

THE PREVALENCE AND CORRELATES OF BEHAVIOR PROBLEMS IN
LEARNING DISABLED CHILDREN

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ABSTRACT

A retrospective crosssectional study of the prevalence of emotional problems among 502 learning disabled children seen in a specialized learning centre was conducted. Learning disabled children, diagnosed by an experienced clinician, were classified as emotionally disturbed using the Child Behavior Checklist. The prevalence of behavior problems among these children was 43%. This was much larger than the 10% expected using this measure in a general population. There was no increased frequency of behavior problems among children referred by teachers compared with those referred by parents. Results of logistic regression analyses reveal that children who were adolescents, from nonintact families, or from lower social class backgrounds had increased odds of having behavior problems. The implications of these findings are examined, especially in the light of possible methodological problems including, principally, selection bias, which may account for the association found in other studies of this relationship.

RÉSUMÉ

On a fait une étude rétrospective sur la fréquence de troubles émotionnels dans un échantillon représentatif de 502 enfants souffrant de troubles de l'apprentissage et appartenant à un centre spécialisé. Ces enfants, diagnostiqués par un clinicien expérimenté, ont été identifiés comme ayant des troubles émotionnels selon la Child Behavior Checklist. 43% de ces enfants avaient des problèmes émotionnels. Ce chiffre est très supérieur aux 10% prévus pour la population en général. Les enfants envoyés par leur professeur ne présentaient pas plus de problèmes que ceux envoyés par leurs parents. Les résultats des analyses régressives logistiques révèlent que les enfants, en fait des adolescents, issus de familles brisées, ou de classes sociales défavorisées risquent plus d'avoir des problèmes émotionnels. Les implications de ces constatations sont en cours d'examen, en particulier dans le cadre de problèmes méthodologiques possibles, principalement de biais de sélection, pouvant justifier l'association relevée par d'autres études.

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LIST OF ABBREVIATIONS

CBCL	Child Behavior Checklist
DSM-III	Diagnostic and Statistical Manual for Mental Disorders (Third Edition)
IQ	Intellectual quotient
LC	Montreal Children's Hospital-McGill University Learning Center
L1	Studying in maternal language
L2	Studying in a language other than maternal language, including French immersion
PPVT	Peabody Picture Vocabulary Test
WISC-R	Wechsler Intelligence Scale for Children - Revised

INTRODUCTION

Learning disabled children exhibit delays in acquiring reading, spelling, or arithmetic skills. These delays are not explained by low intellectual potential, emotional problems, sensory impairments or environmental deprivation (Fletcher & Morris, 1986). Although by definition the term specific learning disabilities does not include children whose learning problems are primarily the result of emotional disturbance, nevertheless a strong association between specific learning disabilities and emotional problems is frequently reported (Harris, King, Reifler & Rosenberg, 1984; McConaughy & Ritter, 1986; McConaughy, 1986; Rutter, Tizard, & Whitmore, 1970). However, because many studies are flawed methodologically, it is not always clear whether learning disabled children are psychiatrically disturbed or simply at the lower end of a continuum of normal adjustment (Bruck, 1986).

In this thesis the terms psychosocial or psychiatric disturbance, emotional problems, and behavior disorders are used interchangeably to refer to a variety of emotional difficulties of a general, rather than a specific nature. All are associated with significant impairment in social and emotional functioning.

This study examines the prevalence and correlates of behavior problems in a clinical sample of learning disabled children. The potential bias in prevalence rates associated with sampling children referred by teachers compared to those referred by parents is estimated.

LITERATURE REVIEW

The emotional problems of learning disabled children have been studied using three different methods; population based samples, special education class samples, and clinic samples. Theoretically, population studies provide unbiased estimates of the association between learning disabilities and emotional problems, because the sampling procedure is relatively free of selection or detection bias. Selection bias is a distortion in the estimate of effect resulting from the manner in which subjects are selected for the study population (Kleinbaum, Kupper & Morgenstern, 1982). Detection bias is a type of selection bias that occurs when procedures used to identify disease status vary with exposure or outcome (Kleinbaum et al., 1982).

Several population based studies have shown that emotional problems are frequent among children with reading difficulties, the most common type of learning disability (Berger, Yule, & Rutter, 1975; Jorm, Share, Matthews, & Maclean, 1986; McGee, Silva & Williams, 1984; McGee, Williams, Share, Anderson & Silva, 1986; McMichael, 1979; Rutter et al., 1970). Rutter, Tizard & Whitmore's (1970) classic study of 10 and 11 year old children on the

Isle of Wight documented a strong association between reading underachievement and emotional problems. Reading retardation was defined using an IQ-achievement discrepancy, while emotional disorders were determined using parent and teacher questionnaires. Maladjustment, based on parent reports, was present among 24.1% of reading disabled children compared with 7.7% of controls, corresponding to a relative risk of 3.1. Teachers also classified more reading disabled children as emotionally disturbed than did parents. Teachers rated 37.2% of reading disabled children as emotionally disturbed compared with 9.5% of nondisabled children, a relative risk of 3.9.

Interpretation of these results is complex because children with reading disorders shared many characteristics common among children with behavior problems. Thus, it is unclear whether these common variables confound the association between learning and emotional disorders. Finally, because the study was limited to children similar in age, it is also difficult to generalize these results to children of other ages. For example, it was unknown whether learning disabled children had always had these high rates of emotional disorders, or whether the prevalence of emotional disorders among them increased as they grew older.

A longitudinal study, conducted in New Zealand, (McGee, Silva & Williams, 1984; McGee et al., 1986) extended Rutter et al.'s (1970) findings in several ways. First, by statistically controlling for social and demographic characteristics common to children with reading and emotional problems, the investigators observed that reading difficulties predicted emotional problems independently of other variables. Second, rates of emotional problems among the children with reading difficulties increased between ages 7 and 11. Parents or teachers, using the Rutter Child Behavior Questionnaire, rated 45% of 7 year old reading disabled children as emotionally disturbed compared to 30% of normal boys, a relative risk of 1.5. At age 11, boys were reexamined using The Diagnostic Interview Schedule for Children (Costello, Edelbrock, & Costello, 1985) (McGee et al., 1986). The Diagnostic Interview Schedule for Children is a lay administered interview that generates psychiatric diagnoses according to the Diagnostic and Statistical Manual for Mental Disorders Third Edition (DSM-III) (American Psychiatric Association, 1980). The prevalence of DSM-III axis 1 diagnoses was 51% in disabled readers and 18% in nondisabled readers, corresponding to a relative risk of 2.8. Inferences from this study are limited, however, because the cohort was from one

hospital, middle class, and therefore not representative of the entire New Zealand population. In addition, the Rutter Teacher and Parent Child Behavior Questionnaires, the instruments used to ascertain psychopathology at age 7, have only been validated on children between ages 9-11. Because the nature and number of symptoms vary in children of different ages (Lapouse & Monk, 1964), use of this questionnaire in younger children may be inappropriate.

Other community surveys also noted increased psychopathology among reading disabled compared with nondisabled readers (Berger et al., 1975; Jorm et al., 1986; McMichael, 1979). The most noteworthy of these is Berger et al.'s (1975) study of reading disabled boys and girls living in an Inner London Borough. Using the teacher as the informant, rates of psychopathology among reading disabled and nondisabled readers were higher than those reported in the Isle of Wight, but the relative risk of psychopathology for reading disabled compared with nondisabled readers was lower than that reported in the Isle of Wight. Although reading disabled girls had lower rates of psychopathology than the disabled boys (31.2% vs. 49%), disabled girls had 2.4 times the rates reported for nondisabled readers, while disabled boys had twice the risk of psychopathology compared to nondisabled boys.

Interpretation of this study is problematic because the measures of psychopathology only relied on teachers as informants. Relying on either teachers or parents to evaluate psychopathology in children is problematic because there is little overlap between children identified as deviant by either adult (Rutter et al., 1970). In addition, because teachers observe learning disabled children at their worst, their reports may be more negative than those of parents. In fact, relative to patterns found for nondisabled children, teachers rate reading disabled children as more emotionally maladjusted than do school screening committees (Kavale, Alper, & Purcell, 1981). The result is misclassification of more well adjusted learning disabled children than nondisabled children as psychiatrically impaired.

The studies of Jorm et al. (1986) and McMichael (1979) are more difficult to interpret because the measures of psychopathology were more limited. For example, the instruments had not been validated in younger children and only relied on teachers as informants.

In summary, population surveys estimate that between 24% and 52% of reading impaired children have emotional problems. These rates are 1.5 to 4.0 times greater than the prevalence rates reported among nondisabled children. Although all studies demonstrated more psychopathology

among disabled readers compared to nondisabled readers, these studies all share one additional methodological flaw. The large number of subjects in these studies often precluded detailed examination of the children and therefore statistical rather than clinical definitions of learning disabilities were adopted. Thus, learning disabilities were diagnosed only on the basis of low scores on tests of achievement. Because children with psychiatric problems, such as depressive neurosis, may have poor academic performance (American Psychiatric Association, 1987), thorough evaluations of children are required in order to exclude those whose academic problems are a direct consequence of emotional disturbance. Sole reliance on below average scores without a global assessment may misclassify emotionally disturbed children as learning disabled thereby inflating the association between learning disabilities and emotional problems.

