ATTENTION DEFICIT HYPERACTIVITY DISORDER
A CASE STUDY

by

Leona Treloar

B.Ed., University of British Columbia, 1970

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Name: Leona Wanda Treloar

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Examining Committee:

Chair: Bernice Y.L. Wong

Leone M. Prock
Senior Supervisor

Jack Martin
Professor

Paul Bion
Director Special Education
Mission School District
British Columbia
External Examiner

Date Approved JUNE 15, 1992

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(signature)

Leona Wanda TRELOAR
(name)

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ABSTRACT

This thesis presented a case study of a nine year old boy with Attention Deficit Hyperactivity Disorder (hereafter ADHD). ADHD is the current diagnostic label for children presenting with problems in attention, impulse control, and overactivity. These primary characteristics, and the related problems of ADHD impair the academic, social and emotional lives of students with ADHD. The prevalence of ADHD and the mis-diagnosis of ADHD as a behavioural problem, makes it an issue of significance.

The project involved a nine year old male student enroled in a Primary Learning Disabilities class. He had received special education services for his entire school career and had presented with behavioural symptoms which met the diagnostic criteria for ADHD.

Literature on the topic was examined in order to provide a conceptual framework for the study of the problem of ADHD. The thesis examined the history, primary and secondary symptoms, conceptual issues, causes, treatments and behavioural interventions of ADHD.

Data collection included continuous observation by the researcher who was also the teacher in the class. Information gathered involved an in-depth, analytical description of the subject. Previous educational assessments and academic history of the subject were examined. Psychological testing was updated by the school psychologist. Information measures specifically designed for the ADHD child such as the DSM III-R criteria (American Psychological Association), and Rating Scales (Barkley & DuPaul,1990) were also used.

Further information was gathered by interviews with the parents, parent questionnaires, student's work samples, a student self-evaluation, teacher reports, and Individual Educational Programs.

Results of this examination showed that the primary symptoms of ADHD have an impact on the child's academic, emotional and social life. It is clear that a greater understanding of ADHD will lead to a greater degree of accuracy in diagnosis and remediation of a large population of children in need.

This work is dedicated to Mike, Dave and Jon.

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CHAPTER 1

The Statement of the Problem

Attention Deficit Hyperactivity Disorder

Attention-Deficit Hyperactivity Disorder (*hereafter ADHD*) is the most recent of a long line of diagnostic labels for children presenting with significant problems in attention, impulse control, and overactivity. The disorder represents one of the most prevalent childhood psychiatric disorders. It is one of the most common reasons why children are referred for psychological testing in both the United States and Canada (Barkley 1990).

Children who have ADHD are commonly described as having chronic difficulties in the areas of inattention, impulsivity, and overactivity. These primary characteristics are displayed to a degree which is inappropriate for their age or developmental level. These symptoms tax their capacity to pay attention, inhibit their impulses, and restrain their movement (Barkley 1990). The nature of these symptoms create problems for the children in their home and at school.

Children who have ADHD are recipients of considerable negative reinforcement. They receive very little in the way of positive feedback from others. Their problem is seen as a behavioural problem. Demands are often made on these children which they cannot meet. Their behaviour is seen as deliberately noncompliant. They are punished for behaviours which are symptomatic of the disorder. This cycle of negativism is a spiral which leads to outcomes which impact negatively on the child's life. Landau and Moore (1991) questioned whether "children with ADHD experience the same quality of life as of other children".

Solutions which can introduce a positive factor into the life of children with ADHD, may be found through an examination of both the disorder and the areas which are impacted by the disorder.

This study examined the behavioural characteristics of a child with ADHD and the impact of ADHD on the academic, social and emotional performance of the child with ADHD. The purpose of an examination of this nature was to create a greater understanding of the disorder and through this understanding, create a learning environment which will allow the child with ADHD to achieve to his/her full potential.

An examination of ADHD begins by looking at the questions surrounding the disorder and the components of the disorder itself. Clarification of these concepts is essential prior to a further investigation of the disorder itself.

The Nature of Attention

An individual's ability to attend to external events is a difficult and complicated concept. There is little doubt that we attend to different events with different intensity. There is in the field of education considerable evidence that certain children have difficulty with one or more facets of attention.

Attention has been described in a variety of terms. Moray (1969) identified seven components of attention: mental concentration, vigilance, selective attention, search, activation, set, and analysis by synthesis. Posner (1975) postulated that attention has three components: alertness, selection, and effort. In the special education framework, Keogh and Margolis (1976) described attention as coming to attention, decision making, and sustaining attention. Krupski (1980) viewed attention along two dimensions: voluntary-involuntary and short-term sustained.

Sustained and selective attention are twin facets of the process of attention. Children who have difficulty in selective attention typically cannot distinguish the central stimulus from the background stimulus. Children who have difficulty in sustaining attention cannot attend to a given task or stimulus for an extended time.

In selective attention, a student is able to maintain attention to a target stimulus even in the presence of distractors. Children who have difficulty with selective attention and who are placed in an environment where there are stimuli which are extraneous to the target stimulus, have difficulty in selecting the appropriate stimulus. These children may be distracted from their work by the visual nature of the classroom displays or by the movement of other students in the hallway. Their attention is focussed ~~on whichever stimulus is prominent~~ Elsewhere ~~to them at that time~~.

In sustained attention, a student is able to sustain attention to a central stimulus for an extended period of time. This could be completing a written activity, watching a video, or listening to a lesson for an extended period of time. Children who have difficulties in sustaining attention move from one uncompleted activity to another. Completion of one task is seldom accomplished. These children have problems of vigilance to the task at hand.

The existence of a disability in either selective or sustained attention needs examination in order to understand more fully the nature of attention and its impact on children with ADHD.

Defining Attention Disorders

Problems of defining attention disorders have arisen and there is little agreement as to who to include and who to exclude in defining children with

attentional difficulties. To further confound these issues, there is a lack of clarity in the actual name of the disorder. Inclusion of the term "hyperactivity" would indicate a symptom rather than a disorder to some, while to others, the issue is one of primacy (Felton & Wood, 1989). An examination of definition issues will assist in clarifying these questions.

Learning Disabilities and Attention

The existence of attentional deficits among learning disabled students has been well-documented in clinical and research literature (Keogh & Margolis 1976, Krupski, 1980). Despite the consensus regarding the existence of attentional disability, there is little consensus regarding the relationship between learning disabilities and attention.

There has been some question of placing attention disorders in the field of learning disabilities (Silver 1990). Learning disabilities are defined in part, as being caused by information processing problems. Clarification is needed as to whether attention can also be classified as a deficiency in processing information. It is necessary as well to determine whether learning disabilities are caused by problems in attention. If a child is not attentive it is not likely that the child will learn. The relationship between attention and learning needs further explanation.

Motivation

Motivation to succeed or complete a particular task can determine the success of failure of that task. Does motivation play a role in a student's ability to pay attention to a task? If the student *is* motivated to do a task, will this motivation overcome his/her attention deficits? Conceptualization the disorder through a model of motivation should be considered.

Optimal Stimulation Theory

Children who exhibit the symptoms of ADHD would appear to be *over-aroused*. They have problems in attention, in being impulsive, and in being hyperactive. They would appear to be excessively aroused. Yet, there are those who might suggest that these children are under-aroused. What is the optimum stimulation theory, and how does this impact on the ADHD student? The impact on education could be considerable if it is found that these children need *more* stimulation, not less.

ADHD Impact

Children who exhibit the behavioural symptoms of ADHD are often seen as behavioural problems. They are restless, inattentive, and impulsive. In the class, students with ADHD may be seen as constantly fidgeting, playing with their pencils, or swinging their feet. They may act before thinking, call out answers before the questions have been completed, and may interrupt when others are speaking. These children also have difficulties waiting for their turn and may appear as though they are inattentive to the lessons being presented. Children with ADHD have difficulty in sustaining attention to a task in class. The prognosis for their education is poor if their behaviour is viewed as being a behaviour problem, rather than a problem with their behaviour. Parents, teachers and other students are often frustrated by the behaviours which children with ADHD display. It is essential that an understanding of the disorder is created that those who come in contact with children who have ADHD are able to understand the behaviours and are able to deal with them appropriately.

Case Study

The focus of this project was to present a case study of a student with Attention Deficit Hyperactivity Disorder. The project looked at a nine year old boy with ADHD. It examined the literature on ADHD in order to provide a conceptual framework for the study of ADHD. In doing this project, it was anticipated that the problems facing both teachers of ADHD students and the students with ADHD would be clarified and solutions to the problems would be constructed. The material gathered in this project may assist those who work with ADHD children in developing intervention programs for their students. The examination of one child in particular, provided a wealth of data which led to an understanding of ADHD in reference to the learning and behavioural patterns of children with ADHD.

The study examined the primary characteristics of a child with ADHD. It looked at these behaviours in the context of the school environment and supplemented these data with information provided from his parents as well as school based data from other years.

The data were examined in order to determine whether there were any other impacts of the disorder on the child. If there were consequences of this disorder, this study sought to clarify these impacts and looked to see the area these were to be found.

The focus of this study was to gain elaborated knowledge and a deeper understanding of ADHD. This knowledge and understanding of the behavioural symptoms of ADHD, as seen in this one case, provided an opportunity to understand an individual and to identify effective feasible interventions for that individual. The data gathered from the case study, along with the information

about ADHD found in the literature, established a foundation for the intervention model developed from this research.

The educational experiences of ADHD children are too often unproductive and unfulfilling. If educators are gain an understanding of children with ADHD, then educational interventions which could break the cycle of negative experiences for the ADHD students may be implemented. Every student has the right to meet his/her educational potential. This can only be achieved for ADHD students through an understanding of these children and the world within which they operate.

CHAPTER 2

A Review of the Literature

It is the intent of this thesis to study Attention Deficit Hyperactivity Disorder (hereafter ADHD) and its impact on the child with ADHD. Insight into the disorder will be gained by examining the primary and secondary characteristics of the disorder, the symptoms as well as the causes. The focus of this literature review will be on the academic achievements, social interactions, and the behaviours of a child with ADHD. The conceptual issues involved in learning disabilities and ADHD should become clarified through an extensive examination of the research on the role of attention in learning. The history of Attention Deficit Hyperactivity Disorder will be presented in order to depict the development of the concept of the disorder. By defining the characteristics of children with attention difficulties, and by clarifying the secondary problems which accompany the disorder, it is anticipated that a clearer understanding and a more efficient treatment modality can be effected.

History

For clarification of the issues surrounding ADHD, it may be useful to look at the history of the concept of attention problems and examine the studies which delineate the problems of students with attention deficit disorders. By looking at earlier writings about Attention Deficit Hyperactivity Disorder, we can see the nascent concepts that served as antecedents to the current conceptualizations of the disorder and its treatment.

Early Conceptions. It was the work of George Still (1902) and Alfred Tredgold (1908) which began to examine the condition known today as ADHD. Still (1902) hypothesized that the deficits in inhibitory volition, moral control, and sustained attention were related to each other and to the same neurological deficiency. He cautiously speculated on the possibility of either a decreased threshold for inhibition of responding to stimuli, or a cortical disconnection syndrome.

Still was the first to note that the symptoms of the disorder were defined as unnatural relative to the behaviour of normal children at a given age. This would suggest that age-referenced criteria were important in diagnosis. He also noted a greater proportion of male than females presented with the characteristics with a ratio of three to one. As well as appearing before the age of 8, Still also showed that the children with the syndrome also had a much higher incidence of minor anomalies in their physical appearance. These physical anomalies were often associated with reflecting defective intellect or morals. The Darwinist perspective on childhood was evident in these perceptions. Childhood behavioural disorders were seen as biologically determined with a pessimistic prognosis. The social prejudices of the time justified the segregation of behaviourally disordered individuals. While the social aspect of these findings are not in keeping with current conceptualizations, the early theorists provided valuable theoretical and clinical insights in building a foundation in our understanding of ADHD.

Brain Damage. An interest in children presenting symptoms of ADHD in North America is seen as beginning after an outbreak in encephalitis in 1917-18. This epidemic presented clinicians with a number of children who survived the

brain infection, yet were left with significant behavioural and cognitive sequela. Such children were described as being impaired in attention, regulation of activity, and impulse control. The disorder was referred to as "postencephalitic behaviour disorder," and was clearly the result of Central Nervous System (CNS) damage. Thus, the study of attention difficulties became a field of study which focused on the brain damage in these children. Children who exhibited a particular pattern of behaviour were considered to have brain damage at the root of their problems. Professionals believed that the behaviour pattern itself was a reliable indicator of the underlying CNS etiology of damage, even where organic evidence of such was lacking.

The concept of the "brain injured child", or Minimal Brain Dysfunction (MBD), was developed by Strauss and Lehtinen (1947). They argued that the psychological disturbances were de facto evidence of brain injury as the etiology. To verify these conceptualizations, Heinz Werner and Alfred Strauss studied purportedly brain-injured, mentally retarded children. They believed that children who were mentally retarded as the result of a brain injury displayed a particular set, or syndrome of characteristics: distractibility, hyperactivity, and perceptual-motor problems.

While much of Werner and Stauss's theorizing was based on clinical impressions rather than on controlled research, they did conduct a series of laboratory investigations concerning the behavioural characteristics of distractibility. In their figure-ground studies (1941), they had children respond to pictures which were displayed at a rapid rate. The group that responded to the background rather than the picture tended to be those children whom Werner and Strauss had diagnosed as brain-injured. The group which responded to the

figure, were considered non-brain-injured. Werner and Strauss hypothesized that brain injury in the mentally retarded leads to distractibility. Until that time, retardation had been seen as a relatively homogeneous state. Their findings of a sub-group of retarded children who exhibited forced responsiveness to stimuli, or distractibility, dispelled the long-standing notion that there were no individual differences among the retarded. The conception that brain damage was the *cause* of distractibility and hyperactivity fostered the concept that individual educational or psychological programming should be initiated on behalf of those children with mental retardation.

The conceptual bridge between the work of Strauss and the current conceptions was a major study by Cruickshank, Bice, and Wallen (1957). This study replicated the work of Werner and Strauss with cerebral-palsied children of near-normal, normal, and above-normal children. Cruickshank found that these children also exhibited poor figure-ground relationships, presumably owing to their distractibility. These findings showed that an individual need not be retarded in order to display characteristics of inattention and hyperactivity.

Cruickshank then extended his work to children who would by today's standards be considered learning disabled. He pointed out that many of the children who exhibited signs of attention difficulties and hyperactivity were children of normal intelligence and did not have any signs of brain damage, such as cerebral palsy.

The decline of the use of the term Minimal Brain Dysfunction was marked by dissatisfaction with the concept of a unitary syndrome of brain damage in children. Birch (1964), and Herbert (1964) both questioned the validity of applying the term "minimal brain damage" to children who had only ambiguous

signs of neurological involvement, not necessarily damage. The concept of Minimal Brain Damage was gradually recognized as being vague, over-inclusive, of little prescriptive value, and without much neurological evidence (Kirk, 1963).

Hyperactive Child Syndrome. Another concept was developing. The "hyperactive child syndrome" was the subject of a number of papers in the late 1950s and early 1960s (Laufer & Denhoff 1957, Chess 1960). In 1966, Clements published the findings of a report on the definitions of children with minimal brain dysfunction. The cause of the learning problems of many children of above-average intelligence was seen to be a deviation of a function in the central nervous system (Clements, 1966). This report which examined the characteristics of the children identified as having minimal brain dysfunction, included children with: 1) learning disabilities ; 2) difficulties with hyperactivity, distractibility, and impulsivity; 3) emotional and social problems. In 1968 the first official diagnostic classification of individuals who were seen as having hyperactivity, impulsivity, or distractibility was formulated. The term *hyperkinetic reaction of childhood* was used, and with it came the concept of hyperactivity.

Stella Chess (1960) defined hyperactivity as follows: "The hyperactive child is one who carries out activities at a higher than normal rate of speed than the average child, or who is constantly in motion, or both." This mention of activity as the defining feature of the disorder led the way for the syndrome to be viewed as separate from brain damage. It was now recognized that hyperactivity was a behavioural syndrome that could arise from organic pathology, but could also occur in its absence.

Chess's paper was acclaimed as being historically significant for a number of reasons: (1) she strongly emphasized *activity* as the defining feature

of the disorder; (2) she stressed the need to consider objective evidence of the symptom beyond the subjective reports of the parents and teachers; (3) her formulation removed the blame for the disorder from the parents; (4) and she separated the concept of a syndrome of hyperactivity from the concept of a brain damage syndrome.

The official catalogue of nomenclature of the time, the second edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-II; American Psychiatric Association, 1968), created the term Hyperkinetic Reaction of Childhood disorder.

Inattention, Impulsivity, and Hyperactivity. Interest in the disorder took a great leap in the 1970's. The defining features of the hyperactive child syndrome had been broadened to include what had previously been considered only associated characteristics. These included impulsivity, short attention span, low frustration tolerance, distractibility, and aggressiveness (Marwit & Stenner 1972).

Hyperactivity and inattention became the focus of studies in the 1970's. The previous focus on the motor problems as the main source of difficulty of children displaying hyperactive behaviour was refuted in studies by Virginia Douglas. In an address to the Canadian Psychological Association Douglas (1972) argued that the difficulties which these children have are more likely the cause of impulsivity and sustained attention, rather than the difficulties being caused by hyperactivity. Further elaboration and refinement of her theories led Douglas to her ultimate view that four major deficits could account for symptoms of ADHD: 1) deficits in investment, organization, and maintenance of attention and effort; 2) inability to inhibit impulsive responding; 3) inability to modulate arousal levels to meet situational demands; and 4) an unusually strong

inclination to seek immediate reinforcement. By the close of the 1970's, the prevailing view of hyperactivity was that hyperactivity was not the most important behavioural deficit of children described as hyperactive. Poor attention span and impulse control were seen as equally, if not more important in explaining these children's problems. Brain damage was relegated to a minor facet in the disorder.

Attention Deficit Disorder (With or without hyperactivity). Following the work of Douglas, the American Psychiatric Association recognized the greater contribution of deficits in sustained attention and impulse control in defining hyperactivity. In 1980, the American Psychiatric Association reconceptualized the disorder in its *Diagnostic and Statistical Manual of Mental Disorders.* The publication of the 1980 edition of the DSM-III provided a new definition which sought to demonstrate that while distractibility was the primary clinical issue, hyperactivity or impulsivity also might be present. This categorisation separated the disorder into two subtypes: Attention Deficit Disorder and Attention Deficit Disorder with Hyperactivity. The term used to describe the disorder now became Attention Deficit Disorder (with or without hyperactivity). The new diagnostic criteria provided a much more specific symptom list, numerical cutoff scores for symptoms and guidelines for age of onset and duration of symptoms. As well, the criteria were exclusive of other childhood psychiatric disorders.

The formulation of the subtypes of the disorder, with or without hyperactivity, was controversial at this time. There had been no research which indicated the need for the creation of these two subtypes. Though subsequent research clarified these subtypes somewhat, there was little evidence for the classification of ADD without hyperactivity as an official subtype.

In 1987 the American Psychiatric Association changed the term to Attention Deficit-Hyperactivity Disorder (ADHD) in the Diagnostic and Statistical Manual III-R (DSM III-R). The revisions which came about during this reformulation were significant in several respects. A single list of symptoms in descending order, and a single cutoff score replaced the three separate lists (Inattention, Impulsivity, and Hyperactivity) and cutoff scores which had been found in the DSM-III. The list was now based more on empirically derived dimensions of child behaviour from behaviour rating scales which could distinguish ADHD children from those with other psychiatric disorders and normal children. This definition also reflected the more recent research which showed that although distractibility was a primary issue, hyperactivity continued to be regarded as an important factor in this disorder.

At this time most professionals view ADHD as a developmentally handicapping condition that is chronic in nature, has a strong biological or hereditary disposition, and has significant negative impact on academic and social outcomes for many children (Barkley,1990). Further clarification of the syndrome will occur in examining both the primary symptoms and the historical conceptualizations of the term ADHD.

Primary Symptoms

While the definitions of ADHD have varied over the history of the disorder, several primary symptoms remain constant. In order to gain a greater understanding of the disorder, these symptoms will be examined in greater depth.

1. Inattention

The broad term "inattention" has numerous facets. It may refer to problems with alertness, arousal, selectivity, sustained attention, distractibility, or span of apprehension, among others (Hale & Lewis, 1979). In attempting to isolate the facets of inattention, research has examined the question of whether this deficit in paying attention reflects a primary deficit in sustained attention or whether it is secondary to another problem such as behavioural disinhibition or behaviour which is not guided by previously stated rules.

Research to date suggests that ADHD children have their greatest difficulties with sustaining attention to tasks or vigilance (Douglas, 1983). These difficulties are seen in the child's inability to play for periods of time or with the same toy (Barkley & Ullman, 1975). When the child is required to sustain attention to dull, boring, repetitive tasks, even greater difficulty is seen (Zentall, 1985). This problem is seen not so much one of heightened distractibility, or the ease with which children are drawn off task by extraneous stimulation, although the problem is often described in such terms. In general, research on the distractibility of ADHD children is somewhat contradictory. Some studies find that these children are no more distractible than normal children by extra task stimulation (Steinkamp, 1980). Some studies find stimulation worsens performance of ADHD children (Rosenthall & Allen, 1980). The problem appears to be one of diminished persistence of effort in responding to tasks that have little intrinsic appeal or minimal immediate consequences for completion (Barkley, 1990).

Selective attention, or the ability to maintain attention to target stimuli, was examined in Hagen's (1967) incidental learning paradigm. In his study, a central

stimulus was presented together with an incidental or background stimulus. The subject was told to pay attention to the central stimulus: usually nothing was said regarding the incidental stimulus. It is assumed that a child with good selective attention will attend to both the central and incidental items. The subjects are then asked what they remember after exposure to a list of items, each of which contain a central and incidental stimuli. In studies of this nature, it had been typically found that non-learning disabled children retain more central items than do learning disabled children. However, the learning disabled children retain more of the incidental items than do the non-learning disabled children. On the basis of these findings, it was concluded that learning disabled children were deficient in selective attention.

Parents and teachers frequently describe the children with attentional difficulties in terms such as "Doesn't seem to listen," "Fails to finish tasks," "Daydreams," "Is easily distracted," "Can't work independently of supervision" (Barkley, 1990). Studies using direct observations of child behaviour find that "off task" behaviour or not paying attention to work is recorded substantially more often for ADHD children and adolescents than learning disabled or normal children (Abikoff, Gittelman-Klein, & Klein, 1977).

In keeping with the findings of Barkley (1990), when he states that where alternate, competing activities are available that promise immediate gratification, the ADHD child may appear distracted or off task in order to engage in a highly rewarding competing activity. Whether this is a clear distraction is not clear. It may be that the child is displaying behavioural disinhibition (i.e., the child fails to follow rules of instructions when provided with competing, highly rewarding activities).

2. Behavioural Disinhibition

A deficiency in inhibiting behaviour in response to situational demands, or impulsivity, is closely related to the problem of sustained attention. The problem of impulsivity is defined as a pattern of rapid, inaccurate responding to tasks (Brown & Quay, 1977). Recent findings also refer to impulsivity as poor sustained inhibition of responding (Gordon, 1979), and poor delay of gratification (Rapport, Tucker, DuPaul, Merlo, & Stoner, 1986). Furthermore, studies that have factor-analyzed ratings of impulsive behaviour mixed in with ratings or objective laboratory measures of inattention, overactivity and oppositional behaviour (Achenbach & Edelbrock, 1983) have failed to differentiate an impulsivity dimension from that measuring hyperactivity. Over-active children are also impulsive children and vice versa. Perhaps then, it is a more global problem of behavioural disinhibition which unites this problem.

Behavioural disinhibition, or poor regulation of behaviour, is gaining recognition as a hallmark characteristic of ADHD. The rank-ordering of the DSM-III-R according to their discriminating power indicates that the symptoms characteristic of disinhibition, such as poorly regulated activity and impulsivity, are more likely to discriminate children with ADHD from children with psychiatric disorders and normal children (Barkley, 1990).

Children displaying characteristics of behavioural disinhibition are often noted to respond quickly to situations without waiting for instructions to be completed. Errors often result from these acts. They may also fail to consider, or perceive, potentially negative, destructive, or even dangerous consequences that may be associated with particular situations or behaviours. Accidental poisonings and injuries are not uncommon. Waiting their turn in a line or in a

game is a difficult situation for ADHD children. When faced with situations in which they are encouraged to delay seeking gratification and work toward longer-term goals and a larger reward, they often opt for the immediate, smaller reward which requires less time to achieve. They are noted for taking short cuts in their performance and applying the least amount of effort and taking the least amount of time to perform the tasks which they find boring or aversive.

Parents often become frustrated with their ADHD children in situations where the adult is in a position to promise something in the future. The interval of waiting is, for the ADHD children, marked with whining and badgering the parent excessively. If the children are involved in a game or activity that requires them to share or cooperate, their impulsive behaviour often prevents successful inclusion in these events.

The impulsivity of ADHD children will also cause them to blurt out answers or to interrupt the conversations of others. Inappropriate or indiscreet comments can cause great social embarrassment to the children's parents, but seldom to the children themselves.The behavioural disinhibition of the ADHD child is often the cause of frustration and annoyance for parents, teachers, and peers.

