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PSYCHOSOCIAL DIMENSIONS OF LEARNING DISABILITIES: EXTERNAL VALIDATION OF (1) STATISTICALLY-DERIVED PSYCHOSOCIAL SUBTYPES AND THEIR RELATIONS TO (2) COGNITIVE AND ACADEMIC FUNCTIONING

by

Katherine D. Tsatsanis

B.A., University of Toronto, 1991

A Thesis
Submitted to the Faculty of Graduate Studies through the Department of Psychology in Partial Fulfillment of the Requirements for the Degree of Master of Arts at the University of Windsor

Windsor, Ontario, Canada
1993
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ABSTRACT

PSYCHOSOCIAL DIMENSIONS OF LEARNING DISABILITIES:
EXTERNAL VALIDATION OF (1) STATISTICALLY-DERIVED
PSYCHOSOCIAL SUBTYPES AND THEIR RELATIONS TO
(2) COGNITIVE AND ACADEMIC FUNCTIONING

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The present study aimed to assess the following: (a) the relationship between age and psychosocial functioning; (b) the relations between psychosocial functioning and cognitive and academic achievement; and (c) the external validity of statistically-derived psychosocial subtypes, employing a behavioral measure distinct from the one used to establish the typology. The subjects in this study consisted of 152 learning disabled children between the ages of 7 and 13 years (inclusive). Of these subjects, 147 were assigned to one of seven psychosocial subtypes using a profile matching algorithm developed by Fuerst (1991). Comparisons between these subtypes yielded the following results: Overall, learning disabled subjects were not found to display increased psychopathology with increasing age; that is, patterns of psychosocial functioning remained stable over time. Results of comparisons on cognitive and academic achievement measures showed a relation between performance on these measures and both severity and type of psychopathology. In particular, subjects who displayed more
severe psychopathology were found to demonstrate better verbal skills on average. Finally, the seven psychosocial subtypes could be distinguished on the basis of patterns of performance on items of the Behaviour Problem Checklist. The results of this study support previous findings and further reinforce the need to consider subtypes of socioemotional and behavioral functioning displayed by learning disabled children.
ACKNOWLEDGEMENTS

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To my family, Peter, Paula, and Linda, and Jay: I thank you for your love, understanding, support, and concern. You are in every way the foundation upon which my achievements are based.
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CHAPTER I
INTRODUCTION

The research literature on children with learning disabilities has typically centred on the study of their academic and cognitive functioning. In recent years, however, a large number of studies have emerged investigating the social, emotional, and behavioral functioning of learning disabled children. Evidence from this literature suggests that children with learning disabilities, in general, display more behavioral problems, less social competence, and greater susceptibility to socioemotional difficulties, compared to their (nondisabled) peers. While there is fairly consistent evidence for an association between learning disabilities and socioemotional disturbance, the issue that many researchers seem to be unclear about is the direction of this relationship.

Rourke (1988) has presented the following three causal hypotheses accounting for the association between learning disabilities in children and socioemotional disturbance: (a) Socioemotional disturbance causes learning disabilities, (b) Learning disabilities cause socioemotional disturbance, and (c) Specific patterns of central processing abilities and deficits cause specific subtypes of learning disabilities and specific forms of socioemotional disturbance. A consideration of the research literature on psychosocial
functioning and learning disabilities is presented in the context of these three causal possibilities.

HYPOTHESIS 1: SOCIOEMOTIONAL DISTURBANCE CAUSES LEARNING DISABILITIES

For many children, a primary disturbance in socioemotional functioning may account for the learning difficulties they display in school and other aspects of their life. In a sample of 153 clinic-referred children who were diagnosed as depressed, 71% of the children were found to be achieving at a level one year or more below expectation in one or more academic areas (Colbert, Newman, Ney, & Young, 1982). Clearly, it is not unreasonable to consider that severe behavioral disturbances can affect academic performance and lead to learning difficulties. However, the majority of support for this assertion lies in clinical accounts rather than systematic investigations (Livingston, 1985; Rourke, 1988). Moreover, a diagnosis of learning disability, by definition, excludes individuals who demonstrate a primary socioemotional disturbance. The question thus arises: What is it that fundamentally distinguishes the emotionally/behaviourally disturbed child who is also experiencing learning difficulties from the learning disabled child who exhibits emotional/behavioral disturbance? In part, the answer to this question may lie in a consideration of Hypothesis 3 and the research described therein. First, however, a discussion of the research on
psychosocial functioning and learning disabilities begins with a consideration of Hypothesis 2.

HYPOTHESIS 2: LEARNING DISABILITIES CAUSE SOCIOEMOTIONAL DISTURBANCE

Socioemotional functioning and behavioral difficulties are commonly explained as secondary manifestations of a primary learning disability. That is, most researchers argue that a learning disability is the basis for obtained differences between learning disabled and nondisabled children on psychosocial measures. Prior to a consideration of this expansive literature, two accounts that illustrate the general Hypothesis 2 argument are presented. The first account represents an example of an argument conceptualized within a developmental framework (Pickar, 1986) and the second (Cohen, 1986) typifies the majority view in its logic and appeal.

Pickar (1986) frames the socioemotional difficulties experienced by learning disabled children within Erikson's (1968) psychosocial theory of development. He suggests that a learning disability leads to impaired resolution of Erikson's fourth stage of development, industry versus inferiority. Indeed, Pickar and Tori (1986) have found support for this view. Learning disabled children in this study obtained significantly lower scores on the industry scale of the Erikson Psychosocial Stage Inventory (EPSI; Rosenthal et al., 1981) compared to their nondisabled peers.
Further, Pickar notes that Erikson proposes an intimate association between self-esteem and the successful resolution of each psychosocial stage. Failure to resolve the fourth stage of development is also seen to affect the positive outcome of the successive stage, identity versus role confusion. A learning disability is thus proposed to engender a poor global sense of competence, low self-esteem, and difficulty developing a sense of identity.

Cohen (1986) similarly conceptualizes learning disabilities as organizers of development. He suggests that a learning disability acts as a prime determinant of the way in which the learning disabled child's sense of self and identity unfold. Specifically, it is proposed that an association exists between a learning disability and experiences of frustration and failure, negative attributions, increased anxiety, lowered self-esteem, and less successful social interaction, such that each outcome arises as a consequence of the previous response. Moreover, because these events are interwoven, they are thought to produce a self-perpetuating cycle of failure that leads the learning disabled child on a spiral of cognitive and social decline.

In the following section, a consideration of the literature on the behavioral and socioemotional functioning of learning disabled children is presented. The discussion is divided into the following sections: behaviour and
personality, peer status, self-concept, attribution, and social competence. Proposed relationships between learning disabilities and specific aspects of socioemotional functioning are discussed within the context of each research section. It should also be noted that general methodological considerations will be discussed after a presentation of the research literature.

**Behaviour and Personality**

Numerous studies have examined the behavioral and personality characteristics of learning disabled children. Although samples, methodologies, and measures have varied widely, the findings have been strikingly consistent.

The Behavior Problem Checklist (BPC; Quay & Peterson, 1975) represents one of the most extensively used instruments in this literature. In an early study, McCarthy and Paraskevopoulos (1969) compared learning disabled children to emotionally disturbed and normal students on this checklist. They found that emotionally disturbed children typically received higher scores on the BPC than did children with learning disabilities who, in turn, were rated higher than normal children. The learning disabled children were found to display both significant conduct behaviour and immaturity-inadequacy problems.

Subsequent studies using the BPC have also shown that learning disabled children display significantly more behaviour problems than their nondisabled peers (Cullinan,
Epstein, & Dembinski, 1979; Cullinan, Schultz, Epstein, & Luebke, 1984; Eliason & Richman, 1988; Epstein & Cullinan, 1984; Epstein, Cullinan, & Bursuck, 1985; Epstein, Cullinan, & Nieminen, 1984; Griege & Richards, 1976; Hoyle & Serafica, 1988; Stone & LaGreca, 1990; Touliatos & Lindholm, 1980). In the majority of these studies, the frequency of behaviour problems displayed by the learning disabled children was not found to increase with age. No significant difference between learning disabled and nondisabled children on the BPC was reported in only one study (Richmond & Blagg, 1985).

The BPC dimension that most consistently characterized children with learning disabilities was Personality Problem. The items comprising this scale generally consist of anxious and withdrawn behaviour, such as nervousness, fearfulness, and lack of interpersonal competence. In contrast, learning disabled children were rarely reported to score higher than their peers on the Socialized Delinquency scale. Thus, learning disabled children, on average, appear to be no more likely to display delinquent or rule-breaking behaviour (e.g., stealing, using drugs) than their peers. This latter finding also receives support from a study conducted by Pickar and Tori (1986) in which learning disabled adolescents were not found to report more delinquent behaviour than nondisabled adolescents.
On other teacher-rated questionnaires, children with learning disabilities have been reported to display significantly more attention problems, distractibility, anxiety, social withdrawal, dependence, and lower frustration tolerance compared to their normally-achieving classmates (Cardell & Parmar, 1988; Margalit, 1989; Toro, Weissberg, Guare, & Liebenstein, 1990). The results of a meta-analysis of classroom behaviour studies showed that, in both observational and teacher-rating studies, learning disabled children were consistently found to display significantly less appropriate behaviour in the classroom compared to their peers (Bender & Smith, 1990). In particular, they were reported to demonstrate more off-task, distractible, shy/withdrawn, and conduct disordered behaviour.

The results of studies using parent-rated behaviour checklists and questionnaires depict a similar presentation. In studies employing the Child Behavior Checklist (CBCL; Achenbach & Edelbrock, 1983), the mean profiles of learning disabled children were found to display moderate elevations (1-2 SD) on a broad range of scales (McConaughy & Ritter, 1986; Michaels & Lewandowski, 1990; Ritter, 1989; Schachter, Pless, & Bruck, 1991). The learning disabled children were reported to demonstrate behaviour problems of both an externalizing (e.g., hyperactivity) and an internalizing (e.g., anxiety, social withdrawal, depression) nature.
On the Personality Inventory for Children (PIC; Wirt, Lachar, Klinedinst, & Seat, 1977, 1984), learning disabled children have been reported to display mean profiles suggestive of only relatively mild behavioral problems (Breen & Barkley, 1984; Forbes, 1987; Goh, Cody, & Dollinger, 1984; Harrington & Marks, 1985). Although the PIC profiles of the learning disabled children consistently demonstrated marked elevations on the Adjustment, Achievement, Intellectual Screening, and Development scales, these findings are neither surprising nor particularly informative. The parents of these children are expressing concern about difficulties in school achievement and intellectual functioning, precisely the area of difficulty that one would expect given a diagnosis of learning disability. Breen and Barkley (1984), however, also reported that 20% of their sample of learning disabled children showed significant elevations on the Anxiety, Psychosis, Hyperactivity, and Social Skills scales of the PIC.

In addition, many learning disabled children have been identified as depressed. Stevenson and Romney (1984) and Goldstein, Paul, and Sanfillipo-Cohn (1985) found that 14% and 26%, respectively, of the learning disabled children in their sample met the cut-off score for severe depression on the Children’s Depression Inventory (CDI; Kovacs & Beck, 1977).
In sum, children with learning disabilities are reported to display a wider range and greater number of behaviour problems, on average, relative to their nondisabled peers. It is important to note, however, that in the majority of these studies, the children displayed only mild behaviour problems; that is, scores were rarely more than 1-2 standard deviations from the mean. Moreover, many learning disabled children were observed to display no significant behavioral problems.

**Self-Concept/Self-Esteem**

Children with learning disabilities are commonly assumed to have poorer self-concepts compared to their normally-achieving peers. Studies examining the global self-concept scores of children with learning disabilities have typically supported this view. That is, learning disabled children have been found to display significantly lower ratings on measures of global self-concept relative to their nondisabled peers (Bear, Clever, & Proctor, 1991; Bruininks, 1978b; Cooley & Ayres, 1988; Goldman & Hardin, 1982; Hall & Richmond, 1985; Margalit & Zak, 1984). However, these findings are not pervasive. Two studies have reported no significant differences between adolescents with learning disabilities and their normally achieving peers (Pickar & Tori, 1986; Silverman & Zigmond, 1983).

Furthermore, it is instructive to consider the nature of the self-concept measures and item composition of the
scales used in these investigations. Cooley and Ayres (1988) found that differences between learning disabled and nondisabled children in global self-concept were largely due to an academic component in the measure. When this academic component was removed, the differences between the two groups of children in global self-concept score disappeared. Indeed, in the majority of studies, learning disabled children are reported to feel significantly less competent in cognitive and academic domains compared to their peers (Bear et al., 1991; Cooley & Ayres, 1988; McConaughy & Ritter, 1986; Pickar & Tori, 1986; Priel & Leshem, 1990; Ritter. 1989).

