learning disabilities in settings that provide as normal a learning environment as possible (Apter & Conoley, 1984). There seem to be two main strands to the definition of mainstreaming. The broad view sees mainstreaming in terms of the notion of the least restrictive setting that is appropriate to the needs of the child. This definition allows for a continuum of services, from special settings to regular classes (Salisbury, 1991; Sailor, 1991; Vaughn, Elbaum & Schumm, 1996). The other view is that mainstreaming refers to the placement of children with learning disabilities in regular schools and classrooms, and providing for their needs in this setting (Abang, 1992; Banerji & Dailey, 1995; Baker & Zigmond, 1990; Zigmond & Baker, 1995).

The wide support received by proponents of mainstreaming has also been on the grounds that special schooling segregates and promotes anti-social attitudes in these children. Further, according to the principles of mainstreaming (Wolfensberger, 1977; Leadbetter & Leadbetter, 1993), children with learning disabilities have a right to lead as normal a life as possible. Thus, if these children are expected to live normal lives in society, they should therefore, be given chances to have normal experiences both academically and socially (Banerji & Dailey, 1995).

It is asserted that integration allows for opportunities for long-term interaction between children with and children without learning disabilities. The social benefits that can accrue include: first, a greater understanding, knowledge and appreciation of issues relating to learning disabilities among children without learning disabilities, and second, opportunities for children with LD to model socially acceptable behaviour, as well as

effective learning patterns and language usage (Leadbetter & Leadbetter, 1993). Apter and Conoley (1984) argue that mainstreaming leads to less labelling and hence less stigmatizing of children with learning disabilities. It is in this stigma-free environment that children thrive, demonstrating both academic and social- emotional growth.

Arguments against mainstreaming are just as many. Proponents of this view cite a number of reasons which include the need to protect students with learning disabilities from the painful and harmful experience of repeated failure which, they argue, would result in permanent and irrevocable damage (Brown, 1974). They also argue that there is a need to target these children with more direct instructional methods in both academic and social skills (Meyen & Lehr, 1980). The concern is that if children with learning disabilities are left in regular settings, they would fall further behind and become stigmatized and rejected by their peers (Semmuel, Gottlieb & Robinson, 1979).

It is further argued that regular classrooms rarely have optimal conditions to meet the needs of children with learning disabilities (Apter & Conoley, 1984). Large class sizes characteristic of regular schools render individualization of instruction unworkable, which in turn reduces learning opportunities for children with learning disabilities in the regular classroom. Moreover, teachers in the regular classrooms rarely teach for the benefit of the child with learning disabilities, even after obtaining additional teacher training in this respect (Bakare, 1992). Special education in self-contained setting, on the other hand, allows for a certain amount of protection against failure and the negative outcomes thereof. It also provides more individualized attention, and hence is more likely to fulfil the child's educational needs. The mere physical integration of children with

learning disabilities into regular schools or classrooms does not in itself ensure social and psychological integration, and stigmatizing may still occur on a more subtle level (Apter & Conoley, 1984).

It is questionable therefore, as to whether mainstreamed classes in many developing countries like Zambia would have the capacity to respond to the needs of children with LD. In Zambia, for example, most classrooms in regular schools are over-crowded, averaging between 45 and 50 students (Serpell, 1993). Since the education of children with LD is highly structured and individualized, such over-populated classrooms would pose great problems to the integration of pupils with LD in regular settings. Because of the high child/teacher ratio, and a lack of facilities for remedial lessons in regular schools, classroom teachers may not have enough time to meet the individual needs of the mainstreamed child. Moreover, special education for children with LD is a recent innovation in most developing countries. There is inevitably a critical shortage of adequately and well-trained special teachers to run the programs. The limited special education resources in many developing countries are usually allocated to more visible handicaps such as pronounced mental retardation, blindness and deafness.

Regardless of the pros and cons for mainstreaming in developed countries, the present reality in most countries such as Zambia is that self-contained classrooms is, for the time being, the only logical alternative for children with learning disabilities. It will remain so until some of the problems outlined above are adequately addressed. A reduction in class size to enable individualization of instruction as well as careful planning and preparation of teachers. Special teacher training is particularly important

because not only are teachers required to deal with some specific learning difficulties of these children, but as has been shown in this study, some of the children with learning disabilities may also have additional problems of aggression and attention deficit. If teachers are expected to manage these children, the training of such teachers may require additional emphasis on behaviour management, apart from remedial training. Of course the argument in favour of self-contained classes can only be made tentatively until this study is complemented by research on the peer relations of any children with learning disabilities in regular Zambian schools.

Problems in Studying LD and Peer Relations in Different Cultures

A critical appraisal of research on learning disabilities must conclude that there is a lack of consensus concerning almost every aspect of learning disabilities except its importance. One of the areas of concern in this field is the problem of comparing results obtained from studies conducted on Western populations with results from research done on non- Western populations. A number of issues have to be taken into account when making such comparisons and the interpretations that may be made as a result. For example, the forms of interactions which a child is expected to follow may differ from one culture to another (Chen, Rubin & Sun, 1992). In some cultures (e.g., Chinese), peer relations may be influenced by a complex network of age-old traditions and philosophies that assign meaning to social behaviour (Schneider, Smith, Poisson & Kwan, 1997). Although it is possible therefore, to specify objectively a number of behaviour patterns that may be considered socially deviant, what may be more difficult to determine is

whether the presence or absence of certain social behaviours is a reflection of lack of social skills, mere unconventionality or rebelliousness. Behaviours that might be positively valued in Western cultures may not be likewise evaluated in a different culture. As well, some negatively valued behaviours in Western cultures may be acceptable in other cultures. Thus, we know little about possible cultural variations in what are regarded as normal and abnormal social behaviours and relationships.

Even the very definition of "special educational needs" presents a problem, especially in terms of diagnosis and labelling because assessment tools in developing countries are mostly imported, or standardized elsewhere on non-comparable population groups (Sattler, 1988). Related to this is also the problem of determining what criteria the school systems in these countries use to guide themselves in identifying students with LD, and whether these criteria are comparable to those used in Western cultures.

Cross-cultural research has been widely criticized for the widespread use of measures that are not culturally sensitive. For example, the use of IQ tests has been under considerable scrutiny for many years. Several issues have arisen from the fact that objectivity and the cross-cultural applicability of IQ tests are very difficult to demonstrate in the assessment of intellectual functioning. Some researchers have asserted that IQ tests have a cultural bias in favour of Anglo-Saxon, middle-class whites (Sattler, 1988). Thus, if tests like the WISC-R are used in another cultural setting, the whole exercise simply involves comparing children in these settings with children upon whom the norms for such tests were established. In such circumstances, the accuracy of these children's intellectual functioning comes into question.

Notwithstanding all these, results of this study showed that although it was done in a self-contained special setting, very far from North American samples, the behavioral correlates of peer status appeared to be the same among these children as those found with normal populations in Western cultures (Newcomb, Bukowski & Pattee, 1993). The characteristics of peer relations did not differ from those of the normally-achieving children in North America. Peer relations problems for many boys in this study stemmed from attention deficit and aggressive disruptive behaviours, indicating that pathways to peer rejection may be largely the same regardless of the setting or cultural background. This is one of the values of conducting studies in atypical settings. Researchers are provided with an opportunity to examine the extent to which scientific principles derived on typical populations are applicable to atypical populations (Burack, 1997).

Limitations of this Study

Although the results from the current study appear to have important implications for an understanding of the interactions of children with learning disabilities who, for the most part of their school days, only interact with fellow students with learning disabilities, several factors limit the generalizability of these findings. First, the very fact that the study was done on students in self-contained special classes makes it difficult to generalize the results of this study to the larger population of children with learning disabilities, most of whom probably attend regular classes in regular schools.

Second, it is always important in most psychological research to consider whether the sample used in the study is representative of the larger population. Participants in this

study were boys who came from two urban schools in Lusaka, the capital city. Because of this, generalization that can be done from these results is limited to a considerable extent by the fact that only boys participated in this study and the very limited geographic region from which participants were drawn. The results can best be interpreted as indicative of school-age boys with LD in special schools in urban areas of Zambia. Additional studies including girls and other geographic locations are needed to determine how applicable these findings are to the general population of students with LD in Zambia.

Third, the use of WISC-R to determine the intellectual functioning of participants in this study also poses some limits on the degree of generalization that can be made from the findings. Because there are no Zambian norms for this test, IQ scores that were obtained may not have provided an accurate picture of these children's IQs.

Suggestions for Future Research

One of the perennial problems in research with learning disabilities, is the criteria used to define and select research samples. Because of discrepant definitions and the lack of agreement on precise, operational definitions of what constitutes learning disabilities, problems of measurement, and arbitrariness in setting boundaries (e.g., Moats & Lyon, 1993), results from many studies on learning disabilities have been inconsistent or simply incomparable, thereby failing to substantially increase understanding of learning disabilities (Rourke, 1989; French, Ellsworth & Amoruso, 1995).

The problems in the field of learning disabilities become even more magnified when cross-cultural comparisons of research outcomes have to be made. It appears that

researchers in this field still have a long way to go in their efforts at trying to present an objective view of some of the issues that they are often confronted with. The first suggestion therefore, is that a more realistic goal for research in this area should be some form of negotiated consensus view of what LD means. Such a consensus view should make it easier to reach agreement on the possible value of comparisons across cultures, and on ways of collaborating in the refinement of the data generated in different cultural contexts. Within this context, there should be a considerable degree of consensus across the various cultural settings on what constitutes an ideal set of criteria for determining the presence or absence of LD. Studies designed to draw cross-cultural comparisons in this field will need to specify functional equivalences on any of the features they so describe. These criteria might or might not include IQ scores (Siegel, 1989).

Second, studies would need to focus on antecedent behaviours that influence the decisions that children make about social interaction rather than on outcomes. Research on peer relations consistently fails to adequately assess the rationale that children use in determining whether to accept, neglect, or reject peers in different situations. In other words, we need to know clearly how children understand the behaviour of the peers they are rejecting. Research needs even to go further by determining the particular setting in which these behaviours occur. This might be accomplished through some type of interview process that encourages children to explain their decisions with regard to accepting or rejecting particular peers.

Third, in addition to sociometric behaviour assessments and sociometric choice nominations of children with LD, the use of additional measures not based on standard

scores would be helpful in determining children's sociometric status and social behaviour. Specifically, this could be bettered by the use of direct observations of children's social behaviour and by a measure of children's friendships at the dyadic level.

Fourth, although the majority of children with LD were boys in the settings from where the participants for this study came (over 65%), additional studies comparing the sociometric status and social behaviours of girls with various subtypes of LD in self-contained settings are also needed. It would be important to try and determine if the findings observed among the sample of boys with LD apply also to a sample of girls with LD who are also in self-contained special classes or schools.

Finally, there are other aspects which have not been fully explored in the literature that will need to be investigated. For example, children's perceptions, beliefs, and attitudes about their sociometric status are one of them. These may be very important variables that help determine how the degree of peer acceptance ultimately impacts children, because children may respond differently to negative feedback they receive from peers. For some, these may have devastating effects on their self-esteem and confidence, whereas others might be motivated to avoid rejection by altering maladaptive behaviour patterns. And if certain children are not at all concerned about peer acceptance, they may not experience any harmful effects. It is this type of additional knowledge that will further enhance our understanding of learning disabilities across settings and cultures and the appropriate interventions strategies toward those who most need them.

REFERENCES

Abang, T. B. (1992). Special education in Nigeria. International Journal of Disability, Development and Education, 39, 13-18.

Achenbach, T. M., & Edelbrock, C. S. (1980). Child Behavior Checklist. Burlington, VT: Author.

Achenbach, T. M., & Edelbrock, C. S. (1983). Manual for the Child Behavior Checklist and Revised Child Behavior Profile. Burlington: University of Vermont, Department of Psychiatry.

Algozzine, B., & Korinek, L. (1985). Where is special education for students with high prevalence handicaps going? Exceptional Children, 51, 388-394.

Algozzine, B., & Ysseldyke, J. (1983). Leaning disabilities as a subset of school failure: The oversophistication of a concept. Exceptional Children, 50, 242-246.

Apter, S. J., & Conoley, J. C. (1984). Childhood behavior disorders and emotional disturbance: An introduction to teaching troubled children. Hillsdale, NJ: Prentice-Hall Inc.

Asher, S. R., & Coie, J. D. (1990). Peer rejection in childhood. New York: Cambridge University Press.

Asher, S. R., & Dodge, K. S. (1986). Identifying children who are rejected by their peers. Developmental Psychology, 22, 444-449.

Asher, S. R., & Hymel, S. (1981). Children's social competence in peer relations: Sociometric and behavioral assessment. In J. D. Wine & M. Smye (Eds.), Social competence (pp. 125-157). New York: Guilford Press.

Asher, S. R., & Wheeler, V. A. (1985). Children's loneliness: A comparison of rejected and neglected peer status. Journal of Consulting and Clinical Psychology, 53, 500-505.

Axelrod, L. (1982). Social perception in learning disabled adolescents. Journal of Learning Disabilities, 15, 610-613.

Badian, N. A., & Ghublikian, M. (1983). The personal-social characteristics of children with poor mathematical computation skills. Journal of Learning Disabilities, 16, 154-157.

Bakare, C. A. (1992). Integration in education: The case of education for the handicapped children in Nigeria. International Journal of Special Education, 7, 255-260.

Baker, J. M., & Zigmond, N. (1990). Are regular education classes equipped to accommodate students with learning disabilities? Exceptional Children, 56, 515-528.

Barkley, R. A. (1988a). Child behavior rating scales and checklists. In M. Rutter, A. H. Tuma, & I. Lann (Eds.), Assessment and diagnosis in child psychopathology (pp. 113-155). New York: Guilford Press.

Barkley, R. A. (1988b). Attention Deficit Disorder with Hyperactivity. In E. J. Mash & L. G. Terdal (Eds.), Behavioral assessment of childhood disorders (2nd ed., pp. 69-104). New York: Guilford Press.

Banerji, M. & Dailey, R. A. (1995). A study of the effects of an inclusion model on students with specific learning disabilities. Journal of Learning Disabilities, 28, 511-522.

Bateman, E. C., 1968). Interpretation of the 1961 Illinois Test of Psycholinguistic Abilities. Seattle: Special Child Publications.

Bayliss, J., & Liversey, P. J. (1985). Cognitive strategies of children with reading disabilities and normal readers in visual sequential memory. Journal of Learning Disabilities, 18, 326-332.

