ATTRIBUTION PATTERNS OF LEARNING-DISABLED BOYS: CORRELATES AND IMPLICATIONS

by

DONNA MARIE HAQQ

B.A., The University of British Columbia, 1976

M.A., The University of British Columbia, 1979

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF

THE REQUIREMENTS FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

in

THE FACULTY OF GRADUATE STUDIES

(Interdisciplinary Studies)

We accept this dissertation as conforming

to the required standard

THE UNIVERSITY OF BRITISH COLUMBIA

September, 1986

95

Abstract

Using interview techniques, researchers have shown that learning disabled children have maladaptive causal attributions for success and failure. In this study, which involved both interviews and an experimental manipulation, attributions of 30 learning disabled (LD) and 38 normally achieving (NLD) boys, 9-12 years, were compared. On a pre-experimental task questionnaire for "academic success," LD boys gave greater attributions to "luck" and to "task ease." On a pre-task questionnaire for "academic failure," both LD and NLD boys ascribed similar levels of causality to "bad luck," "task difficulty," and "lack of ability." However, NLD boys were more willing to attribute academic failure to their own lack of effort.

After an experimental manipulation varying task difficulty, there were no group effects. Both LD and NLD boys attributed greater causality to "effort" and "ability" in the "easy" condition.

While there were no changes in scores (pre-, versus post-experimental task) on six cognitive measures, LD and NLD performances were significantly different on all six measures, especially on Serial Recall (LDs poorer in sequential processing) and on Color Naming (LDs slower in speed of processing).

There were no pre-task group differences on expectancy for "self," but after the experimental manipulation the LD boys expected to do better, overall, and both LD and NLD boys had higher self-expectancy in the easy condition. There were no group differences on expectancy for "other," pre-task, but, after the experimental task, the LD group had higher expectancy for "another boy," and both groups had higher expectancy for "other" in the easy condition.

Using Achenbach's Child Behavior Checklist, LD boys were found to be less competent, socially and scholastically, and more depressed, hyperactive, obsessive/compulsive, aggressive, and delinquent. Despite these LD/NLD differences, the LD boys were better than a clinically referred group (except for lower school competence). The NLD group was comparable to a non-clinic norm group (except for higher school competence).

Implications of this research led to recommendations for attribution retraining, both ascriptions of failures to lack of effort or ineffective strategies, and ascription of successes to good effort and ability.

Table of Contents

Page

Page

Page

Page

List of Tables

List of Appendices

Acknowledgements

I wish to thank my dissertation committee for their assistance and guidance in this research. I thank Dr. Peggy R. Koopman, Chair (Educational Psychology/Special Education), Drs. Bryan R. Clarke and David C. Kendall (Educational Psychology/Special Education), Drs. Kenneth D. Craig and Demetrios Papageorgis (Psychology), and Dr. John U. Crichton (Paediatrics). I am especially grateful to Dr. Demetrios Papageorgis for his expert assistance in the editing of the text.

The following individuals gave valuable advice on methodological issues: Drs. Todd Rogers (Educational Psychology/Special Education), A. Ralph Hakstian (Psychology), and Guy James Johnson (Psychology). For assistance with the statistical analyses, I thank Dr. Michael McRae (Human Learning and Instruction), Dr. Ronald F. Jarman (Educational Psychology/Special Education), and Marsha Schroeder. For assistance with both methodology and statistics, I thank Dr. Walter B. Boldt (Educational Psychology/Special Education). I also wish to thank Dr. Ewart A. C. Thomas (Chair, Department of Psychology, Stanford University) for his expert advice on the methodological and statistical approach taken in this study.

I gratefully acknowledge the cooperation of the Vancouver School Board, the Burnaby School Board, and the Vancouver Catholic School Board in allowing me access to their respective elementary schools. Thanks are extended to all the principals, teachers, and parents who gave consent and to all the children who participated in this study. A special "thank you" is given to Pam Healey for her assistance as a confederate experimenter.

This research was supported by a discretionary grant from the Educational Research Institute of British Columbia, and by a Tina and Morris Wagner Foundation Fellowship. I want to express my thanks to the Educational Research Institute of British Columbia and to the University of British Columbia for this assistance.

I am grateful to my family and friends for all their help, encouragement, and support.

CHAPTER I

The Problem

Background

Issues of motivation - how to instill motivation in children, or how to match programs of instruction to children's motivational predispositions - have been of concern since the beginnings of formal education. While motivation is central to the overall schema of instruction for normally-achieving students, it is probably crucial for those students who have difficulties in learning. How does the teacher or special educator nourish a child's interest and desire to succeed in a learning situation when the child often demonstrates few, slow, or awkward successes in academic achievement?

Children's affective reaction to the experience of continuing success or failure in school has been shown likely to affect their academic motivation and behavior (Bloom, 1976; Phares, 1973). In this regard, concepts such as poor self-esteem, poor motivation, and depression have been considered as direct effects of a child's overall experience of success or failure across a variety of learning situations (Beck, 1971; Black, 1974; Coopersmith, 1967).