Durrant, Cunningham, and Voelker (1990) have examined whether self-concept is related to variables other than achievement. They studied three groups of learning disabled children, Normal, Externalized, and Mixed (Internalizing and Externalizing symptomatology), who were distinguished on the basis of their CBCL scores. It was found that self-concept ratings differed significantly among the groups. In particular, children who exhibited a behaviour disorder obtained significantly lower mean scores on cognitive competence, social competence, and general self-esteem scales compared to non-behaviour disordered children. Durrant et al. (1990) conclude that the relationship between learning disabilities and self-concept likely involves behavioral variables and thus more than just achievement.
In sum, the findings on self-concept are equivocal. Those studies reporting lower global self-concept scores among learning disabled children are also confounded by achievement variables. That is, findings of global self-concept differences may be largely due to the inclusion of school and cognitive competence items in these measures. It is also clear, however, that many other variables (such as behaviour) may account for the proposed association between learning disabilities and low self-concept.

**Attribution**

In this literature, the association between learning disabilities and patterns of success and failure attributions is examined. It is suggested that learning disabled children, having experienced repeated failure, may believe that they are unable to influence or control what happens to them and, in turn, experience lower expectations of success and decreased self-esteem. In addition, learning disabled children who attribute their failures to either stable (e.g., ability) or uncontrollable causes (e.g., chance versus effort) are expected to be less persistent on tasks and thus more likely to experience failure. The research on the attributions of learning disabled children offers at least some support for these predictions.

Kistner, Osborne, and LeVerrier (1988) have reported that learning disabled children's attributions are predictive of their school progress. The tendency to
attribute failures to insufficient effort was associated with better academic progress and more favourable teacher ratings of classroom behaviour. Attributions of insufficient ability were negatively correlated with academic progress and teachers viewed these students as overly dependent and less adept. In addition, Cooley and Ayres (1988) have found that high external attributions for success and high ability (internal, stable) attributions for failure were significantly related to lower self-concept scores, particularly with respect to academic competence. In a similar vein, Margalit and Zak (1984) reported that lower self-concept scores among learning disabled children were associated with increased levels of "pawing" anxiety and inadequacy; that is, related to feelings that events are beyond their control. Finally, learning disabled children have been reported to demonstrate less persistent behaviour than their normally-achieving peers (Palmer, Drummond, Tollison, & Zinkgraf, 1982).

Although these findings are notable, they do not elucidate the nature of the learning disabled child's attributions; that is, the extent to which internal and external attributions are actually made. Several other investigators, however, have examined the pattern of learning disabled children's attributions.

Mindingall, Libb, and Welch (1980) found that children with learning disabilities were external in their locus of
control; outcomes were attributed to luck and chance more often than personal control. More comprehensive investigations have, in turn, revealed a more complex picture of learning disabled children’s attributions. Jacobsen, Lowery, and DuCette (1986) have found that learning disabled children use external attributions (task difficulty and luck) to explain success more than do their nondisabled peers and externalize success more than failure. Further, learning disabled children used ability to explain success to a lesser extent than did their peers but more often used lack of ability to explain failure. Children with learning disabilities were not found to be deficient in their use of effort to explain outcomes. They used effort most often to explain both their successes and failures and tended to attribute outcomes to effort more than did their peers. It is also interesting to note that the learning disabled children chose significantly more causes to items than did their peers. In view of their findings, Jacobsen et al. (1986) proposed that learning disabled children are less certain about why they succeed and fail which may, in turn, reflect more doubts about their ability.

A limitation of the study conducted by Jacobsen et al. (1986) is that subjects were asked to choose attribution statements to hypothetical situations. However, Palmer et al. (1982), using an actual task situation, have reported similar patterns of attributions in their learning disabled
subjects. Palmer et al. (1982) found that learning disabled and nondisabled children equally used ability attributions in the success condition and judged effort as more important in the success versus failure condition. However, learning disabled children judged ability to be a more important determinant of failure than did their peers.

It has also been found that learning disabled children, like their nondisabled peers, exhibit increasing emphasis on effort as a determinant of their achievement as they grow older (Kistner et al., 1988). Further, Jacobsen et al. (1986) reported that learning disabled children offered more ability and effort attributions as their perceived success increased. These results are interpreted to suggest that children with learning disabilities do not enter a self-perpetuating cycle of failure.

Only one study (Sobol, Earn, Bennett, & Humphries, 1983) has specifically examined the attributions of learning disabled children in social situations. Sobol et al. (1983) found that learning disabled children commonly used luck to explain both successful and unsuccessful outcomes of social situations in which they initiated an interaction. In contrast, non-learning disabled children considered personality variables and personality interaction to account for outcome. The use of luck or chance to explain the outcome of a social interaction suggests a less mature way of viewing and reacting to social situations. Thus, this
attributional style in learning disabled children may be related to a more fundamental problem in appreciating the subtleties and complexity of social interaction.

In sum, children with learning disabilities (and normally-achieving children) who attribute their failures to internal, stable causes and their successes to external causes are more likely to demonstrate poorer academic progress and lower self-esteem. Moreover, the studies reviewed above indicate that learning disabled children tend to externalize success and internalize failure to a greater extent than do their peers. Learning disabled children, however, are not reported to be deficient in their use of effort to explain outcome and tend to use it more than either ability or luck. In addition, learning disabled children appear to choose more attributions to account for outcome than do their peers. It is conceivable then that children with learning disabilities are less certain about their ability and, in turn, about why they fail or succeed.

Peer Status

Considerable research has been devoted to examining the social status of learning disabled children. Their level of peer acceptance and status is thought to be indicative of the quality of their interpersonal or social relations.

Although researchers have used varied research designs, samples, and measures, findings have been extremely consistent. Learning disabled children are significantly
less popular and receive lower ratings of peer acceptance compared to their nondisabled classmates (Bruininks, 1978a, 1978b; Hoyle & Serafica, 1988; LaGreca & Stone, 1990; Siperstein, Bopp, & Bak, 1978; Siperstein & Goding, 1983; Stone & LaGreca, 1990; Vaughn, Hogan, Kouzekanani, & Shapiro, 1990; Wiener, Harris, & Shirer, 1990). Moreover, children with learning disabilities are more frequently rejected and neglected by their peers and rarely occupy a "star" status position (LaGreca et al., 1990; Siperstein et al., 1978; Siperstein et al., 1983; Stone et al., 1990; Vaughn et al., 1990; Wiener et al., 1990). It is important to note that these findings are suggestive of the mean scores of learning disabled children. Many children with learning disabilities obtain average peer status and do not demonstrate significant peer relations problems.

Several variables have been proposed to account for the low peer status, on average, of learning disabled children. First, children with learning disabilities may be less likely to possess valued attributes that are associated with peer popularity. Siperstein and his colleagues (Siperstein, Bop, & Bak, 1978; Siperstein & Goding, 1983) have found that nominations for the best looking, most athletic, and smartest individual are significantly correlated with social position. Moreover, learning disabled children who received nominations in one of these categories were more liked and socially accepted than those children who did not receive
nominations. In addition, Wiener et al. (1990) found that learning disabled children were less likely to be nominated as cooperative, humorous, or leaders; qualities that were associated with higher peer status. These findings suggest that social position is enhanced by qualities such as athleticism, attractiveness, leadership, and humorousness.

Second, it is suggested that the status of learning disabled children may be affected by the differential behaviour of teachers toward these children. In the study conducted by Siperstein and Goding (1983), observations of teacher behaviour toward learning disabled and nondisabled children showed that teachers initiated more interactions, responded more often with corrective behaviour, and used more negative verbal and nonverbal behaviours with learning disabled students compared to their classmates. At the very least, increased attention from the teacher may serve to further set apart the learning disabled child from his/her classmates.

Finally, inferior social competence is frequently proposed to account for the low peer acceptance and status of learning disabled children. The results of several studies have shown that learning disabled children inaccurately perceive their social relations. Hoyle and Serafica (1988) found that learning disabled compared to nondisabled children were less likely to express liking for children who had nominated them. This finding was
interpreted to suggest that children with learning disabilities may have difficulty perceiving that they are liked. In turn, a lack of reciprocation of liking may contribute to their lower peer acceptance. In addition, learning disabled children’s self-ratings on social acceptance measures were found to be significantly higher than their actual status (Bruininks, 1978a, 1978b; Priel & Leshem, 1990; Vaughn et al., 1990). This discrepancy is proposed to reflect a lack of social perceptiveness. However, it would also be interesting to examine whether the learning disabled child simply selects the same individuals that he/she likes as those children that like him/her. In this event, the discrepancy findings may also be suggestive of deficient social-cognitive (reasoning) ability. Finally, Stiliadis and Wiener (1989) have found that social perception and peer acceptance are positively correlated. Although the correlation was significant, the size of the effect was small, suggesting that other variables are also of importance. The issue of social competence and learning disabilities will be discussed further in the following section.

In sum, although learning disabled children, on average, are found to be less popular and less liked than their classmates, the weight of these findings is limited. In the first instance, the majority of these studies have employed peer rating and nomination techniques to assess
peer status. Clearly, these methods offer only a very limited depiction of social relations among school children. Observational studies, which could permit an in vivo analysis of children’s relationships in the classroom and the context of those interactions, are noticeably absent in the literature. Moreover, few attempts have been made to examine the extended social networks of learning disabled children; that is, few studies have examined peer status and acceptance beyond the school domain. This is a significant restriction since there are many school factors (e.g., low academic achievement, teacher variables, removal from class for remedial instruction) that might adversely affect the learning disabled child’s social relations. Furthermore, there have been no systematic efforts to determine what qualities or attributes are associated with peer acceptance and status. As Siperstein and Goding (1983) note, the pool of valued traits among children is both large and idiosyncratic. Finally, the learning disability literature largely focuses on the negative outcome of a learning disability; that is, the failures, deficits, and problems. Yet, it would also be informative to examine learning disabled children’s successes and the relationship between success in some endeavour, self-esteem, and peer status. In other words, there is a need to consider the strengths of learning disabled children and ways to accentuate those strengths rather than just remediate their disabilities.
Social Competence

On global social competence measures, learning disabled children are consistently rated significantly lower than their normally-achieving peers (McConaughy & Ritter, 1986; Merrell, 1991; Michaels & Lewandowski, 1990; Ritter, 1989; Siperstein & Goding, 1983; Stiliadis & Wiener, 1989). These results suggest that both teachers and parents perceive learning disabled children to display inadequate social behaviour; to demonstrate less sensitivity toward others, poorer interaction skills, less willingness to show compromise, and to misinterpret facial expressions and miss nonverbal cues.

Clearly, the development of effective social skills is dependent upon a multitude of variables. At a basic level, however, the skills and abilities required for competent social interaction may be classified into 3 groups: (a) perceptual skills; (b) cognitive abilities, such as the ability to understand/appreciate the motivation for an individual’s action; and (c) motor and language skills, by which social behaviour is externally manifested (Ozols & Rourke, 1985). In the following discussion of the literature on learning disabilities and social competence, aspects of these factors are considered.

Perceptual skills that are integral to social competence include the ability to monitor, evaluate, and project nonverbal communications such as facial expression,
gaze direction, body movement, and prosody (Ozols & Rourke, 1985). In turn, this appreciation of nonverbal cues permits an evaluation of the affective state of others as well as the communication of one's own state. There is considerable evidence to suggest that learning disabled children compared to their nondisabled peers are less accurate at perceiving the nonverbal aspects of interpersonal communication.

Holder and Kirkpatrick (1991) found that learning disabled children were less proficient at interpreting emotions from facial expression compared to their peers. In particular, the learning disabled children were significantly less accurate at interpreting the emotions of surprise and disgust; later-developing emotions that are perhaps more subtle, complex, and ambiguous. With one exception (Stone & LaGreca, 1984), learning disabled children have also been found to be more inaccurate at decoding nonverbal cues and interpreting social situations on the basis of nonverbal information alone (Axelrod, 1982; Hall & Richmond, 1985; Jackson, Enright, & Murdock, 1987; Stiliadis & Wiener, 1989).

In these studies, no distinction was made between subtypes of learning disabled children. However, the results of the following two studies (Loveland, Fletcher, & Bailey, 1990; Ozols & Rourke, 1985) underscore the importance of considering the heterogeneity of the learning disabled population. Ozols and Rourke (1985) examined skills related
to social competence in two groups of learning disabled children: "language disorder" and "spatial disorder". Children in the language disorder group were found to perform more poorly on measures of social perception requiring verbal labelling and better on tasks requiring nonverbal responses. The opposite pattern of results was demonstrated by the spatial disorder group. In the study conducted by Loveland et al. (1990), arithmetic disabled compared to reading disabled children were found to have more difficulty understanding and enacting the nonverbal events and aspects of the tasks. In addition, arithmetic disabled children tended to make more mistakes interpreting affect and motive. The results of these studies suggest that different groups of learning disabled children are likely to display distinct perceptual deficits.