Bender, W. N., & Smith, J. K. (1990). Classroom behavior of children and adolescents with learning disabilities: A meta-analysis. Journal of Learning Disabilities, 23, 298-305.

Bennison, E. A. (1987). Before the learning disabled there were feeble-minded children. In B. M. Franklin (Ed.), Learning disability: Dissenting essays (pp. 13-28). London: The Falmer Press.

Boder, E. (1973). Developmental dyslexia: A diagnostic approach based on three atypical reading-spelling patterns. Developmental Medicine and Child Neurology, 15, 663-687.

Braden, J. P. (1987). A comparison of regression and Standard Score Discrepancy methods for learning disabilities identification: Effects on racial representation. Journal of School Psychology, 25, 23-29.

Breen, M. J. (1986). Cognitive patterns of learning disability subtypes as measured by the Woodcock-Johnson psycho-educational battery. Journal of Learning Disabilities, 19, 86-90.

Brenton, B. W., & Gilmore, D. (1976). An operational definition of learning disabilities (cognitive domain) using WISC full-scale IQ and Peabody Individual

Achievement Test scores. Psychology in the Schools, 13, 427-432.

Brophy, J. (1981). Teacher praise: A functional analysis. Review of Educational Research, 51, 5-32.

Brown, L. (1974). Special class: Some reconsiderations. Mental Retardation, 12, 52-53.

Bruck, M. (1986). Social and emotional adjustments of learning-disabled children: A review of issues. In S. J. Ceci (Ed.), Handbook of cognitive, social, and neuropsychological aspects of learning disabilities (Vol. 1, pp. 361-380). Hillsdale, NJ: Erlbaum.

Bruininks, V. L. (1978a). Peer status and personality characteristics of learning disabled and nondisabled students. Journal of Learning Disabilities, 11, 484-489.

Bruininks, V. L. (1978b). Actual and perceived peer status of learning-disabled students in mainstream programs. The Journal of Special Education, 12, 51-58.

Bruno, R. M. (1981). Interpretation of pictorially presented social situations by learning disabled and normal children. Journal of Learning Disabilities, 14, 350-352.

Brunsting-Muller, M. (1995). Integrativ schulen und fordern. Was Lehrer beobachten. [Integrating students with disabilities into regular classroom: Teachers' observations]. Vierteljahresschrift fur Heilpadagokik und ihre Nachbargebiete, 64, 429-440.

Bryan, T. H. (1974). Peer popularity of learning disabled children. Journal of Learning Disabilities, 7, 621-625.

Bryan, T. H. (1977). Learning disabled children's comprehension of nonverbal communication. Journal of Learning Disabilities, 10, 501-506.

Bryan, T. H., & Bryan, J. H. (1978). Social interactions of learning disabled children. Learning Disability Quarterly, 1, 33-38.

Bukowski, W. M., & Hoza, B. (1989). Popularity and friendship: Issues in theory, measurement, and outcome. In T. J. Berndt & G. W. Ladd (Eds.), Peer relationships in child development (pp. 15-45). New York: John Wiley & Sons.

Burack, J. A. (1997). The study of atypical and typical populations in developmental psychopathology: The quest for a common science. In S. S. Luthar, J. A. Burack, D. Cicchetti & J. R. Weisz (Eds.), Developmental psychopathology: Perspectives on adjustment, risk, and disorder (pp. 139-165). Cambridge: Cambridge University Press.

Burd, L., Kauffman, D. W., & Kerbeshian, J. (1992). Tourette syndrome and learning disabilities. Journal of Learning Disabilities, 25, 598-604.

Bursuck, W. (1989). A comparison of students with learning disabilities to low achieving and higher achieving students on three dimensions of social competence. Journal of Learning Disabilities, 22, 188-194.

Busk, P. L., Ford, R. C., & Shulman, J. L. (1973). Stability of sociometric responses in classrooms. Journal of Genetic Psychology, 123, 69-184.

Campbell, S. B., Endman, M., & Bernfeld, G. (1977). A three year follow-up of hyperactive preschoolers into elementary school. Journal of Child Psychology and Psychiatry and Allied Disciplines, 18, 239-249.

Cantwell, D. P., & Baker, L. (1985). Psychiatric and learning disorders in children with speech and language disorders: A descriptive analysis. Advances in Learning and

Behavioral Disabilities, 4, 29-47.

Cantwell, D. P., & Baker, L. (1991). Association between attention deficit-hyperactivity disorder and learning disorders. Journal of Learning Disabilities, 24, 88-95.

Carlson, C. I. (1987). Social interaction goals and strategies of children with learning disabilities. Journal of Learning Disabilities, 20, 306-311.

Carrier, J. G. (1987). The politics of early learning disability theory. In B.M. Franklin (Ed.), Learning disability: Dissenting essays (pp. 47-66). London: The Falmer.

Chen, X., Rubin, K., & Sun, Y. (1992). Social Reputation and peer relationships in Chinese and Canadian children: A cross-cultural study. Child Development, 63, 1336-1343.

Coben, S., & Zigmond, N. (1986). The social integration of learning disabled students from self-contained to mainstream elementary school settings. Journal of Learning Disabilities, 19, 614-618.

Coie, J. D., & Dodge, K. A. (1983). Continuities and changes in children's social status: A five-year longitudinal study. Merrill-Palmer Quarterly, 29, 261-282.

Coie, J. D., Dodge, K. A., & Coppotelli, H. (1982). Dimensions and types of social status: A cross-age perspective. Developmental Psychology, 18, 557-570.

Coie, J.D., Dodge, K.A., & Kupersmidt, J.B. (1990). Peer group behaviour and social status. In S.R. Asher & J.D. Coie (Eds.), Peer rejection in childhood (pp. 17-59). New York: Cambridge University Press.

Coie, J. D., & Koeppl, G. K. (1990). Adapting intervention to the problems of aggressive and disruptive rejected children. In S. R. Asher & J. D. Coie (Eds.), Peer rejection

in childhood (pp. 309-337). New York: Cambridge University Press.

Coles, G. (1987). The learning mystique: A critical look at "learning disabilities." New York: Pantheon Books.

Conners, C. K. (1973). Rating scales for use in drug studies with children. Psychopharmacology Bulletin, 9, 24-84.

Conners, C. K. (1983). Conners' Teacher Rating Scale. North Tanawanda, NY: Multi-Health Systems.

Cruickshank, W. M. (1983). Learning disabilities: A neurophysiological dysfunction. Journal of Learning Disabilities, 16, 27-29.

Cunningham, C. E., Siegel, L. S., & Offord, D. R. (1985). A developmental dose-response analysis of the effects of methylphenidate on the peer interactions of attention deficit disordered boys. Journal of Child Psychology and Psychiatry and Allied Disciplines, 26, 955-971.

D'Andrea, M. (1983). Social development during middle childhood: Clarifying some misconceptions. Elementary School Guidance and Counselling, 17, 214-220.

DeLuca, J. W., Del-Dotto, J. E., & Rourke, B. P. (1987). Subtypes of arithmetic disabled children: A neuropsychological, taxonomic approach. Journal of Clinical and Experimental Neuropsychology, 9, 26. (Abstract)

Denckla, M. B. (1981). Minimal brain dysfunction and dyslexia: Beyond diagnosis by exclusion. In M. E. Blair, I. Rapin, & M. Kinsbourne (Eds.), Child neurology. New York: Spectrum.

Dodge, K. A. (1983). Behavioral antecedents of peer social status. Child Development,

54, 1386-1399.

Doehring, D. G., & Hoshko, I. M. (1977). Classification of reading problems by the Q-technique of factor analysis. Cortex, 13, 281-294.

Dubow, E. F. (1988). Aggressive behavior and peer social status of elementary school children. Aggressive Behavior, 14, 315-324.

Dudley-Marling, C. C., & Edmiaston, R. (1985). Social status of learning disabled children and adolescents: A review. Learning Disability Quarterly, 8, 189-204.

Edmonson, B., deJung, J., Leland, H., & Leach, E. (1974). The Test of Social Inference. New York: Educational Activities.

Eron, L. D., & Huesmann, L. R. (1984). The relation of prosocial behavior to the development of aggression and psychopathology. Aggressive Behavior, 10, 201-211.

Eshel, Y., Katz, M., Gilat, S., & Nagler, C. (1994). Mainstreamed or self-contained classes for students with a mild learning disability: The case of Israel. International Journal of Disability, Development and Education, 41, 185-200.

Feagans, L. V., & Appelbaum, M. I. (1986). Validation of language subtypes in learning disabled children. Journal of Educational Psychology, 78, 358-364.

Fisk, J. L., Finnell, R., & Rourke, B. P. (1985). Major findings and future directions for learning disability subtype analysis. In B. P. Rourke (Ed.), Neuropsychology of learning disabilities: Essentials of subtype analysis (pp. 331-340). New York: Guilford Press.

Fletcher, J. M. (1985). External validation of learning disability typologies. In B. P.

Rourke (Ed.), Neuropsychology of learning disabilities: Essentials of subtype analysis (pp. 187-211). New York: Guilford Press.

Fletcher, J. M., & Morris, R. (1986). Classification of disabled learners: Beyond exclusionary definitions. In S. J. Ceci (Ed.), Handbook of cognitive, social, and neuropsychological aspects of learning disabilities (Vol. 1, pp. 55-80). Hillsdale, NJ: Erlbaum.

Fletcher, J. M., & Satz, P. (1985). Cluster analysis and the search for learning disability subtypes. In B. P. Rourke (Ed.), Neuropsychology of learning disabilities: Essentials of subtype analysis (pp. 40-64). New York: Guilford Press.

Flicek, M. (1992). Social status of boys with both academic problems and attention-deficit hyperactivity disorder. Journal of Abnormal Child Psychology, 20, 353-366.

Flicek, M., & Landau, S. (1985). Social status problems of learning disabled and hyperactive/learning disabled boys. Journal of Clinical Child Psychology, 14, 340-344.

Forman, E. A., & Cazden, C. B. (1985). Exploring Vygotskian perspectives in education: The cognitive value of peer interaction. In J. V. Wertsch (Ed.), Culture, communication and cognition: Vygotskian perspectives (pp. 323-347). Cambridge, MA: Cambridge University Press.

Forness, S. R., & Sinclair, E. (1990). Learning disabilities in children with clinical depression. In H. L. Swanson & B. Keogh (Eds.), Learning disabilities: Theoretical and research issues (pp. 315-332). Hillsdale, NJ: Erlbaum.

Frankenberger, W., & Fronzaglio, K. (1991). A review of states' criteria and procedures for identifying children with learning disabilities. Journal of Learning Disabilities, 24, 495-500.

Frederick, B. P., & Olmi, D. J. (1994). Children with attention-deficit/hyperactivity disorder: A review of the literature on social skills deficits. Psychology in the Schools, 31, 288-296.

French, J. N., Ellsworth, N. J., & Amoruso, M. (1995). Reading and learning disabilities. New York: Garland Publishing.

Gaddes, W. H. (1985). Learning disabilities and brain function: A neuropsychological approach. New York: Springer-Verlag.

Garrett, M. K., & Crump, W. D. (1980). Peer acceptance, teacher preference, and self-appraisal of social status among learning disabled students. Learning Disability Quarterly, 3, 42-48.

Goldberg, E., & Costa, L. D. (1981). Hemisphere differences in the acquisition and use of asymmetries in the brain. Brain and Language, 14, 144-173.

Gottman, J. M. (1986). The world of coordinated play: same- and cross-sex friendship in young children. In J. M. Gottman & J. G. Parker (Eds.), Conversations of friends: Speculations on affective development (pp. 139-191). Cambridge, United Kingdom: Cambridge University Press.

Green, K. D., Forehand, R., Beck, S. J., & Vosk, B. (1980). An assessment of the relationship among measures of children's social competence and children's academic achievement. Child Development, 51, 1149-1156.

Gresham, F. M. (1986). Conceptual issues in the assessment of social competence in children. In P. S. Strain, M. J. Guralnick, & H. M. Walker (Eds.), Children's social behavior: Development, assessment, and modification (pp. 143-179). New York: Academic Press.

Gresham, F. M. (1988). Social competence and motivational characteristics of learning disabled students. In M. C. Wang, M. C. Reynolds, & H. J. Walberg (Eds.), Handbook of special education: Research and practice (pp. 283-302). New York: Pergamon.

Gresham, F. M. (1992). Social skills and learning disabilities: Causal, concomitant, or correlational? School Psychology Review, 21, 348-360.

Gresham, F. M., & Reschly, D. J. (1986). Social skill deficit and low peer acceptance of mainstreamed learning disabled children. Learning Disability Quarterly, 9, 23-32.

Gresham, F. M., & Stuart, D. (1992). Stability of sociometric assessment: Implications for uses as selection and outcome measures in social skills training. Journal of School Psychology, 30, 223-231.

Gronlund, N. E. (1959). Sociometry in the classroom. New York: Harper Collins.

Guterman, B. R. (1995). The validity of categorical learning disabilities services: The consumer's view. Exceptional Children, 62, 111-124.

Haager, D., & Vaughn, S. (1995). Parent, teacher, peer, and self-reports of the social competence of students with learning disabilities. Journal of Learning Disabilities, 28, 205-215.

Hallahan, D. P., & Kauffman, J. M. (1977). Labels, categories, behaviors: ED, LD, and

EMR reconsidered. The Journal of Special Education, 11, 139-149.

Hallenbeck, B. A., & Kauffman, J. M. (1995). How does observational learning affect the behavior of students with emotional or behavioral disorders? A review of research. The Journal of Special Education, 29, 45-71.

Hammill, D. D. (1990). On defining learning disabilities: An emerging consensus. Journal of Learning Disabilities, 23, 74-84.

Hammill, D. D., Leigh, J. E., McNutt, G., & Larsen, S. C. (1981). A new definition of learning disabilities. Learning Disability Quarterly, 4, 336342.

Harris, A. J. (1982). How many kinds of reading disability are there? Journal of Learning Disabilities, 15, 456-460.

Harris, M. J., Milich, R., Johnston, E. M., & Hoover, D. W. (1990). Effects of expectancies on children's social interactions. Journal of Experimental Social Psychology, 26, 1-12.

Hartup, W. W. (1983). Peer relations. In E. M. Hetherington (Ed.), Handbook of Child Psychology: Vol. 4. Socialization, personality, and social development (pp. 103-196). New York: John Wiley & Sons.

Hooper, S. R., & Willis, W. G. (1989). Learning disability subtyping. New York: Springer-Verlag.

Hoyle, S. G., & Serafica, F. C. (1988). Peer status of children with and without learning disabilities: A multimethod study. Learning Disability Quarterly, 11, 322-332.