3. Hyperactivity

Restlessness, fidgeting, and generally unnecessary gross bodily movements are commonplace characteristics of children with ADHD. Observations of the children at school or while working on independent tasks find that they are out of their seats, moving about in class without permission, restlessly moving their arms or legs while working, playing with objects not related to the task, talking out of turn to others, and making unusual vocalizations (Abikoff et al., 1977). Direct observations of their social interactions

with others also indicate generally excessive speech and commentary (Zental, 1975).

Empirical studies also attest to these difficulties. While there are many different types of "overactivity," (Barkley & Ullman, 1975),there are also significant situational fluctuations in the symptom (Luk, 1985). This variability of performance may indicate that there may be a failure to regulate activity level to setting or task demands rather than just an excess of body movement. Greater weight is given to the behavioural class of impulsive and hyperactive characteristics than to inattention as it is the impulsive, disinhibited behaviour which best distinguishes ADHD children from other clinical states or from normal children.

4. Deficient Rule Governed Behaviour

An idea which is gaining recognition is the concept that difficulties with adherence to rules and instructions may be a primary deficit of ADHD children (American Psychiatric Association, 1987, Barkley, 1981). Rule-governed behaviour refers to the extent to which behaviour is under the stimulus control of the preceding verbal stimuli that specify contingencies (if-then relations between behaviour and consequences). The crux of this concept is whether correspondence exists between a child's behaviour and the previously stated rules. ADHD children may display significant problems with initiating or sustaining responses to commands or rules, either immediate (pliance) or over time (tracking or sustained correspondence), without necessarily verbally refusing to obey or physically resisting the guidance of adults. This behaviour is also likely to result in resistance to the guidance of peers when playing games or when in play situations.

It is common clinically to hear these children described as not listening, failing to initiate compliance to instructions, unable to maintain compliance to instruction over time, and poor adherence to directions associated with task (Barkley, 1990).

5. Variability of Task Performance

An inspection of a teacher's grade book for children with ADHD will indicate a pattern of performance that is both variable and erratic. Douglas (1972) noted this problem in observations of ADHD children performing reaction time tasks or serial problem solving. Both the number of problems these children solve, and the accuracy of their performance change substantially from moment to moment , trial to trial, or day to day in the same setting. The fact that these children have done their work well on a few occasions will be held against them during their academic careers (Krupperman, 1988). The teacher or parent views the child's ability to perform a given task on one occasion as a precedent for all other tasks. By the very nature of the disorder, it is impossible for the child to demonstrate the same level of performance on all tasks. This consistent variability may well be a hallmark characteristic of this disorder relative to other behavioural disorders, and may even be diagnostic of it (Barkley, 1990).

Barkley (1990) combined the above factors into a definition which sees inattention, overactivity, and impulsivity as the primary characteristics, and deficits in rule-governed behaviour along with deficits in maintaining a consistent pattern of work performance as the difficulties which become associated with the disorder. Barkley's definition reads:

Attention-deficit Hyperactivity disorder is a developmental disorder characterized by developmentally inappropriate degrees on inattention, overactivity, and impulsivity. These often arise in early childhood; are relatively

chronic in nature; and are not readily accounted for on the basis of gross neurological, sensory, language, or motor impairment, mental retardation, or severe emotional disturbance. These difficulties are typically associated with deficits in rule-governed behaviour and in maintaining a consistent pattern of work performance over time.

Secondary Problems

Children with ADHD often have difficulties in domains other than those affected by their primary symptoms. These problems may include difficulties in the academic domain, difficulties with social relationships, emotional disturbances, and problems of aggression and antisocial behaviour.

Academic Performance. One area of considerable difficulty for ADHD children is that of their academic performance and achievement. Almost all clinic-referred ADHD children are doing poorly at school (Barkley,1990). Typically, they are underachieving relative to their known levels of ability. This is believed to be the result of their impulsive, hyperactive, and inattentive behaviour in the classroom. ADHD children are likely to show performance on standardized achievement tests that is lower than that of their classmates by as much as 10-15 standard score points (Barkley, DuPaul, & McMurray, in press *quoted in* Barkley, 1990)

Social Skills. Although the primary symptoms of ADHD do not reflect problems in social functioning, many affected children experience seriously disturbed peer relations and social rejection. Children with ADHD have been found to be highly rejected by their classmates (Milich & Landau, 1989). Social status represents the personal appeal of an individual to the rest of the group. ADHD children receive few nominations for "most liked" and many nominations for "least liked." This *negative reputation* was investigated by Harris, Milich, Johnston, & Hoover, (1990). In this study, *normal* unfamiliar boys were paired

into dyads and videotaped in their cooperative effort to assemble Lego. In order to create an ADHD expectation, one member of half the dyads was told that he would be working with a child who disrupts the class, talks when he should not, will not sit still, and acts silly. The results indicated that the expectation of working with an ADHD child created interactions that were less reciprocal, less typical, and with younger subjects, more negative than if no expectations had been created. Thus the perception of others to the ADHD child has a significant impact on the way that child will be perceived and treated.

It has been hypothesized that children who have disturbed peer relations are at significant risk for later difficulties.

Cowen, Pederson, Babigian, Izzo, and Trost (1973) demonstrated a strong link between early peer problems and later maladjustment. This study found the negative nominations on Bower's Class Play (1969) by third grade classmates was by far the best predictor of later psychiatric problems. Early peer problems not only indicate current problems for the child, they also indicate a significant "at risk" marker for later emotional and behavioural disturbance (Landau & Milich, 1990). In a summary of a number of studies, Barkley (1989) reported a bleak outcome for adults with ADHD: 75% show depression into adulthood; 23-45% show juvenile convictions; and 27% may be alcoholic. ADHD children who were monitored into adolescence and who were free of psychiatric disorders also seem to experience some degree of social difficulty such as less community and school involvement (Mannauzza, Klein, Bonagura, Konig, & Shenker, 1988).

These academic and social difficulties make it very likely that children with ADHD experience a high rate of negative feedback on their abilities and a high

rate of negative interactions with significant others in their environment. It is not surprising then, that children with ADHD also have a poor self-concept and low self-esteem (Weiss, Hechtman, & Perlman, 1978).

Emotional Disturbances. As a group, ADHD children are rated as having more symptoms of anxiety, depression, and low self-esteem, than normal children or children with learning disabilities who do not have ADHD (Bohline, 1985; Breen & Barkley, 1983, 1984; Margalit & Arieli, 1984). These studies show that it is not their difficulties with learning which cause the emotional distress of the ADHD child, but it is rather the reaction of others to their ADHD behaviours which is the cause of emotional distress.

Conduct Problems. It is widely accepted by scientists studying ADHD children that the most disturbing problems exhibited by children with ADHD are those problems associated with aggressive and antisocial behaviours. In childhood, 20-30% of ADHD children will begin to manifest signs of a conduct disorder. By adolescence, between 40-60% will be diagnosed as having a conduct disorder (Barkley 1990). Children with ADHD often show a severe pattern of conduct problems which increase disruptions experienced by these children in the home, at school, and with their peers (Walker, Lahey, Hynd, & Frame 1987). There is also evidence that the presence of these conduct problems places children with ADHD at risk for abusing substances and exhibiting other antisocial and delinquent behaviours as adolescents and young adults (Mannauzza, Gittelman-Klein, Konig, & Giampino, 1989).

The associated problems of children with ADHD have a significant impact on their lives. The academic, social, and emotional difficulties of children with ADHD may prevent positive outcomes in their lives. The conduct disorders

experienced by these children increase the likelihood of difficulties in later life. It is imperative that these difficulties be the targets of interventions to prevent negative outcomes.

Conceptual Issues

Attention and Learning Disabilities.

The concept of learning disabilities occurring as the *result* of an attention difficulty has motivated research to examine whether learning disabilities stem from difficulties in attention. Conversely, the question of defining an attention deficit as a learning disability has also been the focus of studies. Both the role of attention deficits in learning disabilities and the role of learning disabilities in attention deficits needs examination in the context of the differing cognitive processes which are involved in each.

Specific reading disabilities and attention deficit disorders often coexist. On the one hand, children referred for academic problems are frequently shown to have a greater than normal incidence of attentional problems (Holobrow, & Berry, 1986). Conversely, children in samples chosen for primary attention problems commonly have academic problems more often than do most children with most other psychiatric diagnosis (Lambert & Sandoval, 1980). This overlap in symptoms leads to confusion in the issue of which is the primary symptom when the disorders coexist.

Initially the exploration of attention deficits in learning disabled children was motivated by the conception that learning difficulties were indeed the result of deficiencies in attention (Ross, 1976). Studies were formulated on two types of attention: selective and sustained attention.

Selective attention is usually defined as the ability to maintain attention to target stimuli when distractors are present. In studies which use the incidental learning paradigm to exemplify a selective attention task, it has been typically found that non-learning disabled children retain more central items than do learning disabled children (Hallahan and Reeve, 1980). These studies require a child to pay attention to a central stimulus while it is presented concurrently with a background stimulus. Presumably a child with more diffuse attention will attend to both the central and incidental items.

Evaluating the role of selective attention in LD children is difficult because of an overlap in symptom expression. Specifically, 30-40% of LD children are also known to have ADHD. If such a large sample of ADHD subjects is included in samples of LD children, then the difficulties in selective attention could be due to the ADHD rather than the learning disability.

While some studies (Tarnowski, 1986) have attempted to distinguish the selective attention difficulties of homogeneous groups of LD and ADHD children, they fail to inform as to whether the selective attention difficulty is responsible for the learning problems of the learning disabled children.
Further studies would have to establish that a relationship exists between performance on selective attention tests and measures of either the *type* or *severity* of LDs (Conte, 1991).

The performance of LD children and ADHD children on sustained attention tasks is more clearly delineated. Sustained attention tasks involve the ability to attend for an extended period of time. Subjects are instructed to monitor either visually or auditorally presented individual letters or numbers and are required to respond when a certain target stimulus is present. To do well, a

subject must be able to maintain attention for an extended period and withhold responding to a non-target stimulus.

Tarnowski (1986) found that LD children do not show a deficit in this task. In contrast, ADHD children tend to make more errors of commission. This pattern of behaviour is usually interpreted as a reflection of impulsive behaviour which is a defining characteristic of ADHD children.

Further research is indicated in order to clearly delineate the individual roles of both selective and sustained attention. Groups must be identified as having learning disabilities without ADHD, learning disabilities with ADHD, and those having ADHD without learning disabilities. The simultaneous appearance of the two disabilities often confounds the clarity of research results.

Further examination may wish to investigate the question of the nature of ADHD. Is ADHD a learning disability? Does having an attention difficulty qualify a child as having a learning disability? To clarify these issues, one must examine both concepts in terms of their individual cognitive and behavioural components.

There is little doubt that children with ADHD are at higher risk for school failure (Barkley 1981) and are in need of special education services. Presently PL 94-124 does not provide special provisions for children with ADHD which would make them eligible for educational services as are children with learning disabilities. In Canada there is no provision for these children to receive special services unless they also have other disabilities.

Currently, learning disabilities are presumed to be neurological disorders that impact on the basic psychological processes involved in the understanding of or the use of spoken or written language and in an imperfect ability to listen, think. speak, read, write, spell, or do mathematics (Silver, 1990). Silver takes this

understanding of the neurological foundation of the learning disability further: he maintains that if a learning disability is indeed neurologically based, then the Attention Deficit-Hyperactivity Disorder (ADHD) must also be scrutinized in this light. As ADHD does not impact on the brain's ability to learn, Silver maintains that ADHD does not impact on the psychological process for learning. Silver would see ADHD as a "related, neurological based disorder". ADHD does not impede learning processes, it merely interferes with the individual's availability for learning.

The overlap in symptoms, often makes it difficult to determine whether the attention deficit is the problem, or whether the learning disability causes the attention problem. Further, it could be argued that attention is a psychological process and as learning disabilities are defined as disorders in psychological processes, ADHD could be considered a learning disability.

Recent reformulation of the definition of learning disabilities by the National Conference on Learning Disabilities (1987) states that *an attention disorder can be a cause of learning problems, but it is not the cause of learning disabilities.* This would indicate that there are differing characteristics of learning difficulties that are associated with ADHD.

Felton and Wood (1989) have shown that rote memory tasks pose problems for ADHD children but not for LD children. In contrast, one segment of the LD population (children with reading disabilities) tends to show deficits on rapid automatized naming (RAN) tasks. In these tasks, the speed at which pictures of objects, colours or symbols can be named is measured. On a 20-questions type of task, Tant and Douglas (1982) found that ADHD children ask

less efficient questions and used less efficient strategies than either normal or reading disabled children. The latter two groups did not differ from each other.

Conte (1991) views these differences as differences in cognitive processing skills. LD children and ADHD children perform differently on these tasks because of their differing cognitive processes.

Schworm and Birnbaum (1989) compared the behaviour of students diagnosed as hyperactive or as having attention deficit disorder to students diagnosed as having learning disabilities. Symptoms associated with overactivity, inattention, and impulsivity were observed and counted. Analysis revealed that differences between groups were often qualitative rather than quantitative. Results revealed that students with hyperactivity could be differentiated from students with learning disabilities and no hyperactivity, but only when symptoms of general behaviour patterns were assessed. Schworm and Birnbaum suggest that their findings correspond with Cruickshank's description of hyperactivity. Cruickshank (1981), reported hyperactivity as involving two interrelated aspects, the first being sensory hyperactivity, and the second being motor hyperactivity. The chief characteristic of sensory hyperactivity, according to Cruickshank is the type of distractibility that makes some children unable to attend to a given stimulus for a sufficient period of time. This prevents appropriate intellectual responses. The motor hyperactive students reported by Cruickshank interacted with anything that could be "pulled, turned, pushed, twisted, bent, torn, wiggled, scratched, or otherwise manipulated." It is these very symptoms of hyperactivity which prevent the learning disabled student with hyperactivity from achieving his/her potential. It follows then that one should ask whether it is these actual

movements which prevent learning, or rather is there a neurological cause which impedes the learning of these students.

It would appear that ADHD and learning disabilities are separate and distinct disorders. While many of the symptoms overlap and occur concurrently, the two disorders may occur in isolation. Research which involves one or the other of these problems must be prepared to determine whether both ADHD and learning disabilities are present in a subject. As the symptoms overlap in many instances, there is a requirement that these factors be identified.

Causes of ADHD

Considerable research has attempted to isolate the causes of the occurrence of ADHD in children. It is anticipated that through an investigation of the causes of ADHD a greater understanding of the disorder will follow.

Brain Damage. A variety of etiologies have been proposed for ADHD. Brain damage was initially seen as the chief cause of ADHD symptoms. While some incidence of ADHD symptoms occurs as a result of known brain infections, or other injuries or complications during pregnancy or birth, most ADHD children have no history of organic brain injuries.

Reviews of the evidence suggest fewer than 5% of ADHD children have neurological manifestations indicative of actual brain damage (Ferguson & Rapoport, 1983). It is also the case that most children with brain damage do not show symptoms of ADHD.

Food Additives/Allergies. Investigation of allergies in ADHD was initiated by Benjamin Feingold (1974), Feingold maintained that up to two thirds of his patients were cured of their attentional difficulties by strict adherence to a specified diet. Feingold also proposed that *food additives* in a child's diet induced

hyperactivity. Artificial preservatives, artificial flavourings, artificial colouring and salicytes were thought to be responsible for a child's hyperactivity. A great deal of publicity and debate raged throughout the 1970s regarding the efficacy of the elimination of these elements from the diet.

While there has been some support for Feingold's view that food allergies and ADHD may have a common cause, this should not be taken that food allergies are *causally* related to ADHD. As well, Zametkin and Rapoport (1987) recognized that perhaps one of the reasons for the popularity of the Feingold hypothesis may simply relate to the power of food as a conditioned stimulus. In other words, modifying the diet and rewarding appropriate behaviour with more appropriate food could by themselves, produce behaviour changes that are unrelated to the presence of food colouring or other additives.

While unusual reactions to sugar ingestion have also been suggested as possible causes of ADHD, Behar, Rapoport, Adams, Berg, and Cornblath (1984) found no relationship between sugar ingestion and objective measures of ADHD behaviours. Other studies (Kaplan, Wamboldt, and Barnhardt, 1986) found no evidence that children with ADHD have unusual sensitivities or reactions to the foods or substances they ingest.

Genetic Factors. Behavioural studies of parents of children reveal that a positive family history of ADHD is approximately four times as common in parents of children with ADHD as it is in normal controls (Cantwell, 1972). A further family genetic study by Biederman, Faraone, Keenen, Knee, & Tsang (1990) found that first degree relatives of children with ADHD had significantly increased incidence of ADHD. Although many children with ADHD may not evidence a genetically-based disorder, there is a growing body of literature that

suggests an association between symptoms common to ADHD children and genetic transmission.

Neurobiology and Attention Deficit Hyperactivity Disorder. Studies in the etiology of ADHD have pointed to functional deficits, particularly in the frontal lobes of the brain.

The frontal lobes of the brain are involved in regulating attention, activity, and emotional reactions (Mesulam, 1986). Frontal lobe function is involved in developing goal-directed plans (such as bringing homework materials home from school), in allocating resources (sitting down and getting busy with homework), and inhibiting behaviours which interfere with goal achievement (watching TV) (Hynd, Hern, Voeller, & Marshall 1991)

When the frontal lobe areas are destroyed in laboratory monkeys, the monkeys become hyperactive, distractible, and emotionally overreactive - much like the hyperactive child (Levin, 1936). The frontal lobes are also involved in the ability to plan ahead, another area in which ADHD children typically have problems. This area of the brain does not, however, appear to be associated with innate intelligence (Ingersoll 1988).

Various studies have examined aspects of frontal lobe activity. Functional deficits in the frontal lobe suggest evidence of frontal lobe involvement in ADHD. Mattes (1980) speculated that children with ADHD are often impulsive and have deficits in controlling motor behaviour. Mattes speculated that the frontal lobes anterior and medial to the precentral motor cortex were dysfunctional in children with ADHD.

Lou, Henrikson, and Bruhn (1984) found a decreased blood flow in the frontal lobes of ADHD children. By charting the distribution of a radioactive trace

element in the brain, they found that children with ADHD evidenced low levels of metabolism in the region of the caudate, a subcortical structure known to be involved in the motor-regulatory system. A second study by Lou, Hendriksen, Bruhn, Borner, and Nielson, (1989) replicated earlier results and pin-pointed the right striatum (a subcortical region involving the caudate) that was deficient metabolically in children with ADHD. The regions identified as being underactive metabolically are precisely those subcortical regions that project to the frontal lobes and participate in initiating and regulating motor activity (Hynd et al, 1991).

Chelune, Ferguson, Koon, and Dickey, (1986) detected parallels between the performance on the Wisconsin Card Sorting Test of children with ADHD and patients with frontal lobe damage, further indicating a frontal lobe involvement in ADHD.

In a recent study by Zametkin and his associates (1990) cerebral glucose metabolism in adults with hyperactivity of childhood onset was measured. They investigated the hypothesis that cerebral glucose metabolism might differ between normal adults and adults with a history of hyperactivity. Each patient was also the biologic parent of a hyperactive child. None of the adults had ever been treated with stimulant medication. To measure cerebral glucose metabolism Zametkin et al. administered fluoro-2-deoxy-d-glucose intravenously to 50 normal adults and 50 hyperactive adults while they performed auditory attention tasks. Whole-brain and regional rates of glucose metabolism were measured by two trained research assistants, working independently, who were blinded to the subject's status. Brain images were obtained with a *Scanditronix* positron-emission tomograph.

It was found that four regions, primarily in the premotor and somatosensory cortex, had significantly lower metabolism in patients than in the controls. Results showed that the areas with the greatest depression in glucose metabolism included (but were not limited to) the premotor and superior prefrontal regions. These findings support speculation that the frontal lobes may have a role in the pathophysiologic processes in hyperactivity as do recent results of neuropsychological tests of frontal-lobe function in children with ADHD (Chelune, et al., 1986).

In summary, this study found differences in cerebral glucose metabolism between hyperactive adults and normal adult controls. The frontal lobes of the brain have been postulated to be important in the control of preparation for motor activity, motor activity itself, inhibition of inappropriate response, and attention.

From these results there emerges stronger evidence that there is indeed a neurological etiology in most children with ADHD. The findings from these neurological studies are also consistent with those from behavioural observations and neuropsychological tests which show behavioural disinhibition and poor self-regulation of responses to be the hallmarks of ADHD (Conners & Wells 1986).

Treatment of ADHD

Stimulant Medication. Half a century ago, a startling discovery was made that central nervous stimulants such as amphetamine had the unexpected effect of calming restless, hyperactive children. Dr. Charles Bradley (1937), a physician who was among the first to report this remarkable observation, gave Benzadrine to a group of behaviour-disordered children. He noted that a large proportion of these children became emotionally subdued without losing interest in their

surroundings when given the medication. Bradley's discovery was ignored for years until work with new drugs in the 1950s confirmed Bradley's findings.

There has been some suggestion in the literature that the arousal system in children with ADHD does not function as it does in normal children. It has been argued that children with ADHD are excessively aroused (Satterfield & Dawson, 1971), or that they cannot adjust their arousal level to the task demands (Douglas 1980). In the 1950s Laufer and Denhoff (1957) attempted to show that ADHD children were overaroused and more sensitive to the effects of the drug metrazol than were normal children. In this view it was argued that the high arousal was the cause of a high activity level and that the stimulant drugs acted paradoxically. The overarousal framework also led to predictions that if the child were overaroused, then the focus of treatment should be to decrease the stimulus input of the ADHD child thereby reducing the activity level of the ADHD child.

The lack of empirical support for the overarousal view has prompted research to investigate whether children with attention disorders are *underaroused.* Initially, the low arousal view of ADHD was thwarted by the difficulty in working with the physiological measures of the construct of arousal. Zental and Zental (1983) argued that arousal may be a more viable construct when examined behaviourally rather than physiologically. They maintained that ADHD children are *stimulus seeking* as their ordinary level of stimulation is too low. The view of underarousal would also help clarify the effect of stimulant medication on ADHD children. If ADHD children have a low level of arousal, then they would seek stimulation in their environment. The stimulant medication

would work to raise their level of arousal and diminish their stimulus-seeking behaviour.

At the present time, the treatment of ADHD with stimulant medication is both common and controversial. There have been numerous studies on the effects of stimulants on measures of intellect, memory, attention, concentration, and learning (Barkley, 1977b, Gadow, 1985). It has been shown that these drugs do enhance performance in reaction time (Porges *et al.*, 1975), vigilance (Sykes *et al.*, 1971), and paired associate learning (Swanson and Kinsbourne, 1976). Douglas *et al.* (1988) also found that the stimulants increase on-task behaviour and reduce fidgeting and motor activity.

Less clear, however, is the result of stimulant medication on academic performance. Most studies that have employed achievement tests suggest that there is no benefit from stimulant medication. The use of these achievement tests as measures of improvement has been criticized as they tend to be insensitive to short term changes in behaviour. When the measures include written tasks assigned by each teacher as a measure of academic change, the results were found to be more sensitive to treatment-related change (Rapaport, Stoner, & Jones, 1986). Douglas *et al.*, (1988) based their drug evaluations across a wide range of cognitive and behavioural measures. They found that every child in their study made substantial gains on at least several measures. Douglas reports that the response to stimulant medication is variable across measures. This would confirm the importance of sampling a range of clinically relevant measures when attempting to evaluate the effects of medication.

Thus the majority of existing data indicate that while a short-term benefit of stimulants for the majority of attention-disordered children, the long-term

effects are less clear. While long-term studies are exceedingly difficult to undertake, virtually every study attempted has failed to find evidence of long-term benefits. Consensus (Douglas *et al.*, 1988, Barkley 1990) is that long term benefits derived from stimulant medication are difficult to verify. Each case should be examined and dealt with on an individual basis.

The chronic and pervasive difficulties associated with ADHD are unlikely to be permanently eradicated by a single treatment. It is necessary to examine thoroughly a wide range of interventions which will benefit all those who come into contact with the ADHD child.

Behavioural Interventions

Self Instruction. The traditional view that attentional problems are the cause or source of learning problems or underachievement led to various behavioural interventions which sought to remediate attention problems. The development of these procedures parallelled the development of cognitive behaviour modification procedures. A major component of treatment for attention difficulties has been self-instruction. The inherent appeal of self-instruction as an intervention strategy is its view of the student in the role of the treatment agent. It would be most valuable to examine the specific studies which have shown the value of self-instruction in problems of attention.

Behavioural procedures were examined in initial research on increasing on-task behaviours of children with attention difficulties. Bornstein and Quevillon's (1976) research examined the effects of a self-instructional package on three over-active preschool boys. They used a multiple-baseline design across subjects. Behavioural observations of the three target subjects indicated transfer of training effects from the tasks to the classroom. On-task behaviours

increased dramatically with the introduction of the self-instructional package and maintenance occurred up to 22.5 weeks after the baseline was initiated. This study is seen as a clear indication that components of cognitive behaviour modification should be investigated to examine their impact on the on-task behaviour of learning disabled children.