In addition to perceptual ability, cognitive abilities are thought to contribute to overall social competence. Several studies have examined the level of understanding, strategies, and goals of learning disabled children in social situations. Toro et al. (1990) have found that children with learning disabilities display deficient problem-solving skills compared to their nondisabled peers. Specifically, the learning disabled children were less able to generate alternative solutions (i.e., novel, goal-directed, protagonist actions) in response to a specified social problem situation.
It also appears that learning disabled children experience particular difficulty resolving conflict situations and maintaining interpersonal relationships. Carlson (1987) has found that learning disabled children differ in the social acceptability of their strategies, ability to generate alternative solutions, and orientation of their goals in the resolution of conflict and friendship maintenance situations. That is, in these situations, the children with learning disabilities were less likely to seek compromise and more likely to accommodate, avoid the situation, or appeal to rules and rights. However, in social initiation situations, the learning disabled children did not differ significantly from their peers in terms of how they viewed or handled the situation. Moreover, when the learning disabled children were provided with explicit prosocial interactive goals, they showed a high level of social competence. The results of this study are interpreted to suggest that learning disabled children do not display deficient social knowledge or understanding. However, they do appear to differ in terms of how they perceive and approach the social situation. That is, learning disabled children tend to view peer conflict situations as a win-lose event which, in turn, is likely to influence how they approach the situation and, ultimately, how they are perceived by their peers.
The results of several other studies offer support for this interpretation. Silver and Young (1985) have reported that learning disabled children demonstrate significantly lower levels of interpersonal problem-solving abilities compared to their normally-achieving peers. In particular, the children with learning disabilities were found to be less able to manage unfavourable social situations and anticipate the consequences of courses of action. Hoyle and Serafica (1988) have found that learning disabled and nondisabled children demonstrate an equally sophisticated understanding of the concept of friendship. However, the learning disabled children, on average, displayed lower levels of social reasoning in the area of conflict resolution and friendship formation. In addition, learning disabled children have been consistently found to express a higher need for control in interpersonal situations compared to their nondisabled peers (Bruininks, 1978b; Hall & Richmond, 1985) and to perceive social interactions as generally more unfriendly (Weiss, 1984). Further, Stone and LaGrec (1984) have found that children with learning disabilities demonstrate a basic knowledge of what to say in a defined social situation but the qualitative and nonverbal aspects of their performance are observably deficient.

Clearly, one's response to a social situation is influenced by one's perception, understanding, strategies, and goals in that situation. The studies reviewed above
suggest that learning disabled children do not demonstrate deficient social knowledge or understanding. Yet, there is consistent evidence to suggest that learning disabled children are less socially skilled than their nondisabled peers. In part, these social skills deficits may be accounted for by the following findings: (i) learning disabled children demonstrate impaired perception of nonverbal cues and (ii) children with learning disabilities tend to interpret and approach social interactions as win-lose situations. These limitations, in turn, are likely to lead to inappropriate social behaviour and influence how the learning disabled child is perceived by his/her peers.

Methodological Considerations

The results emerging from the literature on learning disabilities and socioemotional functioning are confounded by several critical methodological flaws. These methodological inadequacies restrict both the interpretability and significance of the findings.

First, criteria for the definition of learning disability lacked both uniformity and specificity among the studies. In the majority of investigations, learning disabled children were defined by (variable) school placement criteria rather than researcher-defined criteria. Moreover, sample sizes, comparison groups, gender composition, age, and psychosocial measures varied widely
among the studies. This lack of consistency affects the comparability and generalizability of the findings.

In addition, the measures (e.g., of social competence, peer status, self-concept) employed in these studies were extremely limited in their scope. Observational studies and examinations of social behaviour beyond the context of school were remarkably scarce. Moreover, the complexity and contextual effects of learning disabled children's social interactions and relationships were in no way addressed.

In virtually all of the studies reviewed, an undifferentiated group of learning disabled children was compared to equally undifferentiated controls on some measure. This research paradigm clearly assumes that learning disabled children constitute a homogeneous group who do not vary with respect to academic performance, neuropsychological assets and deficits, socioemotional functioning, or other variables (such as socioeconomic status). In turn, this design obscures potentially meaningful within-group differences.

Finally, the research on socioemotional functioning and learning disabilities appears highly fragmented and scattered. While many researchers have proposed associations between the behaviour, self-concept, attributions, peer status, and social competence of learning disabled children, relatively few have specifically examined these associations. Thus, although there is no shortage of studies
examining aspects of socioemotional functioning and learning disabilities, the research in this area has been far from systematic.

In the following section (Hypothesis 3), a comprehensive research program that has attempted to address some of these methodological concerns is discussed.

**HYPOTHESIS THREE: SPECIFIC PATTERNS OF CENTRAL PROCESSING ABILITIES AND DEFICITS CAUSE SPECIFIC MANIFESTATIONS (SUBTYPES) OF LEARNING DISABILITIES AND SPECIFIC FORMS OF SOCIOEMOTIONAL DISTURBANCE**

In this view, socioemotional disturbance arises as a direct expression of the same pattern of neuropsychological assets and deficits that underlie the learning disabled child's academic learning difficulties. Evidence for this hypothesis lies in the learning disability subtyping efforts of Rourke and his colleagues at the University of Windsor. Therefore, in association with our consideration of Hypothesis 3, the patterns of neuropsychological assets and deficits and patterns of socioemotional functioning that characterize these subtypes are discussed.

**Patterns of Central Processing Assets and Deficits**

In a series of studies conducted by Rourke and his colleagues (Rourke & Finlayson, 1978; Rourke & Strang, 1978; Strang & Rourke, 1983), three groups of children, between the ages of 9 and 14 years, were compared with respect to their performance on several neuropsychological measures.
The children were selected on the basis of their pattern of scores on the Wide Range Achievement Test (WRAT; Jastak & Jastak, 1965). Group 1 consisted of children who displayed uniformly impaired performance on the Reading, Spelling, and Arithmetic subtests of the WRAT. Group 2 was composed of children who showed severely deficient performance in reading and spelling but only moderate difficulty in arithmetic. Group 3 consisted of children who performed at an average or above average level on the Reading and Spelling subtests of the WRAT, but who displayed severely deficient arithmetic performance.

The results of the studies revealed very different patterns of neuropsychological abilities and deficits displayed by two of these groups of children. Group 2 (R-S) children exhibited poor performance on measures of verbal and particularly auditory-perceptual abilities but at least average visual-perceptual-organizational, simple and complex psychomotor, tactile-perceptual, nonverbal concept-formation, and complex problem-solving abilities. Group 3 (A) children, in contrast, exhibited relatively well-developed auditory-perceptual and verbal skills but markedly deficient performance on visual-perceptual-organizational, complex psychomotor, tactile perceptual, nonverbal concept-formation, and complex problem-solving tasks. Group 3 children are also found to display average performance on tasks that involve rote, overlearned verbal skills but
experience difficulties on measures that involve novel task requirements, whether verbal or nonverbal (Rourke, 1989). In addition to displaying distinct neuropsychological profiles, these two groups of children have been observed to display distinct forms of socioemotional disturbance. In consideration of this finding, the results of a series of five studies examining the patterns of personality and psychosocial functioning of learning disabled children are described.

**Patterns of Psychosocial Functioning**

**Study 1**

The first study in this series (Porter & Rourke, 1985) served to determine whether distinct subtypes of learning disabled children could be distinguished on the basis of socioemotional functioning, as measured by the PIC. It is interesting to note that when the mean PIC profile for the entire sample of learning disabled children was plotted, only one scale score, Intellectual Screening, was in the clinical range. This finding underscores the importance of subtyping investigations.

In the Porter and Rourke study, a subtypal analysis (Q-type factor analysis) was conducted on the PIC scores of 100 children with learning disabilities. The analysis yielded four factors. Each child was assigned to one of the subtypes and mean PIC profiles were plotted for each group. An
overview of the features of these subtypes is presented below.

The first and largest subtype ("Normal") was characterized by a relatively flat PIC profile. That is, significant elevations were displayed on only two scales, Intellectual Screening and Achievement, and a moderate elevation was found on the Development scale. The parents of these children were expressing concern with the cognitive development and academic functioning of their children, but did not suggest personality or socioemotional maladjustment. Children in the second subtype ("Internalized Psychopathology") evidenced the most severe disturbance. Their symptoms were mostly of an internalized nature; depression, excessive anxiety and self-criticism, and social isolation. The third subtype ("Externalized Psychopathology") was characterized by a mean PIC profile that suggested behavioral disturbance of an externalized, hyperkinetic nature. These children tend to be overactive, restless, highly distractible, and impulsive. Mean PIC profiles of children in the fourth and smallest subtype ("Somatic Concern") evidenced relatively normal functioning in most personality areas but displayed a significant elevation on the Somatic Concern scale. That is, the parents of these children were mainly expressing concern about a variety of somatic complaints.
The results of Porter and Rourke (1985) were pivotal in demonstrating the following: (i) there is no unique learning disability personality type and (ii) the majority (almost half in this study) of learning disabled children display minimal socioemotional problems.

**Study 2**

Fuerst, Fisk, and Rourke (1989) attempted to replicate these findings in a new sample of learning disabled children, using a variety of clustering techniques. In this study, scores of 132 learning disabled children on nine PIC scales were subjected to a Q-factor analysis, four hierarchical agglomerative clustering methods, and one iterative partitioning method. Three subtypes emerged from these analyses and there was a high degree of correspondence between the subtypes derived by each method. The first subtype was virtually identical in size, profile shape, and profile elevation to the Normal subtype identified by Porter and Rourke (1985). In addition, the mean PIC profiles of the second and third subtypes were very similar in size, shape, and profile elevation to the Internalized and Externalized Psychopathology subtypes, respectively, reported in the Porter and Rourke (1985) study. The Somatic Concern subtype identified by Porter and Rourke (1985) was not recovered in this analysis. Thus, employing different subtyping techniques and a new subject sample, Fuerst et al. (1989)
have revealed reliable (internally valid) psychosocial subtypes of children with learning disabilities.

Study 3

In a subsequent investigation (Fuerst, Fisk, & Rourke, 1990), with the same subject sample, more sophisticated clustering techniques were employed in order to generate a more fine-grained typology. Six subtypes were derived and labelled as follows: Normal, Internalized Psychopathology, Externalized Psychopathology, Somatic Concern, Mild Hyperactivity, and Mild Anxiety. The first four subtypes were found to be strongly related to the subtypes identified by Porter and Rourke (1985) and Fuerst et al. (1989). The mean PIC profile of the Mild Anxiety group was similar to the Internalized Psychopathology subtype; however, these children tended to display milder forms of anxiety and depression (Rourke & Fuerst, 1991). The Mild Hyperactive group displayed a relatively normal profile but some mild acting-out behaviours.

Subjects in this study were further divided into three groups according to their pattern of VIQ-PIQ discrepancy (i.e., VIQ=PIQ, VIQ<PIQ, VIQ>PIQ). While the mean PIC profiles of all three groups were similar in shape, the VIQ>PIQ group tended to display more pathological elevations on more PIC scales compared to the other two groups. In terms of subtypes, VIQ>PIQ children demonstrated Normal and Mild Anxiety profiles less frequently than did VIQ=PIQ and
VIQ<PIQ children. In contrast, VIQ>PIQ children, compared to the other two groups, were found at higher frequencies in subtypes showing severe psychosocial disturbance (i.e., Internalized and Externalized Psychopathology). These findings appear to suggest that children with learning disabilities who exhibit relatively well-developed language skills versus visual-spatial-organizational skills are at greater risk for severe psychopathology compared to children demonstrating the opposite pattern of skills (Fuerst et al., 1990).

Study 4

The fourth study (Fuerst & Rourke, in press-a) was conducted in order to further address the latter finding. In addition, an effort was made to determine whether the six psychosocial subtypes found in Fuerst et al. (1990) could be replicated in a new, larger, and more diverse sample of children. Cluster analyses performed on a sample of 500 children yielded six subtypes. Five of these subtypes, Normal, Somatic Concern, Mild Anxiety, Internalized Psychopathology, and Externalized Psychopathology, corresponded extremely well with the subtypes identified by Fuerst et al. (1990). However, the Mild Hyperactive subtype reported by Fuerst et al. (1990) was not recovered in this analysis. Rather, a new subtype emerged which was characterized by a mean PIC profile suggestive of conduct disorder.
Further, in this study, the mean WRAT Reading, Spelling, and Arithmetic scores of the children in each of these six subtypes were calculated. While the subtypes did not differ with respect to mean Arithmetic scores, significant differences were found for some subtypes on WRAT Reading and Spelling. First, the mean WRAT Reading and Spelling scores of the Internalized and Externalized Psychopathology subtypes were significantly higher than the scores of the Normal, Conduct Disorder, and Somatic Concern subtypes. Second, discrepancies between Arithmetic and Reading and Spelling scores (i.e., R-A and S-A) were significantly larger in the Internalized Psychopathology subtype compared to all other subtypes. These results, in support of Fuerst et al. (1990), indicate that children who exhibit relatively well-developed verbal skills are more likely to display a PIC subtype profile suggestive of severe psychopathology, of either an internalizing or externalizing nature (Fuerst & Rourke, in press-a). Moreover, in addition to level of pathology, it appears that patterns of cognitive strengths and deficits may be associated with type of pathology.