Humphries, T., & Bone, J. (1993). Use of IQ criteria for evaluating the uniqueness of the learning disability profile. Journal of Learning Disabilities, 26, 348-351.

Hymel, S., & Asher, S.R. (1977). Assessment and training of isolated children's social skills. Paper presented at the meeting of the Society for Research in Child Development, New Orleans.

Jackson, S. C., Enright, R. D., & Murdock, J. Y. (1987). Social perception problems in learning disabled youth: Developmental lag versus perceptual deficit. Journal of Learning Disabilities, 20, 361-364.

Johnson, D. J., & Myklebust, H. R. (1967). Learning disabilities. New York: Grune & Stratton.

Kaluba, L. (1986). Education in Zambia: The problem of access to schooling and the paradox of the private school solution. Comparative Education, 22, 159-169.

Kaplan, H. K., & Kaufman, I. (1978). Sociometric status and behaviors of emotionally disturbed children. Journal of School Psychology, 15, 8-15.

Kaufman, A. S. (1981). The WISC-R and learning disabilities assessment: State of the art. Journal of Learning Disabilities, 14, 520-526.

Kavale, K. A., & Forness, S. R. (1996). Social skill deficits and learning disabilities: A meta-analysis. Journal of Learning Disabilities, 29, 226-237.

Kavale, K., & Nye, C. (1986). Parameters of learning disability in achievement, linguistic, neuropsychological, and social/behavior domains. The Journal of Special Education, 19, 443-458.

Kinsbourne, M., & Warrington, E. K. (1963). Developmental factors in reading and writing backwardness. British Journal of Psychology, 54, 145-156.

Kinsbourne, M., & Warrington, E. K. (1966). The developmental of finger

differentiation. Quarterly Journal of Experimental Psychology, 15, 132-137.

Kirk, S. A., & Bateman, B. (1962). Diagnosis and remediation of learning disabilities. Exceptional Children, 29, 73-78.

Kistner, J. A., & Gatlin, D. F. (1989). Correlates of peer rejection among children with learning disabilities. Learning Disability Quarterly, 12, 133-140.

Kobasigawa, A. (1968). Inhibitory and disinhibitory effects of models on sex-inappropriate behavior in children. Psychologia, 11, 86-96.

Kolb, B., & Wishaw, I. (1990). Fundamentals of human neuropsychology. New York: Freeman.

Kupersmidt, J. B., Coie, J. D., & Dodge, K. A. (1990). The role of poor peer relationships in the development of disorder. In S. Asher, & J. Coie (Eds.), Peer rejection in childhood (pp. 274-305). New York: Cambridge University Press.

La Greca, A.M., & Mesibov, G.B. (1981). Facilitating interpersonal functioning with peers in learning-disabled children. Journal of Learning Disabilities, 14, 197-199, 238.

La Greca, A. M., & Stone, W. L. (1990). LD status and achievement: Confounding variables in the study of children's social status, self-esteem, and behavioral functioning. Journal of Learning Disabilities, 23, 483-490.

Landau, S., & Moore, L. A. (1991). Social skill deficits in children with attention-deficit hyperactivity disorder. School Psychology Review, 20, 235-251.

Leadbetter, J., & Leadbetter, P. (1993). Special Children: Meeting the challenge in the primary school. New York: Cassell.

Lerner, J. W. (1985). Learning disabilities: Theories, diagnosis, and teaching strategies (4th ed.). Boston: Houghton Mifflin.

Loney, J. (1987). Hyperactivity and aggression in the diagnosis of attention deficit disorder. In B. B. Lahey & A. E. Kazdin (Eds.), Advances in clinical child psychology (Vol. 10, pp. 99-135). New York: Plenum.

Loney, J., Kramer, L., & Milich, R. (1981). The hyperkinetic child grows up: Predictors of symptoms, delinquency, and achievement at follow-up. In K. D. Gadow & J. Loney (Eds.), Psychosocial aspects of drug treatment for hyperactivity. Boulder, CO: Westview.

Loney, J., Langhorne, J. E., & Paternite, C. E. (1978). An empirical basis for subgrouping the hyperkinetic/minimal brain dysfunction syndrome. Journal of Abnormal Psychology, 87, 431-441.

Loney, J., & Milich, R. (1982). Hyperactivity, inattention, and aggression in clinical practice. In D. Routh & M. Wolraich (Eds.), Advances in developmental and behavioral pediatrics (Vol. 2, pp. 113-147). Greenwich, CT: JAI Press.

Lopez-Reyna, N. A. (1986). The importance of meaningful contexts in bilingual special education: Moving to whole language. Learning Disabilities Research and Practice, 11, 120-131.

Loveland, K., Fletcher, J., & Bailey, V. (1990). Verbal and nonverbal communication of events in learning disabled subtypes. Journal of Clinical and Experimental Neuropsychology, 12, 433-447.

Luria, A. R. (1961). The role of speech in the regulation of normal and abnormal

behavior. New York: Liveright Publishing Corporation.

Lyon, G. R. (1985). Educational validation studies of learning disability subtypes. In B. P. Rourke (Ed.), Neuropsychology of learning disabilities: Essentials of subtype analysis (pp. 228-254). New York: Guilford Press.

Madden, N., & Slavin, R. (1983). Mainstreaming students with mild handicaps: Academic and social outcomes. Review of Educational Research, 53, 519-569.

Maheady, L., Maitland, G. E., & Sainato, D. M. (1984). Interpretation of social interactions by learning disabled, socially/emotionally disturbed, educable mentally retarded, and nondisabled children. The Journal of Special Education, 18, 151-159.

Mann, L., Davis, C. H., Boyer, C. W., Metz, C. M., & Wolford, B. (1983). LD or not LD, that was the question: A retrospective analysis of Child Service Demonstration Centre's compliance with the federal definition of learning disabilities. Annual Review of Learning Disabilities, 1, 11-14.

Margalit, M., & Efrati, M. (1996). Loneliness, coherence and companionship among children with learning disorders (1). Educational Psychology, 16, 69-79.

Marshall, J. C. (1984). Toward a rational taxonomy of the developmental dyslexias. In R. N. Malatesha & H. A. Whitaker (Eds.), Dyslexia: A global issue (pp. 45-58). The Hague: Nijhoff.

Martlew, M., & Hodson, J. (1991). Children with mild learning difficulties in an integrated and in a special school: Comparisons of behaviour, teaching and teachers' attitudes. British Journal of Educational Psychology, 61, 355-371.

McConaughy, S. H., & Ritter, D. R. (1986). Social competence and behavioral problems of learning disabled boys aged 6-11. Journal of Learning Disabilities, 19, 39-45.

McGee, R., & Share, D. L. (1988). Attention deficit disorder-hyperactivity and academic failure: Which comes first and which should be treated? Journal of the American Academy of Child and Adolescent Psychiatry, 27, 318-325.

McKinney, J. D. (1984). The search for subtypes of specific learning disability. Journal of Learning Disabilities, 17, 43-50.

McLeskey, J. (1989). The influence of level of discrepancy on the identification of students with learning disabilities. Journal of Learning Disabilities, 22, 435-438.

Mercer, C. D., Hughers, C. A., & Mercer, C. A. (1985). Learning disabilities definitions used by state education departments. Learning Disability Quarterly, 8, 45-55.

Mercer, C. D., King-Sears, P., & Mercer, A. R. (1990). Learning disabilities definitions and criteria used by state education departments. Learning Disability Quarterly, 13, 141-152.

Meyen, E., & Lehr, D. (1980). Least restrictive environments: Instructional implications. Focus on Exceptional Children, 12, 1-8.

Michelson, L., & Wood, R. (1982). Development and psychometric properties of the Children's Assertive Behavior Scale. Journal of Behavioral Assessment, 4, 3-13.

Miguel, S. K., Forness, S. R., & Kavale, K. A. (1996). Social skills deficits in learning disabilities: The psychiatric cormobidity hypothesis. Learning Disability Quarterly, 19, 252-261.

Milich, R., & Fitzgerald, G. (1985). Validation of inattention/overactivity and aggression

ratings with classroom observations. Journal of Consulting and Clinical Psychology, 53, 139-140.

Milich, R., & Landau, S. (1988). Teacher ratings of inattention/overactivity and aggression: Cross-validation with classroom observations. Journal of Clinical Child Psychology, 17, 92-97.

Milich, R., Landau, S., Kilby, G., & Whitten, P. (1982). Preschool peer perceptions of the behavior of hyperactive and aggressive children. Journal of Abnormal Child Psychology, 10, 497-510.

Milich, R., McAninch, C. B., & Harris, M. J. (1992). Effects of stigmatizing information on children's peer relations: Believing is seeing. School Psychology Review, 21, 400-409.

Mize, J., & Ladd, G. W. (1990). Toward the development of successful social skills training for preschool children. In S. Asher & J. Coie (Eds.), Peer Rejection in Childhood (pp. 338-361). New York: Cambridge University Press.

Moats, L. C., & Lyon, G. R. (1993). Learning disabilities in the United States: Advocacy, science, and the future of the field. Journal of Learning Disabilities, 26, 282-294.

Murray, F. B. (1982). Teaching through social conflict. Contemporary Educational Psychology, 7, 257-271.

Myklebust, H. R. (1967). Learning disabilities: Definition and overview. In H.R. Myklebust (Ed.), Progress in learning disabilities (Vol. 3, pp. 85-121). New York: Grune & Stratton.

Myklebust, H. R. (1971). The Pupil Rating Scale. New York: Grune & Stratton.

Naglieri, J. A. (1981). Factor structure of the WISC-R for children identified as learning disabled. Psychological Reports, 49, 891-895.

Newcomb, A. F., Bukowski, W. M., & Pattee, L. (1993). Children's peer relations: A meta-analytic review of popular, rejected, neglected, controversial, and average sociometric status. Psychological Bulletin, 113, 99-128.

Obrzut, J. E. (1979). Dichotic listening and bisensory memory skills in qualitatively diverse dyslexic readers. Journal of Learning Disabilities, 12, 304-314.

Oliva, A. H., & La Greca, A. M. (1988). Children with learning disabilities: Social goals and strategies. Journal of Learning Disabilities, 21, 301-306.

O'Sullivan, M., & Guilford, J. P. (1976). Four Factor Tests of Social Intelligence: Manual of instructions and interpretations. Orange, CA: Sheridan Psychological Services.

Ozols, E. J., & Rourke, B. P. (1985). Dimensions of social sensitivity in two types of learning-disabled children. In B. P. Rourke (Ed.), Neuropsychology of learning disabilities (pp. 281-301). New York: Guilford Press.

Ozols, E. J., & Rourke, B. P. (1991). Classification of young learning-disabled children according to patterns of academic achievement: Validity studies. In B. P. Rourke (Ed.), Neuropsychological validation of learning disability subtypes (pp. 97-123). New York: Guilford Press.

Panella, D., & Henggeler, S. W. (1986). Peer interactions of conduct-disordered, anxious-withdrawn, and well-adjusted black adolescents. Journal of Abnormal Child Psychology, 14, 1-11.

Parker, J. G., & Asher, S. R. (1987). Peer relations and later personal adjustment: Are low-accepted children at risk? Psychological Bulletin, 102, 357-389.

Patterson, G. R., & Cobb, J. A. (1971). A dyadic analysis of "aggressive" behaviors. In J. P. Hill (Ed.), Minnesota Symposia on Child Psychology (Vol. 5, pp. 72-129). Minneapolis: University of Minnesota Press.

Pelham, W. E., & Bender, M. E. (1982). Peer relationships in hyperactive children: Description and treatment. In K. D. Gadow & I. Bialer (Eds.), Advances in learning and behavioral disabilities (Vol. 1, pp. 365-436). Greenwich: JAI.

Pelham, W. E., Milich, R., Murphy, D. A., & Murphy, H. A. (1989). Normative data on the IOWA Conners' Teacher Rating Scale. Journal of Clinical Child Psychology, 18, 259-262.

Pennington, B. F. (1991). Diagnosing learning disorders: A neuropsychological framework. New York: Guilford Press.

Perlmutter, B. F., Crocker, J., Corday, D., & Garstecki, D. (1983). Sociometric status and related personality characteristics of mainstreamed learning disabled adolescents. Learning Disability Quarterly, 6, 20-30.

Petrauskas, R. J., & Rourke, B. P. (1979). Identification of subtypes of retarded readers: A neuropsychological multivariate approach. Journal of Clinical Neuropsychology, 1, 17-37.

Pirozollo, F. (1979). The neuropsychology of developmental reading disorders. New York: Praeger.

Porter, J. E., & Rourke, B. P. (1985). Socio-emotional functioning of learning disabled

children: A subtypal analysis of personality patterns. In B. P. Rourke (Ed.), Neuropsychology of learning disabilities: Essentials of subtype analysis (pp. 228-254). New York: Guilford Press.

Poteat, G. M., Ironsmith, M., & Bullock, J. (1986). The Classification of Preschool Children's Sociometric Status. Early Childhood Research Quarterly, 1, 349-360.

Prinz, R. J., Swan, G., Liebert, D., Weintraub, S., & Neale, J. M. (1978). ASSESS: Adjustment scales for sociometric evaluation of secondary-school students. Journal of Abnormal Child Psychology, 6, 493-501.

Quay, H. C., & Peterson, D. P. (1983). Revised Behavior Problem Checklist. Coral Gables, FL: Author.

Riccio, C. A., Gonzalez, J. J., & Hynd, G. W. (1994). Attention-deficit hyperactivity disorder (ADHD) and learning disabilities. Special Issue: Social-emotional development. Learning Disability Quarterly, 17, 311-322.

Richman, L. C., & Eliason, M. J. (1992). Disorders of communication: Developmental language disorders and cleft palate. In C. E. Walker & M. C. Roberts (Eds.), Handbook of clinical child psychology (2nd ed., pp. 537-552). New York: John Wiley & Sons.

Roff, M., Sells, S. B., & Golden, M. M. (1972). Social Adjustment and Personality Development in Children. Minneapolis: University of Minnesota Press.

Rosenberg, M. S., Bott, D., Majsterek, D., Chiang, B., Garland, D., Wesson, C., Graham, S., Smith-Myers, B., Miller, M., Swanson, H. L., Bender, W. Rivera, D., & Wilson, R. (1993). Minimum standards for the description of participants in

learning disabilities research. Journal of Learning Disabilities, 26, 210-213.

Rourke, B. P. (1985). Overview of learning disability subtypes. In B. P. Rourke (Ed.), Neuropsychology of learning disabilities: Essentials of subtype analysis (pp. 3-14). New York: Guilford Press.