In a training session by Varni and Henker (1979), three components of self-regulation were used: self-instruction, self-monitoring, and self-reinforcement. Hyperactive behaviours and academic performance during reading and math were monitored in both clinical and school settings. Initial results showed that self-instructional training did not improve performance in the absence of adult supervision and self-monitoring techniques did not significantly affect response. The issue of adult surveillance and cueing may have been a factor in the specificity of these findings. As with the Bornstein and Quevillon report, observer presence could also have been a discriminatory stimulus for staying "on task". The introduction of the self-reinforcement package in the training program made considerable changes to the student's academic performance. This investigation represented a significant step toward teaching hyperactive children the skills necessary for successful self-regulation and improvement of their academic performance in the absence of direct adult supervision.

Though the specific component of the cognitive-behavioural treatment that is responsible for these different outcomes is not readily apparent, Kendall and Wilcox (1980) speculated that an integrated program, using behavioural and cognitive procedures would be superior to either procedure alone. This would correspond to the theories of metacognitive development where the focus is on

an awareness of the thinking processes. In their study, Kendall and Wilcox (1980) examined the possibility of a differential in the effectiveness of concrete versus conceptual training within the cognitive-behavioural approach to developing self-control. The *concrete* approach, pertaining only to the task at hand, was compared to the *conceptual* approach, relevant to any problem-solving situation. Their findings provided one support for the effectiveness of an integrated approach. Ratings of both self-control and hyperactivity indicated that the desired change had occurred at post-treatment and follow up. The treatment effects of the conceptual training group were stronger than for the concrete training group. In addition, the study suggested the relative superiority of the conceptual cognitive-behavioural treatment. Thus metacognitive training was perceived as an effective remedial program for children with attentional problems.

The generalized effects of self-instructional training on the classroom performance of three "impulsive" children were examined in a study by Bryant and Budd (1982). Measurements of child and teacher behaviour in the classroom were obtained through direct observations during a daily independent work period. Self-instructional training followed Meichenbaum and Goodman's (1971) approach, except training consisted of naturalistic task worksheets rather than psychometric test items. The practical value of self-instructional training was demonstrated in this research as training resulted in increased levels of accuracy on classroom worksheets that were similar to those used in training. By using worksheets in the training condition that were similar to those in the classroom, increased levels of accuracy were observed. As well, the children

had been exposed to instructions, modelling, practice in self-instruction, and teacher feedback on the tasks.

Generalization of self-instructional training is seen as more likely to occur when the materials are of value in everyday class conditions. Bryant and Budd (1982) provided a caution that training may need to incorporate multiple and diverse tasks in order to effect widespread improvements in accuracy across academic activities in the classroom. While the focus of this study was on task completion, it should be noted that these children were considered 'impulsive' and that there was some improvement in on-task behaviour. It was evident, however, that further research was needed to specifically test the efficacy of self-monitoring training on students with: a)learning disabilities, and b) attention problems.

Hallahan, Lloyd, Kosiewicz, Kauffman and Graves (1979) set out to investigate whether evidence could be found which indicated that self-monitoring by itself could increase attention. In addition, they wished to examine whether an increase in attention could have effects on other behaviours such as academic performance. They conducted the study with a learning disabled boy with attentional problems. Previous studies had not included children specifically designated as learning disabled.

The subject was a 7-year, 11-month old learning disabled boy with attentional problems. He was taught to self-monitor his on-and off-task behaviour by using an audio-tape recorder to cue his self-recording. On-task behaviour was defined as occurring when the subject was sitting in his seat with his eyes focussed on his work. The academic productivity was measured in academic output since his rate rather than percentage correct was the area of concern.

Exercises were completed in handwriting and math. Results indicated that on-task behaviour was nearly doubled over the base-line condition. A high correlation between academic performance and attention was also indicated.

Self-monitoring of attention in this instance, did result in academic behaviour changes due to the particular role of attention in the subject's school performance. It is speculated that the more a child's problems are due to inattention, the higher the degree of carryover to academics if the child's attention is increased.

Brown and Alford (1984) sought to investigate a more direct link between attention deficits and academic deficiencies. Their study investigated the efficacy of a package of cognitive self-control procedures for ameliorating the attentional deficits of 12-year old learning disabled children. The study followed the hypothesis that if faulty attention impedes learning, then training methods for learning disabled children should focus on the teaching of strategies for selecting and deploying attention more effectively. The study was seen as an attempt to utilize cognitive self-instructional training to remediate academic deficiencies in a group of severely learning disabled children. It was expected that improved attentional processing would result in enhanced academic performance for these children.

The subjects of this study were 20 LD children who received training over a two month period. Children were seen individually for two 1-hour sessions per week, for a total of 16 sessions. A variety of materials and exercises were used to train the children to process information and selectively attend to visual discrimination problems more effectively. The results of the study showed a significant improvement on the reading subtest, despite no attempt at training

reading in the training package. The trained group continued to show improvement in reading at the time of the three month follow-up testing. Results from the two attention tests suggest that training had a significant effect on attention. It is apparent that a cognitive training package can be readily adaptable to LD classrooms in remediating attentional difficulties of LD children with the consequence of improving their academic performance.

Although there is a strong linkage between academic achievement and attention, it is not entirely clear *how* attentional behaviours become applied to academic tasks. Loper, Hallahan, and Ianna (1982) looked at attention as a cognitive operation. They attempted to find the degree to which LD children's attentional behaviours reflected their understanding or awareness of the process of attention. Metacognitive differences between normal and LD children were thought to be more likely to occur in the *application* of metacognitive information rather than in the *acquisition* of metacognitive information *per se.* Loper. and associates, tested their hypothesis by relating meta-attention, or an awareness of one's attention, to academic performance. Results indicated that LD students do indeed suffer in their application of facts about attention, rather than the rudimentary understanding of the facts themselves. Despite preliminary indications that a causal relationship exists, further study is required. Research to date has been somewhat less than conclusive. Researchers are uncertain as to whether the changes in classroom production are the result of cognitive training or simultaneous operant techniques (Reid & Hresko, 1981). It would follow that if LD children are not as fundamentally aware of the application of attention, then training in the application of attention would be required for attention training to be effective.

Despite initially promising results of Cognitive Behaviour Modification training for students with attention problems, many other studies fail to show generalizable effects over time (Abikoff, 1985). Treatment gains usually are not maintained after the cognitive-behavioural procedures are withdrawn and they rarely generalize to settings in which the procedures have not been implemented. Reasons for this lack of generalization are not entirely clear. The brevity of training, the lack of overlap in training between settings, and the lack of consistent follow up may all be explanations for this lack of generalization. In addition, CBM treatments require a great deal of time and resources to implement properly. Trained experimenters or teachers are necessary to teach the children the procedures. Supervision of the children's self-monitoring and evaluation is also required. CBM treatments are most likely to be useful when they are taught directly to a child's caregivers (parents and teachers) for use within multiple settings. It must be ongoing over a substantial period of time. Parent and teacher involvement in a long term, multifaceted intervention holds the most promise for affecting change in the behaviour of the ADHD student and in the perception of those working with these students.

Preskills and Attention. Several questions need to be addressed at this juncture. If these studies are using self-monitoring of attention as a basis for their information about the attention capabilities of these students, then we must ask:

1. Are the children aware of *what it is that requires their attention?*

2. Do the children have the *preskills needed to pay attention?*

Some thought should be given to whether the focus of studies should include these two components in attention training.

Self-monitoring of attention attempts to train a self-regulatory metacognitive process. While there is some evidence that this training does lead to academic gains, perhaps greater advancements could be made if there was a greater understanding of the components of attention which are involved in learning.

The training used in the studies presented typically had the students monitor their attention by asking themselves "Am I paying attention?" There are some methodological concerns in the structure of this task. If the child is focussing on his/her attention processes, how can he/she be cognitively involved in the task at hand at the same time? It is possible that the training should instead focus on teaching the children *what to pay attention to.* Teaching a child *how* to pay attention by asking him/herself "Am I paying attention?" only benefits those children who also receive the accompanying instruction that enables him/her to recognize *what* is salient.

Further, the student who is being asked about his/her attention, may indeed believe that they *are* paying attention when, in fact, they do not have the *necessary preskills* for the task. The question of preskills in attention has not been addressed in any of the studies reviewed here. Yet the importance of preskills has been demonstrated in other areas of cognitive training.

A study by Lloyd, Saltzman, and Kauffman (1981) sought to demonstrate that preskills were an important factor in strategic learning. It was found that student's learning of math was maintained and generalized when both the preskill and the strategy were presented to the students. If either the preskill or the strategy was absent in the training condition, the results were not as

favourable. The ideal training condition would include both adequate preskills and a range of strategies for their application.

Inadequate preskills are seen as the possible negative results received in a study on self-instruction by Robin, Armel, and O'Leary (1975). They found that teaching kindergarten students self-instruction procedures was unwieldy. The children had difficulty in shaping their verbalizations and the results of the study were inconclusive in terms of cost/effect.

Kosiewicz, Hallahan, Lloyd, and Graves (1982) found that self-instruction and self-training of handwriting could be both practical and successful. It is hypothesized that the difference in the two results is a matter of *preskills* (Wong 1985). The kindergarten children in the study by Robin, Armel, and O'Leary (1975) had to copy letters with which they were unfamiliar. It is possible that the training would have had more successful results had the children already known how to print the letters, ie. *had the necessary preskills for the task.* The success of the training in the investigation by Kosiewicz et al., was in part due to the student already having the requisite preskills as well as being taught the self-instructional training.

If successful metacognitive training demands both preskills *and* strategies, should attention training include these two components as well? Can we assume that the child who is having problems in attention to the degree that it has become a serious learning impediment, is capable of meta-attention? Perhaps the question should be asked "Do these children have the cognitive ability to pay attention, or should training include some preskills in attention?" No research has been found to date which would answer this query.

Antecedent and Contingency Management. Modifications of the task and the environment have not traditionally received attention in dealing with behavioural interventions of ADHD in the classroom. Recent studies have included both antecedent and contingency management as a method of improving the school performance of the ADHD child.

Antecedents. The term "antecedent" refers to the environmental and task characteristics which impact on the student with ADHD. Whalen and Henker and their colleagues have explored the impact of a number of environmental and task variables on the classroom functioning of ADHD children. Their results suggest that classroom noise detracts from on-task behaviour as do tasks that are difficult and tasks that are paced by others as opposed to self-paced (Whelan, Henker, Collins, Finck, & Dotemoto, 1979). Zental and her colleagues have identified a number of task characteristics that affect the rates of on-task behaviour of children with ADHD. Her studies suggest that children with ADHD benefit from novelty and stimulation on easy tasks, but not on new and difficult tasks (Zental, 1985; Zental, Falkenberg, & Smith, 1985; Zental & Shaw, 1980). There is a strong suggestion in this research that the antecedents are of considerable importance in the maintenance of adequate levels of attention in students with ADHD.

Consequences. Contingency management, or the application of consequences contingent on specified child behaviours, has been investigated with children who are diagnosed as ADHD. Token Economies and Home-school contingencies are two behaviour management techniques which have been investigated.

Classroom token economies involve awarding or removing tokens or points to children contingent on specified desirable of undesirable behaviours. These tokens or points are exchanged later for activities, points or privileges. These systems may encompass a wide variety of academic and social behaviours, or they can specifically target one or two selected behaviours (Abramowitz & O'Leary 1991). A token economy may or may not include a response cost (or the removal of a token for behaviour which fails to meet the criteria). Some educators prefer an all-positive approach and are reluctant to withdraw or withhold that which the child has already earned. It has been shown that children with ADHD will require some reductive techniques and it is expedient to build such procedures into the token economy (Pfiffner & O'Leary, 1987).

As it is with all interventions, the issue of maintenance and generalization is particularly an issue with token systems. They are complex programs and may not be implemented in all aspects of school functioning. Children in a special education setting who become ready for mainstreaming may face regression in their behaviour when the token economy is removed simultaneously with the mainstreaming.

Home-school contingencies consist of programs which combine school and parent efforts to improve the child's behaviour. Daily checklists are sent home that indicate whether a child has met specified behavioural goals for that day. The parents provide the appropriate consequences at home by applying the contingencies developed in advance. Studies have shown that concrete positive consequences and response costs work effectively to monitor the behaviour of children in school (Abramowitz & O'Leary, 1991). Teacher training in behavioural

principles is vital to the successful implementation of these programs. As well, it is imperative that both teachers and parents understand the degree of commitment needed for this type of a program.

In summary, the literature reveals a concept of Attention Deficit Hyperactivity Disorder which is on a continuum which is still evolving. Early formulations of the disorder were the foundations of today's concepts. Currently children with ADHD are said to display the symptoms of inattention, behavioural disinhibition, hyperactivity, deficient rule-governed behaviour, and have a greater variability of task performance. ADHD may further be clarified as a neurologically-based syndrome of age-inappropriate levels of hyperactivity, impulsivity, and attentional difficulties.

Secondary problems of the ADHD child impact on the child's academic functioning, on his social interactions, his emotional reactions, on his motivational status, and ultimately on his conduct.

The relationship between learning problems and ADHD remains unclear. The symptoms of the disorder may interfere with learning or perhaps children with the disorder may appear to be more inattentive. It is further suggested that the same mechanisms may be involved in both attention and learning problems.

Treatment modalities examined, including behavioural interventions, stimulant medication and educational antecedent and contingency management, appear to offer no effective unitary intervention program.

Emerging from the literature in a clearer fashion is the etiology of ADHD. The case for neurological impairments to the frontal lobe region of the ADHD child as a cause of ADHD offers directions for future research. The implications of the neurological basis of ADHD gives rise to the expectation that with more

research into the causes of ADHD, a greater understanding of the disorder will evolve. It is anticipated that this understanding will lead to educational interventions which would assist in solving the difficult problem of providing an equitable and appropriate education for the ADHD child. It is important that the range of interventions is seen as part of a treatment continuum. For each group of unwanted behaviours, there is a strategy for intervention which will lead to the attainment of a goal. The sum of the strategies would equate to an intervention plan for the individual child.

CHAPTER 3

Methods

The intent of this study was to gather a wide range of data on a student with attention-deficit hyperactive disorder (hereafter ADHD). ADHD is one of the most frequent reasons children are referred to mental health clinics in the United States and Canada (Barkley, 1988). Most authoritative sources claim that ADHD affects a large number of the population (3-5%) and has profound implications on a child's overall psychosocial development (Frick & Lahey, 1991).

ADHD is a behavioural diagnosis. This is a descriptive label denoting a cluster of behaviours which commonly occur together. The diagnosis of ADHD calls for a behavioural assessment which incorporates different informants and a variety of procedures such as interviews, rating scales, and observations (Mash & Terdal, 1988). Such a multi-method approach to assessment is based on the idea that multiple informants contribute unique information about the child's behaviour and that composite judgements are superior to scores provided by a single informant (Schaughency & Rothlind, 1991). In this instance, the sources of data are extensive. By comparing the data from these sources, a more reliable picture of the ADHD student may be drawn.

The material in this chapter will be organized into the following sections:

I) The ADHD Child

II) Research Design and Methodology

III) Instruments

IV) Setting

V) Data Interpretation

The ADHD Child

Alan. The principal subject in this investigation was a nine year old boy Alan J. (a psuedonym), who exhibited the primary characteristics of Attention Deficit Hyperactivity Disorder. Alan was a small, active, boy enrolled in a Primary Learning Disabilities class in School District #34. He is the elder child of a two parent family and has one younger sister who is five years old.

Alan had experienced difficulty in school since he began Kindergarten. He was placed in a French Immersion Kindergarten where he was tested by the district counsellor as he was experiencing significant difficulty with his motor skills and with his lack of attentiveness. Because of his difficulties in the French Kindergarten, Alan was moved into an English Kindergarten mid-way through the year. After his year in Kindergarten, Alan was placed in a "Junior One Program." This class was meant to be a transition year for those students who had attended their first year in kindergarten but who were not yet ready for the rigours of the first grade. Following this year in the Junior One class, it was evident the Alan was performing well below his age level in his academic achievements, and he was placed in a Primary Learning Disabilities class. In the two years that Alan was in this class, it was housed in a small room in one of the oldest schools in the district. The following year (the year of the study), the Primary Learning Disabilities Class was relocated in a new school with this researcher as the instructor. Alan was in a Learning Disabilities class but had not been diagnosed as ADHD. He consistently displayed the inattentive, hyperactive, and impulsive behaviours which had been reported in previous years. It became apparent to this researcher that these behaviours were evidence that Alan may have ADHD. Further observations and assessments verified that Alan did exhibit

the primary characteristics of ADHD and would be an excellent candidate for a case study on ADHD. The main source of data for this report was gained through the observation of Alan in all aspects of his school work and in his interpersonal interactions.

Alan's Parents. Alan's parents, Mr and Mrs. J., were informants in the study. They provided considerable background information regarding Alan's natal and early childhood development. Alan's mother had been in contact with the school throughout the year and was both willing and eager to discuss Alan with this researcher. She had great concerns for Alan and his future. She was anxious for any help or information she could receive about ADHD. She often expressed frustration and dismay over some of Alan's behaviours.

Alan's father was not available for an interview throughout the year as he had a job which often took him out of the region. It was not until the summer after the study year that the interview took place. He had at this time left his job so that he could be at home and become involved in the family to a greater degree. Alan's father recognized that he had displayed the same behaviours as a child that Alan was exhibiting. He had not known "what was wrong" with himself. His reflections about his struggles as a youth provided an understanding of the disorder from the perspective of an adult with ADHD.

The insights of Alan's parents into living with a child with ADHD were invaluable to understanding the whole picture of the ADHD child.

The principal research was done by this researcher who was also Alan's classroom teacher. The role of participant observer provided unlimited opportunity to observe Alan in all aspects of his school work and his social

interactions at school. The setting was a natural environment and he was unaware that he was being studied.

Research Design and Methodology

Ethnography. The method of research used for this investigation was that of an ethnographic case study. Many of the concepts and methods found in qualitative research have as their foundation *ethnographic* research. An ethnography can be defined as an in-depth analytical description of an intact cultural scene (Borg & Gall, 1989). One of the main characteristics of ethnographic research is that the observer uses continuous observation for data collection.

Ethnographers do not start with a specific hypothesis. In fact, they try to put aside expectations or preconceptions in order to avoid risk that these will bias what they see in the observational situation. Ethnographic research provides a complete picture of the environment (person) being studied. These studies generally extend over many months, and they give a longitudinal perspective. New insights and hypotheses are often formulated through this method. The hypotheses or theories which are developed through ethnographic research are grounded solidly on observational data which is gathered in a naturalistic setting (Borg & Gall, 1989).

The *participant observer* in an ethnographic study often gains insights and develops interpersonal relationships which are impossible to achieve through any other method of research. In *complete participation* the individual becomes a full member of the group and the role of the observer is concealed. This study involves both the participant observer and complete participation.

Case Study. The case study in its simplest form, involves an investigator who makes a detailed examination of a single subject. Most case studies are based on the premise that the case is viewed as an example of a class of events or a group of individuals. In this instance, the subject was viewed as an example of a group of individuals, ie., a sample of a child with ADHD. Once such a case has been identified, it follows that in-depth observations and collection of other data about the single case can provide insights into the group of individuals (ADHD) from which the case has been drawn. Case studies are seen as having the potential to generate data which will produce an in-depth understanding of the entity being studied (Borg, & Gall, 1989).

Clinical case studies are aimed at understanding a particular individual, such as a child with a specific learning disability. Such case studies usually employ clinical interviews and observations but may also involve testing and other forms of data collection. The goals of these studies are to understand the individual and to identify effective, feasible, interventions.

It was the intent of the present study to use the clinical case study to promote an understanding of ADHD as a disorder, and to show how ADHD may impact on a student. This was achieved by examining the parameters of ADHD in the literature, and then studying the child with ADHD in a naturalistic setting. The research looked at both the criteria of the disorder and also at the disorder as it affects a child. Through the combined information from the literature and the behavioural observations of the case, an awareness and understanding of ADHD became evident. From this awareness, appropriate intervention models were drawn (Appendix F and G).

Reliability and Validity. Credibility of ethnographic research is dependent on addressing the questions of the reliability and validity of the study. The *external validity* of qualitative research is the degree to which findings can be generalized to the population from which it is drawn. It addresses the issue of whether independent researchers would discover the same phenomena or generate the same constructs in the same or a similar setting. *Internal reliability* refers to the degree to which other researchers, given a set of previously generated constructs, would match them with the data in the same way as did the original researcher (Goetz & LeCompte, 1984). Establishing the reliability of ethnographic design is complicated by the nature of the data and by the research process. Standardized controls are not available to the ethnographer.

Validity is concerned with the accuracy of scientific findings. Establishing validity involves demonstrating that the propositions which have been generated by the study match reality. Two questions addressed in seeking to establish validity are: do scientific researchers actually observe or measure what they think they are observing or measuring; and to what extent are the results postulated applicable across groups (Goetz & Le Compte, 1984).

Reliability in this study was to be established by recognizing and addressing the major problems as set out in Goetz and Le Compte (1984). The areas of concern in establishing reliability are outlined as: researcher status position; informant choices; social situation conditions; analytic constructs and premises; and methods of data collection and analysis.

Researcher Status Position. The role of the researcher in an ethnographic study creates a problem in replication. Other researchers will fail to obtain comparable findings unless they develop corresponding social positions. The

dependence of ethnographic data on the social relationship of the researcher requires that research reports clearly identify the researcher's role and status within the group investigated (Goetz & Le Compte, 1984).

In this study, the relationship of the researcher and the subject was one of a teacher and student. The role of the researcher was not known to the subject as the researcher was hidden by the fact that this was primarily a student and teacher relationship. Further, it must be noted that the observations occurred within a small group setting. The size of the class, a total of eight students, must also be noted as this factor plays a role in the relationship of the students and the teacher. The reliability of the observations which were made in this instance may then be interpreted as data which may occur in a similar educational setting with the researcher's position being similar to the above situation.

Informant Choices. The problem of identifying the informants who provide that data is another factor in establishing the external validity in research. As each informant has unique and idiosyncratic information, the researcher who wishes to replicate the study must be able to contact individuals similar to those who provided the original data (Goetz & Le Compte, 1984).

The present study was limited in its choice of informants by the nature of the study. The subject, who was the focus of the data, and his parents were the only persons who were included as informants. The parents' information provided an historical perspective of the problem, as well as a viewpoint of living with a child with ADHD. The subject was not interviewed as such, but provided data through formal and informal observations. Replication of this information could be made if the similar informants, i.e., an ADHD student and his/her parents, were observed, tested, and interviewed in a similar setting.

Social Situation and Conditions. A third element which influences the content of ethnographic data is the social context within which the information was gathered. What informants may reveal in some contexts, they may not feel is appropriate to reveal in another. It is important to clarify the specific context in which the data were collected (Goetz & LeCompte, 1984).

The behavioural data for this study was collected in the context of a Primary Learning Disabilities class. The researcher in this instance was the teacher of the subject in this class. All behavioural information was gathered by this researcher within this context. The interviews with each of the parents of the subject were also of the nature of a parent/teacher conference. Each interview occurred at a separate time and place. The interview with the mother took place in the classroom during a time when the children were elsewhere in the school. The interview was recorded on an audio tape and written notes of the interview were made at the same time. The father's interview occurred in the researcher's home and this too was audiotaped supplemented by written notes. Both interviews were held in private, with only the researcher and the interviewee present. Replication of this information would be possible in the context of the above conditions.

Analytic Constructs and Premises. Of utmost importance in establishing the reliability of a study are the constructs, definitions, or units of analysis which were used in the study. Explicit identification of the assumptions which underlie the choice in terminology should be stated (Goetz & Le Compte, 1984).

Outlining the theoretical constructs of ADHD was done in Chapter Two, in the review of the literature. In this chapter, ADHD was presented as a disorder which has historically presented a problem in providing a clear definition of the

disorder. ADHD was also seen as needing clarification as to which symptoms would be included in any diagnosis of the problem. The parameters of ADHD were established through the Diagnostic Criteria of the DSM III-R (American Psychological Association, 1987). The behaviours exhibited by the subject of this study were recorded in the form of field notes. These were analyzed in the context of the three primary symptoms of ADHD: impulsivity, inattention, and hyperactivity. These definitions and constructs remained constant throughout the study and are clearly delineated by those terms and definitions.

Methods of Data Collection and Analysis. Replication of data in a case study is never entirely possible as the same situation will not occur again exactly in the same manner. Replication is made more likely, however, if identification and a description of strategies used are made clear (Goetz & Le Compte, 1984). As well, the identification of general strategies for analyzing ethnographic data must be evident. The researcher must clearly identify and fully discuss data analysis processes and provide retrospective accounts of how data were examined and synthesized (Goetz & Le Compte, 1984).

The strategies used for data collection in this study included both formal and informal data gathering methods. These are clarified further in this chapter under the topic of "Instruments". The data from these instruments were analyzed within the context of the primary and secondary characteristics of ADHD. The field notes which were gathered throughout the year were also analyzed by examining the behaviours of the student in the context of the primary and secondary characteristics of ADHD. An examination of the impulsivity, the inattentiveness, and the hyperactivity of the subject were examined as to their

effect on his social, emotional and academic life. The impact of the disorder was examined through the use of data from both the school and the home.

The data for this study have been collected from a number of sources and represent reliability through triangulation. Triangulation occurs when confirming data are collected from a variey of sources.

The reliability of the study has been made more likely by the inclusion of the factors noted above. Rater reliability, is addressed when the data are collected by more than one person. This ensures that rater bias is not a factor in interpreting the data. While a second rater was not directly involved in this study, reports and data from previous teachers did confirm that the behaviours which were observed in the year of the study were similar to the behaviours which had occurred in previous years. However, a second rater in the study would improve the rater reliablity.