Study 5

In the fifth and final study of this series, the relationship between age and patterns of psychosocial functioning was examined (Fuerst & Rourke, in press-b). A sample of 728 learning disabled children was divided into
three age groups: "Young" (7-8 years old); "Middle" (9-10 years old); and "Old" (11-13 years old). The results of cluster analyses performed at each of the three age levels showed similar subtypes across age groups. Four, six, and four subtypes were found at the Young, Middle, and Old age levels, respectively. In addition, Normal, Internalized Psychopathology, and Externalized Psychopathology subtypes were recovered at each age level and showed strong correspondence. These results indicate that patterns and levels of psychosocial functioning remain relatively stable over time.

A profile-matching analysis of PIC scores in this sample further supported this finding. That is, a typology of seven psychosocial subtypes was generated based on the findings of the previous four studies. The mean PIC scores (on all 16 scales) were calculated for each of the previously derived subtypes (Normal, Somatic Concern, Mild Anxiety, Mild Hyperactive, Conduct Disorder, Internalized Psychopathology, and Externalized Psychopathology), yielding "prototypical" PIC profile subtypes. Subjects were then assigned to a subtype based on the strongest correlation between their PIC profile and one of the seven prototypical profiles. Fuerst and Rourke (in press-b) found that the mean PIC profiles of subtypes generated by this profile-matching technique were similar in terms of profile shape and elevation across the age groups. In addition, subjects were
similarly distributed across the subtypes at each of the three age levels. Overall then, the results of this study strongly suggest that children with learning disabilities do not become more susceptible to socioemotional disturbance with increasing age (Fuerst & Rourke, in press-b).

Summary

In this section, the overall findings of the five studies reviewed above are summarized.

Subtypes

The above studies have demonstrated that reliable (replicable) psychosocial subtypes can be found across different samples of learning disabled children and clustering techniques. Rourke and Fuerst (1991) have examined the correlations between corresponding subtypes and characterized the behavioral patterns of children in each subtype, as predicted by their PIC profile. A summary of these findings is presented below.

The Externalized Psychopathology subtype was found to be the most reliable. The mean PIC profiles of this subtype were very consistent across the studies and the relative size of this subtype, about 15%-25% across studies, was found to be stable. The mean PIC profile is elevated on a number of scales, including Achievement, Intellectual Screening, Development, and Psychosis. Further, marked elevations on the Adjustment, Delinquency, Hyperactivity, and Social Skills scales suggest that these children display
severe behavioral disturbance of an externalized type. In particular, they are expected to exhibit hyperkinetic, acting-out behaviour. As well, they may demonstrate hostile, impulsive, restless behaviour and low frustration tolerance. Aggressive, violent, and destructive behaviour may also be associated with this group of children.

The second most consistent subtype has been the Internalized Psychopathology cluster. This group has consisted of 20%-25% of the learning disabled children. The mean PIC profile of the Internalized Psychopathology subtype demonstrates marked elevations on the following scales: Achievement, Intellectual Screening, Development, Depression, Withdrawal, Anxiety, Psychosis, and Social Skills. This profile suggests severe psychopathology of an internalizing nature. These children are expected to be depressed, anxious, and emotionally labile. They are also characterized by cognitive difficulties, inappropriate affect, problems with orientation to reality, and social isolation. Social interaction and general interpersonal functioning may also be deficient in these children.

The Normal subtype was also recovered in each study and displayed a fairly consistent profile. The size of this group has varied in each study but represents, on average, one third of the learning disabled children. The mean PIC profile of this subtype shows significant elevations on the Achievement, Intellectual Screening, and Development scales
(the "cognitive triad") but an otherwise flat profile on the remaining clinical scales. These children are seen to have cognitive and academic difficulties but are not maladjusted or behaviourally disturbed.

Rourke and Fuerst (1991) suggest that when subtypes are formed using more fine discriminations, children who may have been classified as Normal by coarser subtyping methods are likely to show some differences. Thus, they have found that the Somatic Concern, Mild Hyperactivity, and Mild Anxiety subtypes are much more similar to the Normal subtype compared to the severely disturbed subtypes.

The Somatic Subtype has demonstrated a fair degree of consistency and its relative size (about 14%) has been stable across studies. As noted, the mean PIC profile of this subtype shows some similarity to the Normal subtype but is marked by a significant elevation on the Somatic Concern scale. Thus, parents of these children are likely to report a variety of physical complaints and express concern regarding their children's health.

The reliability of the Mild Hyperactive and Mild Anxiety subtypes is suggested but not evidenced by this research. In the studies in which it was found, the Mild Hyperactive subtype has consisted of 20%-28% of children with learning disabilities. The mean PIC profile of this subtype shows elevations on the cognitive triad and Hyperactivity scales but an otherwise normal profile. Thus,
these children are expected to display cognitive difficulties and some mild acting-out behaviour but no severe socioemotional disturbance.

The profile and size (about 15%) of the Mild Anxiety subtype has been found to be similar across studies. The mean PIC profile of this subtype is characterized by significant (but modest) elevations on the Intellectual Screening, Depression, and Anxiety scales. These children are expected to display mild psychosocial disturbance of an internalized nature.

The Conduct Disorder subtype has been found to be the least reliable subtype. This group was derived using cluster analysis in only one study and found to consist of 10% of the learning disabled children. The mean PIC profile of this group shows significant elevations on the cognitive triad and Delinquency scales. These children are expected to exhibit problematic behaviours for caretakers, such as a disregard for rules and insensitivity toward others. In addition, they may display verbal and physical aggression, destructiveness, lying, and stealing.

Age and Psychosocial Functioning

Fuerst and Rourke (in press-b) demonstrated that, as children with learning disabilities grow older, patterns and degrees of psychosocial functioning remain relatively stable. That is, there does not appear to be an increased risk for the emergence of severe socioemotional disturbance.
with increasing age. It is interesting to note that this finding does not support the notion of a self-perpetuating failure cycle (Hypothesis 2) that is proposed by many researchers to characterize the learning disabled child.

Central Processing Abilities and Deficits and Psychosocial Functioning

The results of Fuerst et al. (1990) and Fuerst and Rourke (in press-a) suggest that both level and type of socioemotional disturbance is related to cognitive functioning and academic achievement. Moreover, it would appear that children with learning disabilities who exhibit relatively well-developed language skills compared to visual-spatial-organizational skills (e.g., Group A children) are at greater risk for severe psychopathology, particularly of an internalizing nature, compared to children demonstrating the opposite pattern of skills (e.g., Group R-S children).

The results of a study conducted by Strang and Rourke (1985) further support this assertion. Strang and Rourke (1985) examined the mean PIC profiles of two groups of children who resembled Group R-S and A children with respect to their neuropsychological profiles. Group R-S children were found to exhibit a mean PIC profile that was extremely similar to the Normal subtype. In contrast, Group A children displayed moderate elevations on the Social Skills, Withdrawal, and Depression scales of the PIC and significant
elevations on Achievement, Intellectual Screening, Development, and Psychosis. Clearly, their pattern of scores on the PIC highly resembles the Internalized Psychopathology subtype. Casey, Rourke, and Picard (1991) report very similar results in their sample of Group 3 type children. Moreover, White, Moffitt, and Silva (1992) have found, in a non-selected sample of children, that learning disabled children with a Group 3 neuropsychological profile were at greatest risk for internalizing psychopathology compared to other groups of learning disabled children.

There is evidence to suggest that this pattern of functioning also exists in adulthood. Del Dotto, Fisk, McFadden, and Rourke (1991) conducted a follow-up study of 5 young adults who had, as children, exhibited a neuropsychological profile similar to the profile of Group 3 children. Although there was no consistent pattern of disturbance, each of the clients was observed to display a significant degree of emotional and/or behavioral disturbance.

Rourke, Young, Strang, and Russell (1986) examined the neuropsychological profiles of 8 clients who were seen for assessments as adults. The patterns of neuropsychological performance of these adults closely resembled the performance of Group A children. Moreover, these adults were found to display deficient social skills, report having few friends, exhibit low self-esteem, and demonstrate a tendency
to become withdrawn and isolated. In addition, two of the clients had previously received a diagnosis of schizophrenia. Overall, these individuals were characterized by a severe degree of socioemotional disturbance of an internalizing nature.

In light of these findings, Group R-S and Group A children are proposed to exhibit distinct patterns of socioemotional disturbance (Rourke, 1988, 1993; Rourke & Fuerst, 1992). While Group R-S children may exhibit severe socioemotional disturbance, they are less frequently described by parents as emotionally or behaviourally disturbed. In addition, Rourke (1988) suggests that a psycholinguistic learning disability (R-S) is not a sufficient condition for the occurrence of disturbed psychosocial functioning. Instead, additional variables, akin to those explored in the previous section (Hypothesis 2), are necessary for the development of behavioral or socioemotional dysfunction.

In contrast, Group 3 children typically demonstrate severe psychosocial disturbance, particularly of an internalized nature. This form of socioemotional disturbance is seen to arise as a direct consequence of the same pattern of central processing abilities and deficits that leads to a particular pattern of academic achievement in these children (i.e., Hypothesis 3). It is proposed that these children manifest a syndrome of nonverbal learning disabilities (NLD)
(Rourke, 1989). Rourke (1993) has depicted both an asset and deficit "stream" which seeks to explain the progress of these children. This model can be understood in terms of a summary of assets and deficits placed within the context of a set of cause and effect relationships. In the following section, only the deficit stream is outlined. A more comprehensive treatment of this material can be found in Rourke (1989, 1993); Rourke and Fisk (1992); and Rourke and Fuerst (1991, 1992).

The primary neuropsychological deficits considered to be displayed by the NLD child are tactile-perception, visual-perception, complex motor skills, and the ability to deal effectively with novel material. These deficits are hypothesized to eventuate in deficient tactile and visual attention as well as restricted exploratory behaviour. In turn, these secondary deficits are seen to lead to memory problems for tactile and visual information and deficits in concept formation and problem-solving. A set of linguistic deficiencies (e.g., repetitive, rote speech; poor psycholinguistic pragmatics; minimal speech prosody; and reliance on language for social relating, information gathering, and relief from anxiety) is also proposed to arise from these deficits.

In addition, the disturbed psychosocial and emotional functioning displayed by these children is thought to be directly related to their pattern of neuropsychological
deficits. Their deficient nonverbal skills, inability to
deal effectively with novel situations, and overreliance on
rote auditory-verbal skills for interacting with others are
seen to affect their interpersonal relations. Deficits in
social judgment may result from basic problems in reasoning
and concept formation. Deficient nonverbal and visual-
spatial skills may lead to difficulties interpreting facial
expressions and other nonverbal aspects of communication.
Moreover, misinterpretations of such nonverbal cues may in
turn lead to inappropriate reactions and behaviour.
Deficient tactile perceptual and psychomotor skills likely
interfere with creating and maintaining intimate
relationships. The high volume of repetitive, rote, verbal
output, in conjunction with a lack of prosody, may result in
negative feedback from others and rejection if this feedback
is not recognized or comprehended. Individuals with NLD may
have difficulty integrating information from facial
expressions, tone of voice, and psychomotor patterns (e.g.,
deficient intermodal integration) which may, in turn, lead
to problems in understanding someone's emotional state.
Their inability to adapt to novel situations and tendency to
apply overlearned strategies is also likely to interfere
with psychosocial development.

CONCLUSIONS

Although the final word on the psychosocial functioning
of learning disabled children does not emerge from the
research literature, there are several results that warrant attention. These findings are summarized below:

1. Learning disabled children cannot be characterized by a single, unitary pattern of personality traits, behaviour, self-concept, attribution, or social competence.

2. The majority of learning disabled children experience no or only mild disturbance of socioemotional functioning.

3. There is no evidence to suggest that learning disabled children relative to their normally-achieving peers are at any greater risk for developing socioemotional problems as they increase in age.

4. There appear to be distinct subtypes of socioemotional and behavioral disturbance that are displayed by learning disabled children. However, the precise nature and incidence of these subtypes has yet to be determined.

5. One pattern of central processing abilities and deficits (NLD) appears to lead to a particular pattern of academic functioning and specific form of socioemotional disturbance (i.e., internalized psychopathology).

RATIONALE

The present investigation seeks to replicate and extend the findings of Fuerst et al. (1990) and Fuerst and Rourke (in press-a, in press-b) in a new sample of learning disabled children. Fuerst and Rourke (in press-b) demonstrated that, as children with learning disabilities
grow older, patterns and degrees of psychosocial functioning remain relatively stable. That is, there does not appear to be an increased risk for the emergence of severe socioemotional disturbance with increasing age. This outcome does not support the notion of a self-perpetuating failure cycle that is commonly proposed to characterize the learning disabled child. As yet, this is the only investigation of the relationship between age and psychosocial functioning in a general population of learning disabled children. The results of this study therefore may be strengthened by a consideration of the findings in a new sample of learning disabled children.