Rourke, B. P. (1988). Socio-emotional disturbances of learning disabled children. Journal of Consulting and Clinical Psychology, 56, 801-810.

Rourke, B. P. (1989). Nonverbal learning disabilities: The syndrome and the model. New York: Guilford Press.

Rourke, B. P. (1991). Neuropsychological validation of learning disability subtypes. New York: Guilford Press.

Rourke, B. P. (1995). Introduction: The NLD syndrome and the white matter model. In B. P. Rourke (Ed.), Syndromes of nonverbal learning disabilities: Neurodevelopmental disabilities (pp. 1-26). New York: Guilford Press.

Rourke, B. P., & Finlayson, M. A. (1978). Neuropsychological significance of variations in patterns of academic performance: Verbal and visual-spatial abilities. Journal of Abnormal Child Psychology, 6, 121-133.

Rourke, B. P., & Fuerst, D. R. (1991). Learning disabilities and psychosocial functioning: A neuropsychological perspective. New York: Guilford Press.

Rourke, B. P., & Strang, J. D. (1978). Neuropsychological significance of variations in patterns of academic performance: Motor, psychomotor, and tactile perception abilities. Journal of Pediatric Psychology, 3, 62-66.

Rourke, B. P., & Strang, J. D. (1983). Subtypes of reading and arithmetic disabilities: A

neuropsychological analysis. In M. Rutter (Ed.), Developmental neuropsychiatry (pp. 473-488). New York: Guilford Press.

Rubin, K. H. (1990). Introduction: Peer relationships and social skills in childhood - an international perspective. Human Development, 33, 221-224.

Sailor, W. (1991). Special education in the restructured school. Remedial and Special Education, 12, 8-22.

Salisbury, C. L. (1991). Mainstreaming during early childhood years. Exceptional Children, 58, 146-155.

Sattler, J. M. (1988). Assessment of children (3rd ed.). San Diego: Jerome M. Sattler Publisher.

Satz, P., & Morris, R. (1981). Learning disability subtypes: A review. In F. J. Pirozzolo & M. C. Wittrock (Eds.), Neuropsychological and cognitive processes in reading (pp. 109-141). New York: Academic Press.

Schaefer, E. S., & Edgerton, M. (1978). Classroom Behavior Inventory. Chapel Hill: University of North Carolina.

Schneider, B. H. (1993). Children's social competence: The contributions of family, school and culture. Oxford: Pergamon.

Schneider, B. H., & Byrne, B. M. (1987). La popularité des enfants agressifs dans un centre de traitement: Identification avec l'agresseur? [The popularity of aggressive children in a treatment center: Identification with the aggressor?] Revue canadienne de psycho-éducation, 16, 119-129.

Schneider, B. H., Ledingham, J. E., Byrne, B. M., Oliver, J., & Poirier, C. A. (1985).

Social consequences of hyperactivity in a children's treatment center. Journal of Pediatric Psychology, 10, 429-438.

Schneider, B. H., Smith, A., Poisson, S. E., & Kwan, A. B. (1997). Cultural dimensions of children's peer relations. In S. Duck (Ed.), Handbook of personal relationships: Theory, research and interventions (2nd ed., pp. 121-146). Chichester: John Wiley & Sons.

Schumaker, J. B., & Hazel, J. S. (1984). Social skills assessment and training for the learning disabled: Who's on first and what's on second? Part I. Journal of Learning Disabilities, 17, 422-431.

Scranton, T. R., & Ryckman, D. B. (1979). Sociometric status of learning disabled children in an integrative program. Journal of Learning Disabilities, 12, 402-407.

Semmuel, M. I., Gottlieb, J., & Robinson, N. M. (1979). Perspectives on educating handicapped children in the public schools. In D. Berliner (Ed.), Review of Research in Education, (Vol. 7). Washington, D.C.: American Educational Research Association.

Semrud-Clikeman, M., & Hynd, G. W. (1990). Right hemispheric dysfunction in nonverbal learning disabilities: Social, academic, and adaptive functioning in adults and children. Psychological Bulletin, 107, 196-209.

Serpell, R. (1993). The significance of schooling: Life-journeys in an African society. Cambridge, NY: Cambridge University Press.

Sheare, J. B. (1978). The impact of resource programs upon self-concept and peer acceptance of learning disabled children. Psychology in the Schools, 15, 406-412.

Siegel, L. S. (1989). IQ is irrelevant to the definition of learning disabilities. Journal of Learning Disabilities, 22, 469-478.

Siegel, L. S., & Heaven, R. K. (1986). Categorization of learning disabilities. In S. J. Ceci (Ed.), Handbook of cognitive, social, and neuropsychological aspects of learning disabilities (Vol. 1, pp. 95-121). Hillsdale, NJ: Erlbaum.

Silver, A. A., & Hagin, R. A. (1990). Disorders of learning in childhood. New York: John Wiley & Sons.

Siperstein, G. N., Bopp, M. J., & Bak, J. J. (1978). Social status of learning disabled children. Journal of Learning Disabilities, 11, 98-102.

Siperstein, G. N., & Goding, M. J. (1983). Social integration of learning disabled children in regular classrooms. Advances in Learning and Behavioral Disabilities, 2, 227-263.

Sleeter, C. (1987). Literacy, definitions of learning disabilities, and social control. In B. M. Franklin (Ed.), Learning disability: Dissenting essays. London: Falmer Press.

Smith, T. D., Smith, B. L., & Smithson, M. M. (1995). The relationship between the WISC-III and the WRAT3 in a sample of rural referred children. Psychology in the Schools, 32, 291-295.

Stainback, S., & Stainback, W. (1980). Educating children with severe maladaptive behavior. New York: Grune & Stratton.

Stiliadis, K., & Wiener, J. (1989). Relationship between social perception and peer status in children with learning disabilities. Journal of Learning Disabilities, 22, 624-629.

Stone, W. L., & La Greca, A. M. (1990). The social status of children with learning disabilities: A reexamination. Journal of Learning Disabilities, 23, 32-37.

Strang, J. D., & Rourke, B. P. (1983). Concept-formation and nonverbal reasoning abilities of children who exhibit specific academic problems with arithmetic. Journal of Clinical Child Psychology, 12, 33-39.

Strang, J., & Rourke, B. (1985). Arithmetic disability subtypes: The neuropsychological significance of specific arithmetic impairment in childhood. In B. P. Rourke (Ed.), Neuropsychology of learning disabilities: Essentials of subtype analysis (pp. 167-184). New York: Guilford Press.

Swanson, H. L., & Malone, S. (1992). Social skills and learning disabilities: A meta-analysis of the literature. School Psychology Review, 21, 427-443.

Sweeney, J. E., & Rourke, B. P. (1985). Spelling disability subtypes. In B. P. Rourke (Ed.), Neuropsychology of learning disabilities: Essentials of subtype analysis (pp. 147-165). New York: Guilford Press.

Tabachnick, B. G., & Fidell, L. S. (1996). Using Multivariate Statistics (3rd ed.). New York: Harper Collins.

Tsatsanis, K. D., Fuerst, D. R., & Rourke, B. P. (1997). Psychosocial dimensions of learning disabilities: External validation and relationship with age and academic functioning. Journal of Learning Disabilities, 30, 490-502.

Tur-Kaspa, H., & Bryan, T. (1995). Teachers' ratings of the social competence and school adjustment of students with LD in elementary and junior high school. Journal of Learning Disabilities, 28, 44-52.

Vance, B., & Fuller, G. B. (1995). Relation of scores on WISC-III and WRAT3 for a sample of referred children and you. Psychological Reports, 76, 371-374.

Vaughn, S. Elbaum, B. E., & Schumm, J. S. (1996). The effects of inclusion on social functioning of students with learning disabilities. Journal of Learning Disabilities, 29, 59-608.

Vincent, P., Williams, B. J., Harris, G. E., & Duvall, G. (1977). Classroom observations of hyperactive children: A multiple validation study. Paper presented at the 85th annual convention of the American Psychological Association, San Francisco.

Voeller, K. K. S. (1986). Right hemisphere deficit in children. American Journal of Psychiatry, 143, 1004-1009.

Walker, R. N. (1967). Some temperament traits in children viewed by their peers, their teachers, and themselves. Monographs of the Society for Research in Child Development, 32, 1-36.

Weintraub, S., & Mesulam, M. (1983). Developmental learning disabilities of the right hemisphere: Emotional, interpersonal, and cognitive components. Archives of Neurology, 40, 463-368.

Whalen, C. K., Henker, B., Collins, B. E., McAuliffe, S., & Vaux, A. (1979). Peer interaction in structured communication task: Comparisons of normal and hyperactive boys and of methylphenidate (Ritalin) and placebo effects. Child Development, 50, 388-401.

Wiener, J. (1987). Peer status of learning disabled children and adolescents: A review of the literature. Learning Disabilities Research, 2, 62-79.

Wiener, J., & Harris, P. J. (1993). Les relations sociales des sous-groupes d'enfants ayant des troubles d'apprentissage. [Social relations in subgroups of children with learning disabilities]. Enfance, 47, 295-316.

Wiener, J., Harris, P., & Shirer, C. (1990). Achievement and social-behavioral correlates of peer status in LD children. Learning Disability Quarterly, 13, 114-127.

Wiig, E. H., & Harris, S. P. (1974). Perception and interpretation of nonverbally expressed emotions by adolescents with learning disabilities. Perceptual and Motor Skills, 38, 239-245.

Wilkinson, G. S. (1993). Manual of the Wide Range Achievement Test (3rd ed.). Wilmington, DE: Wide Range, Inc.

Wolfensberger, W. (1977). The principle of normalization in human services. Toronto: National Institute on Mental Retardation.

Woodcock, R. W., & Johnson, M. B. (1977). Woodcock-Johnson psycho-educational battery. Allen, TX: DLM Teaching Resources.

Zigmond, N., & Baker, J. M. (1995). An exploration of the meaning and practice of special education in the context of full inclusion of students with learning disabilities. The Journal of Special Education, 29, 1-25.

APPENDICES

APPENDIX A

CHILDREN'S VERBAL CONSENT LETTER (Read in Class)

Hello Everyone,

My name is Morgan Mulenga. I am a student at the University of Ottawa in Canada. As part of my training, I am conducting a study about children's friendships, especially friendships of children with learning difficulties.

My study, will require your teachers to complete a questionnaire which asks some questions about you. Also, I will ask each one of you to go with me to a private room, one person at a time, where I will give you a simple test which will take about 50 minutes to complete. Then we shall do a nomination interview, in which I will ask you to select, from a list of your classmates, three classmates whom you like-most and three whom you like-least, and also to name any three of your classmates who best fit some of the descriptions I will show you. This will require another 15 minutes to complete.

The answers you will give me are confidential. That means that no one is supposed to know about what you will tell me. You should not tell your friends what you will tell me and your friends are not supposed to tell you also or even ask about what you will tell me. After we have finished all this, I will record everything using numbers only so that no one will ever know who said what.

This is not compulsory. If you do not want to take part, let me know. If you think you will be taking part, I will ask you to take home and give to your parents or guardians a letter I have prepared for them. This letter also explains what we will be doing. Your parents may sign the letter to agree or not to agree for you to take part. If they give it back to you, please bring it back to the school and give it to your teacher. Don't take the letter if you do not feel like taking part. If you agree to take part and your parents also agree, I want you to know that you are free to stop at any time you want and you do not have to tell me why. Do you all understand what I am talking about? If you are not sure, or you need further explanations, feel free to ask me either now or at any other time.

APPENDIX B

PARENTAL CONSENT LETTER

To the parent/s or guardian/s of _____,

In pursuit of a doctoral degree in Psychology at the University of Ottawa (Canada), I am conducting a study designed to examine the peer relations of children with various subtypes of learning disabilities. In the past, studies such as this one have shown that peer relations play an important role in the development of prosocial and adaptive behaviour of children. Peer relations have also been shown to be related to academic competence and school adjustment. A more thorough understanding of children's peer relations can lead to improved guidance for teachers and parents in their efforts to help children get along with one another.

This project, which met the criteria of the Ethics Committee of the School of Psychology of the University of Ottawa, will require teachers of participating children to complete a teacher rating scale which aims at distinguishing whether a child has aggression problems or attention deficit. This will take about 10 minutes.

The second part will involve the participation of children themselves. Each child will be escorted individually to a private room where he will be told of the strict confidentiality of his responses to the interview. An achievement test will be administered by me individually to each child in one single session. This test might take about 50 minutes to complete. Lastly, each child will be administered a nomination interview, in which I will ask them to select, from a list of their classmates, three classmates whom they like-most and three classmates whom they like-least, and also to name any three of their classmates who will best fit some behavioral descriptions I will show them. It is anticipated that this will take another 15 minutes to complete.

At the end of each of these sessions, each child will be reminded of the strict confidentiality of the responses and will be asked not to discuss the interview with their friends. Also, all the information I will gather will be kept strictly confidential and will not become part of your child's cumulative record. All data will be recorded and analyzed in group form so that no individual child will be able to be identified.

In order for me to include your child in this study, I will need your permission. To grant your permission, please complete these two identical forms and return one to the school at your earliest convenience. You may keep one for your own records. Please note that the participation of your child is not compulsory, it is voluntary and you may withdraw permission at any time.

If you have any questions regarding your child's participation in this study, or if you would like further information, please feel free to contact me at school or at home, after 5 p.m. I ca be reached at (01) 292-666.

Yours Sincerely,

Morgan Mulenga

INFORMED CONSENT FORM

Please sign here to indicate your consent or refusal for your child's participation in this study.

I, Mr./Ms./Dr. _____, have read and understood the description of the study to be conducted by Morgan Mulenga. I hereby **give / do not give** *(circle one)* permission for my child _____to participate in the above mentioned study. I understand that all materials will be kept strictly confidential and that I or my child have the right to discontinue participation at any time.

Signature:_____ Date: _____

APPENDIX C

INFORMATION LETTER TO THE PERMANENT SECRETARY

The Permanent Secretary
Ministry of Education
Lusaka, ZAMBIA

Dear Sir/Madam,

In pursuit of a doctoral degree in Psychology at the University of Ottawa (Canada), I am conducting a study designed to examine the peer relations of children with various subtypes of learning disabilities. In the past, studies such as this one have shown that peer relations play an important role in the development of prosocial and adaptive behaviour of children. Peer relations have also been shown to be related to academic competence and school adjustment. A more thorough understanding of children's peer relations can lead to improved guidance for teachers and parents in their efforts to help children get along with one another.