Studies of learning disabled children sampled from special education classes also report that learning disabled children have more signs of emotional problems than normal children, but fewer than emotionally disturbed children (Cullinan, Epstein, & Dembinski, 1979; Gajar, 1979; Epstein, Cullinan & Nieminen, 1984; Harris et al., 1984).

For example, Harris et al. (1984) determined the prevalence of psychopathology among learning disabled boys ages 6-12 attending a special education school. These boys were diagnosed as learning disabled according to state guidelines. Psychopathology was determined from the Teacher Report Form (Achenbach & Edelbrock, 1986). Fifty percent of children had at least one elevated subscale. If children were only deviant on one subscale of the checklist, then the maximum expected in a 'control' population would be 18%. The minimum relative risk would therefore equal 2.8.

The remaining school studies used checklists that provide data on the number of symptoms of emotional problems children exhibit. They do not, however, determine the prevalence of psychopathology within the learning disabled sample. Some studies suggested that learning disabled girls have more psychosocial disturbance than learning disabled boys. Cullinan, Epstein, & Lloyd (1981) found rates of anxiety, nonparticipation, and poor self confidence were remarkably similar for boys and girls. Because boys are expected to have more behavior problems than girls (Links, 1983), this can be interpreted as a relative increase in behavior problems for girls compared with boys. Bryan (1974) and Scranton & Ryckman (1979) also noted that learning disabled girls suffer more

rejection from peers than learning disabled boys. Bruck (1986) argues that the association may be biased by referral practises. For example, adults may only refer learning disabled girls for treatment when girls have associated emotional problems, whereas referral practises for learning disabled boys may be independent of behavior problems. Direct comparisons of prevalence rates of emotional disturbance among learning disabled boys and girls identified by teachers are, however, lacking.

While studies of school samples indicate an association between learning disabilities and behavior problems, there are again several important methodological issues to be considered. First, many school identified learning disabled children are often misclassified (Shepard & Smith, 1983). For example, in a representative sample of 1,000 learning disabled children identified by the state of Colorado, 57% percent were misclassified, and 11% had primary emotional problems. The use, therefore, of learning disabled children identified only by the school for research, is problematic (Morrison, MacMillan, & Kavale, 1985).

Second, Shepard & Smith (1983) suggest that teachers may remove behaviorally difficult learning disabled children from regular classes and transfer them to special classes. Generally, among handicapped children,

those with behavior problems are more likely to be referred for special education than those without emotional disorders (Pless, 1969). Thus, it is probable that learning disabled children with behavior problems may also be referred for special education more frequently than well adjusted learning disabled children. Because many school studies sample learning disabled children from special classes, the rates of behavior problems may be biased selection factors and may not generalize to the learning disabled population.

Finally, studies of school samples determined psychopathology using only teacher reports. Thus, well adjusted learning disabled children may be misclassified as emotionally maladjusted learning disabled children (Kavale, Alper, & Purcell, 1981). These misclassification and selection biases, if present, inflate the association between emotional problems and learning disabilities and limit the validity of the findings.

Clinic samples of learning disabled children provide an opportunity to study learning disabled children who have undergone thorough evaluations. Thus, children whose learning problems are caused by social and emotional problems are less likely to be misclassified as learning disabled.

Clinic samples also note that learning disabled children have more behavior problems than controls (Aman, 1979; Campbell, 1974; Gajar, 1979; McConaughy & Ritter, 1986; McConaughy, 1986). Among these samples, the largest is that reported by McConaughy & Ritter (1986) and McConaughy (1986). At the University of Vermont's Center for Disorders of Communication, the emotional problems of 123 learning disabled boys age 6-11 (McConaughy & Ritter, 1986) and 53 learning disabled boys age 12-16 (McConaughy, 1986) were examined using parent ratings on the Child Behavior Checklist (Achenbach & Edelbrock, 1983). Average behavior problem scores were at the 90th percentile, the point demarcating children seen in psychiatric settings from those not in treatment. The average social competence was lower than that expected in a normal population but higher than that expected in children attending psychiatric settings. For boys age 6-11 there were significant, but low, positive correlations between IQ scores and behavior problem scores, while for boys 12-16, there was no relationship between IQ and behavior problem scores. This study did not, however, report the percent of children whose scores were similar to those of children seen in psychiatric settings. Thus, the prevalence of psychiatric impairment among the learning disabled boys was not determined.

The present study examines the prevalence and the correlates of behavior problems in learning disabled children. It is an extension of other studies (McConaughy, 1986; McConaughy & Ritter, 1986) in that it provides prevalence rates for girls and boys, as well as the correlates of behavior problems among the learning disabled children.

Although most samples showed that learning disabled children have more emotional problems than controls, it is clear that not all learning disabled children suffer from emotional problems. Therefore, it is important to determine those characteristics associated with behavior problems among learning disabled children. Some correlates of emotional disturbance in community samples of nondisabled children include: age, intelligence, sex, social class (Offord, 1985), special class placement (Offord et al., 1987), chronic medical illness (Pless & Roghmann, 1971) and family composition (Links, 1983). While there is little reason to suspect that such correlates of behavior problems differ among learning disabled, this has not received much attention. In this thesis these variables, along with others that are specifically relevant to the experience and backgrounds of learning disabled children are examined. These include grade repetition, language of instruction compared to

maternal language and family history of learning difficulties.

Although a growing body of evidence suggests that learning disabilities are familial (Decker & Defries, 1980; Defries, Singer, Foch, & Lewitter, 1978; Rutter et al., 1970; Volger, Defries, & Decker, 1985), the psychosocial development of children with familial learning disabilities has not been examined. It is hypothesized that children with familial learning disabilities have more severe illness, and that this may lead to more psychosocial impairment.

In addition, because this study is clinic based, bias associated with sampling children referred by teachers compared to those referred by parents is determined. It is hypothesized that teachers refer more learning disabled children with behavior problems than do parents, because the disturbed child is more likely to be disruptive in class and so be identified.

It is hypothesized that rates of psychiatric disorders among girls referred by teachers will be greater than that among boys referred by teachers, supporting Bruck's argument that there may be a systematic sex bias in the referral of learning disabled girls such that adults only refer girls who also have behavior problems (Bruck, 1986). Because this argument is based on studies of

children identified in schools, it is expected to hold for teachers but not for parents.

OBJECTIVES

Major Objectives

1. To estimate the prevalence of behavior problems in learning disabled girls and boys attending a specialized clinic.
2. To determine whether children referred by teachers have more behavior problems than those referred by parents.
3. To determine whether girls referred by teachers have more behavior problems than boys referred by teachers.

Secondary Objectives

1. To determine whether the prevalence of emotional problems in learning disabled children is greater in the presence of familial learning difficulties than in their absence.
2. To determine the relative contributions of intelligence, age, family composition, social class, language of instruction relative to maternal language, grade failure, special class placement, and chronic medical illness on behavior problems in learning disabled children.

METHOD

Setting

This study was conducted at the Montreal Childrens Hospital-McGill University Learning Centre (LC), a specialized treatment setting for children with specific learning disabilities. This centre, staffed by educators and psychologists, provides psychoeducational assessments in English and French. It accepts referrals from parents, teachers, professionals and other sources. Clients receive services free of charge.

The LC is one of several services available to children on the island of Montreal. Montreal's public school boards and private schools also provide psychoeducational assessments to children attending their schools. Children may, therefore, be referred to the LC for various reasons including a request for an independent assessment, a second opinion, diagnostic teaching, or remediation. Children in remote areas are also referred to the LC when local services are inadequate.

Children who are perceived to have academic problems and emotional problems tend to be referred to psychiatric settings rather than to the LC.

After an initial telephone contact with the clinic and prior to the assessment, parents routinely completed the Background Information Form (Appendix A) and the Child Behavior Checklist (CBCL) (Achenbach & Edelbrock, 1983) (Appendix B).

Procedure

Subject Selection.

The charts of all children assessed at the LC between 1982 and 1986 were reviewed. There were 643 children between 6 and 16 years old whose charts contained the completed CBCL and the Background Information Form.

From this population, the author identified 502 children who were diagnosed as learning disabled by an experienced clinician. These children demonstrated below average performance in reading, spelling or arithmetic skills. All were, however, of average intelligence, as demonstrated by a standard score of 80 or higher on at least one subscale of the Wechsler Intelligence Scale for Children Revised (WISC-R) (Wechsler, 1974), the Stanford-Binet (Terman & Merrill, 1973) or the Leiter (1969) Intelligence test (Siegel & Heaven, 1986). In the absence

of a conventional measure of intelligence a score of 80 or greater on the Peabody Picture Vocabulary Test (PPVT)(Dunn & Dunn, 1981) was taken to indicate average intellectual functioning. Evidence suggests that the PPVT underestimates the WISC-R in the lower spectrum of ability, but provides comparable estimates in the average range (Altepeter & Handal, 1986). This finding supports the decision to include these children in the sample in the absence of a more definitive measure of intelligence.