Second, the results of Fuerst et al. (1990) and Fuerst and Rourke (in press-a) suggest that both level and type of socioemotional disturbance is related to cognitive functioning and academic achievement. Moreover, it is evident that children with learning disabilities who exhibit relatively well-developed language skills compared to visual-spatial-organizational skills are at greater risk for severe psychopathology, particularly of an internalizing nature, compared to children demonstrating the opposite pattern of skills. The general finding that better verbal performance is associated with more severe psychopathology is at odds with the common conception of this relation. In consideration of this fact, replication of this finding becomes all the more important.
Third, as discussed, seven prototypical psychosocial subtypes have been identified and described by Rourke and Fuerst (1991) based on the results of their studies. Descriptions of these subtypes are predictions of behaviour based on PIC profile patterns. It is of interest then to examine these characterizations on a measure other than the one (i.e., the PIC) used to establish the typology. Therefore, an external validation study of these statistically-derived subtypes will be conducted. The measure selected for this validation study is a modified version of the Behavior Problem Checklist. Factor analyses of the BPC have consistently revealed three dimensions of disturbance: "conduct disorder", "personality problems", and "immaturity-inadequacy" (Grieger & Richards, 1976; Matson, Epstein, & Cullinan, 1984; Schnittjer & Hirshoren, 1984). In addition, Epstein, Cullinan, and Rosemier (1983) applied a principal components analysis with varimax rotation to the BPC scores of 559 learning disabled boys. Four predominant factors were identified: "attention deficit" (hyperactive), "conduct disorder", "anxiety", and "social incompetence". Items associated with these dimensions correspond well with descriptions of the prototypical psychosocial subtypes.

HYPOTHESES

In the present study, the following will be examined:
(a) the distribution of psychosocial subtypes of learning disabled children across three different age levels; (b) the
academic functioning of these psychosocial subtypes; and (c) the external validity of the psychosocial typology. The following predictions are made:

Hypothesis 1. The distribution of psychosocial subtypes of learning disabled children across three age groups will be relatively stable.

Hypothesis 2. Learning disabled children who exhibit better verbal skills will evidence more severe psychopathology.

Hypothesis 3. Psychosocial subtypes of learning disabled children will be identified more frequently on dimensions of the BPC that correspond with descriptions of that subtype.
CHAPTER II

METHOD

Subjects

The 152 subjects used in this study were selected from a group of more than 300 children who were referred for neuropsychological assessment because of learning difficulties. The selected children met the following criteria: (i) chronological age between 7 and 13 years (inclusive); (ii) Wechsler Intelligence Scale for Children (WISC; Wechsler, 1949) Full Scale IQ (FSIQ) score of 80 or above; (iii) centile score of 30 or below on at least one subtest of the WRAT; (iv) no primary sensory deficit; (v) no evidence of educational or cultural deprivation; (vi) no primary emotional disturbance; (vii) English as a primary language; (viii) complete PIC scale scores available; and (ix) a completed questionnaire available. For some analyses, the sample was divided into three age groups: "Young" (7-8 years of age), "Middle" (9-10 years of age), and "Old" (11-13 years of age).

The mean WISC Verbal IQ (VIQ), Performance IQ (PIQ), and FSIQ scores of the sample are summarized in Table 1. Mean WISC VIQ, PIQ, and FSIQ scores for males were 92.7, 104.2, and 97.8, respectively, and 94.2, 99.8, and 96.2, respectively, for females. Mean WISC VIQ, PIQ, and FSIQ scores for the entire sample of learning disabled children were 93.1, 103.2, and 97.4, respectively.
Table 1

**Description of Sample: Mean WISC VIQ, PIQ, and FSIQ Scores and Mean Scores on WRAT Reading (RSS), Spelling (SSS), and Arithmetic (ASS).**

<table>
<thead>
<tr>
<th>Subjects</th>
<th>VIQ</th>
<th>PIQ</th>
<th>FSIQ</th>
<th>RSS</th>
<th>SSS</th>
<th>ASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>92.7</td>
<td>104.2</td>
<td>97.8</td>
<td>77.7</td>
<td>74.1</td>
<td>80.6</td>
</tr>
<tr>
<td>Females</td>
<td>94.2</td>
<td>99.8</td>
<td>96.2</td>
<td>84.8</td>
<td>82.5</td>
<td>81.2</td>
</tr>
<tr>
<td>Overall</td>
<td>93.1</td>
<td>103.2</td>
<td>97.4</td>
<td>79.2</td>
<td>75.8</td>
<td>80.8</td>
</tr>
</tbody>
</table>

\( ^a_n = 120 \)

\( ^b_n = 32 \)
Mean standard scores on WRAT Reading (RSS), Spelling (SSS), and Arithmetic (ASS) subtests are also presented in Table 1. The mean Reading, Spelling, and Arithmetic scores for males were 77.7, 74.1, and 80.6, respectively, and 84.8, 82.5, and 81.2, respectively, for females. Mean Reading, Spelling, and Arithmetic standard scores for the entire sample of learning disabled children were 79.2, 75.8, and 80.8, respectively.

For some analyses, differences between VIQ and PIQ scores as well as differences between WRAT Reading and Arithmetic (R-A) and Spelling and Arithmetic (S-A) standard scores were examined. It should be noted that, for the male, female, and complete samples of learning disabled children, the mean WISC PIQ score was higher than the mean WISC VIQ score. Furthermore, the breakdown of subjects with respect to VIQ-PIQ discrepancies was as follows: 8.6% \( (n = 13) \) of the subjects demonstrated a VIQ greater than PIQ by 10 or more points (VIQ>PIQ); 36.8% \( (n = 56) \) of the subjects demonstrated a VIQ-PIQ difference of less than 10 points (VIQ=PIQ); and 54.6% \( (n = 83) \) of the subjects exhibited a PIQ greater than VIQ by 10 or more points (PIQ>VIQ). The relative paucity of VIQ>PIQ subjects is characteristic of clinic-referred samples of children with learning disabilities.

The limited number of subjects demonstrating large R-A and S-A differences is also thought to reflect a bias in the
sample. Subjects tended not to demonstrate large R-A or S-A differences: only 17% (n = 26) of the subjects demonstrated a Reading greater than Arithmetic standard score by 15 or more points, and 8.6% (n = 13) of the subjects displayed a Spelling greater than Arithmetic standard score by 15 or more points.

**Instruments and Measures**

The Personality Inventory for Children (PIC) was used as a measure of psychosocial functioning. The PIC was designed primarily for children and adolescents between the ages of 6 to 16 years. It is administered to the child’s primary caretaker, typically the biological mother. The PIC consists of 600 true-false items that are completed by the respondent based on her/his observation of the child’s behaviour, attitudes, and family relationship. The items on the PIC are divided into 16 scales -- 3 validity scales, 1 screening scale of general maladjustment, and 12 clinical scales that describe a variety of personality dimensions in children (see Table 2 for an outline of these scales). A child’s raw score on these scales can be converted to standard T-scores and plotted to reveal an overall PIC profile.

The Wide Range Achievement Test (WRAT) was used as a measure of academic achievement. The WRAT was designed to provide a convenient measure of basic academic learning. It comprises 3 subtests: Reading, Spelling, and Arithmetic. The
Table 2

**PIC Scales (from Wirt et al., 1984)**

<table>
<thead>
<tr>
<th>Scale</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lie</td>
<td>The Lie scale was designed to identify a defensive response set. L reflects the absence of or denial of behaviour problems, especially those classified as delinquent and asocial, as well as the absence of or denial of family problems.</td>
</tr>
<tr>
<td>F</td>
<td>The F scale was designed to identify deviant response sets, such as exaggeration of symptoms or random responding. F scale elevation may be indicative of intensity or severity of symptoms.</td>
</tr>
<tr>
<td>Defensiveness</td>
<td>This scale was designed to measure the respondent’s tendency to be defensive about the child’s behaviour during an evaluation. It may also measure a tendency to be hostile, vigilant, and withholding of information, as well as provide an indication of the general level of pathology of the informant.</td>
</tr>
<tr>
<td>Adjustment</td>
<td>The Adjustment scale was developed as a screening measure intended to identify children in need of psychological evaluation, and to provide a measure of general maladjustment.</td>
</tr>
</tbody>
</table>
Achievement  The Achievement scale was designed to identify children with academic achievement below age expectation. ACH was found to be strongly related to level of reading comprehension but a relatively poor predictor of arithmetic achievement.

Intellectual Screening  This scale was designed to identify children whose problems may be due to impaired intellectual functioning or specific cognitive deficits and who may be in need of intellectual assessment.

Development  This scale provides a measure of intellectual and physical development. It primarily reflects retardation in the development of motor coordination, academic abilities, and absence of any special skills or abilities.

Somatic Concern  This scale is a measure of a number of health related concerns, such as somatic complaints and illness, adjustment to illness, eating habits, sleep patterns, general energy and strength, headaches, stomach aches, as well as other somatic symptoms.

Depression  The Depression Scale consists of items judged to reflect signs of childhood depression. Such signs include brooding, social isolation, crying spells, low energy level,
pessimism, anhedonia, poor self concept, and withdrawal.

Family Relations
This scale is a measure of family effectiveness and cohesion. It is indicative of the family's stability and adaptiveness, happiness, and parental effectiveness and emotional adjustment.

Delinquency
This scale was designed as a measure of delinquent and antisocial tendencies. It reflects a lack of sensitivity to the rights and feelings of others, a disregard for parents and rules, and characteristics such as hostility, intolerance, and frustration.

Withdrawal
This scale is a measure of withdrawal from social contact. It reflects isolation from peers and general social interaction, shyness and fear of strangers, emotional distance, and distrust of others.

Anxiety
This scale is a measure of overt manifestations of anxiety, such as irrational fears, nightmares, limited frustration tolerance, exaggeration of problems, and physiological correlates of anxiety.

Psychosis
The Psychosis scale was designed to identify children manifesting psychotic symptomatology. High scores are indicative of
reality distortion, cognitive disorientation, poor pragmatic skills, social withdrawal, anxiety, and inappropriate affect.

**Hyperactivity**
This scale was designed to identify children who display characteristics of the "hyperkinetic syndrome". High scores are indicative of emotional instability, hostility, impulsivity and restlessness, poor peer relationships, and discipline problems.

**Social Skills**
The Social Skills scale was designed to measure the effectiveness of interpersonal skills and the reasons for failure in social situations. It is indicative of social comprehension and tact, self-confidence and poise in social situations, and appropriate role-taking behaviour.
Reading subtest provides a measure of oral single-word reading. The Spelling subtest is a measure of written single words to dictation. The Arithmetic subtest is a timed test that consists of both basic mechanical arithmetic operations and more advanced mathematical reasoning and problem solving questions. Scores on these subtests are typically expressed as standard scores, centiles, and grade equivalents.

The measure selected for the validation study was an adapted version of the Behavior Problem Checklist (BPC). Subjects' caretakers completed a questionnaire that was comprised of items including demographic information, medical history, an activity rating scale, and a behaviour rating scale. The behaviour rating scale consisted of 66 items, of which 45 were identical to items on the BPC (see Table 3 for a summary of item composition).

The BPC requires raters to make judgments about the prevalence of behaviours on a 55-item three-point scale. Factor analyses of scores on the BPC obtained from a variety of child populations have consistently revealed three dimensions of disturbance: "conduct disorder", "personality problems", and "immaturity-inadequacy" (Epstein et al., 1983; Grieger et al., 1976; Matson et al., 1984; Schnittjer et al., 1984). The items in the BPC that are not congruent with the questionnaire primarily load on a fourth factor referred to as "Socialized Delinquency". In the questionnaire, these items were typically replaced with
Table 3

**Behaviour Checklist Items**

Thumb sucking*
Restlessness, inability to sit still
Attention-seeking, "show-off" behaviour
Skin allergy*
Doesn’t know how to have fun; behaves like a little adult
Self-consciousness; easily embarrassed
Headaches*
Disruptiveness; tendency to annoy and bother others
Feelings of inferiority
Dizziness, vertigo*
Boisterousness, rowdiness
Crying over minor annoyances and hurts
Preoccupation; "in a world of his own"
Shyness, bashfulness
Social withdrawal, preference for solitary activities
Dislike for school
Jealousy over attention paid to other children
Difficulty in bowel control, soiling*
Short attention span
Prefers to play with younger children*
Lack of self-confidence

* These items do not correspond to items on the BPC
Inattentiveness to what others say
Easily flustered and confused
Lack of interest in environment, generally *bored attitude*
Fighting
Nausea, vomiting*
Temper, tantrums
Reticence, secretiveness
Truancy from school
Hypersensitivity; feelings easily hurt
Laziness in school and in performance of other tasks
Anxiety, chronic general fearfulness
Irresponsibility, undependability
Excessive daydreaming
Masturbation
Hay fever and/or asthma*
Tension, inability to relax
Disobedience, difficulty in disciplinary control
Depression, chronic sadness
Unco-operativeness in group situations
Aloofness, social reserve
Passivity, suggestibility, easily led by others
Clumsiness, awkwardness, poor muscular co-ordination
Stuttering*

* These items do not correspond to items on the BFC
Hyperactivity; always on the go
Distractibility
Destructiveness in regard to his own and/or others's property
Negativism, tendency to do the opposite of what is required
Impertinence, sauciness
Sluggishness, lethargy
Drowsiness
Profane language, swearing, cursing
Prefers to play with older children*
Nervousness, jitteriness, jumpiness; easily startled
Irritability; hot-tempered, easily aroused to anger
Enuresis, bed-wetting
Stomach-aches, abdominal pain*
Specific fears, e.g., of dogs, of the dark*
Seizures*
Bizarre content of thought*
Fluctuating performance*
Socially inept behaviour*
Tics*
Danger to self*
Danger to others*
Excessive talking*

* These items do not correspond to items on the BPC
items consisting of somatic complaints.