This project, which met the criteria of the Ethics Committee of the School of Psychology of the University of Ottawa, will require teachers of participating children to complete a teacher rating scale which aims at distinguishing whether a child has aggression problems or attention deficit. This will take about 10 minutes.

The second part will involve the participation of children themselves. Each child will be escorted individually to a private room where he will be told of the strict confidentiality of his responses to the interview. An achievement test will be administered by me individually to each child in one single session. This test might take about 50 minutes to complete. Lastly, each child will be administered a nomination interview, in which I will ask them to select, from a list of their classmates, three classmates whom they like-most and three classmates whom they like-least, and also to name any three of their classmates who will best fit some behavioral descriptions I will show them. It is anticipated that this will take another 15 minutes to complete.

At the end of each of these sessions, each child will be reminded of the strict confidentiality of the responses and will be asked not to discuss the interview with their friends. Also, all the information I will gather will be kept strictly confidential and will not become part of your child's cumulative record. All data will be recorded and analyzed in group form so that no individual child will be able to be identified.

First, I will need your written permission in order for me to go ahead with this project at some of the selected schools in and around Lusaka. I also wish to inform you that I will be seeking further permission from the school principals, teachers, the children themselves and from their parents. I am enclosing here information and consent letters that I intend to distribute to each of these group of persons.

If you have any questions regarding my request, or if you would like further information, I can be contacted at home at (01) 292-666.

Yours Sincerely,

Morgan Mulenga

APPENDIX D

INFORMATION AND CONSENT LETTER TO PRINCIPALS

The Principal,

_____

_____

Dear Sir/Madam,

In pursuit of a doctoral degree in Psychology at the University of Ottawa (Canada), I am conducting a study designed to examine the peer relations of children with various subtypes of learning disabilities. In the past, studies such as this one have shown that peer relations play an important role in the development of prosocial and adaptive behaviour of children. Peer relations have also been shown to be related to academic competence and school adjustment. A more thorough understanding of children's peer relations can lead to improved guidance for teachers and parents in their efforts to help children get along with one another.

This project, which met the criteria of the Ethics Committee of the School of Psychology of the University of Ottawa, will require teachers of participating children to complete a teacher rating scale which aims at distinguishing whether a child has aggression problems or attention deficit. This will take about 10 minutes.

The second part will involve the participation of children themselves. Each child will be escorted individually to a private room where he will be told of the strict confidentiality of his responses to the interview. An achievement test will be administered by me individually to each child in one single session. This test might take about 50 minutes to complete. Lastly, each child will be administered a nomination interview, in which I will ask them to select, from a list of their classmates, three classmates whom they like-most and three classmates whom they like-least, and also to name any three of their classmates who will best fit some behavioral descriptions I will show them. It is anticipated that this will take another 15 minutes to complete.

At the end of each of these sessions, each child will be reminded of the strict confidentiality of the responses and will be asked not to discuss the interview with their friends. Also, all the information I will gather will be kept strictly confidential and will not become part of your child's cumulative record. All data will be recorded and analyzed in group form so that no individual child will be able to be identified.

First, I will need your permission and help to conduct my study at your school. Your help will be in the form of initial identification of children who had previously been identified as having a learning disability through a formal psychological testing. Second, in order for any child to participate in this study, I will need consent from the participating children as well as written permission from their parents or guardians. Finally, I will also require the participation of the children's teachers. This will be in the form of completing a teacher rating scale.

If you have any questions regarding my request, or if you would like further information, please feel free to contact me at home at (01) 292-666.

Yours Sincerely,

Morgan Mulenga

Please sign here to indicate your consent or refusal.

I, Mr./Ms./Dr. _____, have read and understood the description of the study to be conducted by Morgan Mulenga. I hereby **give / do not give** *(circle one)* permission to him to conduct his study at my school. I understand that all materials will be kept strictly confidential.

Signature:_____ Date: _____

APPENDIX E

INFORMATION AND CONSENT LETTER TO TEACHERS

To the Grade _____ teacher,

Dear Sir/Madam,

In pursuit of a doctoral degree in Psychology at the University of Ottawa (Canada), I am conducting a study designed to examine the peer relations of children with various subtypes of learning disabilities. In the past, studies such as this one have shown that peer relations play an important role in the development of prosocial and adaptive behaviour of children. Peer relations have also been shown to be related to academic competence and school adjustment. A more thorough understanding of children's peer relations can lead to improved guidance for teachers and parents in their efforts to help children get along with one another.

This project, which met the criteria of the Ethics Committee of the School of Psychology of the University of Ottawa, will require teachers of participating children to complete a teacher rating scale which aims at distinguishing whether a child has aggression problems or attention deficit. This will take about 10 minutes.

The second part will involve the participation of children themselves. Each child will be escorted individually to a private room where he will be told of the strict confidentiality of his responses to the interview. An achievement test will be administered by me individually to each child in one single session. This test might take about 50 minutes to complete. Lastly, each child will be administered a nomination interview, in which I will ask them to select, from a list of their classmates, three classmates whom they like-most and three classmates whom they like-least, and also to name any three of their classmates who will best fit some behavioral descriptions I will show them. It is anticipated that this will take another 15 minutes to complete.

At the end of each of these sessions, each child will be reminded of the strict confidentiality of the responses and will be asked not to discuss the interview with their friends. Also, all the information I will gather will be kept strictly confidential and will

not become part of your child's cumulative record. All data will be recorded and analyzed in group form so that no individual child will be able to be identified.

The purpose of this letter is to request for your help in completing a teacher rating scale about the children from your class who will be participating in this study. If you have any questions regarding my request, or if you would like further information, please feel free to contact me at (01) 292-666.

Yours Sincerely,

Morgan Mulenga

Please sign here to indicate your consent or refusal to complete the teacher rating scale.

I, Mr./Ms./Dr. _____, have read and understood the description of the study to be conducted by Morgan Mulenga. I hereby **agree / do not agree** *(circle one)* to take part by completing the teacher rating scale. I also understand that all materials will be kept strictly confidential.

Signature:_____ Date: _____

APPENDIX F

PEER NOMINATION RECORD FORM

Child's Code #:_____ Age:_____ Grade:_____ School's Code #:_____

Information Obtained: Month:_____ Day:_____ Year:_____

Instructions: *For each of the statements given below, name any three boys from the class list in front of you who fit these statements.*

1. **Cooperates.** "Here is someone who is really good to have as part of your group, because this person is agreeable and cooperates - pitches in, shares and gives everyone a turn."

_____

_____

_____

2. **Disrupts**. "This person has a way of upsetting everything when he or she gets into a group - doesn't share and tries to get everyone to do things their way."

_____

_____

_____

3. **Shy.** This person acts very shy with other kids, seems always to play or work by themselves. It's hard to get to know this person."

_____

_____

_____

4. Name any three boys from this class list whom you **like most.**

_____

_____

_____

5. **Fights.** "This person starts fights. They say mean things to other kids or push them, or hit them"

_____

_____

_____

6. **Seeks help.** "This person is always looking for help, asks for help even before they have tried very hard."

_____

_____

_____

7. **Leader.** "This person gets chosen by the others as the leader. Other people like to have this person in charge."

_____

_____

_____

8. Name any three boys from this class list whom you **like least.**

_____

_____

_____

APPENDIX G

IOWA CONNERS' TEACHER RATING SCALE

Child's Code #:_____ Age: _____ Sex:____ School's Code #:_____ Grade:_____

Information Obtained: Month _____ Day _____ Year _____

Instructions: Read each item below carefully, and decide how much you think the child has been bothered by this problem during the past month.

	Degree of Activity			
Observation	Not at all	Just a little	Pretty much	Very Much
1. Restless or overactive	0	1	2	3
2. Excitable, impulsive	0	1	2	3
3. Fails to finish things s/he starts - short attention span	0	1	2	3
4. Inattentive, easily distracted	0	1	2	3
5. Temper outbursts, explosive and unpredictable behaviour	0	1	2	3
6. Hums and makes other odd noises	0	1	2	3
7. Quarrelsome	0	1	2	3
8. Acts "smart"	0	1	2	3
9. Defiant	0	1	2	3
10. Uncooperative	0	1	2	3

IO =_____ A = _____

APPENDIX H

STATISTICAL ANALYSES FOR LD SUBTYPES CLASSIFIED BASED ON ZAMBIAN DISTRIBUTION SCORES OF THE WRAT3

AD, RD, and AD/RD Effects

Multivariate analysis of variance (MANOVA) showed that there was no significant difference between the three subtypes of learning disabilities in terms of social behaviour, $F(12,208) = 1.19$, $p = .29$ (see Table 36). A multivariate analysis of variance comparing only children with AD and RD also showed that there were no significant differences in terms of social behaviour between these two subtypes of learning disabilities, $F(6,98) = .70$, $p = .65$ (see Table 37).

Attention Deficit and LD Effects

There was a significant multivariate main effect for groups, $F(18,272) = 4.63$, $p < .001$ (see Table 38). Univariate analyses of variance for the main effect of attention deficit/LD showed that three of the six dependent variables were significant. Groups differed on disruption, fighting, and leadership variables. The results of Tukey's HSD pairwise comparisons which are presented in Table 39 show that boys with attention deficit received more negative nominations from their peers than boys with LD only.

Table 36.

Descriptive Statistics for Peer-Reported Social Behaviours by LD Subtype (AD, RD & AD/RD)

	n		Peer-reported Behaviours					
			cooperates	disrupts	fights	seeks help	leader	shy
AD	51	M	.08	-.06	-.06	.09	.05	-.55
		SD	1.00	.97	.93	1.04	1.00	.81
		Min	-.96	-.84	-.87	-1.01	-.94	-1.01
		Max	2.43	2.42	2.48	2.65	2.72	2.64
RD	54	M	.02	.09	.11	-.01	-.05	.08
		SD	.98	1.02	1.07	.89	.96	1.08
		Min	-.96	-.87	-.87	-1.01	-.94	-1.11
		Max	2.23	2.52	2.74	2.70	2.50	2.87
AD/RD	7	M	-.20	-.64	-.43	021	.33	.49
		SD	.84	.20	.15	1.28	1.00	1.32
		Min	-.73	-.87	-.57	-.81	-.77	-1.11
		Max	1.53	-.29	-.26	2.34	2.06	2.24

Note: AD = boys with arithmetic disabilities; RD = boys with reading disabilities.

Table 37.

Descriptive Statistics for Peer-Reported Social Behaviours by LD Subtype (AD & RD)

			Peer-reported Behaviours					
	n		cooperates	disrupts	fights	seeks help	leader	shy
		M	.08	-.06	-.06	.09	.05	-.55
AD	51	SD	1.00	.97	.93	1.04	1.00	.81
		Min	-.96	-.84	-.87	-1.01	-.94	-1.01
		Max	2.43	2.42	2.48	2.65	2.72	2.64
		M	.02	.09	.11	-.01	-.05	.08
RD	54	SD	.98	1.02	1.07	.89	.96	1.08
		Min	-.96	-.87	-.87	-1.01	-.94	-1.11
		Max	2.23	2.52	2.74	2.70	2.50	2.87

Note: AD = boys with arithmetic disabilities; RD = boys with reading disabilities.

Table 38.

Descriptive Statistics for Peer-Reported Social Behaviours of Participants by LD Subtypes and Attention Deficit

	n		Peer-reported Behaviours					
			cooperates	disrupts	fights	seeks help	leader	shy
		M	-.44	1.37	1.19	.20	-.57	-.27
		SD	.46	.80	.92	.91	.22	.90
AD/	12	Min	-.96	-.79	-.44	-.79	-.94	-.86
ADD		Max	.73	2.42	2.48	2.12	-.25	2.39
		M	.15	-.43	-.44	-.50	.18	-.12
AD	39	SD	1.09	.52	.50	1.08	1.08	.79
		Min	-.96	-.84	-.87	-1.01	-.94	-1.04
		Max	2.43	1.70	1.45	2.65	2.72	2.64
		M	-.43	.78	.94	.50	-.52	-.36
RD/	18	SD	.56	1.22	1.05	.80	.32	1.21
ADD		Min	-.81	-.74	-.58	-1.01	-.94	-1.11
		Max	1.45	2.52	2.74	1.85	.31	2.87
		M	.24	-.26	-.31	-.42	.19	.14
RD	36	SD	1.07	.69	.81	.95	1.08	.99
		Min	-.96	-.87	-.87	-1.01	-.94	-1.11
		Max	2.23	1.97	2.21	2.70	2.50	2.77

Note: AD = boys with arithmetic disabilities; RD = boys with reading disabilities; ADD = attention deficit.

Table 39.

ANOVA Summary: Peer-Reported Social Behaviours of Participants by LD Subtype

	Groups					
Dependent Variables	AD/ ADD (n=12)	AD (n=39)	RD/ ADD (n=18)	RD (n=36)	F(3,101)	Significant Post hoc Comparisons: Tukey-HSD Test (p < .05)
Disrupts	1.37 (.80)	-.43 (.52)	.78 (1.22)	-.26 (.69)	24.50**	AD < RD/ADD; AD < AD/ADD; RD < RD/ADD; RD < AD/ADD.
Fights	1.19 (.92)	-.44 (.50)	.94 (1.05)	-.31 (.81)	24.18**	AD < RD/ADD; AD < AD/ADD; RD < RD/ADD; RD < AD/ADD.
Leader	-.57 (.22)	.18 (1.08)	-.52 (.32)	.19 (1.08)	4.40*	RD/ADD < AD.

Note: Standard deviations are reported in parentheses; ADD = attention deficit.

*p < .01. **p < .001.

Aggression and LD Effects

A MANOVA examining the relationship between learning disability and aggression on one hand and social behaviour on the other showed significant multivariate main effects for the LD and aggression combination, F(18,272) = 6.29, p < .001, on teacher-rated aggression scores (see Table 40), and F(12,260) = 3.55, p < .001, on the peer-reported aggression scores (see Table 41).

Table 40.