Children with demonstrable evidence of organic brain damage, such as epilepsy, were excluded. (A detailed description of the diagnoses of the 643 children whose charts were reviewed is contained in Appendix C.)

Data Collection.

The following information was abstracted from each chart on to a coding schedule (Appendix D):

1. Age at the time of the assesment.

This was coded either from the clinican's assessment and from the Child Behavior Checklist. When coded from the Child Behavior Checklist, the child's age was categorized into the 6-11 (or latency) age group, or the 12-16 (or adolescent) group. These categories were chosen because they correspond to those used to standardize the Child Behavior Checklist.

2. Gender.

3. Grade placement at the time of the assessment.

When the child's assessment occurred during the summer, the child was treated as if he was already in the next grade.

4. Socioeconomic class.

This was determined using Green's (1970) Index of social class. The index is based on a weighted average of the mother's education and the father's occupation (Green, 1970). The educational levels and occupations of parents were converted to standardized scores. When there were step-parents or guardians these were treated as if they were mothers or fathers. If the mother was a housewife, she was considered to be unemployed.

From the standardized score of the mother's education and the father's occupation, the socioeconomic class was predicted using the following equation:

Socioeconomic index = $0.7 \times$ standardized score of the maternal education + $0.4 \times$ standardized score of the father's occupation.

When the score of one parent was missing, the score of the other was substituted.

5. Family History of Learning Difficulties.

This was obtained from the background information form. This was considered to be positive when either one of the parents, siblings, or a member of the parent's

family had experienced learning difficulties. Parents were asked to indicate if anyone in the family other than the child (mother, father, brother, sister, or extended family of either parent), had any of the following difficulties: trouble learning to read or spell, trouble with arithmetic, speech or language problems, or had repeated a grade. When parents noted that a major psychological or social stressor, for example parental death, coincided with academic failure, this was not considered to represent a learning difficulty.

6. Family configuration.

Family structure was classified as 'intact' or 'nonintact'. Intact families included only children living with both biological parents. Thus, adopted children were considered to be living in 'nonintact' families.

7. Language of Instruction.

The child's language of education was compared to the maternal language. A child was classified as studying either in his maternal language (L1), or in another language (L2). Thus a child studying in a second, or third language, or in a French Immersion program was considered to be studying in L2.

8. Academic History.

If the child had been placed in a special education class, or had repeated a grade prior to or at the time of the assesment, this was recorded. Special class placement was defined as either a learning disability class, a reading readiness class, or a preparatory class. Children who received tutorial or free flow assistance were not considered to be in a special classes because they spent the majority of their time in regular classes.

9. Intelligence.

The following commonly accepted measures of general intelligence were used; The Wechsler Intelligence Scale for Children-Revised (WISC-R) (Wechsler, 1974), the Stanford-Binet (Terman & Merril, 1973), and the Leiter (1969). Most children were administered these tests at the LC. In some instances children presented to the clinic having had a recent intelligence test administered. When this occurred, the tests were not repeated and these results were coded.

10. Peabody Picture Vocabulary Test (PPVT) (Dunn & Dunn, 1981).

This test uses a measure of receptive vocabulary and provides a rough estimate of verbal ability and scholastic aptitude.

11. Chronic Medical Illness.

Children with a medical illness of more than 6 months duration were classified as having a chronic medical illness. This included those with central nervous system dysfunction, asthma, diabetes or heart disease, but excluded those with chronic or recurrent acute respiratory infections.

12. Referral source.

Information recorded from the initial telephone contact with the clinic, in conjunction with the psychoeducational assesment, was used to determine whether parents or teachers had initiated the referral. If a physician initiated the referral, this was considered to be a parent referral because it was felt that the parents had brought the learning problem to the physicians attention. When this was unclear, clinicians who had evaluated the children were consulted. Referral sources for 491 subjects were identified.

13. Behavior Problems.

Parents completed the Child Behavior Checklist (CBCL) (Achenbach & Edelbrock, 1983). This scale was chosen because it has been standardized to distinguish between children in psychiatric treatment and those not in treatment.

The CBCL includes 118 behavior items scored 0-2 (0 = not true; 1 = somewhat or sometimes true; 2 = very true or often true). When scores for individual items are summed, they are converted and expressed as a standardized T score for children of each sex in the 6-11 or 12-16 age group. Children were classified in the 'clinical range' if standardized scores were greater than the 90th percentile provided by the normative data. This corresponds to a summary T score greater than 63.

Children are also assigned scores on narrow band syndromes derived from factor analysis of the checklist. These narrow band syndromes are different for girls and boys at ages 6-11 and 12-16. Children with elevated scores on these narrow band scales have standardized scores above the 98th percentile, that is $T > 70$.

The CBCL also provides standardized scores for externalizing and internalizing problems. Children are classified as externalizers or internalizers if they are in the 'clinical range' and if there is a minimum of ten points difference between the internalizing and externalizing scales.

The reliability of this measure has been established using a one week test-retest as the criterion. Inter-parent reliability in clinical samples ranges from 0.54 to 0.79. The validity of this measure has also been

well established. Total score on the CBCL correlates well with other behavior checklists. This provides evidence of construct validity. The scales also distinguish between referred and nonreferred children on all behavior problem scales, providing further evidence for their validity as a measure of psychopathology.

Data Analysis.

The data were analyzed using the statistical procedures available on SAS (1985) and BMDP (1981). SAS was used for descriptive statistics and general linear regression. BMDP was used for logistic regression analyses.

The following items were treated as categorical variables: sex, age, family composition, family history of learning difficulties, language of education relative to maternal language, history of special class placement, history of grade repetition and chronic medical illness. The following were treated as continuous variables: socioeconomic class and the full score on the WISC-R or its equivalent.

In the logistic regression analyses the variables forced into the equation were: referral source, gender, and family history of learning difficulties. All other

variables were entered into, or removed from the regression, in a stepwise fashion.

Imputing Missing Values.

Because some subjects were missing either a WISC-R score or a Socioeconomic Index these scores were imputed from a regression equation so as to maximize the number of subjects available for the logistic regression analyses. Missing WISC-R scores for 44 subjects were predicted from a regression of PPVT on WISC-R for subjects with both scores (Appendix E) using the following equation:
$$\text{Intelligence (WISC predicted)} = 58.27 + 0.46 \times \text{PPVT}.$$

The index of socioeconomic class was estimated for 28 subjects on whom only the mother's educational level was known. The following equation was derived from a linear regression between maternal education and socioeconomic index for subjects with both maternal education and father's occupation (Appendix F):
$$\text{Socioeconomic class (predicted)} = 12.68 + 0.89 \times \text{maternal education}.$$

These steps resulted in the inclusion of 477 subjects in the final logistic regression equations.

RESULTS

The demographic characteristics of the learning disabled children are shown in Table 1. Seventy percent of the sample were boys. The children were on average, ten years old. The average socioeconomic index was 60, with an actual range of 39-84 within a possible range of 30-85. Approximately two-thirds lived in intact families and two thirds had at least one family member with a reported history of learning difficulties. About seventy percent were studying in their maternal language. The children were of average intelligence. Further details in the Appendices describe the distribution of familial learning difficulties (Appendix G), family configuration (Appendix H), home language (Appendix I), school language compared to maternal language (Appendix J), and chronic medical illness (Appendix K). Although the LC's clientele is primarily English speaking, their educational and occupational backgrounds is similar to residents in Metropolitan Montreal (Appendix L).

Table 2 presents summary scores of the CBCL. The average CBCL scores on the total standardized total behavior scores and the internalizing and externalizing broad band scales, were approximately one standard deviation above that expected for a 'normal' population.

Prevalence of Behavior Problems (Major Objective 1)

Forty three percent of girls and 44% of boys had clinically significant behavior problems (Table 2). This was more than four times the 10% expected in a comparable healthy population. As can be seen from Tables 2 and 3, substantial numbers of learning disabled children showed behavior problems across all narrow band scales and on the internalizing and externalizing broad band scales. According to CBCL criteria, less than 10% of children could be classified as either externalizers or internalizers.

Prevalence of Behavior Problems Among Children Referred by Teachers Compared to Those Referred by Parents (Major Objective 2)

Prevalence rates for children referred by teachers did not differ from those referred by parents (Table 2). This was true for both boys ($\chi^2 = 0.008$, 1 df, $p=0.928$) and girls ($\chi^2 = 0.332$, 1 df, $p=0.565$). The unadjusted odds of having a behavior problem for boys referred by teachers compared with the odds of boys referred by parents was 0.98 (95% confidence interval 0.63-1.53). For girls, the comparable unadjusted odds ratio was 1.23 (95% confidence interval 0.61-2.46).