Internal Reliability. Internal reliability reflects the condition of whether within a single study, multiple observers agree. What is sought is agreement on the composition of events rather than on the frequency of occurrence of events. As this research was the work of a single recorder, it was determined that the internal reliability could be established through low-inference descriptors as outlined by Goetz and Le Compte (1984). Verbatum accounts of participant conversations, descriptions phrased as concretely and precisely as possible from field notes or recordings of observations, and other raw data such as direct quotes from documents constitute the principal evidence for assessing the internal reliability of an ethnographic report. This study established internal reliability through the extensive use of low-inference descriptors. These include direct quotes from: the parent's questionnaire, teacher reports, student self

evaluation, behavioural observations, formal educational assessments, and ADHD assessments. This material provides readers with the means for accepting, rejecting, or modifying an investigator's conclusions. Internal reliability is established through extensive inclusion of these data.

Validity. Establishing validity necessitates demonstration that the issues involved in the study reflect what is actually happening in the real world. Ethnographic research claims a high internal validity as the data collection and analysis techniques are derived from information provided by the real world. The practice of the ethnographer living among participants was parallelled in this study by the researcher being the teacher and in effect, being with the subject throughout the school day and for a long period of time (one year). Continual data analysis and refinement of constructs throughout the study allowed for the match between scientific categories and participant reality to occur. The data provided evidence that the constructs set out in the literature regarding ADHD were evident in the reality of the study.

A second category which provides strength for internal validity of ethnographic studies is the fact that participant observation is conducted in a natural setting which reflect the reality of life's experiences. In this instance, the setting for the study was the school and as such provided the data which reflected life's experiences more accurately than do the more contrived laboratory settings.

Establishing external validity of a case study may represent the limitations of this method of research. External validity is the degree to which the findings can be generalized to the population from which it is drawn. The degree to which the sample is representative of the population from which it is drawn is called

population validity. If population validity cannot be established, then the researcher must be very cautious in generalizing his/her results. Research designs which involve collecting data at several sites (or data from several cases), provide evidence on the typicality of the phenomenon being observed. The subject of this study represented a single entity of his type, therefore, generalization of the data from this study must be entered into with caution.

The naturalistic setting of the study is an aspect of strength in the research design. Throughout the year of the study, the subject was naive about the research which was occurring in the room. The ongoing observations of the subject and the length of the study (one school year), provided rich, descriptive data about the ADHD child.

The information which was gathered through both formal and informal methods, was combined to create an understanding of the nature and significance of the problem of ADHD in an educational setting. The limitations of the case study (generalizability) are off-set by the intensive internal validity of the study and the deeper understanding gained about a problem which affects a large population of school children.

Instruments

Informal Data Collection

- Parent Interviews
- Parent Questionnaire (Satter, 1988)
- Student work samples
- Teacher Reports
- Student self-evaluation
- Behavioural Observations in a variety of tasks and situations.

Formal Assessments

Educational Assessment
- Bender (Bender, 1938)
- MVPT (Colarusso, & Hammill, 1972)
- Peabody Picture Vocabulary Test (Dunn, 1971)
- Raven (Raven, 1962)
- WISC-R (Wechsler, 1974)
- Goodenough-Harris (Harris, 1963)

ADHD Assessment
- ADHD Rating Scale (DuPaul, 1990)
- School Situations Questionnaire Revised (DuPaul, 1990)
- Academic Performance Rating Scale (DuPaul et al., 1990)
- Diagnostic & Statistical Manual III-Revised (DSM III-R) (American Psychiatric Assoc. 1987)

The formal assessments were used to provide an educational profile of the subject. The psychological tests expanded the information with a profile of Alan's abilities and performance levels. The ADHD assessment materials confirmed the diagnosis of ADHD in Alan. The ADHD assessments further characterized the significance of the disorder in its degree of severity and in its pervasiveness.

The results of the formal tests were presented as they related to the case. These provided an academic profile of the subject. The data provided by the informal assessments substantiated the findings of the formal tests. The data from the formal and informal sources combined to increase the understanding of ADHD and its impact on a child with ADHD.

The parents were asked to complete a questionnaire about Alan. This instrument was completed at their home with no instructions regarding the type of information it was seeking to confirm.

Information from teacher reports was readily available in the school files and provided records of five years of schooling. This data source was valuable

as it validated the findings of this study and provided the perspective of four previous teachers regarding Alan's educational profile.

The self-evaluation form which Alan completed and which is presented in this report (Appendix E) was done during a class lesson which had been specifically structured to garner that information from the students. All students filled in the questionnaire and Alan did not feel that he was singled out in this instance.

During the course of this study, lists of Alan's behaviours during academic performance in school were recorded. These sessions consisted of the researcher watching Alan during a specified operation and making notes of all of his movements, noises, and activities. The observations were recorded on numerous occasions throughout the year, in a number of different assignments, and across a variety of settings.

Much of the data which were collected for this study was recorded as field notes or anecdotal comments. A diary of observations was kept throughout the year. In it, the behaviours which pertained to ADHD were recorded as they occurred, or as soon as possible after the occurrence. The observations were valuable in providing insights into the daily behaviours and problems of a child with ADHD and the implications of the disorder on his school performance.

The data gathered in this collection method were extensive. By looking at these data within the context of the primary characteristics and the secondary problems associated with ADHD, a clearer picture of the disorder evolved.

Setting

The school building is a modern, open, and pleasant facility. As well as the Intermediate and Primary LD classes, it also housed a full English and

French Immersion program, Kindergarten through grade 7. The LD classroom was in the central area of the school and was larger than the regular classrooms. The openness of the class, with its large windows and high ceiling, provided a spacious working environment. This large size was of considerable benefit for students as there was ample room for movement and activities. As there were only eight students in this class, the setting was ideal for both learning and observation.

Data Interpretation

The data amassed from a study of this nature are voluminous. The data were examined in the context of the primary characteristics of the disorder. The secondary problems associated with the disorder were considered to determine their presence in this study.

Specifically, the primary symptoms used in this study were the characteristics of the disorder as specified in the American Psychiatric Association (1987)Diagnostic and Statistical Manual III-R (Appendix III). The behaviours which had been monitored and recorded throughout the study were examined in the context of the DSM III-R criteria. These criteria were classified further into three behavioural categories. ADHD behaviours were presented in this study within the context of the primary symptoms of ADHD: inattention, impulsivity, and hyperactivity.

The impact these primary symptoms of ADHD on the secondary characteristics of ADHD were considered. The social, emotional, and academic performance of the student was also examined. The role of motivation was also examined to determine the influence of motivation on the performance of a child with ADHD.

The conclusions about ADHD which were drawn from this study may be seen as an example of a class or type from which this data was drawn. The findings from this single case study will not necessarily generalize to all ADHD cases. The extensive data collected from this study does, however, allow for some strength in the understanding of ADHD which was drawn from the material. It also allows for recommendations which can be made for the educational implications of the disorder. Through an understanding of the disorder, it is possible to prepare solid educational management strategies. These strategies will create an environment where the ADHD child may meet with success. It was one of the anticipated results of this study.

CHAPTER 4

A Case Study in Attention Deficit Hyperactivity Disorder

The data for this study will be presented in four sections:

I) Parent Information

II) School Based Information From Previous Years

III) School Based Assessment and Testing Data

IV) School Based Behavioural Observations

Parent Information

Questionnaire (Completed by Mother)
(Satter 1990)

Family Data.

Mother Donna J. age 34 Education : grade 12
Occupation: Hospital Worker
Father: Terry J. age 35 Education: grade 10
Occupation: Salesman
Marital status "Very Good, Married"
Siblings: Sister, Danielle age 5

Presenting Problem. Lazy Short attention span
When was the problem first noticed: Preschool
How long has this problem been of concern: All his life
What seems to help the problem: Discipline
What seems to make the problem worse: Leniency

Social and Behaviour Check-list.
(Items listed were checked as a behaviour problem which is currently exhibited by the subject)

- has difficulty with coordination
- is stubborn
- is impulsive
- gives up easily

Educational History.
(Items listed were checked as indicating an educational problem currently exhibited by the subject)

- has difficulty with reading
- has difficulty with writing
- does not like school

Developmental History.
During pregnancy did the mother:

- smoke.....no
- take medication.....no
- drink alcoholic beverages ....no
- use drugs..... (no answer given)

What was the child's birth weight: *7 lbs. 14 oz.*
Were there any birth defects or complications: ...*no*
Were there any sleeping problems: ...*yes - colic*
As an infant was the child quiet: ...*no*
As an infant did the child like to be held: ...yes
As an infant was the child alert: ...*yes*
Were there any special problems in the growth and development of the child during the first few years: ..*no*

Behaviour	*Age*
Showed response to mother	First Born
Rolled over	6 mos.
Sat alone	8 mos.
Walked alone	14 mos.
Babbled	6 mos.
Spoke first word	10 mos.
Put several words together	1 yr.
Dressed self	5 yrs.
Toilet trained	2 1/2 yrs.
Stayed dry at night	2 1/2 yrs.
Fed self	?
Rode trike	2 yrs.

Medical History.
(Items checked indicate a condition which the subject has had.)

Hospitalizations: age 6 (pneumonia) and age 8 (hernia)
Operations: age 8, hernia
Visual Problems: age 7

Interview with Mother. March 26, 1991.

Mrs J. arrived at the prearranged interview on time and anxious to begin the interview. She appeared nervous and she was eager to accept the coffee offered. Prior to this meeting, we had chatted on a number of occasions but this formal meeting called at my request may have been disconcerting for her. She had always been most cooperative in our earlier discussions but I felt she was apprehensive as to the nature of the interview. It was the interviewer's intent to explain the rationale for the interview before we began. Mrs. J., however, began talking about her life with Alan immediately.

Prenatal. Mrs. J. reported an easy pregnancy with Alan. She felt well throughout and took good care of herself. She stated that she neither smoked nor drank during the pregnancy and experienced no difficulties until the delivery was due. At this point Mrs. J. went into false labour nightly. This went on for three and one half weeks. Despite an attempted inducement, the baby did not deliver. When labour finally began, it went on for an agonizing 36 hours. A forceps delivery failed and an emergency Caesarean delivery was carried out. Surprisingly, despite the difficult delivery, the baby was fine and unbruised. Mrs. J. said that the baby was tired and slept for a few days after his birth. According to the mother, those seem to have been the only peaceful days the family has had.

Feeding. Alan was not an easy child to tend. In hospital the nurses had to call his mother into the nursery as the baby had been screaming for hours and was keeping the other babies from sleeping. Alan would not settle down or feed on the sugar water which was presented. It was only in desperation in the middle

of the night that his mother was roused from her sleep to help out. The minute that Mrs. J. put her hand on the infant's back, he ceased crying. Alan's bonding with his mother was evident early on and continues to the present.

"Everything was difficult with Alan" were the words Mrs. J. stated when she referred to the care of Alan as a baby. He was a colicky baby despite being breast fed. Mrs. J. was most cautious of her diet during this time and felt that there was nothing that she was eating which would cause the baby's constant screaming. With the help of the grandparents and an aunt, the family managed to cope with this most tiring situation.

Feeding the colicky child was a problem as he would not take a bottle and yet he was not receiving enough nourishment from his mother. The doctor's only solution to this problem was to basically withhold food from the baby until he was hungry enough to take the bottle. After one and a half days of starvation, Alan eventually accepted his bottle along with much sputtering and many cries of objection. The formula appeared to satisfy Alan's hunger more and he began to eat voraciously. Where another baby would eat a part of a jar of baby food, Alan would eat two at a time.

Although Alan accepted the bottle as nourishment, he never developed an attachment for either it or a pacifier. He was, however a much happier baby when he went onto formula feeding.

Bonding. Alan appeared to develop a most unusual and early bonding with his mother. As an infant it was difficult for the parents to engage a baby-sitter as Alan would cry the entire time that his mother was absent. He would not go near anyone but his mother. Occasionally an aunt, a sister of Mrs. J., could look after Alan as their voices have some similarities. When a sister-in-law tried

to look after Alan she was so frustrated after Alan screamed the entire time that she asked not to baby sit him again.

Friends who had witnessed Alan's crying suggested that if left alone, he would eventually stop and so would their difficulties. In many children this approach appears to work. In Alan's case it failed miserably. Alan was able to outlast everyone in his persistence. After 3 1/2 hours of crying he would be holding himself up by the bars of his crib, but he never stopped until his mother finally came and got him. He just needed his mother.

As Alan got older, this relationship with his mother was less disruptive but Mrs. J. says that Alan still likes to cuddle up to her when he needs security.

A psychologist that the family had been seeing because of Alan's behaviour, suggested that this bond between mother and son should be lessened and that a bond with the father be strengthened. Although his father was always present during Alan's infancy, the strong bond developed only with his mother.

His father was away from home frequently due to the nature of his job. He enjoys working with Alan and is making an increased effort at developing his relationship with Alan.

Developmental Milestones. Mrs. J reported only one remarkable milestone in Alan's development: his early speech. He began articulating words as early as nine months. The words were clear and well defined. At eighteen months, Alan was speaking in sentences and was reported to be speaking as clearly and fluently as a three year old child would speak. The family doctor at that time attributed his early and clear speech to the well developed muscles at the side of Alan's mouth. However, speech is more than just an expressive

articulation of sounds, and Mrs. J. reported that Alan's understanding of language was, and continues to be, his strongest area of development.

The ability of Alan to pick up and use language also caused the family considerable embarrassment when he was very young. At that time the J.'s were living in a northern interior logging town. In their association with the rough logging crews, the family was exposing a language-receptive child to some inappropriate language. It was a great embarrassment and of great concern to them when Alan used rather foul language as a small child. He was really much too young to realize that this was not acceptable, and also too young to be chastised for this inappropriate use of words.

Mrs. J. reported that words are still a strong point for Alan today. He enjoys learning new and difficult words and then enjoys using them in the appropriate situations. Mrs. J. is also pleased that the foul language of Alan's childhood has been replaced with much more suitable language.

Pre-School and School. Alan began pre-school at age three. Initially Alan liked the school but he did not "do well" and was withdrawn from that situation. Mrs J. did not elaborate on the actual reasons for this. After a year at home, Mrs. J. enroled him in a more structured preschool which had a more science-based program. This extra structure, along with the opportunity for age-appropriate scientific learning appeared to hold Alan's interest and Mrs. J. stated that this was a good year for Alan.

Kindergarten. Kindergarten at age five proved to be the start of school difficulties for Alan. His parents felt that a French Immersion class seemed to be the right educational choice for a child with such advanced language abilities. This however, was not a successful placement in Alan's case. Up to this point

Alan's parents had no indication that Alan would have any learning difficulties. Indeed, because of his precocious language they had great optimism about his learning. It quickly became evident that the French program was a mistake. While Alan picked up the words and could speak French quickly, he had no idea what he was saying. After six months of frustration, Alan was transferred into a regular English Kindergarten. Here it became evident that Alan was having more problems than just the language problems he had experienced in the French class. His delayed motor skills made it difficult for him to cut, paste or use a pencil or crayon with anything but disastrous results.

Junior One. School district policy generally discourages testing students before at least age seven. Alan's case was seen as urgent and he received testing at age 6. The following year Alan was placed in a special education class known as the "Bridge Class". The official purpose of this class was to give children who had a year of kindergarten, but who were not yet ready for the first grade, an extra year of developmental time. The assumption was that maturation time and special attention were what Alan needed.

After his year in a "Junior One Class" Alan was still having great difficulties with his attention to his work and his motor skills. He was subsequently placed in a Primary Learning Disabilities class.

Primary Learning Disabilities Class. This is his third year in this placement and Mrs. J. expressed concern about the future of Alan's schooling. She sees Alan as an extremely bright child who is not achieving to his potential. She presented the family's concerns for Alan's future in education as well as for life in general.

While Mrs. J., is happy with Alan's placement in a special education class, she expressed concerns regarding the bussing situation. As Alan is not in his neighbourhood school, he is bussed to and from school. During the bus ride Alan and some of the other LD students are sometimes harassed by the older high school students. The younger students are also exposed to the foul language and the sexual talk of teens just entering puberty. This problem is unlikely to be solved until separate bussing is available to these students.

Family/Home. At home the J.s have worked together to help Alan overcome his difficulties. By seeking professional counselling, and following through with the suggestions made to them, Alan's parents have made progress in channelling Alan's energies productively and in providing consequences for inappropriate behaviour. Alan is responsible for keeping his room tidy and for following certain basic rules. Mrs. J feels that by providing Alan with standards and expectations to which he must comply, he is slowly making progress. It has been difficult and Mrs. J. showed concern for Alan in the future.

Despite being actively involved in Alan's behavioural and educational problems, Mrs. J. was unaware that Alan met the diagnostic criteria for ADHD. Mrs. J.'s first reaction to the mention of the ADHD label, was to respond immediately that she did not believe that Alan was hyperactive as he *could* concentrate. Why he could sit for hours playing the Nintendo games! The only "label" the J.'s had been given regarding Alan's problems was when the family doctor used the old term for ADHD, *minimal brain dysfunction*. Clearly the syndrome had never been explained to her. When Mrs. J. was shown some literature on the attention deficit hyperactive disorder student, she related to

each of the diagnostic criteria and went even further to say that her husband likely has the same disorder.

Several days after the initial interview, Mrs J. returned the reading materials loaned to the family. She displayed considerable excitement with the information which they had received. It was obvious that the book had been read thoroughly and Mrs. J's comment was that her husband thought the book had been written for them. She also related that her husband was beginning to understand his own life-long battle with his own undiagnosed ADHD. He is a successful salesman who has had to learn coping strategies to help him overcome his attention difficulties. Mr. J was initially very hard on Alan when as a youngster he began to exhibit the same characteristics which he himself had worked so hard to conquer. He was determined that his son would not go through the same hardships which he had encountered in his life. Mrs. J. stated that in reading the book, her husband was able to understand both himself and Alan to a greater degree.

Interview With Father August, 1991.

After many months of trying to schedule an interview with Alan's father, a mutually agreeable time was arranged in the summer of the year following the study. It was felt that there was some reluctance on the part of Mr. J. to become involved in this project. However, once the contact was made, he arrived for the interview and was eager to talk about both Alan and about his own difficulties. In fact, it was difficult to terminate the interview as Mr. J. appeared to be gaining an insight to the ADHD problem which affects their family so profoundly.

Social. "A boy who lives to play" were the opening remarks made by Alan's father. Although Alan has great difficulties in getting along with other children, play is his main focus in life. He always appears to need someone around and despite fights and disagreements, he is relentless in his pursuit of playmates. If, for instance, he has just come home after being at a friend's house overnight, he will enter the house, throw his things down, and be out the door in search of someone else with whom he can play. He will literally go around the neighbourhood knocking on doors until he finds a playmate. Alan is unrelenting in his pursuit of a friend and will accept anyone of any age just to have somebody. Difficulties while he is playing usually occur because Alan likes to be in control of the activity. Mr. J. gave the example of a friend who brought a Nintendo game over to the house. Alan insisted that he play first because it was his house, while his friend insisted that he go first because it was his game. Alan was most upset and became quite rude when Mr. J. intervened and let his friend take his turn first. Despite the possible consequences of his friend leaving, Alan continued to argue that it just was not fair. Alan has difficulty keeping friends because there is little evidence of give and take in a relationship.

Mealtime. Alan likes his breakfast. The bigger the breakfast the better: eggs, bacon, toast etc. comprise a good meal for him. The one thing which is more important to him than his breakfast is the company of a friend. If a friend should call Alan in the morning, Alan will neglect all personal hygiene, throw on any clothes that are handy, skip his breakfast, and tear out the door to be with his friend. If these friends do not happen to stop for lunch, then Alan will not stop either. When he does finally stop playing and he realizes that he is hungry, he demands food immediately.

Mealtimes generally are difficult times for Alan as he does not stay in his chair while eating. He would be quite content to have his daily ration of food put out onto the table and he could then "eat on the run". He likes to watch T.V., wander around and eat while moving. Despite the need to move continuously, Alan eats a tremendous amount. He has been known to ask when supper will be when the meal had already been taken. "Well, what did we have?" Alan will ask.

Sleep Patterns. When Alan was born, Mr. J. recalls looking at their peaceful baby with his wife and he remembers saying how fortunate they were to get "a quiet one". What a mistake that was. As Mr. J. put it, "He hasn't shut up since." After that initial period of sleep, little Alan's bassinet was put into the far corner of the nursery so he would not disturb the other children.

Mrs. J's memories of Alan as a young child include the recollection of Alan not sleeping. Mr. J. stated that Alan never had a nap in his life. As young parents, they received the advice that they should just put Alan down for a nap and should just let him cry till he went to sleep. Mr. J. also reported on this dismal failure of this method of parenting as had Mrs. J. earlier. Three or four hours later, Alan was still screaming. Bedtime continues to be a difficult time for the family. No matter how late the bedtime is, it is never late enough for Alan. He still has more playing he wants to do. Every night Alan comes down with an important reason as to why he can not go to bed yet. If Alan is tired, he will just remain in bed a little while longer in the morning. Once he is wound up, it is difficult to slow him down.

Perseverance. When Alan has it in his mind that he wants to do something, it is very difficult to explain why that event may not take place. He cannot accept that something will not go his way. As an example, Alan's bike will

not fit into the family cars. When it was purchased, Alan knew that they had to borrow an aunt's car to bring it home. Yet Alan insisted that he wanted to take it to a friend's house. No matter what his parents said, no matter how much they explained the impossibility of taking the bike along, Alan insisted that he take his bike. It was impossible to explain to him that the bike would not go! In exasperation, Mr. J. had to firmly insist that the bike was not going!

Adult Interactions. Company arriving at the J's home is another area which has been difficult for Alan to handle. If the company involves children, Alan will be quick to take them downstairs to play. If the company is adults, Alan does not realize that they are not necessarily there for him. He must be right there to "Put in his two cents worth". He wants to be involved in the adult conversations and is usually sent out because he does not display the appropriate behaviours.

Chores. The topic of chores elicited the word "*lazy*" to describe Alan. Mr. J. again pointed out that Alan does not like to do anything but play. The parents are, however, trying to get Alan to do more chores: " After all, he *has* to do *something*", and he is expected to vacuum every Saturday. This is his only task and the stipulation is that it must be done without nagging in order for him to get his allowance. The usual scenario on Saturday is theoretically supposed to read as follows: Alan will get up, have breakfast, vacuum, get his allowance, and then have the rest of the day to play. The reality of the situation is that every Saturday Alan vacuums, but he never gets his allowance. "It's an all day adventure". It takes Alan hours and hours to do the job, fighting all the way. He does not connect the consequences of not getting an allowance with his behaviour of not doing the task without nagging.

Despite the fact that he often fails to earn his allowance, Alan values the importance of money. He cannot, however, save it. When he does receive any money, he goes out and spends whatever he has even if he is trying to accumulate money for a more expensive item. Long range planning is difficult. As an example, Alan was given money for Christmas, birthdays etc., for an upcoming trip to Disneyland. But nearly every weekend Alan would be begging to withdraw the money to buy whatever it was that caught his fancy that week. The trip to Disneyland was too far away in time and he had a difficult time understanding the importance of saving that money for the trip.

Schooling. Early education for Alan was in a French Immersion Kindergarten class. Mr. J. assumed that Alan was doing well in the class as his strong ability to pick up new vocabulary was put to good use. He would come home from school and use the newly acquired vocabulary. Despite this ability to say the French words, he had no idea of their meaning, or how to use them contextually.

Mr. J.'s Self-Examination

"I can learn anything, but I can't be taught."

These poignant words sum up Mr. J's understanding of his learning and education.

While Mr. J recognized that he is successful in his career, he attributed this success to luck. He was quick to state that he never finished school. He never really knew that he had an attention deficit until he was told that Alan had ADHD and until he read the materials given to him regarding the problem. He related that he had trouble in school his whole life. He stated that he had great difficulty in paying attention to the teacher. He said that he felt that teachers

"didn't know how to explain things" when he was in school. If a teacher explained something in class, Mr. J. would usually not understand what was being said and he would then get a colleague to clarify what the teacher had said. It was not until he was much older that he realized that his inability to understand the teacher arose from the fact that he had not been paying attention, but had been thinking about other things. But when he was one-on-one with his classmate, he could get the concept. Mr. J. described this type of learning as "buffaloing his way through" and said that it seem to work for him. One particular Mathematics teacher did, however find this behaviour troublesome. In grade ten this particular teacher interpreted Mr. J.'s turning around as being disruptive. The teacher would "get on his back" for turning around and the end result was that Mr. J. did not take Math for the remainder of the year. He was sent to study hall or the principal's office for what was in effect using a coping strategy which was helping him learn.

Another, oft used strategy which Mr. J. used for gaining acceptance in school was becoming the class clown. He maintained that the teachers all liked him and clowning only added to class fun.

Schooling ended for Mr. J. when both his grandfather and mother became ill and he had to stay home to assist the family. The school expelled him for poor attendance and Mr. J.'s father could not see much point in his son's continuing an education which was not going anywhere at that point.

He then began to work in his father's business, a construction company. Despite his father owning the company, Mr. J. worked his way up in the company by "beginning at the end of a shovel". He worked his way up to the position of supervisor and remained there for 12 years until the company was

sold. A brother also worked for the company but did not reach the same level of accomplishment. Once the company was sold, Mr. J. felt it was a good opportunity to prove himself without the benefit of being the boss's son. He has gained a great deal of satisfaction and pride in the fact that he has indeed, made it on his own.