Descriptive Statistics for Peer-Reported Social Behaviours of Participants Classified by LD Subtype and Teacher-Rated Aggression

			Peer-reported Behaviours					
	n		cooperates	disrupts	fights	seeks help	leader	shy
		M	-.56	1.69	1.42	.30	-.64	-.60
		SD	.24	.41	.53	1.09	.21	.22
AD/AGG	9	Min	-.96	1.16	.58	-.79	-.94	-.86
		Max	-.24	2.42	2.28	2.12	-.31	-.29
		M	.13	-.37	-.37	-.52	.14	-.59
AD	42	SD	1.06	.59	.65	1.03	1.05	.86
		Min	-.96	-.84	-.87	-1.01	-.94	-1.04
		Max	2.43	1.57	2.48	2.65	2.72	2.64
		M	-.56	1.19	1.32	.23	-.58	-.33
RD/AGG	15	SD	.32	1.07	.95	.87	.27	.94
		Min	-.81	-.73	-.87	-.90	-.94	-1.11
		Max	.32	2.52	2.74	1.85	.00	2.87
		M	.23	-.33	-.36	-.11	.16	.24
RD	39	SD	1.06	.60	.68	.89	1.05	1.07
		Min	-.96	-.87	-.87	-1.01	-.94	-1.11
		Max	2.23	1.74	2.21	2.70	2.50	2.77

Note: AD = boys with arithmetic disabilities; RD = boys with reading disabilities; AGG = boys with LD rated as aggressive by their teachers.

Table 41.

Descriptive Statistics for Peer-Reported Social Behaviours of Participants Classified by LD Subtype and Peer-Reported Aggression

	n		Peer-reported Behaviours			
			cooperates	seeks help	leader	shy
AD/AGG	13	M	-.45	.39	-.56	-.51
		SD	.45	1.00	.23	.33
		Min	-.96	-.79	-.94	-.86
		Max	.73	2.12	-.25	.32
AD	38	M	.16	-.12	.20	-.35
		SD	1.10	1.03	1.09	.89
		Min	-.96	-1.01	-.94	-1.04
		Max	2.43	2.65	2.72	2.64
RD/AGG	16	M	-.56	.32	-.60	-.57
		SD	.28	.84	.26	.33
		Min	-.81	-.90	-.94	-1.11
		Max	.32	1.85	.00	.00
RD	38	M	.26	-.15	.18	.36
		SD	1.07	.88	1.05	1.14
		Min	-.96	-1.01	-.94	-1.11
		Max	2.23	2.70	2.50	2.87

Note: AD = boys with arithmetic disabilities; RD = boys with reading disabilities; AGG = boys with LD nominated as aggressive by their peers.

Univariate analyses for the LD and aggression combination produced significant group differences on the following variables: cooperates, disrupts, and fights. Tukey's HSD pairwise comparisons are shown in Table 42. The same trend was observed when peer-reported aggression was a factor in combination with learning disabilities. These are shown in Table 43. Significant group differences were observed on cooperation, leadership and shyness.

Table 42.

ANOVA Summary: Peer-Reported Social Behaviours of Participants by Teacher-Rated Aggression and LD Subtype

	Groups					
Dependent Variables	AD/ AGG (n=9)	AD (n=42)	RD/ AGG (n=15)	RD (n=39)	F(3,101)	Significant Post hoc Comparisons: Tukey-HSD Test (p < .05)
Cooperates	-.56 (.24)	.13 (1.06)	-.55 (.32)	.23 (1.06)	3.73*	RD/AGG < RD.
Disrupts	1.69 (.41)	-.37 (.59)	1.19 (1.07)	-.33 (.60)	42.22**	AD < RD/AGG; AD < AD/AGG; RD < RD/AGG; RD < AD/AGG.
Fights	1.42 (.53)	-.37 (.65)	1.32 (.95)	-.36 (.68)	37.71**	AD < AD/AGG; AD < RD/AGG; RD < AD/AGG; RD < RD/AGG.

Note: Standard deviations are reported in parentheses. AGG = teacher-rated aggression; ADD = attention deficit.

*p < .05. **p < .001.

Table 43.

ANOVA Summary: Peer-Reported Social Behaviours of Participants by LD Subtype and Peer-Reported Aggression

	Groups					
Dependent Variables	AD/ AGG (n=13)	AD (n=38)	RD/ AGG (n=16)	RD (n=38)	F(3,101)	Significant Post hoc Comparisons: Tukey-HSD Test ($p < .05$)
Cooperates	-.45 (.45)	.16 (1.10)	-.56 (.28)	.26 (1.10)	4.24*	RD/AGG < RD.
Leader	-.56 (.23)	.20 (1.09)	-.60 (.26)	.18 (1.05)	4.84**	RD/AGG < RD, AD.
Shy	-.51 (.33)	-.04 (.89)	-.57 (.33)	.36 (1.14)	5.59**	RD/AGG < RD, AD/AGG < RD.

Note: Standard deviations are reported in parentheses. AGG = peer-reported aggression; ADD = attention deficit.

*$p < .01$. **$p < .005$.

Combined Attention Deficit, Aggression and LD Effects

For the attention deficit, aggression and LD combination, significant multivariate main effects for group were obtained, $F(18,221) = 9.78$, $p < .001$ (see Table 44) when teacher-rated aggression scores were used, and $F(18,235) = 18.44$, $p < .001$ (see Table 45) when peer-reported aggression scores were used.

Univariate analyses of variance, for the attention deficit, aggression (IOWA-CTRS) and LD group, showed significant group differences on two variables as follows: disrupts and fights (Table 46). Significant group differences were observed on peer-reported aggression scores, as follows: cooperates, leader, and shy (Table 47).

Table 44.

Descriptive Statistics for Peer-Reported Social Behaviours of Participants by LD Subtype, Attention Deficit and Teacher-Rated Aggression

			Peer-reported Behaviours					
	n		cooperates	disrupts	fights	seeks help	leader	shy
		M	-.56	1.73	1.41	.44	-.66	-.64
AD/		SD	.26	.46	.61	.98	.20	.23
ADD/	7	Min	-.96	1.16	.58	-.79	-.94	-.86
AGG		Max	-.24	2.42	2.28	2.12	-.31	-.29
		M	.18	-.54	-.54	-.12	.22	-.10
AD	37	SD	1.10	.22	.25	1.04	1.09	.81
		Min	-.96	-.84	-.87	-1.01	-.94	-1.04
		Max	2.43	.00	.29	2.65	2.72	2.64
		M	-.55	1.30	1.47	.35	-.56	-.26
RD/		SD	.36	1.08	.84	.86	.29	1.08
ADD/	11	Min	-.81	-.73	-.58	-.79	-.94	-1.11
AGG		Max	.32	2.52	2.74	1.85	.00	2.87
		M	.34	-.40	-.46	-.37	.29	.22
RD	32	SD	1.10	.46	.62	.96	1.10	1.01
		Min	-.96	-.87	-.87	-1.01	-.94	-1.11
		Max	2.23	1.57	2.21	2.70	2.50	2.77

Note: AD = boys with arithmetic disabilities; RD = boys with reading disabilities; AGG = boys with LD rated as aggressive by their teachers; ADD = attention deficit.

Table 45.

Descriptive Statistics for Peer-Reported Social Behaviours of Participants by LD Subtype, Attention Deficit and Peer-Reported Aggression

	n		Peer-reported Behaviours			
			cooperates	seeks help	leader	shy
		M	-.43	.25	-.56	-.51
AD/ADD/		SD	.48	.94	.22	.35
AGG	11	Min	-.96	-.79	-.94	-.86
		Max	.73	2.12	-.25	.34
		M	.18	-.12	.22	-.10
AD	37	SD	1.10	1.04	1.09	.81
		Min	-.96	-1.01	-.94	-1.04
		Max	2.43	2.65	2.72	2.64
		M	-.58	.29	-.60	-.60
RD/ADD/		SD	.32	.84	.27	.31
AGG	12	Min	-.81	-.78	-.94	-1.11
		Max	.32	1.85	.00	.00
		M	.34	-.10	.29	.22
RD	32	SD	1.10	.94	1.11	1.01
		Min	-.96	-1.01	-.94	-1.11
		Max	2.23	2.70	2.50	2.77

Note: AD = boys with arithmetic disabilities; RD = boys with reading disabilities; AGG = boys with LD nominated as aggressive by their peers; ADD = attention deficit.

Table 46.

ANOVA Summary: Peer-Reported Social Behaviours of Participants by Attention Deficit, Teacher-Rated Aggression and LD Subtype

	Groups					
Dependent Variables	AD/ ADD/ AGG (n=7)	AD (n=37)	RD/ ADD/ AGG (n=11)	RD (n=32)	F(3,83)	Significant Post hoc Comparisons: Tukey-HSD Test (p < .05)
Disrupts	1.73 (.46)	-.54 (.22)	1.30 (1.08)	-.40 (.46)	70.65*	AD < RD/ADD/AGG, AD < AD/ADD/AGG, RD < RD/ADD/AGG, RD < AD/ADD/AGG.
Fights	1.41 (.61)	-.54 (.25)	1.47 (.84)	-.46 (.62)	64.89*	AD < AD/ADD/AGG, AD < RD/ADD/AGG, RD < AD/ADD/AGG, RD < RD/ADD/AGG.

Note: Standard deviations are reported in parentheses. AGG = teacher-rated aggression; ADD = attention deficit.

*p < .001.

Table 47.

ANOVA Summary: Peer-Reported Social Behaviours of Participants by Attention Deficit, Peer-Reported Aggression and LD Subtype

	Groups					
Dependent Variables	AD/ ADD/ AGG (n=11)	AD (n=37)	RD/ ADD/ AGG (n=12)	RD (n=32)	F(3,88)	Significant Post hoc Comparisons: Tukey-HSD Test (p < .05)
Cooperates	-.43 (.48)	.18 (1.10)	-.58 (.32)	.34 (1.10)	3.68*	RD/ADD/AGG < RD.
Leader	-.56 (.22)	.22 (1.09)	-.60 (.27)	.29 (1.11)	4.29**	RD/ADD/AGG < RD.
Shy	-.51 (.35)	-.10 (.81)	-.60 (.31)	.22 (1.01)	4.16**	RD/ADD/AGG < RD.

Note: Standard deviations are reported in parentheses. AGG = peer-reported aggression; ADD = attention deficit.

*p < .05. **p < .01.

Sociometric Status of Boys with LD

A MANOVA was computed comparing boys with AD and RD on the variables of like-most, like-least and social preference nominations. Descriptive statistics for these variables are presented in Table 48. No significant differences were observed between boys with AD and boys with RD on these variables, F(3,101) = .07, p = .977.

Table 48.

Descriptive Statistics for Like-Most, Like-Least and Social Preference Scores by LD Subtype (AD & RD)

Diagnostic Categories	n	Like-Most	Like-Least	Social Preference
AD	51	-.01 (.98)	.03 (1.01)	.03 (.99)
RD	57	.04 (.98)	.05 (.99)	-.01 (1.00)

Note: Standard deviations are reported in parentheses.

A Chi-square analysis revealed no significant relationship between LD subtype and peer rejection, χ^2 (1) = .31, p = .580 (See Table 49). Ten (16.6%) boys with AD were in the rejected sociometric status group compared to 13 (24.1%) boys with RD.

Table 49.

Distribution of LD Subtypes in the Rejected Sociometric Status

Diagnostic Categories	n	Rejected	Not Rejected
AD	51	10 (19.6)	41 (80.4)
RD	54	13 (24.1)	41 (75.9)

Note: Percentages are reported in parentheses.

APPENDIX I

RESULTS OF MANOVAs PERFORMED ON EQUALIZED CELLS USING RANDOM DELETION OF CASES

Attention Deficit Effects

MANOVA: $F(6,53) = 9.51$, $p < .001$ (see Table 50).

Aggression Effects

MANOVAs: $F(6,43) = 10.81$, $p < .001$, and $F(4,53) = 9.51$, $p < .001$ (see Tables 51 and 52).

Attention Deficit and LD Effects

MANOVAs: Based on WRAT3 norms, $F(18,111) = 2.73$, $p < .001$ (Table 53) and based on Zambian distribution scores, $F(18,111) = 3.81$, $p < .001$ (Table 54).

ANOVAs: Groups based on WRAT3 norms differed on: disrupts and fights (see Table 55). Groups based on Zambian distribution scores differed on: disrupts, fights and leader (see Table 56).

Aggression and LD Effects

MANOVAs: $F(18,77) = 2.11$, $p < .01$, for WRAT3 norms (Table 57) and $F(18,77) = 3.27$, $p < .001$, for Zambian distribution scores (Table 58), based on teacher-rated aggression scores. Using peer-reported aggression scores, there was no significant difference in social behaviour when groups were based on Zambian distribution scores,

$F(12, 119)$, $p = .06$. There was, however, a significant difference in social behaviour for groups based on WRAT3 norms, $F(12,98) = 4.51$, $p < .001$ (see Table 59).

ANOVAs: When teacher-rated aggression scores were used, groups based on WRAT3 norms differed on: disrupts and fights (see Table 60). Groups based on Zambian distribution scores differed on: disrupts, fights and leader (see Table 61). In terms of peer-reported aggression, groups based on WRAT3 norms differed on the following variables: cooperates, leader, shy and seeks help (see Table 62).

Combined Attention Deficit, Aggression and LD Effects

MANOVAs: $F(18,54) = 4.63$, $p < .001$, in terms of teacher-rated aggression and based on WRAT3 norms (see Table 63); and $F(18,54) = 3.51$, $p < .001$, based on Zambian distribution scores (see Table 64). When peer-reported aggression scores were used, MANOVAs were as follows: $F(12,77) = 3.43$, $p < .001$, for WRAT3 norms based groups (see Table 65), and $F(12,98) = 3.80$, $p < .001$), for groups based on Zambian distribution scores (see Table 66).

ANOVAs: Using teacher-rated aggression, groups based on WRAT3 norms differed on: cooperates, disrupts, fights, leader and shy (see Table 67). Those based on Zambian distribution scores differed on: disrupts and fights (see Table 68). In terms of peer-reported aggression scores the following were the obtained ANOVAs: groups based on WRAT3 norms differed only on leader (see Table 69). Groups based on Zambian distribution scores differed on: cooperates, leader and shy (Table 70).

Table 50.

Descriptive Statistics for Peer-Reported Social Behaviours of Boys with and Boys without Attention Deficit

			Peer-reported Behaviours					
	n		cooperates	disrupts	fights	seeks help	leader	shy
		M	$-.45_a$	$.93_a$	$.95_a$	.06	$-.44_a$	.12
		SD	.51	1.12	1.02	.83	.55	1.08
ADD	32	Min	-.96	-.79	-.58	-1.01	-.94	-1.11
		Max	1.45	2.52	2.74	2.12	2.06	2.87
		M	$.15_b$	$-.38_b$	$-.37_b$	-.04	$.17_b$	-.10
LD	32	SD	1.07	.66	.76	1.06	1.12	.73
		Min	-.96	-.87	-.87	-.91	-.94	-1.11
		Max	2.23	1.70	2.21	2.65	2.50	1.33

Note: ADD = boys with attention deficit; LD = boys with no attention deficit.