To determine whether referral source was associated with a particular narrow band scale, the percent of children in each age group who had deviant behavior and had been referred by schools was compared with the percent who had deviant behavior and who had been referred by parents (Table 4). Thirty five comparisons resulted in only two statistically significant findings ($p = 0.04$). Since multiple comparisons had been undertaken, these results are not considered to be significant (Colton, 1974).

Comparison of Relative Prevalence Rates Among Girls
Referred By Teachers Compared to Boys Referred By Teachers
(Major Objective 3)

There is no statistically significant difference between prevalence rates of boys and girls referred by teachers ($\chi^2 = 0.08$, 1df, $p = 0.78$) (Table 1). Examination of the crude data also failed to reveal any evidence of an interaction between referral source and gender.

The Correlates of Behavior Problems in Learning Disabled Children (Secondary Objectives 1,2)

The correlates of behavior problems among learning disabled children were examined initially using bivariate statistics. The results of these analyses are summarized in Table 5. The following characteristics were associated with clinically significant behavior problems (Standardized total behavior score greater than 63); age 12-16, family configuration, special class placement, language of instruction compared to maternal language, and grade failure. To examine the association between predictor and outcome variables when the predictor variable was a continuous variable, the summary behavior problem score was used as the dependent variable. The total behavior problem score was significantly associated with socioeconomic class ($F, 1, 460 = 4.29, p = 0.04$) and IQ ($F, 1, 454 = 4.13, p < 0.04$), but neither accounted for more than 9% of the variation in behavior problem scores.

To control for variables that might potentially confound the association between referral source and behavior problems, and to determine the independent effect of each predictor variable in the presence of the other variables, a stepwise forward logistic regression was performed with the presence of clinically significant behavior problems, that is a summary T score greater than

63, as the outcome variable. Gender, familial learning difficulties, and referral source were forced into the regression equation. The following predictor variables were offered as candidates in the logistic regression model: age group, full WISC-R score, socioeconomic index, family composition, language of instruction (compared to maternal language), history of having repeated a grade, a history of special class placement prior to or at the time of the assesment, and chronic medical illness.

The results of these logistic regression analyses are summarized in Table 6. Referral source, sex, intelligence, history of grade repetition, language of instruction, and chronic medical illness were not associated with an increased odds of having behavior problems. The likelihood was, however, significantly increased if the child was in the 12-16 age group compared to the 6-11 age range; if the child was of lower social class; or if the child was not living in an intact family. There were trends for those with familial learning difficulties or a history of special class placement to have more behavior problems than those with a negative family history or attending regular classes, but these did not reach conventional levels of statistical significance ($p < 0.05$).

To assess the confidence interval of variables excluded from the logistic regression equation, these variables were forced into the logistic regression equation. As can be seen from Appendix L, the odds ratios were close to unity and the confidence intervals around these variables were not large. These variables are not, therefore, associated with behavior problems in multivariate analyses.

To determine whether the lack of an interaction between referral source and gender might be confounded by effects of other variables, the interaction of sex and referral source was examined in the logistic regression model when referral source, age group, gender, family composition, socioeconomic index, familial learning difficulties, and special class placement were retained in the model. The interaction term failed to enter the stepwise forward logistic regression ($p > 0.10$) and was removed when forced into the model ($p < 0.15$). When the interaction term was forced into the model, the relative odds of having behavior problems for girls referred by teachers compared to that of boys referred by teachers was 1.20 (95% confidence interval 0.49-2.90).

DISCUSSION

Prior to discussing the findings, the quality of the data needs to be examined. First, because of the retrospective nature of the study, information on some variables was limited. For example, in some cases it was difficult to determine parents' occupation from the available information. A prospective design would also have generated more detailed information about referral processes. In this study, this had to be inferred from the intake form and the assesment history. Although this information was not systematically collected through a checklist or measure about the referral process, the clinic routinely asked for information regarding the referral to the LC and thus these data are probably adequate. The reliability and validity of other variables such as medical illness and family history of learning disabilities is not known but is generally assumed to be reasonably accurate when based on parent reports.

Second, although this study relied on the diagnosis of experienced clinicians to determine the presence of learning disabilities, the reliability of their diagnoses was not established. Thus, given the different operational definitions of learning disabilities (Fletcher & Morris,

1986), it is not certain that clinicians were rating children consistently. To minimize this type of error, all histories were read and re-evaluated by myself (a psychiatric resident) or a psychologist.

Third, the CBCL is a limited measure of psychopathology because it only relies on parents as informants. It would have been preferable to determine psychopathology using psychiatric interviews and supplementary information obtained from parents and teachers. Several investigators have recommended that the best estimate of psychiatric illness may be obtained by multiple informants along with an independent assesment of the children (Weissman et al., 1987; Young et al., 1987). In the absence of more comprehensive assesments, the CBCL does, however, provide reasonable estimates of the prevalence of clinically significant behavior problems.

Finally, this study did not have a concurrent control group, and it was necessary to rely on American normative data to determine the relative risk of behavior problems among learning disabled. Although there is little reason to expect major differences between American and Canadian normative data, the use of these normative data among Canadian children has been questioned by some

investigators who have used a modified version of the CBCL (Woodward, Thomas, Watters, & Links, 1987).

Despite these shortcomings, this study reveals a strong association between learning disabilities and significant behavior problems. More than 40% of the learning disabled children were classified as having significant behavior problems. The norms for this checklist are such that 10% of a control population would be deviant, therefore, the relative risk for having a behavior disorder for learning disabled girls and boys is 4.0. These rates are consistent with what has been observed in community and school samples of learning disabled children (McGee, 1986; Harris, King, Reifler, & Rosenberg, 1984). The average total behavior problem scores are also similar to those noted in other clinic settings that used the CBCL (McConaughy & Ritter, 1986; McConaughy, 1986).

The association between learning disabilities and emotional problems was not explained by an increased prevalence of behavior problems among children referred by teachers compared to those referred by parents. Thus, behavior problems do not appear to sensitize teachers more than they do parents to suspect a learning disability. Perhaps both are sensitized equally to academic problems

when emotional problems are present. Only a population-based study could address this issue.

There was no difference in the proportion of girls and boys classified as emotionally disturbed. Although this contradicts the observation that nonlearning disabled boys have more psychiatric disorders than girls who do not have learning disabilities (Anderson, Williams, McGee, & Silva, 1987; Cullen & Boundy, 1966; Goldberg, Roghmann, McInerny, & Burke, 1984; Lapouse & Monk, 1964; Leslie, 1974; Papatheophilo, Bada, Mischeloyiannakis, Makaronis, & Pantelakis, 1981; Offord, 1985; Werry & Quay, 1971), this finding is consistent with the CBCL being standardized separately for girls and boys. Thus, the effect of the learning disability and the sex of the child appear to operate independently in increasing the likelihood of children having significant psychosocial maladjustment. These findings contradict sociometric data suggesting that girls suffer more peer rejection than boys (Bryan, 1974).

The hypothesis that girls referred by teachers have more emotional problems than boys was also not supported. Thus, behavior problems in girls do not appear to heighten teachers' sensitivity to an underlying learning disability compared with behavior problems in boys. This indirect evidence fails to support the speculation that emotional

problems play a role in the identification of learning disabled girls (Bruck, 1986; Bryan, 1974).

The correlates of emotional problems in children can be grouped according to whether they relate to children, schools, or families. Among variables directly related to children, only age was significantly associated with behavior problems. Learning disabled children aged 12-16, compared with those age 6-11, had an increased risk of having behavior problems. The odds of behavior problems for older children was 1.8 times that for younger children.

Perhaps as children deal with more advanced academic material, more failure is experienced. This may lower their self esteem and their risk for developing behavior problems. Community cohort studies (McGee et al., 1986; McMichael, 1979), though flawed methodologically, also report increased rates of behavior problems among older reading disabled children. Alternatively, the increased rates of behavior problems among older children may reflect different selection factors operating in the identification and referral of children in this age group. Prospective longitudinal studies may resolve these issues.

In this study intelligence was associated with total behavior scores in univariate analyses but explained only 9% of the variation in total behavior scores. This is consistent with results from community surveys of nondisabled children (McGee et al., 1985; Rutter et al., 1970). Rutter et al. (1970) also observed statistically significant, but small differences in intelligence scores between children with behavior problems and well adjusted children. McGee et al. (1985) noted statistically significant correlations between intelligence and behavior problems, but again these explained only 5% of the variation in behavior scores. Among learning disabled children intelligence was associated with behavior problems among boys 6-11 but explained only 7% of the variation in total behavior scores (McConaughy & Ritter, 1986). Intelligence was not associated with behavior problems among learning disabled boys aged 12-16 (McConaughy, 1986). In the present study, intelligence was not associated with the presence of clinically significant behavior problems in multivariate analyses. Because intelligence is associated with social class (Rutter et al., 1970) and explains only a small fraction of variation in total behavior scores, it is likely that this association is confounded by other variables.

The familial and environmental characteristics associated with behavior problems were family composition and social class. Children with learning disabilities from nonintact families had more behavior problems than those living in intact families. This finding is consistent with observations made in other community studies (Goldberg et al., 1984).