Throughout his working life, Mr. J stated that he always has to "really apply" himself to what he does. He has always given "110%" in whatever he does. While this work- ethic is good in some respects, he is successful, it has its drawbacks in the number of hours worked in order to achieve success. As an example, if a piece of equipment which he has sold is broken, he is called in to "trouble-shoot" and find the source of the problem. In order to do this, he has to take it apart to find out how it works and to diagnose the problem. It was interesting to note that he cannot read the instruction manual in order to complete the repair, but he can go through the complex process of figuring out how the machine works.

Mr. J. revealed that his problems with attention were kept from those who knew him. At the time of this interview, Mr. J's parents had not been told of their son's disability. Mr. J. has developed coping strategies which will enable him to appear as though he is listening to someone, when in fact, his mind is wandering during the conversation. He has developed the habit of nodding his head at strategic times during a conversation so that it appears that he is involved in the conversation. It is instead, a strategy of deception. This strategy has helped him in his business when a client is presenting him with a dissertation which he is unable to follow. Nodding his head at regular intervals allows Mr. J. to give to appearance of listening, yet his mind is not totally attuned to what is being said.

He stated that because he is not paying attention to them, his mind can go on to the next thing. His mind is not blank during this time, it is actively engaged in perhaps the next stage of the conversation. He is able to get the gist of what is being said and therefore he does not encounter difficulties during the conversation.

(It was difficult to be unaware of this habit after Mr. J. had shared his tactic with me. He did indeed nod regularly and it was most distracting to realized that at that point he was in all probability not listening to what was being said.)

One of the most difficult tasks which Mr. J. faces is reading a book. He can read a book out loud, but if he has to read it on his own, he may read a paragraph and then realize that he is actually thinking of something else. He will then go back and try to find where he is reading. After several repetitions of this, he becomes bored with reading and either falls asleep or gives up trying to find where was reading. Magazine articles and shorter passages are not as difficult for Mr. J to read as they require less attention.

School Based Information From Previous Years

School Reports and Records

French Immersion Kindergarten

Alan entered the school system in a French Immersion Kindergarten. It was felt that Alan's exceptional ability with the English language would transfer to this situation. At this point, there had been no indication that he would experience any difficulty in school. Reports from the year tell a story which does not bear out these expectations.

Oct. 1986: Alan has to be encouraged to curb his energy and express it in an acceptable ways. He is prone to wander from one activity to another. Encouragement is needed to complete a given task.

Nov. 1986 Alan has difficulty following daily routines. During group time his attention span is very short. He seems in a world of his own, whistling, or talking to himself. During activity time he wanders about from one activity to another. Unless I insist, he will not start or complete the assignments. He finds it difficult to apply himself in a constructive way.

Jan. 1987: ...Alan is able to concentrate for longer periods. He is reluctant to say anything in French. It seems utter jibberish to him...His development is below average in all areas.(French Immersion Kindergarten Report Card)

Alan's difficulties were such that at this time he was tested by the school and district counsellor. The fact that Alan was assessed would indicate the severity of the problem at this point as it is district policy to defer assessments until after the first grade..

He was also moved from the French class into an English class. While the problems with his attentiveness and his motor skills remained, Alan was able to use more of his abilities in this setting ie. his expressive language, and the comments of the teachers are of a much more positive nature.

English Kindergarten

MAR. 1987: Alan now works and plays in a happy and willing manner. He has matured and is developing a sense of self-discipline.... June 1987: Alan is more secure and confident at school now. He demonstrates his intellectual ability through his interesting comments, questions and his ability to use the English language for a variety of purposes....His fine motor skills will take time to develop...(Kindergarten report card)

After the psychological assessments, it was determined that Alan was not yet ready for grade one and he was referred for placement in a transitional class.

Junior One.

Information From Referral Sheet

Reasons for referral:

Mainly fine motor development plus orientation skills (needs help with organization, getting to the task, and awareness of time limits)

Statement of Developmental Lag:

Motor skills - mainly fine motor involving cutting, drawing shapes, lines and following directions while patterning and drawing.

Professional Observations:

He has an excellent English vocabulary, a good memory, good ability to relate story events.

Orientation (Sense of time, direction, organization)

Needs help - very slow at getting materials organized, getting started, and cleaning up.

Junior One Class

The first report card in his Junior One class reflects both his extensive knowledge and his difficulties with attentiveness, impulsivity and hyperactivity.

> *Nov. 1987: ...Alan often displays aggressive behaviour once out of the structure of the classroom. He will hit out at other children... Alan frequently needs to be asked to leave some space between himself and the others as he will blow into students' faces, or creates a distraction in some other way ...Alan's knowledge of dinosaurs is vast and he frequently amazes me with the information he supplies about them..*
>
> *(Report Card Junior One)*

By the next reporting period, it is evident that Alan is beginning to understand that he has significant problems. His self-esteem is beginning to suffer.

> *Mar. 1988 Alan has an extensive vocabulary which he uses with complete comprehension. When it comes to written work though, Alan feels very inadequate. He is aware of his difficulties and feels very frustrated by the need to record things.(Report Card Junior One)*

Comments from the gym teacher would also indicate that Alan had difficulties in this domain as well:

> *Mar. 1988: Alan has forgotten to bring his gym strip five times this term ...He has difficulty following gym procedure. At times he needs to exercise more caution during running and tag games.*

By the end of the school year, Alan would appear to have made great progress.

> *June 1988: Alan's self image has greatly improved. He now feels safe to attempt work that previously he would not have tried. He has learnt that it is acceptable to make mistakes if one has tried his best. With this realization he has come alive academically...*

Despite these considerable gains, Alan was not yet ready for regular class placement and he was placed in a Primary Learning Disabilities class.

Primary Learning Disabilities Class (1988-89)

> *Nov. 1988 ...Alan really wants the attention and acceptance of other members of the class but at times has difficulty expressing himself in an appropriate manner. He also has difficulty with independent work but is improving.*
>
> *Mar. 1989...Alan's printing skills are really improving. The frequency with which he reverses letters is decreasing.... Alan's work habits are improving this term. He generally enjoys his work but still has days where he must work very hard to attend to the task at hand.*
>
> *June 1989...Alan has really enjoyed the theme work we have done on dinosaurs and has actively participated in all projects. ...Alan really enjoys math and completes assignments quickly and neatly. (Report cards PLD)*

Primary Learning Disabilities Class (1989-90)

> *Nov. 89...I noticed on several occasions that Alan is capable of very good work. His printing can be neat and legible with proper spacing. Alan is often required to redo assignments- only because we know that he is capable of a higher quality product... He has good math understanding but has difficulty with paper-pencil tasks due to his perceptual difficulties... We understand that Alan finds many tasks difficult but we know that he can do it! Alan is an intelligent, interesting person...*

March, 1990 Alan continues to have difficulty with independent reading assignments. Often he gives up without putting forth real effort... Alan's ability to complete independent math tasks has improved this term... Alan's printing deteriorates if he is anxious or in a hurry... He is easily distracted and influenced by other children. He has a good sense of humour but needs to learn self-control. We are working on behaviour management skills in the classroom.

June, 1990 Alan continues to have attentional difficulties during group lessons. He must work hard to focus his concentration... He is capable of neat printing when he works slowly and focuses attention to the task... Alan orally demonstrates a good understanding of numbers and mathematical thinking skills. Alan has been most successful with written assignments when he has worked in an area isolated from distraction. He enjoys working in a small group, but seldom can concentrate well enough to stay on task. (Report Cards PLD)

Summary of Home and School-Based Data

The data from Alan's parents, from his school assessments, and from his classroom teachers indicate the extent of Alan's difficulties. In the home, Alan has been a child who has been a source of concern since birth. His educational record and his behavioural record gave rise to anxiety. His impulsive nature prevented him from considering the consequences of his actions. Punishment by the parents had failed to deter Alan from engaging in unwanted behaviours.

School Based Assessment and Testing Data

(The year of the study 1990-1991)

ADHD Assessments. Alan was assessed on instruments which tested for ADHD. These instruments included:

- *ADHD Rating Scale (DuPaul 1990)*

{Appendix A}

- *The School Situations Questionnaire R.(DuPaul 1990)*

{Appendix B}

- *Academic Performance Rating Scale (DuPaul 1990)*

{Appendix C}

- *Diagnostic and Statistical Manual III-R Diagnostic Criteria*

(American Psychiatric Association 1987)

{Appendix D}

These assessments were carried out by a school counsellor and this researcher in the school year 1990-1991.

ADHD RATING SCALE

The ADHD Rating Scale was developed by Dr. R.A. Barkley and Dr. George DuPaul (1990) for evaluating the occurrence of ADHD symptoms in children. They took the 14 diagnostic criteria for ADHD from the DSM-III-R and placed them in a rating scale format. Rating is achieved on a four point scale with "0" indicating a behaviour is not at all present to "3", indicating that a behaviour is very much present. The items included in this list include behaviours dealing with hyperactivity, inattention, impulsivity, and attention.

On this instrument Alan achieved a total score of 40/42. The mean for his age is 13.46 with a Standard Deviation of 12.41. This places Alan over two standard deviations (SD) above the mean which is clinically significant at 1.5 SD above the mean. For Factor I (inattentive - hyperactive) Alan is almost two SD above the mean and a clinical significance is achieved at 1.5 SD above the mean. For Factor II (impulsive - hyperactive) Alan achieved a score over two SD above the mean and again clinical significance is obtained at 1.5 SD above the mean.

Therefore, according to the ADHD Rating Scale, Alan has a severe, or clinically significant, degree of ADHD on all aspects of ADHD tested with this instrument.

REVISED SCHOOL SITUATIONS QUESTIONNAIRE

The SSQ-R was created by DuPaul (1990) to permit teachers to rate specific problems children might have with attention or concentration. This instrument consists of eight questions which seek information on the child's ability to pay attention or concentrate in eight situations in school. These responses are rated on a scale of one to nine indicating the severity of the disorder by degree. Situations rated are behaviour during:

- individual seatwork
- small group activities
- free play time in class
- lectures to the class
- field trips
- special assemblies
- movies, film strips
- class discussions

On this instrument Alan obtained a score of 8 while the mean is 3.49 with a SD of 3.38 for his age group. This places Alan over 1 SD above the mean. In terms of the severity factor, Alan obtained a score of 7.735. The mean for his age is 4.23 with a SD of 1.98. This places Alan over 1.5 SD above the mean and indicates that he has severe difficulties in school situations as listed on this instrument.

ACADEMIC PERFORMANCE RATING SCALE

This scale was developed by Dr. George DuPaul (1990) to assess children's productivity and accuracy in completing school work. It also contains questions that deal with organization and attention skills. The test consists of 19 questions which report on the student's performance over a week. Questions include categories such as:

- percentage of work completed
- accuracy of completed work
- frequency of accurately followed instructions
- work habits
- inability to complete task without teacher intervention
- reading and speaking skills
- length of time to complete tasks
- social withdrawal

On this instrument Alan appears weak but without clinical significance overall. He achieved a total score of 54 while the mean is 69.77 with a SD of 15.83. This places Alan almost one SD below the mean.

In terms of learning ability, he achieved a score of 24 while the mean is 28.50 with a SD of 7.51. This score also places Alan below the mean. On impulse control he achieved a score of 17 with a mean of 21.78 and a SD of 4.90. Here again he is close to being one SD below the mean. On academic performance he obtained a score of 21 while the mean is 34.36 with a SD of 8.40. This places him over one SD below the mean. On the social withdrawal factor Alan obtained a score of 17 while the mean for his age is 18.40 with a SD of 4.21. Here again he is below the mean. Overall he appears somewhat weak in terms of his learning ability and social withdrawal. His academic performance and impulse control appear as major weaknesses on this scale.

DSM III-R (1987)

Alan exhibits a significant number of behaviours which meet the diagnostic criteria for ADHD as presented by the American Psychiatric Association *Diagnostic and Statistical Manual III-R* (1987). A diagnosis of *Severe ADHD* can be made for Alan as he has "many symptoms in excess of those required to make the diagnosis and pervasive impairment in functioning at home and school and with peers" (DSM III R 1987). Alan scored on thirteen, out of a possible of fourteen items. Alan has not been known to engage in physically dangerous activities to a degree which would be considered a significant problem. The remaining thirteen behaviours are evident to a degree that they are considered a significant problem. Therefore, according to this instrument, Alan meets and exceeds the diagnostic criteria for ADHD.

In the assessment methods undertaken, Alan clearly displays symptoms of ADHD which will make him an excellent choice for a study in ADHD. His behaviours are problematic to a significant degree and will provide information which will assist in understanding Attention Deficit Hyperactivity Disorder.

Psychological Assessments. An educational assessment was completed by the school Learning Assistance Teacher and the School Counsellor in the year of this study. The summary of test results provided an educational profile and a clear picture of Alan's academic performance and were not specifically administered for this study. They are the assessments commonly used in this school district by the counsellors to provide an educational profile of students who are experiencing some difficulties in their school performance. The tests reported here are: Kaufmann Test of Educational Achievement; Wechsler Intelligence Scale for Children-Revised; Peabody Picture Vocabulary Test;

Raven Colored Progressive Matrices; Bender Visual Motor Test; Goodenough-Harris Drawing Test; and the Motor-Free Visual Perception Test.

Learning Assistance Testing

KAUFAMNN TEST of EDUCATIONAL ACHIEVEMENT

Reading Decoding	Standard Score-88	24% ile
Reading Comprehension	Standard Score-80	9% ile

Alan's placement in the twenty fourth and ninth percentile does not reflect his classroom performance which is generally much higher. The explanation for this may be found in the Learning Assistant Teacher's report on testing behaviour.

*"Alan presented with a very short attention span and even with breaks, he wanted to give up often and did not attempt any of the longer reading comprehension questions. He vocalized all through the math and complained frequently that he needed his glasses "to read." Despite these behaviours he was remarkably pleasant and sociable. Staying on task was extremely difficult for him. A reading inventory (miscue analysis) was given from a basal reader he knew. He did very well with this and did not ask for any breaks. He seems very interested in print and has a variety of reading interests. He loved reading these stories and did not want to stop or leave. He made no errors on the story he chose and had three omissions, four substitutions that made sense, and two errors on a requested reading. This is a better indication of his reading ability (than the **K TEA**). The K TEA is a standardized test that did not capture his interest or effort. His reading program needs to be selected according to his interests if we are to motivate him."*

School Counsellor's Assessment

WESCHSLER INTELLIGENCE SCALE for CHILDREN - Revised (WISC-R)

The WISC-R is an individually administered cognitive measure considered a good predictor of academic performance. It yields a verbal score and a

performance score, and a composite full scale score. Sub-test scores are reported as scaled scores ranging from one to nineteen with the average range being eight to twelve. A percentile indicates the percentage of age peers scoring at or below the subjects test score. This was an assessment update and the report compared his performance and scores to those of the previous testing some four years earlier.

Counsellors Report on the WISC-R:

Overall, the test results indicate that Alan is continuing to experience uneven cognitive development. His overall or Full Scale Score indicates that he averages in the Normal or Average range of Intellectual functioning but there is a highly significant 21 score point discrepancy between his Verbal and Performance reasoning at this testing. His previous testing at age 6-04 indicated a 30 score point drop from his Verbal to his Performance reasoning with the verbal in the average range (95-105) and his performance in the low average (72-90) range. There are some changes in his profile, but the overall developmental pattern remains significantly uneven.

Analysis of the Verbal subtests indicates that Alan has a good fund of general knowledge and long term memory for facts (75 %ile). His expressive vocabulary which is a measure of language development, word knowledge, and memory is at the top of the average range (75 %ile). His mental arithmetic problem solving is also good at the 63 %ile and had quick response style. He got the correct answer to a more difficult question beyond the time limit. This subtest measures his ability to follow oral directions, mentally manipulate arithmetic facts, and select order information. His ability to classify, categorize, and do associative thinking is within the normal range but scoring below the mean (37 %ile). This score had been significantly higher on former testing. His practical knowledge, common sense, and social judgement is at the bottom of the normal range (25 %ile) as is his auditory short term memory for digits. He could hold 6 digits forward but only three digits backwards. His comprehension score may have been affected by his response style of answering quickly and with some humour thrown in. Overall, his Verbal score is averaging in the middle of the normal range.

Interpretation of the Performance subtests reveals that visual perceptual tasks are significantly more difficult for Alan. His strengths at this time are in his visual sequential reasoning in anticipating the consequences of social situations (37 %ile) and in his psychomotor speed which is also at the 37 %ile). This subtest is a measure of the speed at which Alan takes in and puts out new

information on paper. It taps into his sensory motor functioning, i.e., his fine eye-hand coordination. These two scores are essentially unchanged since the previous testing and are his only two Performance scores in the Average range. Alan appears to have made substantial gains in his abstract visual analysis and synthesis as measured by the replication of geometric designs (16 %ile). Formerly this score was at the 1 %ile. He appears to have lost some ground in his ability to mentally anticipate the whole from the parts in visual assembly measured through the puzzle format (9 %ile). He had great difficulty seeing gestalt of the overall form of a concrete object. His long term visual memory and ability to separate essential and non-essential details remains consistent (5 %ile) His visual perceptual organization as measured by the tracking task, Mazes, is at the 9 %ile. These performance tasks were obviously difficult for him, but he was tenacious throughout.

Overall the test results reinforce the previous results indicating a continuing severe discrepancy between Alan's verbal and visual reasoning ability. His Verbal Comprehension is his strength with this factor averaging the mean or in the centre of the normal range: and his Freedom from Distractibility factor is below the mean but well within the Normal range. This score is based on his performance on three sub-tests: Coding, Digit Span, and Arithmetic and indicates that he can concentrate or focus when he is in a one-to-one situation.

PEABODY PICTURE VOCABULARY TEST (PPVY-R-L)

The PPTV-R-L is an oral measure of hearing vocabulary or receptive knowledge of spoken words. Alan achieved a Standard Score of 116 placing him at the 86 %ile for his age and giving him an age equivalency of 11 years, 7 months. This receptive score is reflective of and supportive of his WISC-R expressive language score. Alan's overall vocabulary is his strength. He was very persistent throughout this test and would say things such as, "I don't know but I must try; I'm not giving up on any of them." He did not like to guess at an answer nor did he want to skip any and he took his time to decide on an answer.

RAVEN COLORED PROGRESSIVE MATRICES (Raven)

The Raven is a non-verbal measure of an individual's capacity for analytical or logical reasoning. It requires visual reasoning but without motor

involvement. Alan achieved 31/36 problems placing him at the 90 %ile for his age. This score is in contrast to his visual assembly scores on the WISC-R which were "hands-on" tasks.

BENDER VISUAL MOTOR TEST (Bender)

The Bender measures both visual perception and the motor expression of visual perception. Alan had an error score of 6 while the mean numbers of errors for his age group is 2.3 with a standard deviation of 2.1. This places his at the 10 %ile and gives him an age equivalency of 7.0 to 7.5 years and represents a two year delay. His errors includes angulation, distortion, rotation, and perseveration. His diamonds still have severe hooks on them as he searches direction to get the pencil to reproduce what he sees. His visual motor integration ability is severely delayed.

GOODENOUGH-HARRIS DRAWING TEST (DAP)

The DAP measures intellectual maturity through human figure drawings. Alan's self-portrait contained 21 concepts yielding a standard score of 84 and placing him at the 14%ile. He reported at the outset that he had a drawing problem with one eye so he needed an eye patch and glasses. His drawing of himself is small in relation to the page, but the figure is now two dimensional. Four months ago he was using stick arms and legs on a rectangular body. His drawing indicates that he is very conscious of his hands but he lacks feet. The picture shows him wearing a big smile.

MOTOR-FREE VISUAL PERCEPTION TEST (MVPT)

The MVPT is a test of visual perception which avoids motor involvement in order to measure overall visual processing ability in children. It looks at spatial relationships, visual discrimination, figure-ground, visual closure, and visual

memory. Alan is over-age for this instrument but it was given as a supplementary measure due to his visual perceptual difficulties. He achieved 29/36 problems which equated to a Perceptual Age of 8.8 years indicating a year delay and placing him below the mean for his age group. The visual spatial problems and the visual closure problems presented the greatest difficulty to him.

Behavioural Observations by Counsellor:

The testing was done over two time periods and Alan came easily to these sessions. He was an open, interesting and uninhibited child. He had lots of comments and questions. He is a small lad for his age and he is extremely persistent with a quick response style and lots of energy. He stated that he liked "math and learning about spiders and stuff." He maintained a steady patter of self-talk as he did the motor activities and he would make comments such as:"they're crazy but I can do it" (Block Design): "I'm in the twilight zone" (Coding); "I killed her, I cut off her legs" (as he helped re-package a puzzle); "OK, you maniac-I'm outa there- I'm too smart- they really wanna tangle- they are making me really mad- I'm not stoopid -ooh, they are trying to bug me" He also kept up a verbal rhythm with ch ch ch ch ch... and singing "Oh sinner man." He had some quite complex verbal rhythms. He is right handed. He did not want to be timed on Mazes while he looked at a puzzle prior to putting his pencil to it. He has a lively imagination and interest in his world. His effort was excellent.

Discussion

Overall the results confirm that Alan is experiencing uneven cognitive development and the degree of separation between his verbal and visual reasoning ability continues to be severe. His visual motor integration and visual perception continue to be significantly delayed with his overall perceptual factor in the deficit range. His motor speed is adequate, he has a good fund of knowledge and a strong vocabulary. His verbal comprehension is above the mean and is his strength. His Distractibility factor (WISC-R) is below the mean but still well in the normal range. He can focus and attend well in the one-to-one situation i.e., the testing, but he is highly distractible and off task in the classroom environment. His desire for friendship and peer interaction and general classroom stimulation interferes with on task behaviour. The K-TEA results indicate clearly that he has to be interested in the materials in front of him if he is to be motivated.

School testing indicated that Alan was having problems of an academic nature with an uneven cognitive development indicating a learning disability.

The ADHD assessments indicated clearly that Alan was having problems because of his impulsivity, his inattention, and his hyperactivity. These difficulties impacted his social skills, his academic performance, and his emotional and motivational status.

The year of this study, the Primary Learning Disabilities class was moved to a newly-constructed, beautiful school. This study took place in this school in the year 1990-91.

School Based Behavioural Observations

(The Year of the Study)

The data which were gathered in the year of the study will be presented here in the categories which define Attention Deficit Hyperactivity Disorder:

i) Inattention

ii) Impulsivity

iii) Hyperactivity.

The behavioural observations which make up the largest portion of this section will examined within these contexts. Although it is at times difficult to represent some behaviours in terms of only one ADHD category, they will be examined in the category which is highlighted by that behaviour. The impact of ADHD behaviours on the child's social, emotional, and academic performance will then be presented. Motivation, as a factor in the educational process of the child with ADHD will be examined in the context of performance and approach.

Background for Classroom/School Observations. Alan was one of eight students in the Primary Learning Disabilities Class in the year 1990-1991. All children, including Alan, were learning disabled. Their disabilities had been the source of a variety of problems in the regular classroom, and hence they were placed in the Primary Learning Disabilities Class.

Alan was observed on a daily basis by this reporter who was also Alan's teacher. Alan is small in stature, with an average build for his height. His eyes are noteworthy in that they are small, red-rimmed, and closely set. His appearance was usually unkempt and dishevelled: his shirt was often hanging out, his shoes, even when fairly new, looked broken down. His entry into the classroom was regularly noisy and often emotional. His emotions were at one extreme or another, either excessively happy, or excessively upset. When Alan was in the room, we were all aware of his presence. While Alan's behaviour often made him the focus of the class, he was a student who was genuinely interested in learning and in having friendships. He enjoyed the company of the other children and was a caring and kind student. Alan's quick wit and his love of learning made him an interesting study. These facets of Alan's nature were often over-shadowed by his inability to control his behavioural difficulties. The behaviours which he displayed throughout the study prevented him from fulfilling his social, emotional, and academic potential.

During the year of observation, Alan was consistent in his display of ADHD characteristics. His behaviour was recorded at regular intervals and covered a broad spectrum of activities which included virtually all aspects of his school life within the reporting year. These examples were examined in the context of the primary symptoms of ADHD of inattention, impulsively, and

hyperactivity. As well, the data were examined in order to ascertain how ADHD impacted on Alan's social, emotional, and academic skills. The role of motivation was also examined to determine the influence of motivation on the educational performance of a child with ADHD

Inattention

The ratings in Alan's ADHD assessments showed that he had significant difficulties in the area of attention. Sustained and selective attention were examined in order to ascertain which is the area of greater difficulty for Alan.

Sustained Attention. Sustained attention is defined as the ability to attend or perform a task for an extended period of time. Behaviour-recording sessions indicated that Alan had difficulty in sustaining attention. However, when he was motivated by the nature of the task, Alan could perform for a longer period. Two behavioural observations which follow indicate that while movement by Alan was continuous, he did not produce the work required in the first instance. In the second instance, Alan was motivated by his interest in the task and was able to complete the assignment despite his continuous movements.