Means with different subscripts are significantly different.

Table 51.

Descriptive Statistics for Peer-Reported Social Behaviours of Boys with and Boys without Aggression Problems (Teacher-Rated Aggression)

			Peer-reported Behaviours					
	n		cooperates	disrupts	fights	seeks help	leader	shy
		M	$-.56_a$	1.31_a	1.28_a	.22	$-.57_a$	-.37
		SD	.28	.95	.88	.94	.30	.81
AGG	25	Min	-.96	-.73	-.87	-.90	-.94	-1.11
		Max	.32	2.52	2.74	2.12	.26	2.87
		M	$.23_b$	$-.36_b$	$-.34_b$	-.15	$.22_b$	.17
LD	25	SD	1.11	.63	.72	.86	1.13	.97
		Min	-.96	-.79	-.87	-.91	-.94	-.86
		Max	2.23	1.57	2.21	2.65	2.50	2.39

Note: AGG = boys rated aggressive by teachers; LD = boys with aggression problems.

Means with different subscripts are significantly different.

Table 52.

Descriptive Statistics for Peer-Reported Social Behaviours of Boys with and Boys without Aggression Problems (Peer-Reported Aggression)

	n		Peer-reported Behaviours			
			cooperates	seeks help	leader	shy
AGG	29	M	$-.51_a$	$.35_a$	$-.58_a$	$-.54_a$
		SD	.36	.90	.24	.32
		Min	-.96	-.90	-.94	-1.11
		Max	.73	2.12	.00	.32
LD	29	M	$.18_b$	$-.35_b$	$.16_b$	$.23_b$
		SD	1.07	.73	1.09	1.05
		Min	-.96	-.91	-.94	-1.11
		Max	2.23	2.65	2.50	2.87

Note: AGG = boys nominated for aggression by peers; LD = boys with aggression problems. Means with different subscripts are significantly different.

Table 53.

Descriptive Statistics for Peer-Reported Social Behaviours of Participants by LD Subtype and Attention Deficit Status (LD Subtype Based on US Norms)

			Peer-reported Behaviours					
	n		cooperates	disrupts	fights	seeks help	leader	shy
		M	-.39	1.02	.74	.07	-.28	-.17
		SD	.50	1.00	.94	.87	.79	1.01
AD/	12	Min	-.96	-.79	-.57	-.79	-.77	-1.11
ADD		Max	.73	2.18	2.28	2.12	2.06	2.39
		M	-.40	-.36	-.37	.25	.47	-.28
AD	12	SD	1.12	.62	.60	1.22	1.17	.73
		Min	-.75	-.84	-.77	-.78	-.94	-.99
		Max	2.42	1.45	1.42	2.40	2.72	1.33
		M	-.52	1.01	1.17	.22	-.58	-.19
RD/	12	SD	.35	1.11	.88	.89	.28	1.19
ADD		Min	-.81	-.73	-.58	-.79	-.94	-1.11
		Max	.32	2.52	2.31	1.85	.00	2.87
		M	-.56	-.46	-.47	-.42	.10	.63
RD	12	SD	.93	.59	.52	.62	.99	1.16
		Min	-.75	-.87	-.87	-.90	-.77	-.96
		Max	2.23	1.16	.99	1.30	2.50	2.58

Note: AD = boys with arithmetic disabilities; RD = boys with reading disabilities; ADD = attention deficit.

Table 54.

Descriptive Statistics for Peer-Reported Social Behaviours of Participants by LD Subtype and Attention Deficit Status (LD Subtype Based on Zambian Distribution Scores)

			Peer-reported Behaviours					
	n		cooperates	disrupts	fights	seeks help	leader	shy
		M	-.44	1.37	1.19	.20	-.57	-.27
		SD	.46	.80	.92	.91	.22	.90
AD/	12	Min	-.96	-.79	-.44	-.79	-.94	-.86
ADD		Max	.73	2.42	2.48	2.12	-.25	2.39
		M	.25	-.59	-.64	.11	.50	-.32
AD	12	SD	1.19	.19	.11	1.36	1.25	.56
		Min	-.96	-.84	-.87	-.91	-.94	-.96
		Max	2.42	-.25	-.51	2.65	2.72	.80
		M	-.30	.75	.90	.10	-.46	-.08
RD/	12	SD	.65	1.28	1.11	.84	.35	1.22
ADD		Min	-.81	-.74	-.58	-.79	-.94	-.96
		Max	1.45	2.52	2.74	1.85	.31	2.87
		M	-.19	-.52	-.55	.62	-.03	.31
RD	12	SD	1.02	.28	.50	1.19	1.01	.88
		Min	-.96	-.87	-.87	-.79	-.94	-.99
		Max	2.00	.00	.85	2.70	2.50	2.58

Note: AD = boys with arithmetic disabilities; RD = boys with reading disabilities; ADD = attention deficit.

Table 55.

ANOVA Summary: Peer-Reported Social Behaviours of Participants by LD Subtype and Attention Deficit Status (LD Subtype Based on US Norms)

	Groups					
Dependent Variables	AD/ ADD (n=12)	AD (n=12)	RD/ ADD (n=12)	RD (n=12)	F(3,44)	Significant Post hoc Comparisons: Tukey-HSD Test (p < .05)
Disrupts	1.02 (1.00)	-.36 (.62)	1.01 (1.11)	-.46 (.59)	11.09*	RD, AD < RD/ADD; RD, AD < AD/ADD.
Fights	.74 (.94)	-.37 (.60)	1.17 (.88)	-.47 (.52)	13.89*	RD, AD < AD/ADD; RD, AD < RD/ADD.

Note: Standard deviations are reported in parentheses; ADD = attention deficit.

*p < .001.

Table 56.

ANOVA Summary: Peer-Reported Social Behaviours of Participants by LD Subtype and Attention Deficit Status (LD Subtype Based on Zambian Distribution Scores)

	Groups					
Dependent Variables	AD/ ADD (n=12)	AD (n=12)	RD/ ADD (n=12)	RD (n=12)	F(3,44)	Significant Post hoc Comparisons: Tukey-HSD Test (p < .05)
Disrupts	1.37	-.59	.75	-.52	18.78**	AD, RD < RD/ADD;
	(.80)	(.19)	(1.28)	(.28)		AD, RD < AD/ADD.
Fights	1.19	-.64	.90	-.55	18.72**	AD, RD < RD/ADD;
	(.92)	(.11)	(1.11)	(.50)		AD, RD < AD/ADD.
Leader	-.57	.50	-.46	-.03	4.14*	AD/ADD, RD/ADD < AD.
	(.22)	(1.25)	(.35)	(1.01)		

Note: Standard deviations are reported in parentheses; ADD = attention deficit.

*p < .05. **p < .001.

Table 57.

Descriptive Statistics for Peer-Reported Social Behaviours of Participants Classified by LD Subtype and Teacher-Rated Aggression (LD Subtype Based on US Norms)

	n		Peer-reported Behaviours					
			cooperates	disrupts	fights	seeks help	leader	shy
		M	-.60	1.39	1.13	.27	-.50	-.38
		SD	.23	.70	.79	1.11	.34	.59
AD/AGG	9	Min	-.96	-.29	-.57	-.79	-.77	-.86
		Max	-.24	2.18	2.28	2.12	.26	1.11
		M	.10	-.61	-.59	-.13	-.19	-.65
AD	9	SD	1.02	.13	.22	1.09	1.04	.66
		Min	-.73	-.79	-.87	-1.01	-.94	-.86
		Max	1.75	-.46	-.26	1.89	1.77	1.33
		M	-.51	.84	1.23	.24	-.59	-.26
RD/AGG	9	SD	.39	1.19	1.21	.98	.32	1.22
		Min	-.81	-.73	-.87	-.79	-.94	-1.11
		Max	.32	2.03	2.74	1.85	.00	2.87
		M	.48	.18	-.15	-.25	-.18	.30
RD	9	SD	1.12	.89	.81	.77	.92	1.09
		Min	-.73	-.87	-.85	-.78	-.78	-1.11
		Max	2.23	1.74	1.42	1.68	1.81	2.58

Note: AD = boys with arithmetic disabilities; RD = boys with reading disabilities; AGG = boys with LD rated as aggressive by their teachers.

Table 58.

Descriptive Statistics for Peer-Reported Social Behaviours of Participants Classified by LD Subtype and Teacher-Rated Aggression (LD Subtype Based on Zambian Distribution Scores)

			Peer-reported Behaviours					
	n		cooperates	disrupts	fights	seeks help	leader	shy
		M	-.56	1.69	1.42	.30	-.64	-.60
		SD	.24	.41	.53	1.09	.21	.22
AD/AGG	9	Min	-.96	1.16	.58	-.79	-.94	-.86
		Max	-.24	2.42	2.28	2.12	-.31	-.29
		M	.37	-.27	-.55	-.49	.44	.79
AD	9	SD	1.18	.70	.14	.48	1.35	1.15
		Min	-.96	-.79	-.74	-1.01	-.70	-.96
		Max	2.42	1.45	-.28	.34	2.72	2.64
		M	-.56	1.44	1.33	.20	-.64	-.51
RD/AGG	9	SD	.34	1.11	.96	.74	.22	.30
		Min	-.81	-.73	-.87	-.79	-.94	-.96
		Max	.32	2.52	2.74	1.52	-.23	.00
		M	.14	-.42	-.09	-.20	.13	-.08
RD	9	SD	1.08	.60	.63	.83	.97	.78
		Min	-.73	-.79	-.69	-1.01	-.78	-.96
		Max	1.62	1.12	.91	1.68	1.87	1.73

Note: AD = boys with arithmetic disabilities; RD = boys with reading disabilities; AGG = boys with LD rated as aggressive by their teachers.

Table 59.

Descriptive Statistics for Peer-Reported Social Behaviours of Participants Classified by LD Subtype and Peer-Reported Aggression (LD Subtype Based on US Norms)

	n		Peer-reported Behaviours			
			cooperates	seeks help	leader	shy
		M	-.43	.38	-.55	-.49
		SD	.48	1.00	.19	.33
AD/AGG	11	Min	-.96	-.79	-.77	-.86
		Max	.73	2.12	-.26	.32
		M	.13	-.49	.27	.21
AD	11	SD	1.08	.70	1.07	.96
		Min	-.96	-1.01	-.94	-.66
		Max	1.97	1.50	2.07	2.39
		M	-.69	.45	-.56	-.60
RD/AGG	11	SD	.72	.85	.27	.33
		Min	-.81	-.34	-.82	-1.11
		Max	-.54	1.85	.00	.00
		M	.74	-.23	.42	.40
RD	11	SD	1.05	.62	.78	1.34
		Min	-.49	-.81	-.70	-1.04
		Max	2.23	1.30	1.36	2.87

Note: AD = boys with arithmetic disabilities; RD = boys with reading disabilities; AGG = boys with LD nominated as aggressive by their peers.

Table 60.

ANOVA Summary: Peer-Reported Social Behaviours of Participants Classified by LD Subtype and Teacher-Rated Aggression (LD Subtype Based on US Norms)

	Groups					
Dependent Variables	AD/ AGG (n=9)	AD (n=9)	RD/ AGG (n=9)	RD (n=9)	F(3,32)	Significant Post hoc Comparisons: Tukey-HSD Test ($p < .05$)
Disrupts	1.39 (.70)	-.61 (.13)	.84 (1.19)	-.02 (.89)	10.33*	AD < RD/AGG, AD < AD/AGG, RD < AD/AGG.
Fights	1.13 (.79)	-.59 (.22)	1.23 (1.21)	-.15 (.81)	10.81*	AD, RD < AD/AGG, AD, RD < RD/AGG.

Note: Standard deviations are reported in parentheses. AGG = teacher-rated aggression; ADD = attention deficit.

*$p < .001$.

Table 61.

ANOVA Summary: Peer-Reported Social Behaviours of Participants Classified by LD Subtype and Teacher-Rated Aggression (LD Subtype Based on Zambian Distribution Scores)

	Groups					
Dependent Variables	AD/ AGG (n=9)	AD (n=9)	RD/ AGG (n=9)	RD (n=9)	F(3,32)	Significant Post hoc Comparisons: Tukey-HSD Test (p < .05)
Disrupts	1.69	-.27	1.44	-.42	19.85**	RD, AD < RD/AGG,
	(.41)	(.70)	(1.11)	(.60)		RD, AD < AD/AGG.
Fights	1.42	-.55	1.33	-.09	22.06**	AD, RD < RD/AGG,
	(.53)	(.14)	(.96)	(.63)		AD, RD < AD/AGG.
Leader	1.61	.44	-.64	.13	3.80*	RD/AGG < AD,
	(.34)	(1.35)	(.22)	(.97)		AD/AGG < AD.

Note: Standard deviations are reported in parentheses. AGG = teacher-rated aggression; ADD = attention deficit.

*p < .05. **p < .001.

Table 62.

ANOVA Summary: Peer-Reported Social Behaviours of Participants Classified by LD Subtype and Peer-Reported Aggression (LD Subtype Based on US Norms)

	Groups					
Dependent Variables	AD/ AGG (n=11)	AD (n=11)	RD/ AGG (n=11)	RD (n=11)	F(3,40)	Significant Post hoc Comparisons: Tukey-HSD Test (p < .05)
Cooperates	-.43	.13	-.69	.74	7.13**	RD/AGG < RD;
	(.48)	(1.08)	(.07)	(1.05)		AD/AGG < RD.
Leader	-.55	.27	-.56	.42	6.51**	RD/AGG < AD, RD;
	(.19)	(1.07)	(.27)	(.78)		AD/AGG < AD, RD.
Shy	-.49	.21	-.60	.40	3.75*	RD/AGG < RD;
	(.33)	(.96)	(.33)	(1.34)		AD/AGG < RD.
Seeks Help	.38	-.49	.45	-.23	3.62*	AD < RD/AGG.
	(1.00)	(.70)	(.85)	(.62)		

Note: Standard deviations are reported in parentheses. AGG = peer-reported aggression; ADD = attention deficit.

*p < .05. **p < .001.

Table 63.