Children of lower social class also had more behavior problems than those of upper socioeconomic classes, consistent with the majority of data from community surveys (Links, 1983; Offord, 1985).

There was a trend toward an increased risk of psychosocial maladjustment if a child had a family history of learning difficulties. The odds of having a behavior problem for those with a family history of learning difficulties was 1.5 times that for children with no reported family history of such difficulties. A family history of speech, language, or reading difficulties has been associated with psychiatric illness in children with speech and language impairment (Beitchman, 1985) in univariate but not multivariate analyses (Beitchman, Peterson, Rochon, Hood, Majumdar & Mantini, 1987). In this study there was also no independent effect of family history of learning difficulty when multivariate analyses were undertaken. However, there were trends for those

with familial learning difficulties to have more behavior problems than those without familial learning difficulties.

While the meaningfulness of this finding is questionable, given the self-report nature of these data and the possibility that this variable may be subject to recall bias, it is interesting to speculate on possible explanations for the association between family history of learning difficulties and behavior problems in learning disabled children. If family history of learning difficulties results in more severe learning disabilities, and if the severity of the disability is related to the prevalence of emotional difficulties, then this may explain the observed relationship.

Another possibility is that parents' expectations and hopes for their children may vary with parents' academic history. Parents with learning difficulties may place their unmet wishes for academic success on their children. When these needs are not fulfilled as their children fail, the parents disappointment may be greater than that of parents who are not as highly invested emotionally in their children's success. This increased sense of failure may be transmitted to the failing child and may then increase the child's vulnerability to emotional difficulties. These altered expectations may enhance

childrens' sense of failure and result in more psychosocial maladjustment. Whether the increase in behavior problems is mediated through more severe illness, or different family and environmental factors, remains to be determined.

The influence of school variables on learning disabled children's emotional adjustment was also examined. Grade repetition was associated with behavior problems in univariate but not in multivariate analyses. Although repeating a grade may be hypothesized to lower self esteem and hence increase children's likelihood of developing social and emotional difficulties. The results of this study suggest that repeating a grade does not increase children risk for behavior problems when other variables such as sex, social class, and family configuration are controlled for statistically.

Although placement in special educational classes was associated with behavior problems in univariate analyses, this association also did not reach conventional levels of statistical significance in multivariate analyses. This study reveals trends for those who had been in special classes to have higher rates of behavior problems than those in regular classes, consistent with the results of a community survey of Canadian children (Offord et al., 1987). Thus, the independent effect of attending special

classes appears to have a more negative influence on childrens emotional development than repeating grades. The implications of this difference are, however, unclear. It may be that placement in special educational classes results in more labelling and therefore more lowered self esteem than is experienced by children who repeat grades. Alternatively children who are transferred to special classes may have more emotional problems than learning disabled children who repeat grades. Finally, learning disabled children attending special education classes may have more severe disabilities than those children in regular classes, and severity of the disability may be associated with increased behavior problems.

Children studying in their own maternal language had higher rates of behavior problems than those enrolled in bilingual, trilingual or second language programs in univariate analyses, but again this did not reach conventional levels of statistical significance in multivariate analyses. One reason for this association may be that those in maternal language programs are more likely to be in special education classes or of lower socioeconomic class. Thus, the initial association may be confounded by these variables.

In this study intelligence, chronic medical illness, language of instruction relative to maternal language, and

history of grade repetition had no main effect on the likelihood of learning disabled children having behavior problems. However, the cross-sectional and retrospective nature of the study limits interpretation of these data.

CONCLUSION

This study reveals a strong association between learning disabilities and behavior problems. The rates obtained in the present study are consistent with rates from studies of special education classes and those from community samples of reading disabled children. Forty-four percent of boys and girls had behavior problems similar to those observed in children who attend psychiatric clinics. There was no evidence to support the hypothesis that learning disabled children referred by teachers had more behavior problems than those referred by parents. There was also no evidence to suggest that girls referred by teachers had relatively more behavior problems than boys referred by teachers. This suggests that teachers were not more likely than parents to suspect learning disabilities among the behaviorally disturbed or among females.

The univariate correlates of behavior problems included age, socioeconomic class, intelligence, family composition, special class placement, studying in maternal language compared to a second language, and having repeated a grade. However, after multivariate analyses

were performed only socioeconomic class, family composition, and age independently increased odds of having behavior problems.

Table I

Demographic Characteristics of Learning Disabled
Children by Referral Source

Variable	Referral Source					
	Parent		Teacher		All ^a	
	Boys	Girls	Boys	Girls	Boys	Girls
No.	223	98	122	48	350	152
Age						
Mean	10	9.9	11	10	10	10
SD	2.2	2.1	2.6	2.6	2.4	2.3
Grade						
Mean	4.0	3.8	4.7	4.2	4.2	4.0
SD	2.2	2.0	2.3	2.6	2.2	2.2
Social Class						
Mean	62	63	59	61	61	62
SD	8.0	8.9	9.2	7.9	8.5	8.8
Intact Family (%)	76	73	73	69	75	71
Family History (%)	72	65	60	70	67	66
Medical Illness (%)	10	15	11	4	10	11
L1 ^b (%)	68	65	67	81	67	69
Repeated Grade (%)	40	31	41	27	40	29

(table continues)

Variable	Referral Source					
	Parent		Teacher		All ^a	
	Boys	Girls	Boys	Girls	Boys	Girls
Special Class (%)	19	23	25	31	21	26
WISC-R ^c						
Mean	103	100	100	99	102	100
SD	13	12	15	11	13	12
PPVT ^d						
Mean	91	86	91	89	91	88
SD	14	13	16	14	15	14

^aIncludes 11 subjects whose referral source is unclear.

^bL1 = studying in maternal language.

^cWechsler Intelligence Scale for Children Revised.

^dPeabody Picture Vocabulary Test.

Table II

Standardized Behavior Scores and Prevalence of Clinically
Significant Behavior Problems

Variable	Referral Source					
	Parent		Teacher		All ^a	
	Boys	Girls	Boys	Girls	Boys	Girls
Summary T						
Mean	61	61	61	62	61	62
SD	9.9	10	11	9.0	10	10
% Deviant	44	41	43	46	44	43
Externalizing T						
Mean	61	60	60	62	61	61
SD	9.0	9.9	10	9.0	9.4	10
% Deviant	45	33	39	46	43	38
Internalizing T						
Mean	60	59	59	60	60	60
SD	9.9	9.6	10	9.1	10	9.5
% Deviant	45	37	39	35	43	37

^aAll includes 11 subjects for whom referral source is unclear.

Table III

Narrow Band Scales on the Child Behavior Checklist

	Mean	SD	% Deviant
Boys 6-11 (<u>n</u>=258)			
Anxious	62	7.4	18
Depressed	62	7.2	14
Uncommunicative	63	9.2	26
Obsessive-Compulsive	60	6.4	12
Somatic Complaints	60	6.4	8
Social Withdrawal	62	7.3	9
Hyperactive	66	8.3	27
Aggressive	61	7.7	17
Delinquent	61	6.2	9
Boys 12-16 (<u>n</u>=92)			
Somatic Complaints	63	7.6	21
Schizoid	63	7.6	18
Uncommunicative	64	8.8	18
Immature	67	9.5	33
Obsessive-Compulsive	61	7.9	10
Hostile Withdrawal	66	9.0	27
Delinquent	63	6.0	10
Aggressive	63	8.8	15
Hyperactive	70	10.5	49

(table continues)

	Mean	SD	% Deviant
Girls 6-11 (<u>n</u>=126)			
Depressed	63	9.8	22
Social Withdrawal	63	8.4	23
Somatic Complaints	60	6.0	6
Schizoid Obsessive	59	5.0	0
Hyperactive	67	8.8	33
Sex problems	62	8.3	13
Delinquent	61	5.8	5
Aggressive	62	8.1	19
Cruel	60	5.2	2
Girls 12-16 (<u>n</u>=26)			
Anxious Obsessive	65	7.3	27
Somatic Complaints	66	8.7	35
Schizoid	62	6.1	8
Depressed Withdrawal	65	8.9	19
Immature Hyperactive	68	9.0	42
Delinquent	64	7.2	12
Aggressive	64	7.3	8
Cruel	64	7.4	19

Table IV

Percent Deviant on Narrow Band Scales by Referral Source

	Parent	Teacher	Chi-Square	P-value
Boys 6-11				
Anxious	18	18	0.007	0.93
Depressed	14	15	0.013	0.91
Uncommunicative	26	26	0.002	0.97
Obsessive-Compulsive	12	12	0.007	0.94
Somatic Complaints	9	5	1.356	0.24
Social Withdrawal	7.5	10	0.444	0.51
Hyperactive	28	28	0.002	0.97
Aggressive	17	14	0.519	0.47
Delinquent	12	5	2.742	0.10
Boys 12-16				
Somatic Complaints	28	12	3.608	0.06
Schizoid	26	9.5	4.113	0.04
Uncommunicative	26	9.5	4.113	0.04
Immature	36	29	0.573	0.45
Obsessive-Compulsive	10	9.5	0.006	0.94
Hostile Withdrawal	26	29	0.076	0.78
Delinquent	8	12	0.394	0.53
Aggressive	18	12	0.657	0.42
Hyperactive	58	38	3.619	0.06