A typical behavioural observation in a Journal Writing activity was recorded for a five minute period as follows:

- opened book
- stared blankly
- twirled pencil
- shifted in seat
- looked around at classmates (who are busy working)
- dropped pencil
- picked up pencil
- pushed chair back too far from desk
- fidgeted
- talked to himself
- chewed on nothing

- put pencil in mouth
- pulled desk forward
- rubbed eyes
- dropped pencil
- rolled pencil around with his feet
- coughed and sniffs
- flew his pencil as if it were a plane
- pulled his desk forward again
  (After four minutes he wrote "Odey" (Obey)
- fiddled with pencil
  (Wrote one more letter)
- looked up
- bit his fist
- erased what he had written
- began writing, stretched, scratched
- looked at his neighbour's work

After 5 minutes he had written "Odeytheteachers."

One month later, similar results were obtained in another behaviour-recording session. Whether the recording of the behaviour was formal or informal observation, Alan's attention to a task was varied.

Different results were obtained during an activity which involved drawing a picture for a science report. This was a task in which Alan was highly motivated as he was interested in the topic of "Penguins". The recording of his behaviour occurred over a period of 20 minutes. During this time Alan began his work immediately, and remained on task for 20 minutes. While he was working, he was constantly in motion. He was seen to:

- stretch
- yawn
- cough
- pull his chair in
- look up
- rub his nose
- rub his eyes
- knock his knees together
- make noises with his mouth

- swing his feet
- move around in his seat

Though he still displayed continual motion, Alan remained focussed on his task. Inattention was not a problem. He was motivated by the interest in the topic.

Alan displayed inattentive behaviour during a behaviour-recording session in math. The assignment was to copy addition and subtraction questions from the blackboard into a note book. He was seen to:

- explore his mouth with his finger
- copy one numeral from board while his chin was on his desk and his fingers were in his mouth
- swing his feet
- chew with nothing in his mouth
- stare blankly
- write a few numerals on his paper
- rub his desk
- look at the pictures on the wall
- put his pencil in his mouth
- brush his desk with his hands
- poke his hand with his pencil
- drop pencil
- pick up pencil
- write some more numerals and attempt to do the math

The written numerals appeared in the incorrect space for mathematical functions. They were not aligned as to their position in the hundreds, tens, and ones columns. Inappropriate spaces were left between the rows of numerals. Little attention had been paid to the purpose of the exercise or to the task demands.

Alan's behaviour during these assignments was regularly off-task and fidgety. He played with objects and manipulated any materials within his reach. His attention was not focussed on the task at hand but on extraneous stimuli in the room. The instance where Alan was productive (the penguin exercise) still

showed considerable activity. It was not, however, the type of activity which interfered with the task at hand; i.e., he could still swing his feet while working on the assignment. The lack of task-directed activity recorded during the non-productive sessions would indicate a difficulty in sustaining attention for Alan.

A difficult situation for Alan occurred during times when the class was listening to a story being read. He found it difficult to sit still while listening. During this time, Alan would be seen poking other children. Shifting about in his seat, playing with his pencils, crayons, etc. While it was possible that he was listening to the story at this time, his behaviour was a distraction to the others who were listening attentively.

A solution to this dilemma was found parenthetically during one reading session. The children in the class had enjoyed listening to the story "Charlotte's Web" and were anxious to hear the ending chapters in one sitting. Knowing that this would be a session of at least one hour in duration, they were all given a design to colour while the story was read. The colouring had an unexpected result on Alan. Alan listened attentively to the story for the entire hour and more. He was focussed on the design and was able to use fine, intricate, colouring strokes to fill in the picture. It was undoubtedly the finest colouring and *listening* he had done that year. This would appear to indicate that Alan needs *more* stimulation to direct his continual need for motion or teacher initiated/controlled distractors.

Selective Attention. Selective attention, or the ability to maintain attention to the target stimuli was a significant problem for Alan. There were times when Alan was paying attention, but it was attention to the incorrect stimulus. His inability to distinguish the background stimuli from the central stimuli made

listening a complex problem for Alan. He appeared to be distracted by sounds which were virtually imperceptible to the others in the class. During a lesson, Alan could be easily distracted by something occurring in the class. He would pay close attention to a part of a picture which was irrelevant to what was being taught. He would watch the movement of students in the hall. He would be focused on a single word in a lesson which caused him to lose the main idea of the topic being presented. He could hear sounds which were so far in the background that they were difficult for the others in the class to hear. It was Alan who noticed that the sound of the water running in the boy's washroom could be heard in our classroom. This noise, while evident when it was pointed out, was not discernible to the others in the class until Alan noted it. Alan's response to these irrelevant stimuli, would often be a commenting on the noise. ("There goes that water again!") His responses distracted Alan and his classmates from the lesson at hand.

Alan was receptive to ideas and strategies which would help him overcome difficulties in attention which he encountered. One such strategy to which Alan was receptive was a metacognitive exercise which attempted to increase his ability to focus on a task. He was first made aware that one of his difficulties was the inability to focus on a particular task for any length of time. He was then told about athletes who could develop their ability to focus by looking at a simple object such as a pen and describing that object for several minutes. Alan was interested that a similar strategy could help him develop his focus and could help him in his school work.

He began simple "focus" exercises several times a day. These consisted of looking at an object of his choice and giving an oral description of the object

for as long as possible. These were timed and he was able to increase the length of time of his focus. He looked forward to these and was highly motivated to improve his focus. The focus was then transferred from oral descriptions of objects to a focus on skills involved in written work. He began by doing simple pencil and paper exercises to develop an awareness of the spaces between letters. With the help of self-talk, he was able to transfer this focus to the size and spacing of letters in his printing. Alan would talk about each stage of the task while he was performing that task. He would repeat a simple instruction such as "Start at the dots, (lines on an interlined page) down to the line. Space." This instruction would be repeated and condensed until it became, "Dot, line, space."

It appeared that when Alan was focussed on a task, the extraneous stimuli did not impinge on his attention. He was able to attend to the target stimulus, or develop selective attention. Further investigation would be in order to ascertain whether selective attention could be maintained consistently through a program of developing focus.

Impulsivity

Organization. Alan's impulsivity prevented him from organizing many facets of his life. The lack of organizational skills was a considerable handicap for Alan. It was often a contributing factor in Alan's difficulties in his school performance.

His impulsivity created difficulties when dealing with his tools ie. pencils, crayons, scissors, glue, etc. At the start of the year, Alan's desk was crammed with his school books and tools. Though he had a box in which he was expected to place his tools, he invariably pushed them into his desk before moving on to the next activity. When the time came next to use the tools, they would be

difficult to find. In order to avoid the clutter of a desk crammed with materials, Alan was then asked to keep his belongings on a shelf at the side of the room. This served two purposes: it allowed him to get up and engage in some activity in order to get his supplies, and it kept his desk interior relatively free. While this method did have some merit, it was not entirely efficient. Alan often failed to put his things into the proper place on the shelf. Then when he did go to look for them, the papers, pencils etc., would not be in the appointed place.

Organizing Alan's papers and exercise books was also a difficult task for him. If the work of the day was done on a loose sheet of paper, Alan would either stuff it in his desk or toss it on the side shelf regardless of whether it was completed or not. Most often it was not completed in the allocated time but Alan was busy organizing the next activity.

Organizing his supplies and materials for other classes was also difficult for Alan. He regularly forgot his gym strip for Physical Education classes. He had difficulty in remembering to bring his library books back on the correct day, and he consistently forgot to bring his musical instrument back to school if he took it home for practice. A lack of organization also hampered home-school communications. Most information for the parents was sent home via the student through newsletters or notices. These could include notices regarding general school news, lunch orders, or field trip information. Often Alan would miss out on a special lunch day because he either did not get the notice home, or else he forgot to bring the money and notice back. It was often a phone call home which alerted the parents that the permission slip had not been returned, or that a meeting was to take place.

Calling out/Speaking Excessively. Alan's impulsivity was a problem in group situations when a lesson was being presented or when the other children were speaking. He could not wait for a question to be completed and if he thought that he knew the answer, he would interrupt and call it out. As stated earlier, Alan has a extensive knowledge and an excellent memory. But his contributions to class discussions were of an impulsive nature. He called out and interrupted the lesson to relate his particular information.

Alan was known to be an excessive talker. Once speaking, he had difficulty giving up the floor to others. He did not appear to want to listen to the opinions or comments of others. It was as though Alan was driven to keep talking. It was difficult at times to interrupt him to ask him to stop.

Another problem Alan exhibited was his compulsion to speak whenever he wanted. When he wanted the attention of the teacher or of his classmates, he would not stop to observe whether these persons were available to listen to him. Most often Alan interrupted whatever anyone was doing and started to talk. It was as though Alan was not aware of what the others were doing, his mind was just on his own problem or on what he wanted to say. Throughout the year Alan was reminded to "Stop, look, and listen" before he spoke. This was effective as a reminder when he was about to interrupt, but it was never used by Alan to prevent an impulsive outburst.

Alan's impulsive nature created difficult social situations for his parents as well. A teacher on staff reported the following incident to me.

"The Restaurant Scene"

> *"As my husband, my parents, and I were waiting in a line at a local Chinese restaurant, I heard a child yell, "That's Ms. R,* **the mean teacher!"** *It was Alan.*
> *We all started to laugh and his poor mother had put her hand*

completely over his mouth. We could hear the muffled sounds as his very red-faced mother apologized to me. When she took her hand off his mouth, he did not stop!
I explained to the mother that he had been behaving inappropriately on the school ground and I had told him to leave the area. As I was explaining this, Alan continued to insist... "Everybody else was there... I didn't do it!" The mother left the restaurant quite quickly. She went out the front door but I could tell that she wished the floor would swallow her."

Hyperactivity

Alan displayed excessive movements throughout all aspects of this study. The movements were irrelevant to the task and were developmentally inappropriate. This hyperactivity was evident to a greater degree than either the impulsive factor or the inattentive factor of the disorder. Hyperactivity was often also a factor which occurred concurrently with impulsivity and inattention. The hyperactive aspect of the observations could not be entirely separated from the impulsive or the inattentive aspects of the behavioural observations.

Hyperactivity was examined in two dimensions: gross motor activity, including running, jumping, sitting still; and fine motor activity, including printing, cutting, pasting and keeping his hands still.

Gross Motor Skills. Alan was observed in his regular Physical Education class throughout the year. His activities were also monitored in class and on the playground. In P.E., a variety of physical skills were taught which would require co-ordination and a degree dexterity. Bouncing a ball, whether it was large or small, caused Alan many problems. He could not get the rhythm needed to connect the ball with his hand at the appropriate time. He had a difficult time with skipping as his lack of co-ordination prevented him from jumping when he brought the rope around. When he tried to walk on the balance beam during a

gymnastics lesson, he seldom reached the end of the beam without falling. On one recorded instance, he jumped off the bench six times before he reached the end of the ten-foot beam.

Some of Alan's movements in class were ungainly and clumsy. He bumped into the furniture as he moved from one part of the room to another. Sitting still in his desk was a difficult time for Alan as he was in constant motion. On three occasions during the year Alan actually fell out of his chair because of his lack of coordination.

The constant need for motion caused Alan considerable difficulties when he was in a larger group such as in an assembly in the gym. The expectation that a student could sit still for an hour or even half an hour was more than Alan could meet. His continual motion disturbed the other children around him and was cause for concern to the staff.

Fine Motor Skills. Alan's difficulties with his fine motor skills were evident whenever he had to print, use his scissors, trace, paste, or complete a puzzle.

His written work was oblivious to the lines on the page. Letter formation was frequently illegible. Spaces between words were nonexistent. Placement of the work on the page tended to be pushed to the top of the paper. His sentences floated like an undulating wave across the top of the page. It was as difficult to read as it was for him to produce. He laboured at his written work with unsatisfactory results.

Any assignments which involved cutting paper and pasting it were an exercise in frustration for Alan. His fingers could not make the scissors cut along a designated line. Pieces which were to be cut out became smaller and smaller until they were no longer identifiable and he had to begin the work again. Gluing

the paper was another task which Alan could not master. He consistently used too much glue with the result that the excess was splattered over the entire piece of work. Tracing an outline with a pencil or crayon was also an assignment which caused problems for Alan. His pencil would shift the tracer and the resulting outline bore no resemblance to the original. Completing puzzles was also an area which frustrated Alan. Simple jigsaws were difficult for him. He could not "see" that there were edge pieces and corner pieces. The shape of the puzzle piece bore no relation to the shape of the space in which he tried to place that piece.

The results of the Bender test of visual perception and motor expression of visual expression give an indication of the root of Alan's problems with his fine motor skills. It was shown on this instrument that Alan had a two year delay in his visual perception and the motor expression of his visual perception.

Summary. The data from the behavioural observations substantiate the data from the formal assessments. These indicate that Alan was a strong candidate for the diagnosis of attention-deficit hyperactivity disorder. He clearly met and exceeded all the criteria for the disorder from the DSM III-R. The behavioural symptoms of ADHD were pervasive and significant. The impact of the disorder on Alan's academic, social, emotional, and motivational performance will be examined in the next section.

ADHD Impact

Social. Alan was by nature a gregarious student. "He lives to play" were his father's words when he described Alan. Much of Alan's energy was directed towards social interactions. He was both highly successful and highly

unsuccessful in his social activities. Initially children were drawn to Alan and liked to play with him. He was eager to be friendly. Yet his inability to control certain behaviours would alienate him from the very children whose friendship was so important to him.

Alan was often a most helpful and considerate student. He was concerned about the feelings of others. He would readily offer a portion of his lunch when a student had forgotten his/hers. He was also concerned when classmates were sick or hurt. He was eager to please and quick to offer assistance when required in the class.

Alan's amiability was readily evident on the occasion of a school Open House. Alan, who had a difficult day at school, returned to the school in the evening with his mother for a "Meet the Teacher" night. In typical fashion, Alan was in constant motion showing his mother the classroom and where he sat, what he played with, etc. His mother could barely keep up with his movement from one area to the next. At the end of the evening, he was so pleased and excited by the occasion that he wished to give me a gift. He pulled a dollar coin from his pocket and insisted that I should take it. He informed me that it was indeed a special coin as the queen's crown was different and it would one day be very valuable. This obvious caring was a touching gesture by a boy who truly did wish to please others. Yet, his inability to control his behaviour, so often interferred with his desire to do well.

Alan's interactions with his friends were inconsistent. While his friends were of utmost importance to him, he would fight bitterly with them. Alan's inability to connect consequences with behaviours made it difficult for him to realize that children would not chose to play with him if he behaved in a manner

which frustrated or antagonized them. He was driven by a need to have friends, yet he consistently fought with them and insisted on playing by his rules.

Alan was unable to reconcile school yard battles before he entered the classroom. His entry into the classroom after breaks was regularly marked by Alan being upset by an incident which had occurred while waiting for the school doors to open. He was often embroiled in a conflict with one of his classmates or with children from another class. Alan was unable to put aside the incident as he felt compelled to continue the argument as he entered the class. Regardless of the severity or triviality of these incidents, Alan came into the classroom, interrupted whatever was occurring, and "told on" the person who had slighted him. Alan found it difficult to accept that the incident was a thing of the past.

If, on some mornings, Alan was enjoying a game or activity prior to school opening, he could not easily leave the details of the game outside when it was time to enter the class. Typically, he ignored any directives, greetings or comments by the teacher, and he continued discussing the game. He was busily engaged in his discussions and he kept on making arrangements to continue the game at recess. His involvement in this activity took up his entire focus. It could only be stopped by direct instructions from the teacher. Usually Alan needed to be touched physically on the arm or shoulder before his attention could be shifted. It was difficult for him to make the transfer from play time to class time without this intervention.

Alan often displayed an inability to judge social mores. On a typical morning, Alan entered the class pushing and pressing against other children. Alan exhibited a constant need to be touching others or to be in very close proximity to others. It was be bothersome to others as Alan was consistently

shoving, pressing, bumping and entering other students' "space". When the children sat in a circle on the floor during discussions, story reading, sharing, or other small group lessons, it was not uncommon for Alan to be leaning on a student or looking closely at another student. He may have been be totally involved in the pattern or design on a colleague's shirt. His presence was usually intrusive to the others. In a line up, Alan was seldom seen behind a student, he was instead leaning up against them or beside them.

Alan's desire to socialize was the cause of him being inattentive to lessons, even when the lesson content was highly motivational. An example of a lesson which showed Alan's inability to attend an eagerly-anticipated lesson was a school swimming lesson. The lessons were scheduled for one week, forty five minutes each session. Alan had been looking forward to these lessons. Alan was observed during each of these five lessons and anecdotal comments were kept of these sessions. The notes seldom varied from one day to the next. In one lesson, the group was instructed to move the width of the pool performing a "torpedo swim". (This is basically an exercise in which the children stretch out on the surface of the water with their arms in front of them. They then kick their feet and "swim".) Alan was talking to his friends throughout the guard's instructions. As the other children began the exercise, Alan kept up with their movements by bobbing up and down beside them, talking to whoever was coming up for air. Alan did not learn to do the "torpedo swim" that week. Swimming was secondary to the more important socializing.

Alan's impulsive nature made it difficult for him to await his turn in games. He wanted to be first and he wanted control when playing games and he wanted to tell others how they could play. An example of this type of behaviour occurred

at the class computer. Two children were permitted to play games at one time. On one particular day, Alan was told that he could use the computer with another student. He did not stop to put away the work he was doing, but he ran to the computer, got out the game, and took charge of the keyboard before the other student had a chance to join him. Alan was not willing to share the game with the other child if that meant that he was the helper-observer in the game.

The class routine in the morning was for the most part, unvarying: the students entered the room and put away their coats, shoes, and lunches. They then were required to get their supplies ready for the day, ie., pencils sharpened, books prepared. A 15 minute activity time followed. This time could be spent on a class computer, listening to various book tapes, playing games or being involved in a number of educational activities. The intent of these activities was to allow for a "settling in period" before the more structured activities were begun.

During this activity time, Alan found it difficult to follow the routine. He began at the computer, lost interest in that, and then he moved onto another activity. Most of the other children stayed at one game for the entire time. Some of the children carried over their activities from one day to the next. Although the routine in these activities was set, Alan's inability to remain on a task or on a play activity was very evident.

Emotional. The range of emotional responses in Alan appeared to swing from one extreme to another. He was either very happy or very unhappy.

When the class was involved in a project or event about which Alan was excited, it was difficult for him to do anything other than think of the event. Prior to his family's trip to Disneyland, Alan would talk of little else. While this may not

be unusual for most children in these circumstances, the degree of Alan's focus on the trip was notable. He would talk about the trip in the middle of a math or reading lesson. His mind was completely taken with the trip. He would interrupt a lesson with his latest thought on the trip.

A difficult situation in dealing with Alan occurred when he perseverated or became fixated on a particular response. If a task was presented or a consequence occurred which Alan did not like, he could become intensely insistent and a change in his demeanour resulted. His voice became high pitched and whining, his face became flushed, and he became argumentative. He would ask the same question ie. "*Why?*", or continually repeat, "*It's not fair*", without listening to, or even wanting an answer. When Alan was in this state, it was impossible to reason with him. Certainly arguing with him was pointless as was trying to force pliant behaviour. The most effective action for all concerned was to remove Alan from the area if it was disruptive to the other children. Alan was then best left alone to settle down. He was not violent or threatening, just persistent. Once he was calmed, the consequences of that type of behaviour could be implemented. He might have to catch up on the work missed during this "tantrum" during recess etc. It was imperative that at no time did this behaviour result in him evading the initial task or consequence. As much as possible, it was also important that Alan was given an opportunity for success after the event. Ideally, it was advisable for the teacher to learn what might trigger the behaviour, and to try and circumvent its occurrence.

Alan has also been known to have emotional outbursts when playing with other children. While playing was critically important to him, he did not appear to connect friendship with give and take. He would insist on things being done in

his way and he became angry and stubborn until the other children finally left or refused to play with him. Early in the year an incident of this nature meant that his whole day would invariably be coloured by this incident. He would become angry with others and refuse to do his work. He would insist on discussing the incident long after the other children had forgotten it. As the year went on, and the futility of the action was pointed out to Alan, he gradually became able to deal with situations such as this and he was able to go on to other activities. His mother stated that when he was in the first years of school, a bad incident could have meant a week of difficult behaviour.

An informal measure of self esteem as reflected in school achievement was achieved through a self-evaluation report card {Appendix E}. This instrument was completed by Alan and the other children in the class. The purpose of the evaluation was to indicate to the parents how the students felt about school and how they felt about their progress in their school work. It is a particularly useful tool as each child was given individual attention during the assessment and it was completed in a one-on-one situation with the teacher. There was no peer pressure to answer in a particular way, nor was there any stigma attached to negative answers. Honesty was valued and a negative answer was treated as an instructional focus.

(The instrument (Appendix E) used in this instance was an informal report which was developed by teachers who wished to involve the students in their own evaluation. As such the name and source are unavailable.) The format of the report required that the student read a sentence, or have the sentence read for him, and answer with one of three illustrations: a happy face drawing, indicating agreement with the statement; a neutral face drawing, indicating a

neutral stance; or a frowning face drawing indicating disagreement with the statement.

Alan enjoyed completing the form and the examiner felt that his answers coincided with classroom observations. Of note is Alan's comment that he *does* like school. In the questionnaire completed by Alan's mother, she had indicated that Alan did *not* like school. This is not a contradiction, but rather, like many school children, Alan may be stating his like or dislike according to whom it is that is asking the question. By stating "I don't like school" the child often receives a reaction from his/her parents and this reaction may be used in the manipulation of the child's parents. His positive response in the self-evaluation may have been a reaction to the fact that at that moment he was enjoying the one-on-one situation required by the task.

The positive tone in which Alan answered the remaining questions would indeed indicate that he both likes coming to school and feels good about himself and the work he does at school.

Alan did not have *any* "unhappy faces" drawn, indicating that he has a positive outlook and image of himself and of his education.

Alan had a neutral response in areas where he did require some growth and areas where he had genuine difficulties: ie.,

- I like to cut and paste.
- I use capital letters where they are needed.
- I leave spaces between my words.
- I like to read at home.
- I listen and follow directions.
- I can work without bothering others,
- I keep my things in order.
- I clean up well.
- I can solve problems with others without hurting them or fighting.
- I listen to others when they speak to a group.

In looking at the above responses which were "neutral", one cannot help but be struck by the accuracy of his self-diagnosed symptoms of ADHD. All of the items reflect problems with inattention, hyperactivity and impulsivity.

At the time of the study, in the setting of the Primary Learning Disabilities Class, Alan did not appear to suffer from a low self esteem. He was happy with himself and with his performance in school as indicated by this instrument.

Academic Performance. The measurement of academic growth is often performance related. This factor creates difficulties for a student like Alan who is weak in his performance profile on the WISC-R. Alan's abilities were often masked by task demands not meeting his performance capabilities.

Writing. Written work is a particular problem to Alan both in quantity and quality. While he had no difficulty in understanding what was to be done, his lack of organization, or impulsivity did not allow him to settle into the task. He often lost the equipment needed for the task, and paid attention to other stimuli in the class. Settling down to do his written work was difficult for Alan. He was in motion and restless and he wandered to his seat touching other children, talking about whatever was on his mind at that moment. When he was finally seated, he forgot the task at hand. He did not see this as a problem as he is cognitively involved in some other endeavour. When reminded about the task to be done, Alan would say, "Oh, yeah" and then look busy trying to gather his needed equipment.

Alan's fine motor skills continued to be a problem. His written work was without spacing and oblivious to the lines on the page. It was not uncommon for the printing to be bunched at the top of the page in a jumble of letters. This was a continual problem throughout the year. Alan did show some improvement

when the class began handwriting. He was highly motivated to learn handwriting as this was seen as a developmental step by the students. Because of the emphasis placed on space and on repetition of strokes, Alan came to focus on the elements involved in writing. His handwriting was never up to a standard required for his age level, but there was evidence of growth in his fine motor skills. This transferred to his printing and gradually it became more legible with the size and space becoming more standard.

Reading. Alan's age at the time of the study was ten. While this was Alan's fifth year in the school system, his reading level was not at the Grade Four level. It was difficult to determine the exact level at which Alan read as his performance varied considerably depending on his interest in what was being read. He had a superb sense of rhythm and read poems and chants without difficulty after they had been read to him. His ability to decode original print material was weak. It is not clear from this study whether Alan's difficulties in reading were the result of his learning disability, or the result of his ADHD symptoms interfering with his reading.

Arithmetic. Alan had difficulties in numeral writing and placement. This created difficulties in the operations to be completed. He understood the concepts, but his inattention to the task demands created problems in their completion.

Alan had mastered his basic number facts in addition and subtraction through the use of an elaborate "number dot" system. This had been taught to him in the previous year and the strategy was valuable in helping his computations. This strategy provided him with a focus for task-completion and allowed him to operate efficiently.

A self-vocalization technique was used in math where Alan could verbalize the steps in rote math operations to help him perform the task more quickly. He became aware of his thinking about thinking. He was actively engaged in his learning and he was pleased with the improved results of his written work. In one recorded instance, Alan was frustrated by his inability to use "borrowing" or "regrouping." He knew he had to "borrow" a number, but he consistently forgot to change the number in the next column. The researcher modelled the operation required for the procedure using a story format along with self-vocalizations as to the operations. The personification of the numerals combined with the self-talk assisted him in learning the strategy. Difficulties in attention and hyperactivity were more evident when Alan was required to work with pencil and paper rather than with manipulatives. Pencil and paper required a degree of organization and concentration. During one behavioural observation session when Alan was to complete a set of twenty math computations on paper, Alan was off-task for five minutes before he began to do the work. During the observation he:

- dropped his paper onto the floor,
- looked in his desk for a pencil but found a toy plane which he "flew",
- talked to his classmate about recess,
- looked around the room,
- looked out into the hall,
- picked up the paper,
- borrowed a pencil,
- finally began his work.