Data Analysis

To test hypotheses 1 and 2, subjects were first assigned to one of seven psychosocial subtypes using a profile matching algorithm (designed by Fuerst (1991) using SAS macro programming language). As noted, Rourke and Fuerst (1991) have produced a typology of seven psychosocial subtypes based on PIC scores. "Prototypical" PIC profiles for those subtypes were generated by calculating the mean scores on all 16 scales of the PIC for the previously derived subtypes. In the profile matching program, subjects are assigned to the subtype to which their PIC profile correlates most strongly (and positively). Subjects showing no positive correlations or only insignificant correlations (i.e., < .40) with the prototypical profiles were dropped from subsequent analyses.

To test hypothesis 1, subjects were divided into three age groups: Young (7-8 years of age), Middle (9-10 years of age), and Old (11-13 years of age). An examination of the distribution (i.e., frequencies) of psychosocial subtypes across the three age groups was conducted using the chi square test.

To test hypothesis 2, mean WRAT standard scores on the Reading, Spelling, and Arithmetic subtests were calculated for each subtype. In addition, the differences between mean WRAT Reading and Arithmetic (R-A) and Spelling and
Arithmetic (S-A) standard scores were calculated. Univariate analysis of variance (ANOVA) tests were conducted to compare the mean scores among the groups. Post-hoc comparisons were performed using Tukey’s HSD method.

Further, the number of subjects demonstrating Reading, Spelling, and Arithmetic standard scores greater than or equal to 85 was compared for each of the subtypes. (A cut-off score of 85 was chosen because standard scores on the WRAT are distributed with a mean of 100 and standard deviation of 15. Thus, a score of 85 or above is within average limits whereas a score below 85 suggests impaired performance.) The distribution of R-A and S-A differences of 15 or more points was also examined. These comparisons were performed using chi-square analyses.

To test hypothesis 3, a principal components factor analysis with orthogonal rotation to a varimax criterion was performed on the BPC scores. The minimum eigenvalue for acceptance of a factor was set at 1.00 and a scree test was performed to further determine the number of significant factors. For an item to be included in a factor, a correlation coefficient of .45 or greater was required. Following factor identification, scores were computed for each subject on each of the factors. These factor scores were calculated in the following manner: Variables (BPC questions) that had a factor loading of .45 or greater were selected to define a factor. Each subject’s raw scores (0 or
1) for these questions were added up and expressed as a percentage of the total number of questions defining that factor. (Thus, if a subject exhibited 7 of the 9 behaviours defining a factor, his/her factor score would be 77.7). A one-way ANOVA was used to compare the mean scores of each psychosocial subtype on the factors. Post-hoc comparisons were conducted using Tukey’s HSD method.
CHAPTER III

RESULTS

Profile Matching

As noted, subjects were first assigned to one of seven psychosocial subtypes using the profile matching algorithm designed by Fuerst (1991). This resulted in the assignment of 147 subjects to one of the seven subtypes. Five subjects (3.3% of the total sample) were rejected as outliers. Thirty-six subjects (24.5% of assigned subjects) were matched to the Normal subtype. The largest number of subjects (n = 39; 26.5% of assigned subjects) were matched to the Externalized Psychopathology prototype. Twenty-three subjects (15.6% of assigned subjects) were matched to the Internalized Psychopathology prototype. Of the assigned subjects, 19 (12.9%) subjects were matched to the Mild Anxiety prototype and 16 (10.9%) subjects were matched to the Mild Hyperactivity prototype. The fewest number of subjects were matched to the Conduct Disorder prototype (n = 8; 5.4% of assigned subjects) and the Somatic Concern prototype (n = 6; 4.1% of assigned subjects).

Mean PIC profiles for each of the seven subtypes were calculated and used to plot Figures 1 through 7. Visual inspection of the subtypes' PIC profiles from this study and the corresponding prototypical profiles presented in Rourke and Fuerst (1991) reveals strong similarity. In addition, the proportion of assigned subjects falling into each
Figure 1. Mean PIC profile for the Normal subtype.
Figure 2. Mean PIC profile for the Externalized Psychopathology subtype.
Figure 3. Mean PIC profile for the Internalized Psychopathology subtype.
Figure 4. Mean PIC profile for the Mild Anxiety subtype.
Figure 5. Mean PIC profile for the Mild Hyperactivity subtype.
Figure 6. Mean PIC profile for the Conduct Disorder subtype.
Figure 7. Mean PIC profile for the Somatic Concern subtype.
subtype is similar to the proportions described in Rourke and Fuerst (1991). These percentages are summarized in Table 4. As shown, five of the seven subtypes (Normal, Internalized Psychopathology, Mild Anxiety, Mild Hyperactivity, and Conduct Disorder) show no sizable differences between the percentage of subjects assigned to the subtypes and the percentage of subjects assigned to the corresponding prototypes. The Externalized Psychopathology subtype is somewhat larger (26.5%) than the corresponding prototype (16%) and the Somatic Concern group is somewhat smaller (4.1%) than the corresponding prototype (11%). Overall, however, the subtypes are very similar to the prototypes in terms of relative size.

Results of analyses comparing the seven psychosocial subtypes are presented in the following section. It should be noted that the small and highly unequal numbers of subjects in each of the subtypes served to reduce test power. Therefore, for some analyses, the subtypes were collapsed into three groups in order to increase the power of the statistical tests. In light of the research questions, the subtypes were grouped according to severity (Normal, Moderate, and Severe) and type of psychopathology (Normal, Externalized, and Internalized). The Normal, Moderate, and Severe psychopathology groups were constructed as follows: The Normal group consisted of subjects in the Normal subtype. The Moderate category was made up of
Table 4

Percentages of Assigned Subjects Within Subtypes Derived by Profile Matching Compared to Prototypical Subtypes

<table>
<thead>
<tr>
<th>Source</th>
<th>Normal</th>
<th>Mild Hyperactivity</th>
<th>Mild Anxiety</th>
<th>Somatic Concern</th>
<th>Conduct Disorder</th>
<th>Internalized Psychopathology</th>
<th>Externalized Psychopathology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profile Matching</td>
<td>28</td>
<td>11</td>
<td>11</td>
<td>11</td>
<td>8</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Prototypical</td>
<td>24</td>
<td>11</td>
<td>13</td>
<td>4</td>
<td>5</td>
<td>16</td>
<td>26</td>
</tr>
</tbody>
</table>
subjects in the Mild Anxiety and Mild Hyperactivity subtypes. The Severe psychopathology group contained subjects assigned to the Internalized and Externalized Psychopathology subtypes. Comparisons were also made according to type of pathology; that is, Normal, Externalized, and Internalized. The Normal group was again made up of only subjects assigned to the Normal subtype. The Externalized group consisted of subjects in the Mild Hyperactivity and Externalized Psychopathology subtypes. The Internalized category consisted of subjects assigned to the Mild Anxiety and Internalized Psychopathology subtypes. The results of analyses comparing these groups as well as the seven subtypes are presented below.

Relationship between Age and Subtype Membership

The mean ages of subjects assigned to the seven subtypes was calculated and compared. As shown in Figure 8, the mean age of the Somatic Concern and Conduct Disorder subtypes appeared to be somewhat higher than that of the remaining five subtypes. However, a one-way ANOVA revealed no significant differences in mean age between the subtypes.

Frequency crosstabulations for subtype membership and age categories were also calculated and compared. Figure 9 displays the percentage of subjects at each age level (Young, Middle, and Old) assigned to one of the seven psychosocial subtypes. (This means, for example, that of the Young subjects, 17% were assigned to the Internalized
Figure 8. Mean age of children in all subtypes.

Mean Age (Years)

- Normal
- Mild Hyper
- Mild Anxiety
- Somatic Concern
- Conduct Disorder
- Internal
- External

Subtype
Figure 9. Percentages of Young, Middle, and Old subjects in all subtypes.
Psychopathology subtype.) The results of a chi-square test comparing age and subtype membership could not be validly interpreted because greater than 20% of the cells had expected frequencies of less than five. Therefore, further chi-square tests were conducted comparing age group and severity of psychopathology (Normal, Moderate, Severe) as well as age group and type of psychopathology (Normal, Externalized, Internalized). Neither of these tests was significant. Thus, no significant differences were found in severity or pattern of psychosocial functioning with increasing age.

Visual inspection of Figure 9, however, reveals several trends. The percentage of subjects classified in the following subtypes tended to decrease with age: Normal, Internalized Psychopathology, and Mild Hyperactivity. In addition, the percentage of subjects classified in the Externalized Psychopathology, Somatic Concern, and Conduct Disorder subtypes tended to increase with age. In consideration of the expected percentages at each age group, it is clear that the Normal and Mild Hyperactivity subtypes were overrepresented and the Externalized Psychopathology subtype was underrepresented at the Young age category. However, observed and expected frequencies were similar at the Middle and Old age groups. Conduct Disorder subjects were found at greater than expected frequencies at the Old age level and less than expected frequencies at the Young
and Middle ages. In terms of the Somatic Concern and Internalized Psychopathology subtypes, although observed percentages clearly varied at each age level, the observed frequencies did not deviate greatly from expected frequencies for any of the age groups.

**Subtype Differences on the WISC**

Mean WISC VIQ, PIQ, and FSIQ scores were calculated and compared for each subtype (see Table 5). A univariate ANOVA showed no significant differences. However, when comparisons were made between the Normal, Externalized, and Internalized groups, significant group differences on VIQ were indicated; ANOVA ($F = 3.33, p < .05$). Post hoc comparisons using Tukey's HSD revealed significant differences between the Internalized and Normal groups. Specifically, the Internalized group obtained a significantly higher mean VIQ score compared to the Normal group. The mean WISC VIQ scores for the Internalized, Externalized, and Normal groups were 96.1, 92.2, and 90.6, respectively.

The distribution of VIQ-PIQ discrepancies across psychosocial subtypes was also examined. Chi-square tests could not be validly interpreted because of low cell counts. However, it was clear that the number of subjects displaying a VIQ>PIQ discrepancy was greatest in the Internalized Psychopathology subtype. Specifically, 41.7% of the subjects displaying a VIQ>PIQ discrepancy were assigned to the Internalized Psychopathology subtype, compared to an
Table 5

Characteristics of the Subtypes: Mean Scores on WISC VIQ, PIQ, and FSIQ and WRAT Reading (RSS), Spelling (SSS), and Arithmetic (ASS) Standard Scores

<table>
<thead>
<tr>
<th>Subtype</th>
<th>VIQ</th>
<th>PIQ</th>
<th>FSIQ</th>
<th>RSS</th>
<th>SSS</th>
<th>ASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>90.6</td>
<td>102.0</td>
<td>95.5</td>
<td>74.4</td>
<td>70.3</td>
<td>78.3</td>
</tr>
<tr>
<td>Mild Hyperactivity</td>
<td>89.1</td>
<td>100.9</td>
<td>93.9</td>
<td>72.0</td>
<td>71.5</td>
<td>79.2</td>
</tr>
<tr>
<td>Mild Anxiety</td>
<td>96.1</td>
<td>107.9</td>
<td>101.6</td>
<td>83.2</td>
<td>78.7</td>
<td>84.0</td>
</tr>
<tr>
<td>Somatic Concern</td>
<td>91.8</td>
<td>101.7</td>
<td>95.8</td>
<td>78.5</td>
<td>76.7</td>
<td>75.0</td>
</tr>
<tr>
<td>Conduct Disorder</td>
<td>88.4</td>
<td>100.4</td>
<td>93.2</td>
<td>79.9</td>
<td>76.9</td>
<td>78.1</td>
</tr>
<tr>
<td>Internalized Psychopathology</td>
<td>96.1</td>
<td>99.5</td>
<td>97.3</td>
<td>79.5</td>
<td>77.3</td>
<td>79.8</td>
</tr>
<tr>
<td>Externalized Psychopathology</td>
<td>93.5</td>
<td>105.0</td>
<td>98.7</td>
<td>84.1</td>
<td>79.7</td>
<td>82.2</td>
</tr>
</tbody>
</table>
expected frequency of 15.6%.