(table continues)

	Parent	Teacher	Chi-Square	P-value
Girls 6-11				
Depressed	17	27	1.651	0.20
Social Withdrawal	19	27	0.906	0.34
Somatic complaints	8	0	3.314	0.07
Schizoid Obsessive	0	0	-	-
Hyperactive	31	32	0.014	0.90
Sex Problems	8	16	1.605	0.20
Delinquent	6	0	2.326	0.13
Aggressive	17	19	0.075	0.79
Cruel	2	0	0.907	0.34
Girls 12-16				
Anxious Obsessive	33	18	0.740	0.39
Somatic Somplains	47	18	2.275	0.13
Schizoid	7	9	0.053	0.82
Depressed Withdrawal	20	18	0.014	0.91
Immature Hyperactive	53	27	1.766	0.18
Delinquent	13	9	0.112	0.74
Aggressive	13	0	1.589	0.21
Cruel	20	18	0.014	0.91

Table V

Univariate Correlates of Behavior Problems

Variable	% Behavior Problems	Odds Ratio	95% Confidence Interval
Age Group			
12-16	53	1.67 ^d	(1.11,2.54)
6-11	41		
Sex			
Male	44	1.01	(0.69,1.48)
Female	43		
Family Composition			
Nonintact	55	1.90 ^d	(1.27,2.83)
Intact	39		
Familial LD ^a			
Positive	47	1.43	(0.98,2.10)
Negative	38		
Special Class			
Yes	54	1.72 ^d	(1.13,2.64)
No	41		
Language of Education			
L1 ^b	48	1.83 ^d	(1.24,2.70)
L2 ^c	34		

(table continues)

Variable	% Behavior Problems	Odds Ratio	95% Confidence Interval
Grade Repetition			
Yes	50	1.52 ^d	(1.05,2.19)
No	40		
Medical History			
Yes	45	1.07	(0.60,1.92)
No	43		

Note. In these analyses all 502 subjects were entered.

^a=learning difficulty

^b=studying in maternal language

^c=studying in a language other than maternal language.

^dstatistically significant $p < 0.05$.

Table VI

Results of Logistic Regression with Behavior Problems as the Outcome Variable

Source	Adjusted Odds of Having a Behavior Problem	
	Odds Ratio	95% Confidence Interval
Referral Source		
Teachers : Parents	0.90	(0.60,1.36)
Age Group		
12-16 : 6-11	1.68 ^b	(1.05,2.67)
Sex		
Male : Female	1.02	(0.67,1.56)
Socioeconomic Class		
any level: any level 10 units higher ^a	1.46 ^b	(1.14,1.86)
Family Composition		
Nonintact : Intact	2.02 ^b	(1.30,3.14)
Family History		
Positive : Negative	1.46	(0.96,2.23)
Special Class Placement		
Yes : No	1.49	(0.94,2.37)

^aRange within 30 to 85.

^bStatistically significant $p < 0.05$.

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Appendix A

Background Information Form

MCGILL-MONTREAL CHILDREN'S HOSPITAL LEARNING CENTRE

FORM A

LEARNING CENTRE BACKGROUND QUESTIONNAIRE

DIRECTIONS

1. Please print.
2. Please fill in as much as possible. If you are not entirely sure of specific ages or dates, give approximate information.
3. If you have additional information you would like to provide that is not covered by the questionnaire, please write it in the comment sections, or at the end.

This questionnaire is completed by

mother _____ father _____ mother and father _____ other _____

Date Completed _____

A. GENERAL INFORMATION

1. Child's Name _____ Sex _____
 Date of Birth _____ Place of Birth _____
 Child's first language _____ Religion _____
 Current School _____ Grade _____
 Language of instruction _____ Quebec Permanent Code No. _____

2. Child's Family Doctor

Name _____
 Address _____
 Telephone _____
 Date of Last Check-up _____
 M.C.H. Chart No. _____ Medicare No. _____

3. Parents

	Mother	Father
Name	Maiden Name _____ Given Name _____	
Birthdate	_____	_____
Age	_____	_____
Educational Level	_____	_____
Present Occupation	_____	_____
Home Telephone	_____	_____
Business Telephone	_____	_____
Home Address	_____	
Postal Code	_____	

B. SOCIAL HISTORY AND FAMILY BACKGROUND

1. Parents' marital status

When?When?

_____ separated _____
 _____ divorced _____
 _____ widowed _____

_____ parent(s) remarried _____
 _____ family together _____

2. Child lives with:

_____ mother _____ mother and father
 _____ father _____ other _____

Comment: _____

3. Is the child:

_____ adopted _____ foster _____ natural
 _____ at what age

4. Number of Brothers and Sisters. _____

Name of Sibling	Birthdate	Age	Grade

3.

5. Please indicate if anyone in the family besides the child has had any of the following difficulties.

Problem	Mother	Father	Brother(s)	Sister(s)	Mother's family	Father's family
1. trouble learning to read or spell						
2. trouble with arithmetic						
3. speech or language problems						
4. repeated grade(s) (specify)						
5. hyperactive						
6. retarded						
7. other (specify)						

6. List the names of other family members who have been assessed at the Learning Centre

Name	Year(s)	Age when assessed

4.

- a. mother and father : _____
- b. mother and child : _____
- c. father and child : _____
- d. siblings and child: _____

- a. mother: _____
- b. father: _____
- c. child : _____

1. Complete the following information on your child's school history beginning with daycare or nursery school. If he/she repeated please indicate this as a separate year. Note: for language of education indicate if it is French, (FR) French Immersion (Fr. Imm.), English, Hebrew etc.

[illegible]

5.

2. Has your child ever been in one of the following special classes? (if yes, specify the number of years)

Class	No	Yes	Number of Years
Educable Mentally Retarded			
Emotionally Disturbed			
Readiness (class d'attente)			
Prep (classe de recuperation)			
Learning Disability			
Other (specify)			

3. Areas of difficulty currently or in the past

Area	Never a Problem	Was a problem Now O.K.	Is a problem now
1. Reading			
2. Spelling			
3. Math			
4. Handwriting			
5. Composition			
6. Speech and/or language			
7. Fine motor coordination			
8. Gross motor coordination			
9. Other (specify)			

4. What do you consider are your child's main difficulties?

2. PREVIOUS ASSESSMENTS AND TREATMENTS

1. Provide the following information concerning assessments received by your child.

Assessments	No	Yes	Date	Age	Place	Name of Professional
Psychological						
Educational						
Sensory-Motor						
Speech-Language						
Occupational Therapy						
Psychiatric						
Social worker						
Other _____						

COMMENT _____

2. Provide the following information concerning treatments received by your child.

Training/Treatment	No	Yes	Date	Age	Place	Name of Professional
Occupational therapy						
Sensory-Motor Training						
Individual Psychotherapy						
Family Therapy						
Counselling						
Private Tutor						
Remedial Teacher in school						
Special Reading Program						
Parent Volunteer						
Other _____						

COMMENT _____

F. MEDICAL HISTORY

1. Pregnancy and Birth

7.

a. pregnancy ☐ normal

☐ problems or maternal illness (give details eg. bleeding, diabetes)

Comment: _____

b. length of pregnancy: ☐ full term

☐ premature ☐ # of weeks early

☐ overtaken ☐ # of weeks late

c. mother's age at birth of child: _____

d. child's birthweight: _____

e. delivery: ☐ normal

☐ problems (give details: ie. Caesarian section, needed oxygen, cord around child's neck etc.)

Comment: _____

2. Neonatal History and Infancy

a. Did the following problems occur during the first few weeks of life?

Problem	No	Yes	Comments
placed in incubator	☐	☐	
infections	☐	☐	
blood transfusions	☐	☐	
jaundice	☐	☐	
problems breathing	☐	☐	
problems feeding	☐	☐	
convulsions	☐	☐	
other (specify)	☐	☐	

b. Did the baby leave the hospital with the mother?

☐ yes ☐ no Comment: _____

c. Did the baby have colic?

☐ yes ☐ no Comment: _____

d. In general how would you best describe your child's behaviour during the first 2 years of life?

☐ easy ☐ slow to adjust
☐ difficult ☐ other: _____

3. Developmental Milestones

a. at what age did the child do the following

Behaviour	Age
1. sit without support	
2. crawl	
3. walk alone	
4. say single words	
5. combine 2 or 3 words	

b. which hand does the child use for writing? ____ right ____ left ____ both

c. which hand does he use for activities other than writing?

4. Physical Problems

a. Has the child been examined by any of the following specialists? If any problems were found please specify under problems

Specialist	Yes	No	Date	Name of Professional	Place	Problems
1. audiologist						
2. ophthalmologist						
3. neurologist						
4.						
5.						

b. Is your child taking drugs?