Descriptive Statistics for Peer-Reported Social Behaviours of Participants Classified by LD Subtype, Attention Deficit and Teacher-Rated Aggression (LD Subtype Based on US Norms)

			Peer-reported Behaviours					
	n		cooperates	disrupts	fights	seeks help	leader	shy
		M	-.62	1.34	1.04	.08	-.49	-.36
AD/		SD	.24	.80	.90	1.00	.37	.68
ADD/	7	Min	-.96	-.29	-.57	-.79	-.77	-.86
AGG		Max	-.24	2.18	2.28	2.12	.26	1.11
		M	.72	-.37	-.48	-.62	.86	-.21
AD	7	SD	.84	.25	.25	.32	1.07	.81
		Min	-.66	-.56	-.69	-1.01	-.78	-.99
		Max	1.60	.00	.00	.00	2.07	1.04
		M	-.56	1.25	1.64	.69	-.54	-.63
RD/		SD	.39	.98	.38	.86	.33	.28
ADD/	7	Min	-.81	.00	1.14	-.34	-.94	-1.11
AGG		Max	.32	2.52	2.31	1.85	.00	-.32
		M	.06	-.62	-.62	.66	.99	.90
RD	7	SD	1.01	.28	.20	1.40	1.22	1.34
		Min	-.73	-.87	-.85	-1.01	-.82	-1.04
		Max	1.53	-.23	-.28	2.70	2.28	2.77

Note: AD = boys with arithmetic disabilities; RD = boys with reading disabilities; AGG = boys with LD rated as aggressive by their teachers; ADD = attention deficit.

Table 64.

Descriptive Statistics for Peer-Reported Social Behaviours of Participants Classified by LD Subtype, Attention Deficit and Teacher-Rated Aggression (LD Subtype Based on Zambian distribution scores)

			Peer-reported Behaviours					
	n		cooperates	disrupts	fights	seeks help	leader	shy
		M	-.56	1.73	1.41	.44	-.66	-.64
AD/		SD	.26	.46	.61	.98	.20	.23
ADD/	7	Min	-.96	1.16	.58	-.79	-.94	-.86
AGG		Max	-.24	2.42	2.28	2.12	-.31	-.29
		M	.56	-.57	-.63	.74	.19	.75
AD	7	SD	1.46	.16	.22	1.24	1.15	.86
		Min	-.81	-.79	-.87	-.91	-.94	-.86
		Max	2.43	-.28	-.23	2.65	1.54	1.06
		M	-.62	1.32	1.37	.51	-.45	-.90
RD/		SD	.28	1.24	.93	1.03	.29	1.34
ADD/	7	Min	-.81	-.73	-.58	-.79	-.82	-1.11
AGG		Max	.00	2.52	2.31	1.85	.00	2.87
		M	.49	-.50	-.48	.59	.21	-.17
RD	7	SD	1.38	.38	.61	.95	1.06	.76
		Min	-.73	-.87	-.85	-.91	-.82	-1.11
		Max	2.23	.24	.85	1.82	1.87	.96

Note: AD = boys with arithmetic disabilities; RD = boys with reading disabilities; AGG = boys with LD rated as aggressive by their teachers; ADD = attention deficit.

Table 65.

Descriptive Statistics for Peer-Reported Social Behaviours of Participants Classified by LD Subtype, Attention Deficit and Peer-Reported Aggression (LD Subtype Based on US Norms)

	n		Peer-reported Behaviours			
			cooperates	seeks help	leader	shy
		M	-.41	.20	-.55	-.49
AD/ADD/		SD	.52	.91	.18	.37
AGG	9	Min	-.96	-.79	-.77	-.86
		Max	.73	2.12	.26	.32
		M	.41	-.56	.53	-.39
AD	9	SD	1.28	.44	1.19	1.02
		Min	-.96	-1.01	-.78	-1.04
		Max	2.42	.34	2.72	2.24
		M	-.53	.26	-.66	-.62
RD/ADD/		SD	.36	.85	.28	.35
AGG	9	Min	-.75	-.78	-.94	-1.11
		Max	.32	1.85	.00	.00
		M	.52	.27	.24	.45
RD	9	SD	1.27	1.08	.96	1.30
		Min	-.73	-.81	-.77	-.99
		Max	2.23	2.34	1.81	2.58

Note: AD = boys with arithmetic disabilities; RD = boys with reading disabilities; AGG = boys with LD nominated as aggressive by their peers; ADD = attention deficit.

Table 66.

Descriptive Statistics for Peer-Reported Social Behaviours of Participants Classified by LD Subtype, Attention Deficit and Peer-Reported Aggression (LD Subtype Based on Based on Zambian Distribution Scores)

	n		Peer-reported Behaviours			
			cooperates	seeks help	leader	shy
		M	-.43	.25	-.56	-.51
AD/ADD/		SD	.48	.94	.22	.35
AGG	11	Min	-.96	-.79	-.94	-.86
		Max	.73	2.12	-.25	.34
		M	-.11	.46	.15	-.34
AD	11	SD	.90	1.49	1.08	.49
		Min	-.96	-1.01	-.94	-.99
		Max	1.60	2.65	2.07	.37
		M	-.56	.20	-.58	-.55
RD/ADD/		SD	.33	.82	.28	.28
AGG	11	Min	-.81	-.78	-.94	-.96
		Max	.32	1.85	.00	.00
		M	.60	-.39	.69	.18
RD	11	SD	1.07	.77	1.31	1.03
		Min	-.73	-.91	-.82	-1.11
		Max	1.70	1.82	2.50	2.58

Note: AD = boys with arithmetic disabilities; RD = boys with reading disabilities; AGG = boys with LD nominated as aggressive by their peers; ADD = attention deficit.

Table 67.

ANOVA Summary: Peer-Reported Social Behaviours of Participants Classified by LD Subtype, Attention Deficit and Teacher-Rated Aggression (LD Subtype Based on US Norms)

	Groups					
Dependent Variables	AD/ ADD/ AGG (n=7)	AD (n=7)	RD/ ADD/ AGG (n=7)	RD (n=7)	F(3,24)	Significant Post hoc Comparisons: Tukey-HSD Test ($p < .05$)
Cooperates	-.62 (.24)	.72 (.84)	-.56 (.39)	.06 (1.01)	5.73**	AD/ADD/AGG < RD; RD/ADD/AGG < RD.
Disrupts	1.34 (.80)	-.37 (.25)	1.25 (.98)	-.62 (.28)	17.46***	RD < RD/ADD/AGG; RD < AD/ADD/AGG; AD < RD/ADD/AGG; AD < RD/ADD/AGG.
Fights	1.04 (.90)	-.48 (.25)	1.64 (.38)	-.62 (.20)	33.28***	RD < AD/ADD/AGG; AD < RD/ADD/AGG; RD < AD/ADD/AGG; AD < RD/ADD/AGG.
Leader	-.49 (.37)	.86 (1.07)	-.54 (.33)	.10 (1.22)	4.15*	RD/ADD/AGG < AD; AD/ADD/AGG < AD.
Shy	-.36 (.68)	-.21 (.81)	-.63 (.28)	.90 (1.34)	4.22*	RD/ADD/AGG < AD.

Note: Standard deviations are reported in parentheses. AGG = teacher-rated aggression; ADD = attention deficit.

*$p < .05$. **$p < .01$. ***$p < .001$.

Table 68.

ANOVA Summary: Peer-Reported Social Behaviours of Participants Classified by LD Subtype, Attention Deficit and Teacher-Rated Aggression (LD Subtype Based on Zambian Distribution Scores)

	Groups					
Dependent Variables	AD/ ADD/ AGG (n=7)	AD (n=7)	RD/ ADD/ AGG (n=7)	RD (n=7)	F(3,24)	Significant Post hoc Comparisons: Tukey-HSD Test (p < .05)
Disrupts	1.73 (.46)	-.57 (.16)	1.32 (1.24)	-.50 (.38)	21.09*	AD < RD/ADD/AGG; AD < AD/ADD/AGG; RD < RD/ADD/AGG; RD < AD/ADD/AGG.
Fights	1.41 (.61)	-.63 (.22)	1.37 (.93)	-.48 (.61)	21.44*	AD < RD/ADD/AGG; AD < AD/ADD/AGG; RD < RD/ADD/AGG; RD < AD/ADD/AGG.

Note: Standard deviations are reported in parentheses. AGG = teacher-rated aggression; ADD = attention deficit.

*p < .001.

Table 69.

ANOVA Summary: Peer-Reported Social Behaviours of Participants Classified by LD Subtype, Attention Deficit and Peer-Reported Aggression (LD Subtype Based on US Norms)

	Groups					
Dependent Variables	AD/ ADD/ AGG (n=9)	AD (n=9)	RD/ ADD/ AGG (n=9)	RD (n=9)	F(3,32)	Significant Post hoc Comparisons: Tukey-HSD Test (p < .05)
Leader	-.55	.53	-.66	.24	5.05*	RD/ADD/AGG < AD;
	(.18)	(1.19)	(.28)	(.96)		AD/ADD/AGG < AD.

Note: Standard deviations are reported in parentheses. AGG = peer-reported aggression; ADD = attention deficit.

*p < .01.

Table 70.

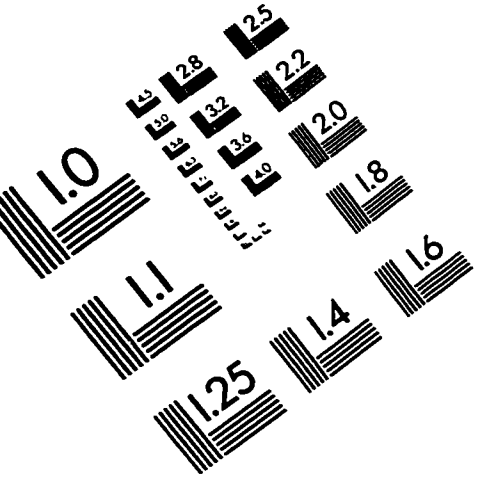
ANOVA Summary: Peer-Reported Social Behaviours of Participants Classified by LD Subtype, Attention Deficit and Peer-Reported Aggression (LD Subtype Based on Zambian Distribution Scores)

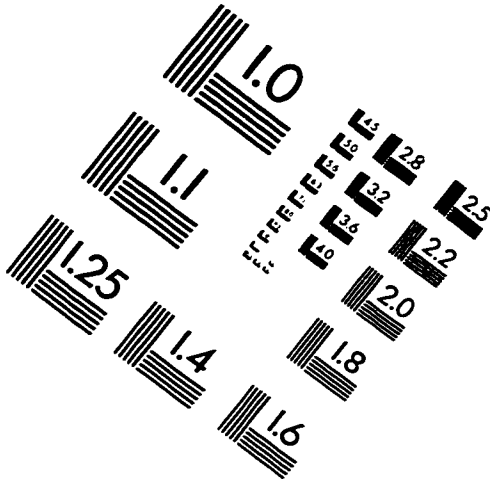
	Groups					
Dependent Variables	AD/ ADD/ AGG (n=11)	AD (n=11)	RD/ ADD/ AGG (n=11)	RD (n=11)	F(3,40)	Significant Post hoc Comparisons: Tukey-HSD Test (p < .05)
Cooperates	-.43	-.11	-.56	.60	5.22**	RD/ADD/AGG < RD;
	(.48)	(.90)	(.33)	(1.07)		AD/ADD/AGG < RD.
Leader	-.56	.15	-.58	.69	5.50**	RD/ADD/AGG < RD;
	(.22)	(1.08)	(.28)	(1.31)		AD/ADD/AGG < RD.
Shy	-.51	-.34	-.55	.18	3.28*	RD/ADD/AGG < RD.
	(.35)	(.49)	(.28)	(1.03)		

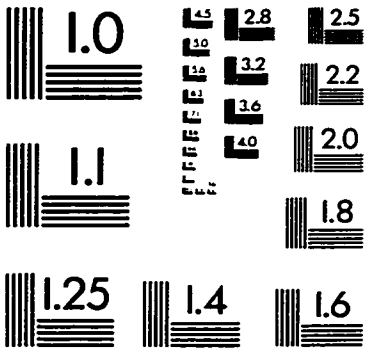
Note: Standard deviations are reported in parentheses. AGG = peer-reported aggression; ADD = attention deficit.

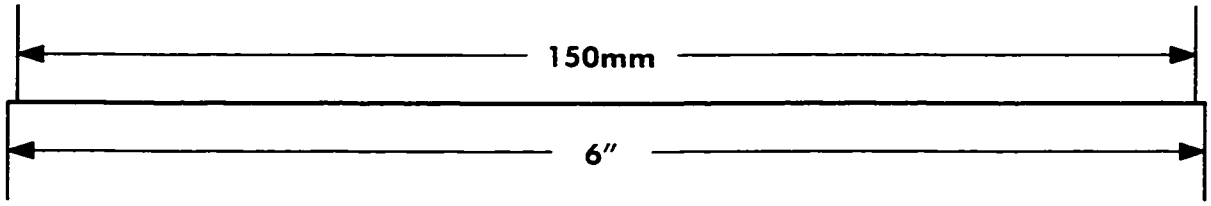
*p < .05. **p < .01.

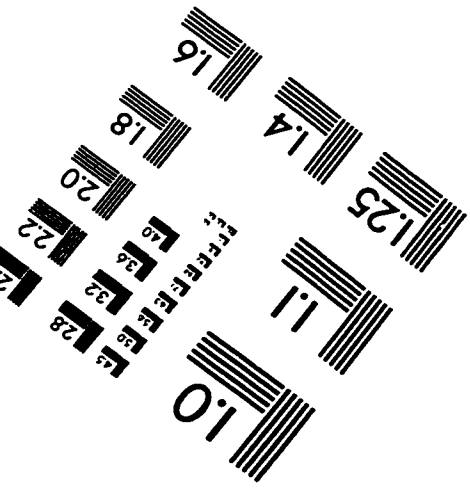
IMAGE EVALUATION
TEST TARGET (QA-3)

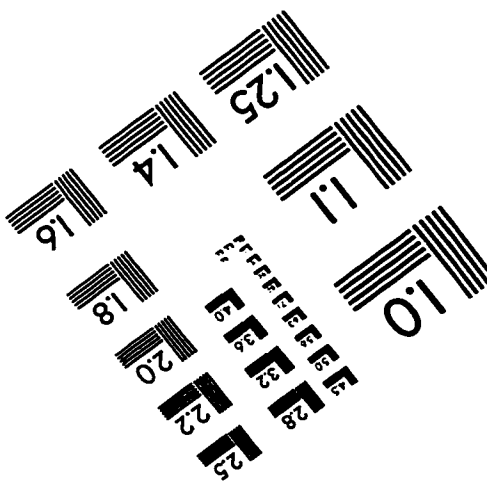












APPLIED IMAGE, Inc
1653 East Main Street
Rochester, NY 14609 USA
Phone: 716/482-0300
Fax: 716/288-5989