**Subtype Differences on the WRAT**

Mean WRAT standard scores on Reading, Spelling, and Arithmetic were computed and compared for each psychosocial subtype (see Table 5). The results of an ANOVA were not significant but did suggest group differences on Reading and Spelling. These trends are apparent in Figure 10.

Significant differences were found when ANOVA was used to compare the mean scores of Normal, Moderate, and Severe psychopathology groups on the WRAT. There were clear differences between the groups on WRAT Spelling ($F = 4.30$, $p < .05$) and suggested differences on WRAT Reading ($F = 2.89$, $p < .06$). Post hoc comparisons using Tukey's HSD revealed significant differences between the Severe and Normal groups on Spelling. In particular, the Severe group obtained a significantly higher mean WRAT Spelling score compared to the Normal group. The mean Spelling standard scores of the Normal, Moderate, and Severe groups were 70.3, 75.4, and 78.8, respectively. The mean WRAT Reading standard scores of the Normal, Moderate, and Severe groups were 74.4, 78.1, and 82.4, respectively.

In addition to examining mean WRAT scores, the distribution of standard scores (i.e., "greater than or equal to 85" versus "less than 85") on WRAT Reading, Spelling, and Arithmetic was analyzed. The chi-square test comparing WRAT scores and each of the seven psychosocial
Figure 10. Mean WRAT standard scores for all subtypes.
subtypes could not be validly interpreted because greater than 20% of the cells had expected frequencies of less than five. However, clear differences in the distribution of WRAT Reading and Spelling scores were found with respect to severity of psychosocial functioning. The chi-square test was significant for Spelling ($X^2 = 11.7, p < .05$) and suggestive for Reading ($X^2 = 5.3, p < .07$). In both instances, the Severe psychopathology group, relative to its size, accounted for the largest proportion of subjects with standard scores greater than 85. Differences between the subtypes were not found for Arithmetic in either the ANOVA or chi-square analyses.

Differences between WRAT Reading and Arithmetic (R-A) and Spelling and Arithmetic (S-A) standard scores were also calculated and compared for each subtype. ANOVA revealed no significant differences on either of these measures. However, the distribution of R-A and S-A differences of 15 or more points was found to differ according to severity of psychosocial functioning. Unfortunately, the results of the chi-square analyses were limited by small sample sizes and thus did not reach significance. Yet, it was clear that the Severe psychopathology group, relative to its size (46.6%), accounted for the largest proportion of R-A (63.6%) and S-A (75%) discrepancies.
Subtype Differences on BPC Factors

The factor analysis results are presented in the following section. These findings are followed by a report of the results of comparisons between the psychosocial subtypes on the BPC factors.

A principal components factor analysis with orthogonal rotation to a varimax criterion was performed on 46 items of the BPC. The original questionnaire completed by parents consisted of 66 items. Items that did not correspond to the BPC and items that showed an extreme response rate (i.e., endorsed by greater than 90% or fewer than 10% of subjects) were eliminated from subsequent analyses. In addition, of the original sample of 152 subjects, 8 subjects were not included in the analysis because their response form contained numerous missing values.

The minimum eigenvalue for acceptance of a factor was set at 1.00 and a scree test was performed to further determine the number of significant factors. Using these criteria, the principal components analysis was rerun with the specification that 3 factors be retained. For an item to be included in a factor, a correlation coefficient of .45 or greater was required. Items that demonstrated equal or near equal loadings on more than one factor were not included in a factor. Table 6 presents the three factors that were yielded from this analysis; the items in each factor and the item's factor loading are specified. Inspection of Table 6
Table 6

BPC Items Contributing to Factors Derived from Principal Components Analysis

<table>
<thead>
<tr>
<th>Factor I</th>
<th>*</th>
<th>Factor II</th>
<th>*</th>
<th>Factor III</th>
<th>*</th>
</tr>
</thead>
<tbody>
<tr>
<td>impertinence</td>
<td>.63</td>
<td>restlessness</td>
<td>.72</td>
<td>aloofness</td>
<td>.58</td>
</tr>
<tr>
<td>attention-seeking</td>
<td>.63</td>
<td>excessive</td>
<td>.65</td>
<td>depression</td>
<td>.58</td>
</tr>
<tr>
<td>boisterousness</td>
<td>.59</td>
<td>inability to</td>
<td>.64</td>
<td>anxiety</td>
<td>.55</td>
</tr>
<tr>
<td></td>
<td></td>
<td>relax</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>fighting</td>
<td>.59</td>
<td>hyperactivity</td>
<td>.62</td>
<td>&quot;in a world of one's own&quot;</td>
<td>.50</td>
</tr>
<tr>
<td>disobedience</td>
<td>.59</td>
<td>inattentiveness</td>
<td>.52</td>
<td>social withdrawal</td>
<td>.49</td>
</tr>
<tr>
<td>swearing</td>
<td>.58</td>
<td>short attention</td>
<td>.52</td>
<td>lack of self-confidence</td>
<td>.48</td>
</tr>
<tr>
<td></td>
<td></td>
<td>span</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>negativism</td>
<td>.58</td>
<td>jumpiness</td>
<td>.47</td>
<td>shyness</td>
<td>.48</td>
</tr>
<tr>
<td>irritability</td>
<td>.58</td>
<td>distractibility</td>
<td>.45</td>
<td>reticence</td>
<td>.46</td>
</tr>
<tr>
<td>temper, tantrums</td>
<td>.55</td>
<td>irresponsibility</td>
<td>.45</td>
<td>self-consciousness</td>
<td>.46</td>
</tr>
<tr>
<td>disruptiveness</td>
<td>.48</td>
<td></td>
<td></td>
<td>sluggishness</td>
<td>.45</td>
</tr>
<tr>
<td>unco-operative</td>
<td>.46</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Factor Loadings
shows that Factor I consists of externalizing behaviours:
Factor II represents a measure of hyperactive behaviour; and
Factor III consists of behaviours of an internalizing
type.

Following factor identification, scores were computed
for each subject on each of the factors. To iterate, these
factor scores were calculated in the following manner:
Variables (BPC questions) that had a factor loading of .45
or greater were selected to define a factor. Each subject’s
raw scores (0 or 1) for these questions were added up and
expressed as a percentage of the total number of questions
defining that factor. (For example, if a subject exhibited 7
of the 9 behaviours defining a factor, his/her factor score
would be 77.7). A one-way ANOVA was used to compare the mean
scores of each psychosocial subtype on the factors. Post-hoc
comparisons were conducted using Tukey’s HSD method.

**Factor I (Externalizing Behaviours):** Highly
significant differences were found between the subtypes on
Factor I ($F = 16.21, p < .0001$). Post hoc comparisons showed
that the Externalized Psychopathology subtype scored
significantly higher than the Internalized Psychopathology,
Mild Hyperactivity, Somatic Concern, and Normal subtypes. In
addition, the Conduct Disorder subtype obtained
significantly higher scores compared to the Somatic Concern
and Normal subtypes. The mean scores are presented, in
parentheses, from highest to lowest for each subtype:
Externalized Psychopathology (84.5), Conduct Disorder (72.7), Mild Anxiety (58.6), Internalized Psychopathology (54.1), Mild Hyperactivity (48.3), Somatic Concern (43.9), and Normal (31.6).

**Factor II (Hyperactive Behaviour):** The results of the ANOVA comparing the mean Factor II scores indicated highly significant group differences ($F = 5.64, p < .0001$). Post hoc tests with Tukey’s HSD revealed that the Externalized Psychopathology subtype scored significantly higher than the Normal subtype. The mean scores for Factor II are presented, in parentheses, from highest to lowest according to subtype: Externalized Psychopathology (79.6), Mild Anxiety (74.1), Conduct Disorder (73.0), Mild Hyperactivity (66.0), Somatic Concern (55.6), Internalized Psychopathology (52.2), and Normal (48.4).

**Factor III (Internalizing Behaviours):** Highly significant differences were found between the subtypes on Factor III ($F = 8.16, p < .0001$). Post hoc tests indicated that the Internalized Psychopathology subtype scored significantly higher than the Somatic Concern, Mild Hyperactivity, and Normal subtypes. In addition, the Mild Anxiety subtype obtained significantly higher mean Factor III scores compared to the Mild Hyperactivity and Normal subtypes. The mean Factor III scores are presented, in parentheses, from highest to lowest according to subtype: Internalized Psychopathology (64.0), Mild Anxiety (55.6),
Conduct Disorder (48.6), Externalized Psychopathology (48.4), Somatic Concern (45.0), Mild Hyperactivity (30.0), and Normal (27.4).
CHAPTER IV

DISCUSSION

The present study was conducted in order to examine the following: (a) the relationship between age and psychosocial functioning; (b) relations between psychosocial subtypes and measures of cognitive and academic functioning; and (c) the external validity of statistically-derived psychosocial subtypes, using a behavioral measure distinct from the one used to create the typology. In brief, it was found that the psychosocial functioning of learning disabled subjects remained stable over time; there was no significant increase in severity or type of psychopathology demonstrated at each of three age levels. Further, the results of this study demonstrated that patterns of academic and cognitive performance varied according to pattern and severity of psychosocial functioning. Finally, the psychosocial subtypes could be discriminated on the basis of responses to items on the Behaviour Problem Checklist, a behavioral measure distinct from the one used in the formation of the typology. These findings are discussed in greater detail below.

Rourke and Fuerst (1991) have identified and described seven statistically-derived psychosocial subtypes. Using a profile matching program developed by Fuerst (1991), 147 of the 152 learning disabled subjects in this study were assigned to one of the seven subtypes. Visual inspection of the subtypes' PIC profiles and the corresponding
prototypical profiles presented in Rourke and Fuerst (1991) revealed strong similarity. In addition, the relative size of assigned subjects in each subtype was consistent with proportions described in Rourke and Fuerst (1991).

**Relations between Age and Psychosocial Functioning**

Univariate analyses revealed no significant differences between the seven psychosocial subtypes with respect to mean age. However, the average age of subjects in the Somatic Concern and Conduct Disorder subtypes appeared to be high compared to the remaining subtypes. The small sample size of these two subtypes, both in general and relative to the other subtypes, may account for this finding. In addition, it is not unreasonable to expect subjects in the Conduct Disorder subtype to be older, on average, compared to other learning disabled subjects. The behaviours that characterize the Conduct Disorder subtype (e.g., truancy, drug use, delinquency) are behaviours that are more readily manifested at older ages.

In further analyses, subjects were divided into 3 age groups: Young (7-8 years), Middle (9-10 years), and Old (11-13) years. Examination of the relative sizes of the subtypes at the three age levels displayed no marked differences. In addition, comparisons with respect to either severity or type of psychosocial functioning revealed no significant differences between the age groups. However, several trends were noted: (a) Normal subjects were found at greater than
expected frequencies at the Young age level but at expected frequencies at Middle and Old ages; (b) Externalized Psychopathology subjects were found at lower than expected frequencies at Young ages but at expected frequencies at the Middle and Old age levels; (c) Mild Hyperactivity subjects were found at greater than expected frequencies at Young ages but at expected frequencies at Middle and Old age levels; and (d) Conduct Disorder subjects were found at greater than expected frequencies at the Old age category and lower than expected frequencies at Young and Middle ages.

Overall, the results did not evidence an increase in psychopathology with increasing age in learning disabled subjects. The trends that were observed likely reflected a bias in the sample. That is, for the Normal, Externalized Psychopathology, and Mild Hyperactivity subtypes, observed frequencies were somewhat inconsistent with expected frequencies only at the Young age level. The variability in the patterns of psychosocial functioning observed at the Young age level may reflect a uniform bias in referrals at this age. That is, it is possible that clinic-referred Young children are more likely to display normal behaviour, mild behaviour problems, or hyperactive behaviour. Two other explanations may account for these results. In the first instance, it is likely that the range of aberrant behaviours displayed by the Young child is more limited. In addition,
behaviours that are noticeable or considered abnormal at older ages may not be readily identified by the parents of Young children. In terms of the Conduct Disorder subtype, as noted, these subjects can be expected to be found with greater frequency at older ages precisely because of the nature of the behaviours that characterize this subtype.

Overall then, the results suggest that the psychosocial functioning of learning disabled children remains relatively stable over time. There was no evidence to support the notion that learning disabled children are more likely to develop more severe psychopathology with increasing age. Moreover, nearly half of the subjects sampled in this study displayed no or only relatively mild psychosocial disturbance. This finding is extremely striking when one considers that the sample consisted of clinic-referred learning disabled children. Specifically, the children in this sample were considered to display both a learning disability and emotional disturbance that was severe enough to have them referred to a day treatment centre. Thus, even among clinic-referred learning disabled children, nearly half were found to display no or only relatively mild psychosocial disturbance. These results, of course, are limited to the age range investigated.