Several researchers have shown, in support of these propositions, that attempts to help underachieving children may be hindered, if not rendered ineffectual, if the children develop negative affective responses toward school tasks (Covington & Beery, 1976; Hamachek, 1978). In addition, learning-disabled children are seen as more likely than are nondisabled children to have negative self-concepts, to believe that their successes are the result of luck or other external factors, and that their failures are insuperable and due to internal causes such as lack of ability (Bingham, 1980; Bryan & Pearl, 1979; Frieze, 1980; Johnson, 1981; Patten, 1983; Pearl, Bryan, & Donahue, 1980; Smith, 1979). There is also some indication that these maladaptive beliefs or attributions increase over time, at least through grade eight (Boersma & Chapman, 1978; Pearl et al. 1980).

In the last several years, interest has been renewed in children's interpretations, intentions, and expectations as significant factors in learning. Based upon the theoretical framework of attribution theory, research has demonstrated relationships between such variables as self-concept, causal attributions, school achievement, and expectancy and persistence at tasks (e.g., Stipek & Weisz, 1981; Weiner, 1974; 1976; 1984).

Learning-disabled children are often described as no longer able to believe that they can achieve, even at tasks which are well within their capabilities. It has been noted that even when exhaustive, carefully structured remedial programs have been used to train learning-disabled children on very specific types of tasks, they will sometimes fail to use such well-learned problem solving strategies on the same or similar tasks when they are presented to them later (Douglas, 1980a; 1980b; Thomas, 1979). The parallels between this lack of achievement success and "learned helplessness" phenomena (e.g., Abramson, Seligman & Teasdale, 1978; Garber & Seligman, 1980) are quite striking. By "learned helplessness" is meant the perception that one's responses have no effect or are independent of one's outcomes (see Seligman, Maier, & Geer, 1968). In simpler words, nothing an individual can do is perceived to matter to what will happen. On an achievement task, for example, a child might perceive independence between a response and failure by attributing the outcome to the influence of some external agent such as a teacher; or the child might perceive independence between the response and the outcome by attributing it to a personal inability to perform the required response, whether or not this in fact is true. In either case, the situation is seen as uncontrollable, and performance, motivational, and affective deficits may result.

Perceiving that one is unable to overcome failure can have highly debilitating effects on scholastic performance, as demonstrated in studies of learned helplessness in children (e.g., Dweck, 1975; Dweck & Reppucci, 1973). These studies will be examined in greater detail later since they elucidate the role of expectations and attributions in the learned helplessness of normally-achieving school-aged children.

<u>Statement of the Problem</u>

Since the phenomenon of learned helplessness has been demonstrated in normal school populations (Dweck, 1975; Dweck & Reppucci, 1973), there is good reason to expect an even greater degree of learned helplessness among learning-disabled children who may meet with proportionately greater amounts of school failure. Learning-disabled children may be more disposed to childhood depression, as presently understood (Schulterbrandt &

Raskin, 1977). There may be certain personality traits or other behavioral characteristics that differentiate learning-disabled from normal school children.

There may be differences in expectancies and/or attributions both before and after easy or difficult task conditions. Although some studies have examined the attributional systems of normal school children (e.g., Bar-Tal & Darom, 1979; Dweck, 1975; Dweck & Reppucci, 1973; Weiner, 1974; Young & Egeland, 1976), very few studies have explored the attributional systems of learning-disabled children, who are characterized by failure-dominated school histories (e.g. Bryan & Pearl, 1979; Grimes, 1981; Pearl et al., 1980). However, in the Pearl, Bryan, and Donahue (1980) study, and in the Pearl (1982) study, children were asked to rate the importance of four factors (ability, effort, luck, task ease/difficulty) for success and failure in reading, in social situations, and on puzzles, but using structured interviews. There was no actual experimental manipulation of success-failure with a learning-disabled subject population.

Moreover, there may be particular types of tasks that are especially vulnerable to the affective consequences of success-failure. These are some of the questions that will be addressed in this dissertation.

<u>Definitions</u>

The following definitions will prove helpful to the reader of this study. These definitions are expanded in Chapter II, the survey of the literature, and are operationalized, where necessary, in Chapter IV, the method chapter.

Attribution. The study of perceived causation is identified by the term "attribution theory," with an "attribution" referring to the inference or perception of cause. The main idea of attribution theory is that individuals interpret behavior in terms of its causes, and these interpretations play an important role in determining reactions to the behavior.

Motivation. Weiner (1980; 1984) has outlined the many approaches to the problem of motivation that have been taken according to researchers' clinical and/or experimental orientations. For example, motivation, as conceptualized by Freudian psychoanalytic theorists and Hullian drive theorists, involves tension or need reduction as the basic principle of action.

Other researchers conceive motivation to be a function of the expectancy of goal attainment together with the incentive value of the goal. These expectancy-value theories include Lewin's (1938; 1951) field theory, Atkinson's (1964) theory of achievement motivation, and Rotter's (1966) theory of social learning.