When the math lesson was at a more concrete level, Alan was more focussed on the task. In a lesson where the questions were presented orally and the class had to manipulate materials (small blocks) to solve the equation, Alan was attentive and quick to find the answer. In the same five minute period, he

listened to the question, picked up the blocks and began the manipulation immediately. The only time that Alan was not attentive was during a period when the teacher needed to help another student and Alan did not have an equation on which to work. He then began moving around and shifting from one position to another. This stopped as soon as the next question was introduced. It should be noted too that the math lessons using manipulatives were carried out on the floor where Alan had a greater opportunity for movement. The paper and pencil activity was done in a desk which was a more restrictive environment for Alan. The task demands of the pencil and paper task were more challenging for him. This must be taken into account when considering the positive results for the manipulatives.

Alan's academic performance cannot be generalized to all children with ADHD. Alan's learning disability was not factored into the data on academic achievement. His academic performance may have been affected to an uncertain degree by his learning disability. There are difficulties which Alan encountered in the academic domain are related to ADHD ie., his fine motor skills, his inattention and his hyperactivity all impact on performance. The impact of his ADHD behaviours on his social and emotional status is clearer. His impulsivity, inattention and hyperactivity were the cause of difficulties in these domains.

Motivational Implications

Alan's motivation to become involved in a task or to complete a task was inconsistent. As recorded earlier in the section on attention, Alan was on-task to a greater degree when he was interested in the subject being studied. Alan was an eager learner. He had an amazing ability to remember facts and details *of*

things and events in which he was interested. He had the ability to learn, but there was a considerable variability in task performance. On some tasks, he would work for an extended period of time. While on other tasks, he would not settle into the work. He would instead be distracted by stimuli in the class. He would display the symptoms of the disorder, inattention, impulsivity, and hyperactivity.

When the curriculum included learning about spiders, grasshoppers, salmon etc., Alan was a sponge for the information. He could remember facts and details of the subject presented earlier. It was not uncommon for Alan to speak in great detail about facts learned in a unit on dinosaurs which he had studied in the previous year. He certainly benefited from an integrated curriculum and his motivation to learn related subjects in the context of his interest was high.

If the lesson involved an activity which was seen by Alan as being less interesting, he was not easily drawn into the task. He was distracted and his performance was poor. It was difficult for Alan to complete a task when he was *not* motivated.

A further example of Alan's performance variability dependent on his motivation occurred during his psychological assessment by the district counsellor. Two of the tests are very different in their format. The K-TEA is a test of basic reading ability. Its format is one of reading passages each increasing in difficulty. These are presented on a page with no pictures or visual cues. Alan did not like this test. He seemed distracted, he fidgeted and shifted in his seat, and performed poorly. The results of this test did not accurately indicate his

reading ability. The results were more indicative of his lack of motivation when completing a task in which he is not interested.

The WISC-R is a test which tests a broader range of abilities, both verbal and performance tests. The tasks in this instrument are for the most part pictorial and do not require the amount of reading as does the K TEA. Here Alan was eager and motivated to do well. He enjoyed the exercise and was continually engaged in self talk. ie. "Boy this is fun, I can't do this but I'm not going to let them beat me." The Testing Behaviour was recorded by the examiner as follows:

Alan was open, talkative, task oriented, interesting and easy to test. His arithmetic responses were very fast. He stated that he liked Math and learning about "spiders and stuff". He was very determined to finish tasks and he hummed and sang to himself through performance tasks - keeping a very rhythmic beat. His difficulty with visual perception is very evident but he struggles and does not give up! He is a small child with a lively imagination and interest in his world. Excellent Effort!"

The enthusiasm he showed towards a task also appeared contingent on the task demands. Tasks which required extensive work with his fine motor control presented him with greater difficulty and were more likely to be the tasks which would lead to less productivity. Any tasks which required Alan to cut accurately, print within a specified set of lines, would lead to frustration and to a task which was often ruined or incomplete.

It was evident that Alan's performance in school work was controlled by his interest in the subject as well as the demands of the task. It was the interest he had in a subject and his ability to do the task which combined to form the motivation which he had to complete a task. It was this motivation which determined the effort put into the task by Alan.

Summary

The data which were gathered in this study verified that the subject displayed the primary characteristics of ADHD. The behavioural symptoms of inattention, impulsivity, and hyperactivity were documented extensively and consistently throughout the study. The data also show that the primary behavioural symptoms of ADHD have an impact in the social, emotional, and academic performance of the child with ADHD.

The data regarding motivation and ADHD are less clear. In some instances motivation impacts on performance. In other instances, lack of performance appears to impact on motivation. Further research is required to delineate the role of interest and motivation in the performance of the student with ADHD. The investigation should analyse how ADHD impacts on the motivation of the child with ADHD, and whether the ADHD behaviours are intensified by a lack of motivation. The role of performance demands on the child with ADHD must also be established.

The degree to which ADHD impacts on the child with the disorder clearly indicates that it is a problem of major significance.

CHAPTER 5

Discussion

The discussion will follow the categories presented in Chapter 4. It will analyse the results of the data from parent information and from school based reports. Results from the assessments and testing will be discussed as well as the behavioural observations. These will be examined in the context of ADHD characteristics with a view to recommending educational management strategies. The impact of ADHD on the student's academic, social and emotional performance will also be examined. From these data, a model of ADHD will be drawn along with an intervention model.

Parent Interviews

Both interviews with the father and the mother indicated considerable frustration in dealing with Alan throughout his childhood and in his school experiences. The obvious ability which Alan has intellectually is often overshadowed by the symptoms of ADHD.

From the time that Alan was born, he was restless and hyperactive. His mother's comment that "everything was difficult with Alan" clearly indicates that nurturing this child was difficult. He did not eat well, nor did he sleep well. His area of strength was his quick grasp of language and its use. Even this was troublesome as Alan was impulsive in the use of inappropriate language.

Alan's very social nature were highlighted by Alan's father. His need of friendship was very strong and was often impaired by his inappropriate behaviour. This need for friends was less a reflection of his ADHD characteristics

than it was a characteristic of this particular child. Therefore generalizations about ADHD children would not follow from this observation.

The difficulties which Alan experienced were reflected in his father's interview and in his reflections of his own school problems. Alan's father recognized that he had the same difficulties that Alan did. Through the reading materials provided to him, Mr. J. had finally come to recognize the reasons for his struggles throughout his life. He was willing to speak to this researcher about his difficulties, yet he was reluctant to do so with others. It was anticipated that through an understanding of his own struggles, Alan's father would be able to deal with the difficulties which Alan encountered with his ADHD symptoms.

Implications. In dealing with students who have ADHD, it is important to remember that there is evidence of a genetic link in the disability. Therefore, assistance from the parent in regulating the symptoms of the disorder in the child may be exacerbated by the parent who has similar difficulties. Though the characteristics may have abated somewhat in the parent, the teacher or psychologist should be alert to this possibility. In some cases, such as the present case, the parent may not be aware of his/her connection to the disorder. While nothing should be assumed, nothing should be overlooked. To ask a parent who has difficulties in organization to help a child organize his/her work, may be setting the stage for family conflict.

School Based Information from Previous Years

Alan's early and continuing difficulties in school were a typical indicator of the nature and severity of the disorder and its impact on the school functioning of an ADHD child. While some early difficulties may have been the result of the learning disability, the greater portion of reported behaviours were ADHD

related. Repeated comments were made in the reports as to his poor motor skills, his poor organization, his inappropriate behaviours, his impulsiveness, and his restlessness. Yet none of the reports mentioned the fact that these behaviours may be related to a disorder. All suggested that he needed to try harder. His behaviour was seen as something over which he needed to exert more control. It is evident that a general lack of information about the disorder is a common thread in the reports.

Implications. It is clear from reading the teacher's comments from previous years that there is little understanding of ADHD. Alan had not been diagnosed as having ADHD and neither was it suggested at any time that this was the source of his problems. Teachers need to receive training in childhood disorders so that they may be able to recognize behavioural as well as learning disorders. This training should be an integral part of all teacher training and teacher upgrading. Courses should be readily available both at the university level and at the community colleges for teachers at all levels of education.

School Based Assessment and Testing Data

ADHD Assessments. The data from the ADHD rating scales were consistent in their affirmation of the diagnosis of ADHD for Alan. On the ADHD Rating Scale, Alan was above the mean by more than two standard deviations (SD) on both the inattentive-hyperactive factor and the impulsive-hyperactive factor. Clinical significance is obtained at 1.5 SD above the mean. These results indicate the Alan showed a significant degree of difficulty in both these areas. This significant difficulty in inattentive, hyperactive, and impulsive behaviour is reflected in the behavioural observations in this study.

The data obtained from the Revised School Situations Questionnaire, indicate that Alan has severe difficulties in school situations as listed on this instrument. His difficulties as noted on this instrument are evident throughout this study: in individual seatwork, in small group activities, in free play time in class, in lectures to the class, on field trips, during special assemblies, during movies, and film strips, and during class discussions. Confirmation of these problems is readily seen in the data of this report.

The Academic Performance Rating Scale also placed Alan below the mean in all categories. He was below the mean in learning ability and was more than one SD below the mean on academic performance. On the social withdrawal factor, Alan was also below the mean though not significantly. Overall, he appeared weak in terms of his learning ability and social withdrawal. His academic performance and his impulse control appear as major weaknesses on this scale. The weakness in the academic performance may in part be clarified in the context of Alan's learning disability. The test was designed to assess children's productivity and accuracy in completing school work. It also contains questions which deal with organization and attention. The questions which deal with organization and attention would indicate a problem based in ADHD, while the productivity and accuracy portion of the questionnaire would be influenced by the learning disability as well as by the ADHD symptoms. Therefore, any conclusions regarding Alan's academic performance must be made with caution. The question must be addressed as to whether the results reflect the learning disability or whether they suggest a problem which is due to the behavioural nature of ADHD. A closer examination of the impact of attention on learning would help clarify this question.

The DSM III-R provides clear evidence as to the severity of Alan's disorder. The fourteen items are presented in descending order of discriminating power. The data from this report clearly supports the diagnosis of ADHD. Alan needed only eight of the diagnostic criteria to be present in order to qualify for the diagnosis. Alan scored on thirteen of the fourteen items. He does not regularly engage in physically dangerous activities. This was the single item, which was also the last on the list, which Alan was not known to perform. The strength of this diagnosis would indicate the severity of Alan's disorder. The data from this study clearly depict a child who is profoundly affected by ADHD.

Psychological Assessments. The results from the battery of psychological assessments were presented as an indication of Alan's educational profile and his academic performance. The results of the testing done by the Learning Assistance teacher would indicate that Alan's reading level was actually lower (24 % ile for reading decoding and 9 % ile for reading comprehension) than the reading which he performed in class. This was accounted for by the explanation that Alan was not interested in the reading materials in the tests. The format of the test did not provide him with motivation or stimulation to do the task and thus he was seen to be distracted easily. The materials which were used in class reading exercises were largely from visually-pleasing books and high interest subjects. Alan was interested in these materials and did read fluently from them. These were a truer indication of Alan's reading ability and these he read at a grade three level.

The school counsellor's assessments were of a wide-ranging nature. Her conclusions affirm that Alan's cognitive development indicates a significant gap between his visual performance and his verbal performance, with his strength in

the latter. The visual motor integration difficulties are born out in the difficulties he experienced in the tasks which required fine motor control, i.e., cutting, pasting, and writing.

The results from the WISC-R were further factored into three categories with Alan's percentile score in each as given: Verbal Comprehension Factor, 53 % ile; Perceptual Organization Factor, 8 % ile, Freedom From Distractibilty Factor, 39 % ile. This analysis of these results also add strength to the difficulties experienced by Alan in perceptual organization and distractibility. His verbal performance is a strength is this interpretation. It is not difficult to see why a student whose strongest area is in his verbal factor, who also displays characteristics of inattention, hyperactivity and impulsivity, would have considerable difficulties in conforming to the task demands in a classroom.

School Based Behavioural Observations (The year of the study)

The information in this section was presented in the categories of inattention, impulsivity, and hyperactivity. Alan displayed difficulties throughout the study in each of these domains.

Inattention. Both sustained and selective attention created problems for Alan in the classroom. Sustained attention, necessary for the completion of tasks, or for listening to instruction, was impacted by the nature of the task, and the motivation to do the task. As well, a factor which impinged on Alan's ability to sustain attention was whether the level of physical energy was appropriately challenged.

Sustaining attention to a task was often dependent on the nature of the task. The tasks which required Alan to use his fine motor skills were the tasks which failed to hold his attention. He had great difficulties in using his pencil,

scissors, and in putting things together, such as gluing. When frustrated by these activities, he would not remain on-task.

As reported by this study there were instances in which Alan was able to sustain attention for a considerable length of time: when he was drawing a picture for the "Penguin" unit of studies; and when he was colouring while listening to "Charlottes' Web". The examples cited would show that Alan was capable of sustained attention. The factors which impinge on his performance of sustaining attention to a task may be of a kind which may be manipulated. If the situations are examined where Alan did not have difficulties in sustained attention ie., the picture of the penguin and colouring while listening, it can be seen that he does have the ability to attend. ie the pre-skills. Methods for improving Alan's attention to the task at hand are evident in these examples. In the first instance, Alan's performance was improved by his interest in the task. He had enjoyed the study of Penguins and this motivated him to perform on the task. In the second instance, Alan was motivated to listen to the story but had difficulty in sustaining attention for a longer period of time. It was not until he had another activity which directed his physical energy towards something else, the colouring that he was successful in sustaining attention.

The examples provided in which Alan was able to sustain attention present instances which may give suggestions for improving the capacity for sustaining attention in an ADHD child. As well as motivation and the ability to perform a task, there may be a matter of under-arousal rather than over-arousal which detracts from a child with ADHD to sustain attention. If the difficulties which a child with ADHD encounters in sustaining attention originate in the child's understimulation, it would follow then that there should be an increase in

stimulation. This increase in stimulation could come in the form of activities which involve more motion, rather than less motion. As well, it is predicted that motivation is a factor in sustaining attention. Further studies in both motivation and in arousal and their relation to task performance are needed to verify these hypotheses.

Selective attention was also an area which created difficulties in the classroom for Alan. The ability to focus on a target stimulus without attention to extraneous stimuli was an area in which Alan needed instruction and practice. His attention to stimuli which were not the target stimuli impeded his capacity to attend to lessons.

The focus exercises which were initiated by the researcher show promise for further investigation in this area. Alan was not as likely to attend to the incorrect stimulus when he was focussing on the task at hand. This aspect of developing selective attention through a program of developing focus requires further investigation.

Impulsivity. Many of the difficulties which Alan encountered in his daily activities stemmed from his lack of organization. His books and school supplies were in total disarray as was any completed or uncompleted work. When Alan stopped one activity, whether it was finished or not, he was already thinking about the next activity. He found it difficult to sustain attention on any task and did not see the completion of the task as a goal.

Close monitoring of Alan's work was essential to ensure that his work was completed. A system which monitored task completion was requisite in the classroom for this monitoring. At times this would be a self-checking system and at other times it was a teacher monitored system. Alan was aware of the

necessity to complete each task and while this was not difficult to monitor in a class of eight students, the same monitoring in a larger class would need considerable attention and monitoring.

Classroom organization of student materials is also critical for Alan. His pencils, crayons, eraser, and ruler were seldom where one would expect them to be. Although he had a box in his desk for these materials, he usually just shoved these items into his desk loosely when he was finished with them. The solution which appeared to have some success was to place all these items in a large shoe-box and to place this box at the side of the room. This eliminated the mess in the desk and also gave him an opportunity for movement when he needed his tools. While this was successful for the most part, there were still occasions where he still could not find the equipment needed because it had not been placed in the box as required.

Materials needed for other classes such as gym strip, library books, and music equipment, also are best looked after in a system where everything has its place and this can be monitored. Alan's lack of organizational skills showed that he needed systems which had been tailored to his needs. These systems were only effective when monitored by an adult until Alan was using the system routinely.

Calling out/speaking excessively

Calling out answers or comments is a behaviour which creates problems in the classroom for many children with ADHD. Alan was very strong on his verbal performance profile and had considerable difficulties in controlling his impulse to call out. His considerable bank of knowledge made it more difficult to

check his impulse to call out. He wished to share this information the moment it came to mind.

Alan's inability to monitor this intrusive and frustrating behaviour had given him difficulties in his earlier school years as well. Alan's inability to control his outbursts or to think before he spoke was the cause of problems for both Alan and his parents. No intervention had been effected which allowed Alan to monitor his own behaviour and would allow him to check his impulse to call out or interrupt others.

Hyperactivity. Alan's excessive movement created difficulties in his functioning in the areas of both gross and fine motor skills. The significance of these problems lay in the fact that they are linked to performance. If a child is poor in both of these areas, it is evident that school functioning will be hampered. Much of what is expected of children in schools is performance based. The tasks presented to children with fine and gross motor skills should not frustrate them or create unnecessary problems in their completion. Every assistance should be made to help children who have difficulties with their fine and gross motor control to develop these areas of weakness. However, much more consideration should be given to alternative tasks which the child could perform which would prevent the frustration.

If children who have difficulties with fine and gross motor skills are evaluated by the same standards as are those who do not have these difficulties, they will fall short in the comparison. As was the case of Alan, his intellectual abilities far exceeded his performance when the performance was limited to fine and gross motor skills. For students like Alan, evaluation of their knowledge should be matched with their abilities, not to their disabilities. If Alan were

evaluated using his strong verbal profile, the evaluation would reflect his abilities more accurately.

ADHD Impact

Social. The data indicate that the behavioural manifestations of ADHD impaired Alan's social functioning. Despite the fact that much of Alan's energy was directed towards socializing with his friends, he did not always know how to behave appropriately when he was with these friends. He also had difficulties when he was in contact with adults in a social situation. Alan was by nature a kind student, but his inappropriate responses and behaviours kept him from successful interactions.

In examining the problems encountered by Alan, it is evident that the symptoms of hyperactivity and impulsiveness are to a large part the underlying cause of his social difficulties. The many fights in which he was engaged were often caused by Alan wanting to take charge of a situations and of Alan insisting on playing things his way. He said things to other children which were hurtful, not because he meant them but because they were the first thing that came to mind. Children who are impulsive need training which will create an awareness of others and of other's feelings. Perhaps if Alan was involved in a program which would reinforce positive interactions, he would become more sensitive to the effects of his behaviour on others.

His hyperactivity was a problem for him in situations where he was expected to sit in close proximity to others for an extended period of time. This difficulty could be alleviated to a degree by a seating arrangement which would allow for more movement and would be physically further from other children. In whole-school assemblies special consideration should be given to children who

are restless and who are unable to sit quietly for a length of time. These children are usually pulled from the group in front of the entire school, an event which may be more disruptive than the original behaviour of the student. Preventing the problem by allowing these children to be situated so that their restlessness would not be a distraction could possibly be one intervention/prevention.

Emotional. Alan was well-adjusted and yet he had extreme swings in his emotions. Avoiding the extremes was of paramount importance in maintaining a balance in the class.

Alan showed a keen perception of himself when completing the self-evaluation form (Appendix E). He was generally satisfied with his school performance, and yet he was aware of his difficulties (as indicated by the neutral responses). Though Alan had many difficulties in his life, indications are that he was achieving a degree of success and therefore felt positive about himself.

Alan's perseverating behaviour was a matter of considerable concern. Alan would not back down in any situation of conflict. Playground confrontations were more difficult to control. However, classroom confrontations could be avoided through understanding the capabilities and limits of Alan's behaviours. Avoiding confrontations became a matter of adjusting classroom demands to match Alan's capabilities. Situations which were likely to become problems were circumvented before a clash of wills occurred. It was much easier to learn what Alan *could* do than to try and undo a situation where the expectations were unreal for Alan.

The research on the negative reputation of ADHD children has implications for teachers and students. The study be Harris, Milch, Johnston, and Hoover, (1990) reported that the *expectation* of working with a child who was

disruptive, who talked excessively, who would not sit still, and who acted in a silly manner, created interactions which were less reciprocal, less typical, and more negative than if no expectations had been created. Consequently, students who are integrated into a regular classroom may receive some of these reactions from their peers. The perception of others to the ADHD child has a significant impact on the way that child will be perceived and treated. If the children in the class are told only that a student will be joining the class who is disruptive, who calls out, who will not sit still, and who acts silly, then their treatment of that child will not be positive. If, on the other hand, both the teachers and the students receive in-service as to the nature of the disorder, then it is anticipated that the attitudes of all concerned will be more positive.

Prevention of problems is the single most effective way in which confrontations can be avoided. The self-esteem of children who are always on the receiving end of negative feedback suffers greatly. An environment where children with ADHD *can* achieve success is critical to their continued emotional well-being. This can only be achieved through an understanding of the disorder and a willingness to create an environment where differences are accepted and accommodated.

Academic. Academic achievement is measured primarily through a student's performance in class. This performance traditionally takes the form of a pencil and paper activity. Alan's difficulties in performing using these instruments is documented throughout the data given here. It is unclear to what degree the ADHD impacted on his performance, and to what degree his difficulties were caused by his learning disability.

The WISC-R assessment results provide a picture of a student who is weak on his performance subscore and strong on his verbal performance. In order to assess Alan's academic abilities, assessments should be of a nature which would allow him to use his abilities, not be hampered by his disabilities. One must question the use of assessment instruments which handicap the results from the outset.

In classrooms, teachers should be aware of the difficulties which children may experience when performing on instruments or on assignments which they are physically unable to perform to the best of there ability. This only accentuates the disability. Reports could be done on a video or an audio tape. Math concepts could be demonstrated through the use of manipulatives. In the age of computers, children who have difficulties putting work down on paper should be given the opportunity to prepare their work on the word processor. As most schools in the province are just beginning to have access to the computer, it is important that this method of working should become available to children who need it most.

Alan was diagnosed as having a learning disability. By definition, this would indicate certain neurological impairments which impede information processing. The relationship between ADHD and learning disabilities remains somewhat unclear. The two disorders are separate and distinct yet there is evidence that one impacts on the other. The frustrations which a student experiences when having difficulties in school would be certain to exacerbate the symptoms of ADHD. And clearly the behavioural manifestations of ADHD i.e. inattention, hyperactivity, and restlessness, would impact on the learning process. Further research is necessary to establish more clearly the relationship

between learning disabilities and ADHD: which aspect of learning is affected by the disorder, and which aspect of ADHD is affected by the learning disability. The two questions were not addressed by the present study.

Motivation

The data on motivation is less than straightforward. It does appear, however, to indicate that in order for Alan to become motivated to complete a task two key elements should be present: interest and ability.

The lessons in which Alan became interested were invariably those which had a high level of interest for him. His enjoyment of the units on penguins, grasshoppers, spiders, dinosaurs, etc. indicated that he had a great capacity to learn. The tests on which he achieved the highest were those which visually stimulating and manipulative in nature. Those tests in which he had difficulties remaining focussed were those which were of a less stimulating format.

Alan's motivation was also impacted by the nature of the task. His difficulties with fine motor skills would impede his performance in tasks which required a degree of motor control. The implications of this are significant. Motivation to become involved in a task will be low if a child is frustrated in its execution and if he/she does not anticipate that the end product will be of a satisfactory standard. A strong recommendation for these children would be to allow them to use other presentation methods for their work. These could take the form of role playing, acting out parts of a story, oral reports, reports prepared on the word processor, video presentations etc. It is important to look at the *ability* of the students and to adjust task expectations to match this ability. In order for students to become motivated to do a task, they must have the interest in the task and they must feel that they have the ability to do well in the task.

Motivation may represent an area in which management strategies may be based. Many factors need to be taken into account when an examination of ADHD and motivation is implemented. The task variables must be considered. Motivation in the context of skills involved in each task in relation to the area of difficulty for the student should be examined. As well, the factors which are said to be motivating need clarification.

ADHD Awareness

Difficulties which Alan encountered in dealing with other children or with adults in authority were often alleviated through an understanding of the disorder. Teachers who had sought to curtail all movement or who expected Alan to be self-monitoring, were invariably frustrated in dealing with Alan. Alan was often seen outside the music room or sitting at the sidelines during a gym class. Teachers found it difficult to teach the other children when Alan was disruptive or inattentive. As the year progressed and these teachers were given some information regarding the behaviour which Alan displayed, they showed a greater willingness to attempt new strategies which could prevent an occurrence of the problem behaviour. The instances which were most successful were those in which the teacher recognized that Alan's behaviour was not an act of defiance, but rather an act which was related to a disorder. A changed attitude towards the problem could help the situation become less reactive.

Alan's mother reported that Alan had a difficult time on the bus with the older students harassing the children. It is likely that this situation arose, at least in part, from a lack of awareness by the high school children of who these children were and of why they were on the bus. Clearly there is a need for information about learning disabled students and ADHD students. It would be

interesting to involve some of the high school children in an activity with the LD and ADHD children. A system of "Buddies" might help the older children realize the personal abilities of the younger children.