A significant concern in the evaluation of a typology pertains to its external validity. That is, it is essential to examine whether subtypes differ in a meaningful and
predictable manner on measures distinct from the one(s) used to establish the typology (Fletcher, 1985). In the present study, an examination of the external validity of the Rourke and Fuerst (1991) typology was conducted as follows: The seven psychosocial subtypes were compared with respect to their performance on a cognitive measure (WISC), an academic achievement measure (WRAT), and a measure of behavioral functioning (BPC).

It should be noted again that the small and highly unequal sample sizes of the subtypes served to reduce test power. Therefore, for some analyses, the subtypes were collapsed into groups in order to increase the power of the statistical tests. In light of the research questions of interest, the subtypes were grouped according to severity (Normal, Moderate, and Severe) and type (Normal, Externalized, and Internalized) of psychopathology. The composition of these groups was described in the previous chapter and will not be reiterated here. The results are discussed in terms of these groups and the seven subtypes.

**Cognitive Measure**

Univariate analyses revealed no significant differences between the seven psychosocial subtypes on WISC VIQ, PIQ, and FSIQ scores. However, comparisons between the Normal, Externalized, and Internalized groups did reveal significant differences on WISC VIQ. In particular, subjects in the Internalized group scored higher on VIQ compared to the
Normal group. In addition, the Internalized group accounted for the largest proportion of VIQ>PIQ differences, relative to group size. Whereas subjects in the Internalized group were found at greater than expected frequencies, subjects demonstrating VIQ>PIQ discrepancies were found at lower than expected frequencies in the Externalized group.

**Academic Achievement Measure**

Although the subtypes did not demonstrate significant differences on WRAT Reading, Spelling, or Arithmetic scores, trends were evidenced on both Reading and Spelling. In addition, comparisons between the Normal, Moderate, and Severe groups revealed significant differences on WRAT Spelling and strongly suggested a difference on WRAT Reading. In both instances, subjects in the Severe group obtained higher mean scores as compared to subjects in the Moderate group who, in turn, scored higher than Normal subjects. Neither the subtypes nor the groups differed on Arithmetic.

Analyses of the distribution of WRAT subtest standard scores (i.e., "greater than 85" versus "less than 85") also supported these findings. That is, subjects in the Severe group, relative to group size, accounted for the greatest proportion of Reading and Spelling standard scores above or equal to 85. Whereas subjects with scores of at least 85 points were found at greater than expected frequencies in the Severe group, they were found at lower than expected
frequencies in the Normal group. The distribution of Arithmetic scores was virtually identical across groups and subtypes.

In addition to considering mean WRAT Reading, Spelling, and Arithmetic scores, discrepancies between Reading and Arithmetic (R-A) and Spelling and Arithmetic (S-A) scores were examined. Neither the subtypes nor the groups displayed significant differences with respect to mean R-A and S-A differences. The subtypes and groups were also compared with respect to the distribution of R-A and S-A discrepancies of at least 15 points. Although no significant differences were found, largely because of small cell sizes, it was clear that subjects in the Severe group accounted for the greatest percentage of R-A and S-A differences. Furthermore, whereas subjects with R-A and S-A discrepancies were found at higher than expected frequencies in the Severe group, they were found at lower than expected frequencies in both the Moderate and Normal groups.

The findings of Fuerst et al. (1990) and Fuerst and Rourke (in press-a) suggested that both level and type of socioemotional disturbance is related to cognitive functioning and academic achievement. In particular, it appeared that children with learning disabilities who demonstrated relatively well-developed language skills compared to visual-spatial-organizational skills were at greater risk for severe psychopathology, particularly of an
internalizing nature, as compared to children demonstrating the opposite pattern of skills. The results of the present study offer some support for these findings.

Comparisons between the psychosocial subtypes on cognitive and academic measures demonstrated that learning disabled subjects who evidenced relatively well-developed verbal skills were more likely to demonstrate severe psychopathology. Thus, the results of this study indicated a relationship between severity of psychosocial functioning and cognitive and academic performance. In addition, a particular type of psychosocial functioning (Internalized psychopathology group) was found to be associated with higher verbal compared to performance skills. However, the pattern of WRAT performance demonstrated by the Internalized Psychopathology subtype was not consistent with expectations. That is, subjects in the Internalized Psychopathology subtype, on average, did not demonstrate significant R-A or S-A discrepancies compared to other subtypes. In part, these results can be accounted for by the small sample size and limited range of patterns of performance in the sample. These limitations are discussed in greater detail below.

**Behavioral Measure**

The seven psychosocial subtypes identified by Rourke and Fuerst (1991) are described in terms of predictions of behaviour based on PIC profile patterns. In order to examine
these subtypes on a behavioral measure other than the one used to establish the psychosocial typology (i.e., the PIC), a factor analysis (of a modified version) of the BPC was conducted. The factor analysis was conducted in order to reduce the large number of variables contained in the questionnaire to a few components. The subtypes were then compared with respect to their scores on each of the dimensions identified in the factor analysis.

In the present study, a principal components analysis was conducted on 46 items of the Behaviour Problem Checklist. The factor analysis yielded three factors that were consistent with the results of previous BPC factor-analysis studies (Epstein, Cullinan, & Rosemier 1983; Grieger & Richards, 1976; Matson, Epstein, & Cullinan, 1984; Schnittjer & Hirshoren, 1984). The three factors obtained in this analysis were interpreted as follows: Factor I consisted of behaviours of an externalizing nature; Factor II was made up of behaviours characteristic of hyperactivity; and Factor III consisted of internalizing behaviours. Comparisons of the mean scores of the seven psychosocial subtypes on these factors were highly significant.

On Factor I, the mean scores of subjects in the Externalized Psychopathology subtype were significantly higher than the scores of the Internalized Psychopathology, Mild Hyperactivity, Somatic Concern, and Normal subtypes. In
addition, subjects in the Conduct Disorder subtype scored significantly higher than Somatic Concern and Normal subjects. Clearly then, as would be expected, parents of subjects matched to psychosocial subtypes consisting of externalizing behaviours also endorsed a greater number of behaviours of an externalizing nature on the BPC. Although the Mild Hyperactivity subtype might also be expected to display a high score on Factor I, this was not the case. It is likely that the Mild Hyperactivity subtype did not exhibit a relatively high score on Factor I because these subjects exhibit both somewhat milder and a more specific or narrowly-defined set of externalizing behaviours.

The results of post hoc analyses on Factor II scores revealed a significant difference between Externalized Psychopathology and Normal subjects. In further consideration of these results, the subtypes are displayed, from highest to lowest, in order of their mean Factor II scores: Externalized Psychopathology, Mild Anxiety, Conduct Disorder, Mild Hyperactivity, Somatic Concern, Internalized Psychopathology, and Normal. The finding that the Externalized Psychopathology and Conduct Disorder subtypes obtained high scores on this factor reinforces the notion that these subjects demonstrate numerous and varied externalizing behaviours. Contrary to expectation, the Mild Hyperactivity subjects’ scores, although high, were not significantly different from the scores of the other
subtypes. Although the behaviours in this factor may characterize the Mild Hyperactivity subtype, the findings suggest that they are not specific to this group. In addition, because subjects in this subtype are expected to display only mild acting-out behaviour, the rate of endorsement of these behaviours is unlikely to be extreme. The unexpected high score of the Mild Anxiety group is discussed following a consideration of Factor III.

Comparisons on Factor III yielded significant differences between the Internalized Psychopathology subjects' scores and the scores of the Somatic Concern, Mild Hyperactivity, and Normal subjects. In addition, subjects in the Mild Anxiety subtype scored significantly higher on Factor III than Mild Hyperactivity and Normal subjects. As expected, parents of subjects matched to subtypes consisting of internalizing behaviours endorsed a greater number of behaviours of an internalizing nature on the BPC.

Overall then, the Normal, Externalized Psychopathology, and Internalized Psychopathology subtypes were well-discriminated on the basis of their BPC scores. Subjects in the Normal subtype obtained the lowest scores on all three factors. In addition, the parents of children in the Externalized and Internalized Psychopathology subtypes endorsed a greater number of behaviours of an externalizing and internalizing nature, respectively, relative to other subtypes. The high score of the Mild Anxiety subtype on all
three factors was an unexpected finding. This result suggests a high rate of endorsement of problem behaviours, of both an internalizing and externalizing nature. Thus, parents of Mild Anxiety subjects in this sample appear to be identifying a diverse range of behavioral problems in their children.

The results of these external validation studies underscore the need to consider subtypes of psychosocial functioning in learning disabled children. There was evidence to suggest that three subtypes in particular - Normal, Externalized, and Internalized - reliably characterize learning disabled children. Further, severity and type of psychosocial functioning were found to be related to performance on cognitive and academic achievement measures. A focus of continuing research in this area should be to better elucidate the nature of these psychosocial subtypes. In addition, future studies would be worthwhile to contribute to our understanding of relations between these patterns of psychosocial functioning (i.e., psychosocial subtypes) and subtypes of learning disabilities based on patterns of neuropsychological performance.

Limitations

The results of this study support previous findings concerning the relationship between age and psychosocial functioning (Fuerst & Rourke, in press-b) and cognitive and academic performance and psychosocial functioning (Fuerst &
Rourke, in press-a; Fuerst et al., 1990). However, the magnitude of this support was limited by several factors. The majority of these difficulties pertain to the nature of the sample of learning disabled subjects in this study. In the first instance, the sample was modest in size. In turn, the number of subjects in each of the seven psychosocial subtypes was highly variable and in some instances very small. This variability limited the analyses that could be conducted and limited test power. In addition, the number of subjects was less than ideal for the purposes of a factor analysis. A further consequence of the small subject numbers and a problem that is characteristic of clinic-referred subjects is a restricted range of performance patterns. That is, relatively few subjects displayed VIQ>PIQ discrepancies or large differences between WRAT Reading and Arithmetic and Spelling and Arithmetic standard scores. In addition, it is likely that certain groups of learning disabled children, such as NLD subjects, were underrepresented in the sample. In turn, these limitations reduced the potential for differences between the subtypes to emerge.

It is also important to note that the subjects used in this study were clinic-referred. Thus, the results are susceptible to the influence of referral biases. For example, children with extremely disruptive (severe) behaviour problems but relatively mild academic difficulties may be more likely to be referred to a clinic because they
exhibit problems at home or in the classroom. In turn, this pattern of referral could lead to results suggesting that children with more severe socioemotional disturbance perform better on cognitive and academic measures. It would be valuable, therefore, to examine the questions addressed in this study using a sample of learning disabled children obtained from the general population.

A final issue concerns the relationship between age and psychosocial functioning. Although the results of this study are notable, it is important to recognize the limitations of a cross-sectional investigation. For example, the stability of patterns of socioemotional functioning in the individual child is not addressed in this study. In addition, the results of this investigation are again susceptible to referral bias and, in particular, to variable bias at each age level. Finally, this study does not assess the risk of socioemotional disturbance in learning disabled relative to normal children.

Further research opportunities are suggested by the limitations of this study. In the first instance, only two measures of academic and cognitive functioning were employed in this study. It would be interesting to compare the psychosocial subtypes on a wider range of neuropsychological variables. Fuerst (1991) has compared the subtypes on several neuropsychological variables but with limited findings. Further, it is interesting to note that Harnadek
and Rourke (in press) have recently identified 4 tests, in particular, that discriminate NLD versus R-S subtypes and 2 tests that discriminate R-S versus NLD and Normal subjects. Only the latter two tests were included in the Fuerst (1991) study and the subtypes were found to differ significantly on those measures. Thus, it might prove worthwhile to compare the performance of the psychosocial subtypes on these two tests as well as the other four tests identified by Harnadek and Rourke (in press).

Second, as noted, a relationship has been proposed between psychosocial functioning and patterns of performance on neuropsychological measures. To date, the psychosocial subtypes have been compared with respect to performance on a (limited) range of measures in order to reveal potential differences in cognitive functioning. However, it is not unreasonable to expect that each subtype consists of subjects with varied neuropsychological profiles. Therefore, comparisons between the subtypes on neuropsychological measures may in fact obscure important differences. A valuable approach in future investigations may involve distinguishing learning disabled subjects on the basis of their neuropsychological profiles and then examining the distribution of psychosocial subtypes among these subtypes of learning disabled children.
REFERENCES


VITA AUCTORIS

Katherine D. Tsatsanis was born on December 10, 1967 in Toronto, Ontario. In the first quarter century of her life, she has pursued a range of interests, travelled extensively, and achieved several academic successes. In 1986, she graduated at the top of her class at North Toronto Collegiate Institute and was awarded the J.W. Billes Admission Scholarship to the University of Toronto. At U of T, she engaged in several areas of study and eventually obtained a Bachelor of Arts degree with a double major in Philosophy and Psychology. She graduated With High Distinction in 1991 and was awarded the Ethel Treble and Louis Barber Travelling Scholarship from Victoria College. Following graduation, she enroled in the Clinical Neuropsychology program at the University of Windsor. She has been awarded both a University of Windsor Tuition Scholarship and Ontario Graduate Scholarship.