____ no, never

____ yes, now (name of drug(s)) _____

____ not presently, but in the past (name of drug(s)) _____

c. Has the child ever had any serious diseases, accidents, operations or illnesses? Please specify (ie. loss of consciousness, convulsions, allergies, repeated ear infections etc.)

Illness/Injury	Age	Comments

Revised June 17, 1985

Appendix B

Child Behavior Checklist

CHILD BEHAVIOR CHECKLIST FOR AGES 4-16

For office use only
ID #

CHILD'S NAME		PARENT'S TYPE OF WORK. Please be specific—for example, auto mechanic, high school teacher, homemaker, doctor, airline operator, shoe salesman, army sergeant. Even if parent does not live with child.	
SEX ☐ Boy ☐ Girl	AGE	RACE	
TODAY'S DATE Mo ____ Day ____ Yr ____		CHILD'S BIRTHDATE Mo ____ Day ____ Yr ____	
GRADE IN SCHOOL		THIS FORM FILLED OUT BY ☐ Mother ☐ Father ☐ Other (specify)	

I. Please list the sports your child most likes to take part in. For example, swimming, baseball, skating, skateboarding, bike riding, fishing, etc. ☐ None	Compared to other children of the same age, about how much time does he/she spend in each?	Compared to other children of the same age, how well does he/she do each one?
	Don't Know Less Than Average Average More Than Average	Don't Know Below Average Average Above Average
a. _____	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐
b. _____	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐
c. _____	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐

II. Please list your child's favorite hobbies, activities, and games, other than sports. For example, stamps, dolls, books, piano, crafts, singing, etc. (Do not include T.V.) ☐ None	Compared to other children of the same age, about how much time does he/she spend in each?	Compared to other children of the same age, how well does he/she do each one?
	Don't Know Less Than Average Average More Than Average	Don't Know Below Average Average Above Average
a. _____	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐
b. _____	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐
c. _____	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐

III. Please list any organizations, clubs, teams, or groups your child belongs to. ☐ None	Compared to other children of the same age, how active is he/she in each?
	Don't Know Less Active Average More Active
a. _____	☐ ☐ ☐ ☐
b. _____	☐ ☐ ☐ ☐
c. _____	☐ ☐ ☐ ☐

IV. Please list any jobs or chores your child has. For example, paper route, babysitting, making bed, etc. ☐ None	Compared to other children of the same age, how well does he/she carry them out?
	Don't Know Below Average Average Above Average
a. _____	☐ ☐ ☐ ☐
b. _____	☐ ☐ ☐ ☐
c. _____	☐ ☐ ☐ ☐

V 1 About how many close friends does your child have? ☐ None ☐ 1 ☐ 2 or 3 ☐ 4 or more

2 About how many times a week does your child do things with them? ☐ less than 1 ☐ 1 or 2 ☐ 3 or more

VI Compared to other children of his/her age how well does your child:

	Worse	About the same	Better
a. Get along with his/her brothers & sisters?	☐	☐	☐
b. Get along with other children?	☐	☐	☐
c. Behave with his/her parents?	☐	☐	☐
d. Play and work by himself/herself?	☐	☐	☐

VII 1 Current school performance—for children aged 6 and older

☐ Does not go to school

	Falling	Below average	Average	Above average
a. Reading or English	☐	☐	☐	☐
b. Writing	☐	☐	☐	☐
c. Arithmetic or Math	☐	☐	☐	☐
d. Spelling	☐	☐	☐	☐
Other academic subjects—for example his tory, science, foreign language, geography	☐	☐	☐	☐

2 Is your child in a special class?

☐ No ☐ Yes—what kind?

3 Has your child ever repeated a grade?

☐ No ☐ Yes—grade and reason

4 Has your child had any academic or other problems in school?

☐ No ☐ —please describe

When did these problems start?

Have these problems ended?

☐ No ☐ Yes—when?

VIII. Below is a list of items that describe children. For each item that describes your child now or within the past 6 months, please circle the 2 if the item is very true or often true of your child. Circle the 1 if the item is somewhat or sometimes true of your child. If the item is not true of your child, circle the 0. Please answer all items as well as you can, even if some do not seem to apply to your child.

0 = Not True (as far as you know) 1 = Somewhat or Sometimes True 2 = Very True or Often True

0	1	2	1	Acts too young for his/her age	16	0	1	2	31	Fears he/she might think or do something bad
0	1	2	2	Allergy (describe) _____		0	1	2	32	Feels he/she has to be perfect
						0	1	2	33	Feels or complains that no one loves him/h
0	1	2	3	Argues a lot		0	1	2	34	Feels others are out to get him/her
0	1	2	4	Asthma		0	1	2	35	Feels worthless or inferior
0	1	2	5	Behaves like opposite sex	20	0	1	2	36	Gets hurt a lot, accident prone
0	1	2	6	Bowel movements outside toilet		0	1	2	37	Gets in many fights
0	1	2	7	Bragging, boasting		0	1	2	38	Gets teased a lot
0	1	2	8	Can't concentrate, can't pay attention for long		0	1	2	39	Hangs around with children who get in trouble
0	1	2	9	Can't get his/her mind off certain thoughts, obsessions (describe) _____		0	1	2	40	Hears things that aren't there (describe) _____
0	1	2	10	Can't sit still, restless, or hyperactive	25	0	1	2	41	Impulsive or acts without thinking
0	1	2	11	Clinging to adults or too dependent		0	1	2	42	Likes to be alone
0	1	2	12	Complains of loneliness		0	1	2	43	Lying or cheating
0	1	2	13	Confused or seems to be in a fog		0	1	2	44	Bites fingernails
0	1	2	14	Cries a lot		0	1	2	45	Nervous, highstrung, or tense
0	1	2	15	Cruel to animals	30	0	1	2	46	Nervous movements or twitching (describe) _____
0	1	2	16	Cruelty, bullying, or meanness to others		0	1	2	47	Nightmares
0	1	2	17	Daydreams or gets lost in his/her thoughts		0	1	2	48	Not liked by other children
0	1	2	18	Deliberately harms self or attempts suicide		0	1	2	49	Constipated, doesn't move bowels
0	1	2	19	Demands a lot of attention		0	1	2	50	Too fearful or anxious
0	1	2	20	Destroys his/her own things	35	0	1	2	51	Feels dizzy
0	1	2	21	Destroys things belonging to his/her family or other children		0	1	2	52	Feels too guilty
0	1	2	22	Disobedient at home		0	1	2	53	Overeating
0	1	2	23	Disobedient at school		0	1	2	54	Overtired
0	1	2	24	Doesn't eat well		0	1	2	55	Overweight
0	1	2	25	Doesn't get along with other children	40				56	Physical problems without known medical cause
0	1	2	26	Doesn't seem to feel guilty after misbehaving		0	1	2	a.	Aches or pains
0	1	2	27	Easily jealous		0	1	2	b.	Headaches
0	1	2	28	Eats or drinks things that are not food (describe): _____		0	1	2	c.	Nausea, feels sick
						0	1	2	d.	Problems with eyes (describe) _____
0	1	2	29	Fears certain animals, situations or places, other than school (describe) _____		0	1	2	e.	Rashes or other skin problems
						0	1	2	f.	Stomachaches or cramps
0	1	2	30	Fears going to school	45	0	1	2	g.	Vomiting, throwing up
						0	1	2	h.	Other (describe) _____

PAGE 3

Please see other side

0 = Not True (as far as you know)			1 = Somewhat or Sometimes True			2 = Very True or Often True				
0	1	2	57	Physically attacks people	16	0	1	2	84	Strange behavior (describe) _____
0	1	2	58	Picks nose, skin or other parts of body (describe) _____	80	0	1	2	85	Strange ideas (describe) _____
0	1	2	59	Plays with own sex parts in public	16	0	1	2	86	Stubborn, sullen, or irritable
0	1	2	60	Plays with own sex parts too much	16	0	1	2	87	Sudden changes in mood or feelings
0	1	2	61	Poor school work	16	0	1	2	88	Sulks a lot
0	1	2	62	Poorly coordinated or clumsy	16	0	1	2	89	Suspicious
0	1	2	63	Prefers playing with older children	20	0	1	2	90	Swearing or obscene language
0	1	2	64	Prefers playing with younger children	20	0	1	2	91	Talks about killing self
0	1	2	65	Refuses to talk	16	0	1	2	92	Talks or walks in sleep (describe) _____
0	1	2	66	Repeats certain acts over and over compulsions (describe) _____	16	0	1	2	93	Talks too much
0	1	2	67	Runs away from home	16	0	1	2	94	Teases a lot
0	1	2	68	Screams a lot	25	0	1	2	95	Temper tantrums or hot temper
0	1	2	69	Secretive, keeps things to self	16	0	1	2	96	Thinks about sex too much
0	1	2	70	Sees things that aren't there (describe) _____	16	0	1	2	97	Threatens people
0	1	2	71	Self-conscious or easily embarrassed	16	0	1	2	98	Thumb-sucking
0	1	2	72	Sets fires	16	0	1	2	99	Too concerned with neatness or cleanliness
0	1	2	73	Sexual problems (describe) _____	16	0	1	2	100	Trouble sleeping (describe) _____
0	1	2	74	Showing off or clowning	30	0	1	2	101	Truancy, skips school
0	1	2	75	Shy or timid	16	0	1	2	102	Underactive, slow moving or lacks energy
0	1	2	76	Sleeps less than most children	16	0	1	2	103	Unhappy, sad or depressed
0	1	2	77	Sleeps more than most children during day and/or night (describe) _____	16	0	1	2	104	Unusually loud
0	1	2	78	Smears or plays with bowel movements	35	0	1	2	105	Uses alcohol or drugs (describe) _____
0	1	2	79	Speech problem (describe) _____	16	0	1	2	106	Vandalism
0	1	2	80	Stares blankly	16	0	1	2	107	Wets self during the day
0	1	2	81	Steals at home	16	0	1	2	108	Wets the bed
0	1	2	82	Steals outside the home	16	0	1	2	109	Whining
0	1	2	83	Stores up things he/she doesn't need (describe) _____	40	0	1	2	110	Wishes to be of opposite sex
						0	1	2	111	Withdrawn, doesn't get involved with others
						0	1	2	112	Worrying
									113	Please write in any problems your child has that were not listed above
						0	1	2		70