At no time prior to this study had the parents of Alan been made aware of his ADHD classification. The lack of information is evident at all levels of the school system. Alan's educational records do not indicate that Alan's difficulties in school may be ADHD. All the testing and all the reports from previous years focus on the behaviours as the problem. All professionals acknowledged that there was a problem being presented, but at no time is the problem seen as Attention Deficit Hyperactivity Disorder.

This indicates an obvious need for information about the disorder at all levels of the education system. Teachers need to receive training in ADHD recognition and remediation. Parents also need involvement in understanding the disorder and in management strategies. School administrators need to be aware that ADHD is not a behaviour problem as much as it is a problem with ADHD behaviours.

The significance of this distinction is in the management strategies used with the child with ADHD. A child, with or without ADHD who is seen to be misbehaving in school or at home faces certain consequences. It is the intent of the consequences to extinguish these behaviours. In this situation, for most children, the consequences, or the threat of negative consequences, will prevent an occurrence, or a reoccurrence of a particular behaviour. Neither punishment, nor threat of punishment will alter the ADHD behaviour. The impulsive nature of the child with ADHD, combined with his/her hyperactivity, results in behaviours which may be seen to be deliberate in their intent. If these behaviours are not to

be extinguished by consequences, then alternate methods of management should be investigated. Behavioural expectations should reflect the capacity of the child to change his/her behaviour. An understanding of the child and his/her abilities will assist when efforts are made to accommodate the inattentive, hyperactive and impulsive child.

Over-arousal vs Under-arousal

ADHD students are frequently placed in non-distracting environments as they are thought to be more easily distracted than are other children. The fact that Alan was able to colour a picture for a considerable length of time while he was listening to a story would indicate that he can attend to more than one stimulus at a time. Children who have ADHD may need more stimulation rather than less if they are to perform optimally. Perhaps educators should consider management strategies for these children which include teacher initiated, controlled distractors. This would allow the child with ADHD to reach the optimal level of arousal while at the same allowing him to achieve an appropriate level of performance.

If children with ADHD need more stimulation, then it should also be evident that they need more opportunities for movement. Including a program which allows for activity may alleviate the problem of too much motion at inappropriate times. It is not realistic to expect children who have difficulties in controlling their levels of activity to completely curb this restlessness. It is more realistic to channel that energy towards productive outcomes.

Classroom Management

In determining an educational program for ADHD children, one must examine the targets of intervention. Disruptive, off-task behaviours are the most

frequently reported problems exhibited by ADHD children in the classroom. Effective management programs should directly target the areas in which change is desired. Antecedent events should be noted and consequences which follow and maintain problem behaviour should be noted. It is also important that students be taught alternate appropriate behaviours to replace the behaviours which are a problem.

Models

The models presented in Appendices F and G were developed from the information obtained in this study. Both models deal with the behavioural manifestations of ADHD. As well, both models look at impact of ADHD on the social, emotional and academic performance of children presenting the problem of ADHD. The literature review and the data from the case study provided the foundation for the models. The impact of the disorder on a child and the possible outcomes of the disorder for that child were examined and an intervention model was developed.

ADHD Vicious Cycle (Appendix F). This model examines the impact of the three primary symptoms of the ADHD student on his/her social, emotional, and academic performance. The primary symptoms are decreased attention, increased activity and increased impulsivity. These symptoms have a significant impact of the student's academic performance. If a student does not pay attention, and is restless and impulsive in an academic setting, a decrease in school performance and eventual school failure is inevitable. An outcome of this academic failure is a high dropout rate with increased unemployment in the ADHD population.

Emotional implications of this school failure are seen in a low self esteem for the ADHD child, and in a decrease in social skills. A student who is seen as disruptive, inattentive and restless receives fewer positive communications and therefore develops a lower self esteem than does a students who is experiencing academic success. This emotional trauma may result in a higher incidence of substance abuse for the ADHD student as well as a greater tendency towards depression.

The poor academic performance, abetted by the poor social skills of the ADHD student, is likely to create within the ADHD student an anger with him/herself and equal anger at authority figures. This anger may manifest itself as delinquency and conduct disorder.

These three areas of difficulty will in turn lead to an expansion of the initial primary symptoms of the disorder. And thus the cycle continues and feeds on itself.

ADHD Intervention Cycle (Appendix G). Given the self-propelling nature of the vicious cycle presented in Appendix VI, an intervention model needs a point of entry and a goal. The point of entry in this model is achieved through knowledge and understanding of ADHD; the goal of the intervention is the management of ADHD behaviours.

In this model, the intervention plan begins with an understanding of ADHD. The development of this understanding is the central factor in the change process for those who work with children who have ADHD. Children who exhibit the behavioural symptoms of ADHD are often misdiagnosed as defiant, or conduct disordered. Through knowledge and understanding, situations which place unrealistic demands on the child with ADHD, can be avoided. Knowing the

limitations of these children will allow the expectations to meet the child's potential. Equally important, is the knowledge of what the child *can* do. This knowledge will change the focus from the disability to a focus on ability. Understanding ADHD is the core of the plan for intervention.

This understanding will also allow the school to provide the ADHD student with opportunities for academic success. It is at this point that the process of change may begin for the student. The more success the student is able to have, the harder he/she is likely to work. With increased success, the less probable it will be that the student will leave school early. Graduation and employment will be seen as possible for this student.

The opportunities for success which are provided in the school for the student with ADHD, will in turn lead to an increase in self esteem and a greater number of friendships. When a child has a higher regard for him/herself, it is anticipated that he/she will become involved in positive activities which will continue to reinforce the positive self esteem.

This emotional impact will have a direct impact on the social life of the ADHD student. The ADHD student who is experiencing success academically, with an increasing self esteem, will experience less frustration and anger socially. An atmosphere of cooperation and communication may then be established.

Combined, the academic, emotional and social benefits of this intervention will lead to the goal of the intervention model, the management of ADHD behaviours. The model provides educators with a basic, workable plan which will assist in dealing with this perplexing and prevalent problem in our

schools. The model begins with an understanding of ADHD. It is hoped that this study has provided that understanding.

Summary

The Models presented in Appendix F and Appendix G were developed from the data presented in this study. The problems encountered by students exhibiting the behaviours of ADHD prevent these children from achieving their educational potential.

The ADHD assessments, the psychological assessments, the parent interviews, the school data and the data from the year in question, all indicate that ADHD is a problem of significance for the child. The symptoms of inattention, impulsivity, and hyperactivity are seen as an obstruction in the learning of the child with these difficulties. The impact of the disorder is seen on the social, emotional, and academic performance of the child.

While the data from this case study are seen as a detailed examination of a single subject, the results cannot necessarily be generalized to all subjects with ADHD. The case is presented as an example of a class of individuals. The in-depth observation of the subject may be used to provide insights into a group of individuals with the same disorder. This insight will lead to a greater knowledge and understanding of the disorder and consequently provide educators with data which can be used in accommodating the needs of these children in the classroom.

There exists a need for an awareness of ADHD as well as a need for knowledge and understanding of the disorder if the child is to meet his/her educational potential. Intervention is possible and successful given the correct opportunities within the child's abilities.

Appendix

Appendix A

ADHD RATING SCALE

Child's Name _____ Age ____ Grade ____

Completed by _____

Circle the number in the *one* column which best describes the child.

	Not at all	Just a little	Pretty much	Very much
1. Often fidgets or squirms in seat.	0	1	2	3
2. Has difficulty remaining seated.	0	1	2	3
3. Is easily distracted.	0	1	2	3
4. Has difficulty awaiting turn in groups.	0	1	2	3
5. Often blurts out answers to questions.	0	1	2	3
6. Has difficulty following instructions.	0	1	2	3
7. Has difficulty sustaining attention to tasks.	0	1	2	3
8. Often shifts from one uncompleted activity to another.	0	1	2	3
9. Has difficulty playing quietly.	0	1	2	3
10. Often talks excessively.	0	1	2	3
11. Often interrupts or intrudes on others.	0	1	2	3
12. Often does not seem to listen.	0	1	2	3
13. Often loses things necessary for tasks.	0	1	2	3
14. Often engages in physically dangerous activities without considering consequences.	0	1	2	3

Note. From *The ADHD Rating Scale: Normative Data, Reliability, and Validity* by G. J. DuPaul, 1990, unpublished manuscript, University of Massachusetts Medical Center, Worcester. Reprinted by permission of the author. This form may be reproduced for personal use.

Appendix B

SCHOOL SITUATIONS QUESTIONNAIRE—REVISED

Name of Child _____

Name of Person Completing This Form _____

Does this child have problems paying attention or concentrating in any of these situations? If so, indicate how severe these attentional difficulties are.

Situations	*Yes/No* (Circle one)		*If yes, how severe?* Mild (Circle one) Severe								
During individual deskwork	Yes	No	1	2	3	4	5	6	7	8	9
During small-group activities	Yes	No	1	2	3	4	5	6	7	8	9
During free-play time in class	Yes	No	1	2	3	4	5	6	7	8	9
During lectures to the class	Yes	No	1	2	3	4	5	6	7	8	9
On field trips	Yes	No	1	2	3	4	5	6	7	8	9
During special assemblies	Yes	No	1	2	3	4	5	6	7	8	9
During movies, filmstrips	Yes	No	1	2	3	4	5	6	7	8	9
During class discussions	Yes	No	1	2	3	4	5	6	7	8	9

Office Use Only: No. problems ____ Mean severity ____

Note. From *The Home and School Situations Questionnaires—Revised: Normative Data, Reliability, and Validity* by G. J. DuPaul, 1990, unpublished manuscript, University of Massachusetts Medical Center, Worcester. Reprinted by permission of the author. This form may be reproduced for personal use.

Appendix C

ACADEMIC PERFORMANCE RATING SCALE

Student _____ Date _____

Age ____ Grade ____ Teacher _____

For each of the below items, please estimate the above student's performance over the *past week*. For each item, please circle *one* choice only.

1. Estimate the percentage of written math work *completed* (regardless of accuracy) relative to classmates.	0–49% 1	50–69% 2	70–79% 3	80–89% 4	90–100% 5
2. Estimate the percentage of written language arts work *completed* (regardless of accuracy) relative to classmates.	0–49% 1	50–69% 2	70–79% 3	80–89% 4	90–100% 5
3. Estimate the *accuracy* of completed written math work (i.e., percent correct of work done).	0–64% 1	65–69% 2	70–79% 3	80–89% 4	90–100% 5
4. Estimate the *accuracy* of completed written language arts work (i.e., percent correct of work done).	0–64% 1	65–69% 2	70–79% 3	80–89% 4	90–100% 5
5. How consistent has the quality of this child's academic work been over the past week?	Consistently poor 1	More poor than successful 2	Variable 3	More successful than poor 4	Consistently successful 5
6. How frequently does the student accurately follow teacher instructions and/or class discussion during *large-group* (e.g., whole class) instruction?	Never 1	Rarely 2	Sometimes 3	Often 4	Very often 5
7. How frequently does the student accurately follow teacher instructions and/or class discussion during *small-group* (e.g., reading group) instruction?	Never 1	Rarely 2	Sometimes 3	Often 4	Very often 5
8. How quickly does this child learn new material (i.e., pick up novel concepts)?	Very slowly 1	Slowly 2	Average 3	Quickly 4	Very quickly 5

Appendix C

9. What is the quality or neatness of this child's handwriting?	Poor 1	Fair 2	Average 3	Above average 4	Excellent 5
10. What is the quality of this child's reading skills?	Poor 1	Fair 2	Average 3	Above average 4	Excellent 5
11. What is the quality of this child's speaking skills?	Poor 1	Fair 2	Average 3	Above average 4	Excellent 5
12. How often does the child complete written work in a careless, hasty fashion?	Never 1	Rarely 2	Sometimes 3	Often 4	Very often 5
13. How frequently does the child take more time to complete work than his/her classmates?	Never 1	Rarely 2	Sometimes 3	Often 4	Very often 5
14. How often is the child able to pay attention without you prompting him/her?	Never 1	Rarely 2	Sometimes 3	Often 4	Very often 5
15. How frequently does this child require your assistance to accurately complete his/her academic work?	Never 1	Rarely 2	Sometimes 3	Often 4	Very often 5
16. How often does the child begin written work prior to understanding the directions?	Never 1	Rarely 2	Sometimes 3	Often 4	Very often 5
17. How frequently does this child have difficulty recalling material from a previous day's lessons?	Never 1	Rarely 2	Sometimes 3	Often 4	Very often 5
18. How often does the child appear to be staring excessively or "spaced out"?	Never 1	Rarely 2	Sometimes 3	Often 4	Very often 5
19. How often does the child appear withdrawn or tend to lack an emotional response in a social situation?	Never 1	Rarely 2	Sometimes 3	Often 4	Very often 5

Note. From *Teacher Ratings of Academic Performance: The Development of the Academic Performance Rating Scale* by G. J. DuPaul, M. Rapport, and L. M. Perriello, 1990, unpublished manuscript, University of Massachusetts Medical Center, Worcester. Reprinted by permission of the authors. This form may be reproduced for personal use.

Appendix D

Diagnostic Criteria for ADHD (from DSM-III-R)

A. *A disturbance of at least six months during which at least eight of the following are present:*

(1) Often fidgets with hands or feet or squirms in seat (in adolescents, may be limited to subjective feelings of restlessness)

(2) Has difficulty remaining seated when required to do so

(3) Is easily distracted by extraneous stimuli

(4) Has difficulty in awaiting turn in games or group situations

(5) Often blurts out answers to questions before they have been completed

(6) Has difficulty in following through on instructions from others (not due to oppositional behaviour or failure of comprehension) e.g., fails to finish chores

(7) Has difficulty sustaining attention in tasks or play activities

(8) Often shifts from one uncompleted activity to another

(9) Has difficulty playing quietly

(10) Often talks excessively

(11) Often interrupts or intrudes on others e.g., butts into other children's games

(12) Often does not seem to listen to what is being said to him or her

(13) Often loses things necessary for tasks or activities at school or at home(e.g., toys, pencils, books, assignments)

(14) Often engages in physically dangerous activities without considering the consequences (not for the purpose of thrill seeking), e.g., runs into the street without looking.

Appendix D

DSM III - R (cont.)

Note: The above items are listed in descending order of discriminating power based on data from a national field trial of the DSM-III-R criteria for Disruptive Behaviour Disorder.

B. Onset before age seven.

C. Does not meet the criteria for a Pervasive Developmental Disorder.

Appendix E

INTERIM REPORT

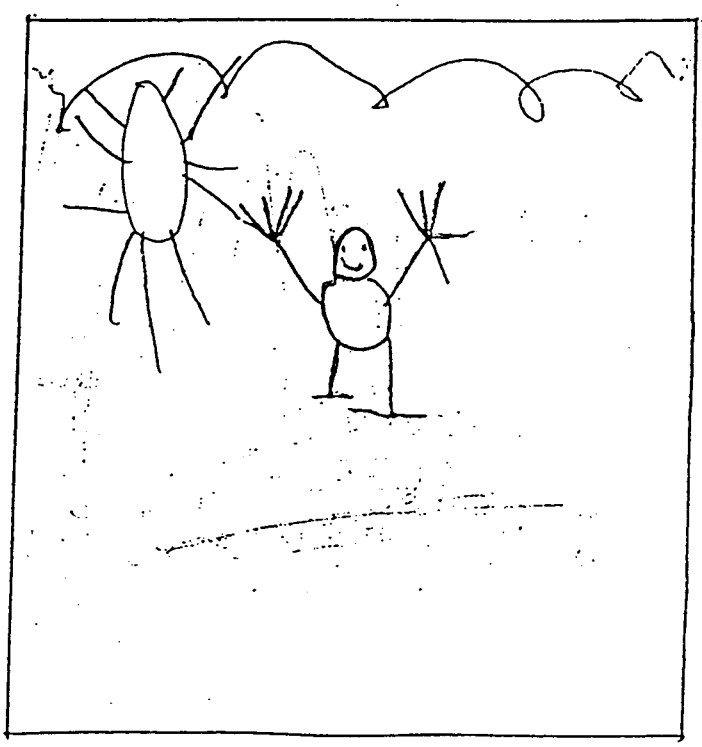
STUDENT SELF-EVALUATION

NAME: _____

DIVISION: 13

Date: Feb 1991

			
I like coming to school.			
I feel good about myself and the work I do at school.			



Appendix E

Math and science			
I like to work and play with numbers.			
I understand the ideas in math.			
I like to use manipulative materials.			
I like to learn new things about the world.			
~~I like to watch and do experiments.~~			
Art			
I like to draw.			
I like to colour.			
I like to cut and paste.			
I like to look at other people's art.			
Music			
I like to sing.			
I like to play instruments.			
~~This is my favourite instrument.~~			
P.E.			
I like playing games in P.E.			

Things I would like to do better in P.E.

Appendix E

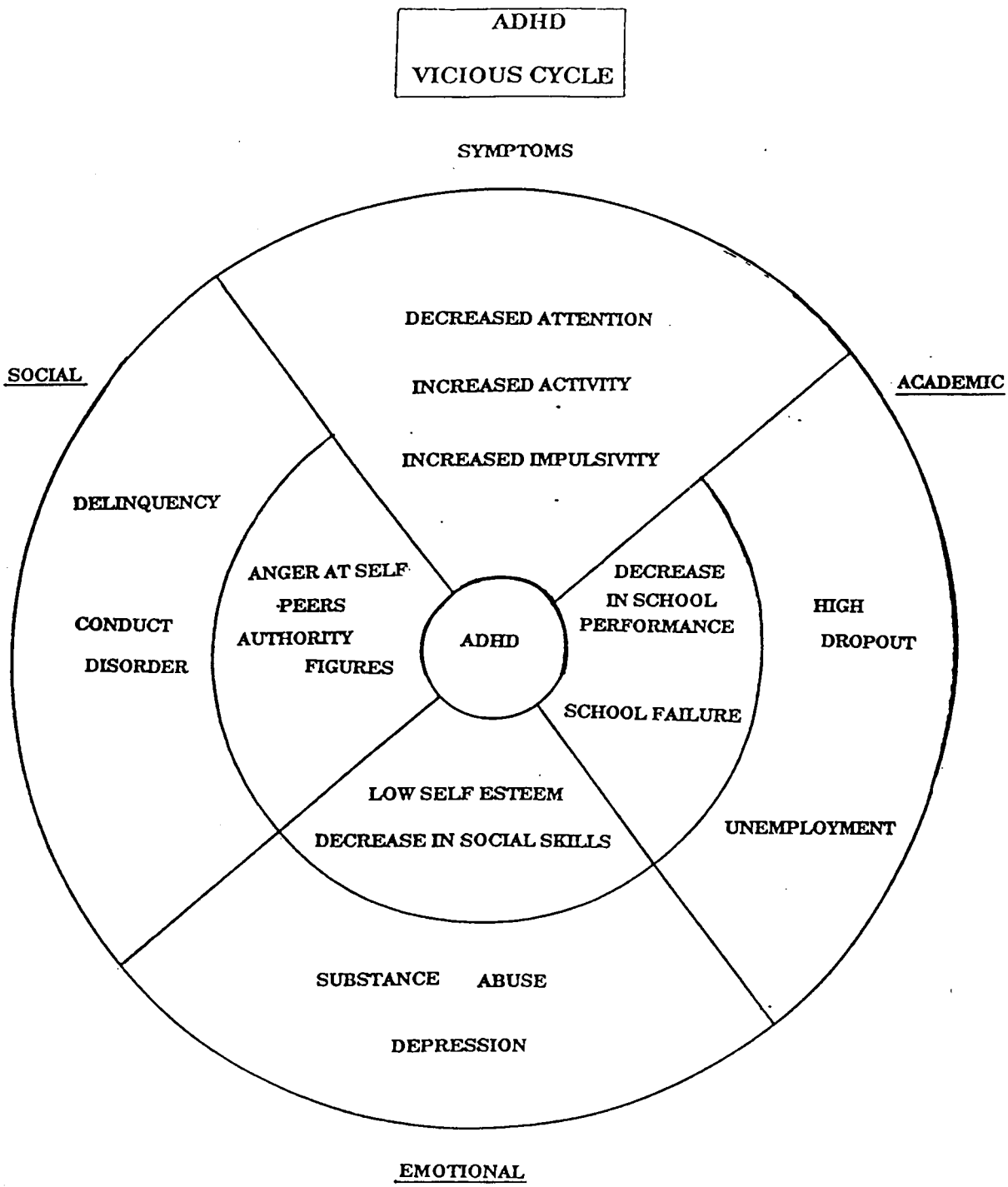
Writing			
I like to write sentences in my journal.			
Usually I can read my own writing.			
I use capital letters where they are needed.			
I remember to use periods.			
I can print neatly.			
I leave spaces between my words.			
I like to write my own stories.			
I always try to write interesting stories.			
Reading			
I like looking at books.			
It's fun to read.			
I like to read at home.			
I like to read with my parents.			
I like to try to figure out new words.			
I can often read new words with help.			
I like to read with the class.			
I like to read to a buddy or the teacher.			

My favorite kind of books are Magic tree hat

Appendix E

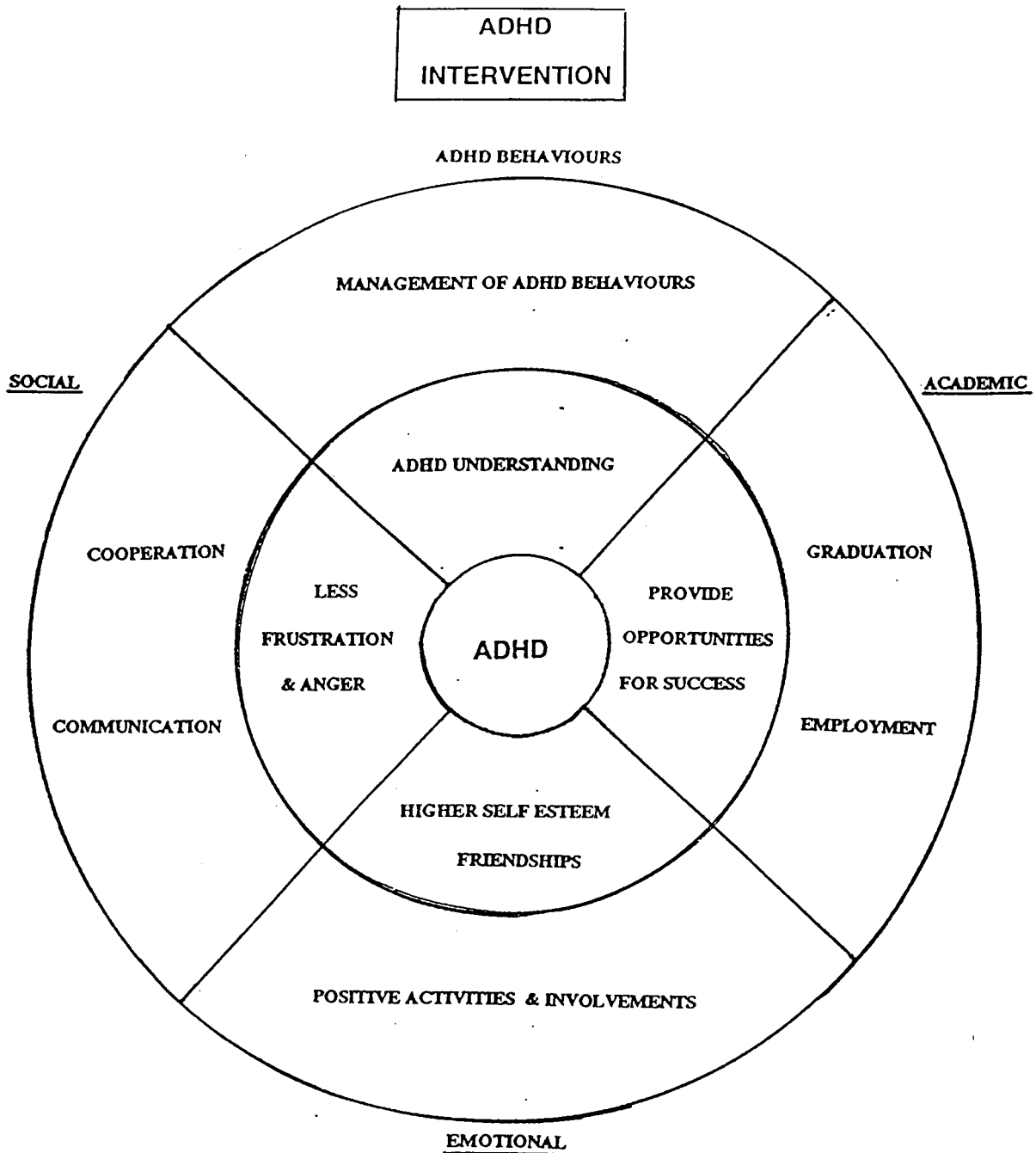
Social skills and work habits.			
I listen to and follow directions.			
I can work without bothering others.			
I wait my turn to speak.			
I listen to others when they speak.			
I work well with others.			
I am kind to others.			
I keep my things in order.			
I clean up well.			
I help clean up the classroom.			
I can solve problems with others without hurting them or fighting			
Speaking and drama			
I like to speak in front of the class.			
I like speaking to a small group.			
I like to be in skits or plays.			
I listen to others when they speak to a group.			

Appendix F



Vicious Cycle Model developed by L. Treloar 1992.

Appendix G



Intervention Model developed by L. Treloar 1992.

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