PLEASE BE SURE YOU HAVE ANSWERED ALL ITEMS

PAGE 4

UNDERLINE ANY YOU ARE CONCERNED ABOUT

Appendix C

Diagnoses of Children Seen at the Learning Centre

Diagnosis	Number	Percent
Learning Disabled	502	78
Not Disabled	89	14
Mentally Retarded	16	2.5
Uncertain	12	2.0
Learning Problem		
+ Organicity	20	3.0
Other	4	0.4

Appendix D

Coding Sheet

Name: Delbe Schachter

DOB 07 / 27 / 55
(mon) (day) (yr)

Age of 1st Assess 10 / 08

Grade of 1st Assess 11

Mother's Educ: _____

Mother's Occu: _____

Father's Educ: _____

Father's Occu: _____

Family Comp Intact 1 parent reconstituted other ^{ad-pind}

Family LD ✓ father ✓ mother ✓ sibling extfamily none

Home Lang Eng Fr other bilingual

Lang of school L1 ✓ L2 parochial other

Special Class Placement yes no

Grade Repetition yes no

Referral parent school ✓ professional other OK

Intelligence WISC-V 100

WISC-R 100

WISC-III 100

PPVT 100

Other 100

Learning Problems reading yes no m

spelling yes ✓ no ni

math yes no ✓ m

Diagnose ✓ LD OK EMR OK Other

Medical Asthma yes ✓ no ni

Organic Brain Dis yes ✓ no ni

Diabetes ✓ yes no m

Heart Disease yes ✓ no m

Stroke yes no ni m R + L

Appendix E

Relationship Between Peabody Picture Vocabulary Test (PPVT) and the Wechsler Intelligence Scale for Children- Revised (WISC-R)

Missing WISC-R scores were predicted from PPVT scores using a linear equation derived for those 242 individuals with full WISC-R and PPVT scores. The model with PPVT was significantly better than excluding PPVT scores ($F, 1, 241 = 74.96, p=0.0001$), and explained 24% of the variance.

The final linear equation was :

$$\text{WISC-R} = 58.27 + 0.46 \times \text{PPVT}$$

As shown in Table E-1, this substitution did not appreciably affect average WISC scores.

Table E-1

Mean WISC-R and WISC-R predicted scores

WISC-R	Boys	Girls
Actual		
Mean	100	100
SD	13.2	12
No.	319	137
Predicted		
Mean	102	100
SD	13	11.5
No.	349	152

Appendix F

Relationship between Socioeconomic Class and Maternal education

Missing Socioeconomic scores were predicted from maternal education using a linear equation derived for those 446 individuals with socio-economic scores and maternal education levels. This linear model using maternal education to predict the socioeconomic score was significantly better than chance ($F, 1, 445 = 3187$, $p=0.0001$), and explained 88% of the variance. The following linear equation was obtained:

Socioeconomic Class = $12.68 + 0.89 \times$ maternal education.

Use of this approximation did not appreciably alter the average socioeconomic scores (Table F-1).

Table F-1

Mean Socioeconomic Index and Predicted Socioeconomic Index

Socioeconomic Index	Boys	Girls
Actual		
Mean	61	62
SD	8.5	8.8
No.	324	138
Predicted		
Mean	61	62
SD	8.4	8.9
No.	343	147

Appendix G
Family History of Learning Difficulties

Family Member	Referral Source					
	Parent		Teacher		All Children ^a	
	Boys	Girls	Boys	Girls	Boys	Girls
Anyone (%)	72	65	60	70	67	66
Father (%)	37	33	32	40	35	35
Mother (%)	32	35	31	30	32	33
Sibling (%)	29	24	29	30	29	26
Extended (%)	27	25	16	27	23	25

^a Includes all 502 learning disabled children, including those for whom referral source was not known.

Appendix H
Family Configuration

Family Configuration	Referral Source					
	Parent		Teacher		All Children ^a	
	Boys	Girls	Boys	Girls	Boys	Girls
Intact (%)	76	73	73	69	75	71
Single (%)	15	8	16	23	15	13
Reconstituted (%)	4	8	8	4	6	8
Other (%)	5	10	2	4	4	8

^a Includes all 502 learning disabled children, including those for whom referral source was not known.

Appendix I

Home Language

Home Language	Referral Source					
	Parent		Teacher		All Children ^a	
	Boys	Girls	Boys	Girls	Boys	Girls
English (%)	69	59	70	71	69	63
French (%)	9	12	7	4	9	10
Other (%)	3	1	5	2	4	1
Bilingual (%)	19	28	17	23	18	26

^a

Includes all 502 learning disabled children, including those for whom referral source was not known.

Appendix J

School Language Compared to Maternal Language

School Language	Referral Source					
	Parent		Teacher		All Children ^a	
	Boys	Girls	Boys	Girls	Boys	Girls
Maternal (%)	68	65	67	81	67	69
Second (%)	8	8	9	0	9	6
Parochial (%)	6	3	4	4	5	4
Other (%)	0.5	1	0	0	0.2	0.6
French Imm. ^b (%)	17	22	20	15	18	20

^a Includes all 502 learning disabled children, including those for whom referral source was not known.

^b French Imm. = French Immersion.

Appendix K
Chronic Medical Illness

	Referral Source					
	Parent		Teacher		All Children ^a	
	Boys	Girls	Boys	Girls	Boys	Girls
Asthma (%)	4	7	5	0	4	5
Diabetes (%)	0.5	0	0	2	0.3	1
Brain (%)	0.5	0	1	0	0.6	0
Heart (%)	0	0	1	0	0.3	0
Medication ^b (%)	5	7	5	2	5	5

^aIncludes all 502 learning disabled children, including those for whom referral source was not known.

^bUse of any medication such as a stimulant or anticonvulsant, excluding antibiotics.

Appendix L

Linguistic, Educational, and Occupational Backgrounds of Parents of the Learning Disabled and Residents of Metropolitan Montreal

Variable	Learning Disabled	1986 Census Data ^{ab}
Home Language		
English (%)	67	18
French	9	67
Other	3	8
Bilingual	21	7
Mother's Education ^c		
Mean	55 ^d	
SD	9.1	
Father's Education ^c		
Mean	55 ^d	
SD	9.0	
Educational level of adults		
15 years and older ^{bc}		
Mean		51 ^e
SD		11

(table continues)

Variable	Learning Disabled	1986 Census Data
Mother's Occupation ^c		
Mean	57	56
SD	7.4	5.3
Father's Occupation ^c		
Mean	57	53
SD	8.8	6.6

^a 1986 Census Data for Metropolitan Montreal
(Statistics Canada, 1988)

^b Census data on occupation was not listed by gender,
thus cumulative results are presented for both sexes.

^c Data on education and occupation was coded using
Green's Index of socioeconomic class (Green, 1970).

^d An educational level of 55 approximates one year of
special trade school, secretarial college, or other
vocational education beyond high school.

^e An educational level of 51 represents more than 11 but
less than 12 years of schooling.

Appendix M

Odds Ratios and Confidence Intervals For Variables Excluded from the Logistic Regression Equation with Behavior Problems as the Outcome Variable

Variable	Odds Ratio	95% Confidence Interval
Language of Education		
L2 ^a : L1 ^b	0.73	(0.49,1.13)
Grade Repetition		
Yes : No	1.12	(0.75,1.69)
Medical Illness		
Yes : No	1.63	(0.80,3.35)
Intelligence		
Any IQ : any IQ 10 years greater	1.01	(0.56,1.72)

Note. These odds ratios were adjusted for referral source, age group, gender, family configuration, social class, familial learning difficulties, and special class placement.

^aL2 = studying in a language other than maternal language, including French immersion.

^bL1 = studying in maternal language.