Theorists who espouse attribution theory (Heider, 1958, for example) and humanistic psychology (e.g., Maslow, 1971; Rogers, 1959) assume that individuals strive to understand themselves and their environment. While Hull and Freud accepted a deterministic view of humans, which emphasized the importance of past events, attribution theorists and humanists are more concerned with the mental processes involved in explaining or interpreting behavior. Like the expectancy-value theorists, attribution theorists such as Heider and Kelley, and humanists such as Maslow, Rogers, and Allport, accept a cognitive view of human beings. They assume that mental events intervene between input-output relations and that thought influences action. In addition, they assume that individuals are always "active" and, to various degrees, future-oriented.

Attribution theorists accept a mastery principle, a contention that individuals seek competence (Bandura, 1977; Schunk, 1981). They espouse a cognitive approach to human motivation, studying the "how" and "under what conditions" specific cognitions (i.e., attributions) influence behavior. Attribution theorists are concerned with the perceptions of causality, or the perceived reasons for the occurrence of a particular event.

For the purposes of this dissertation, the approach to motivation taken by attribution theorists is adopted. Accordingly, motivation is defined as the impetus or direction of a person's behavior given that person's specific cognitions and perceptions of causality.

Affect and mood. Affect and mood are not, generally, sharply differentiated constructs. Both deal with "emotional" responses, especially when these are contrasted, somewhat artificially, to cognitive activities. When a distinction is made (e.g., Diagnostic and Statistical Manual of Mental Disorders (3rd ed.) [DSM-III], American Psychiatric Association, 1980), affect refers to a usually short-lived subjective feeling or emotional tone often accompanied by bodily expression noticeable by other people. On the other hand, <u>mood</u> refers to a rather prolonged emotional state that colors the whole psychic life. The interrelationships between affect (mood) and cognition are the subject of an extensive literature (e.g., Deci, 1975; Mischel, 1971; 1973) which is beyond the scope of this dissertation. Suffice to say that the connection is a very close one and perhaps the distinction itself is more a matter of conceptual convenience: "Cognition provides the structure for affective states, and affect provides the energy for cognitive functioning (Deci, 1975, p. 67)."

Of more direct relevance to the present study are the effects of mood and affect on self-regulated performance. For example, Masters and Santrock (1976) demonstrated that contingently verbalized or imagined affective responses significantly influence behavioral persistence. Children who talked about how much fun a task was (contingent upon working at the task) showed greater task persistence than those children who verbalized a task-irrelevant phrase (controls), who, in turn, persisted longer than did those children asked to talk about how little fun the task was. In addition, there are sex differences in the effects of mood on self-management, with girls generally being more susceptible to the emotional concomitants of goal-directed behavior (e.g., Karoly, 1977).

The subjective construct of "affect" may be tapped by a rating scale (to be fully described in Chapter IV, Methodology).

<u>Learned Helplessness Theory</u>. Seligman (1974) proposed that depression often comes about through learned helplessness. He suggests that although anxiety is the initial response to a

stressful situation or event, it is replaced by depression if the individual comes to believe that control is unattainable. Perceived independence between responding and reinforcement is hypothesized to lead to performance decrements which may deleteriously affect performance in stressful situations which can, in fact, be controlled.

Learning Disabilities. These are difficulties in mastering reading, arithmetic, language or articulation, writing, or other important skills, that are not caused by mental retardation, impairment of visual or auditory functions, other psychological disorders, or cultural disadvantage. These problems are called "specific developmental disorders" in DSM-III (American Psychiatric Association, 1980).

Learning disabled child. In recent reviews on diagnostic classification of learning disabilities, Adelman (1979a; 1979b) discusses both the research and ethical problems and practical and procedural problems involved. He states that "...limitations of current diagnostic procedures make it very difficult to identify homogeneous groups of subjects with regard to critical variables, thereby almost guaranteeing that the youngsters in any given sample will differ as to the source of the problem and the 'syndrome' manifested. This, of course, limits analyses and generalizations of findings (Adelman, 1979b, p. 13)."

Most researchers use as their learning disabled sample children who have difficulty reading. Torgesen (1975) reported that about 80% of learning disabilities researchers have used childrens' reading scores to define their samples.

The most commonly used definition of the learning disabled sample is that it consists of children reading six months below grade level in the primary grades, and one and one-half grades below grade level in the higher grades. Thus, much of the research on learning disabled children reduces to research on poor readers (Bryan & Bryan, 1980).

The other major consideration is that the learning disabled child should demonstrate a normal potential to learn. This is generally translated as the child who has an intelligence test score within the normal range. For clinical purposes, this means an IQ of at least 70 on the WISC-R (Wechsler Intelligence Scale for Children - Revised). For research purposes, however, many professionals (e.g., Douglas, 1981) suggest an IQ of at least 80.

Lovitt and Jenkins (1979) suggest that researchers define learning disabled populations within at least the four following categories: <u>situational variables</u> (such as where and how the study took place, the time involved, how many students were included, and the number and training of teachers or other managers involved), <u>demographic variables</u> (including subject's age, sex, race, socioeconomic status, and label), <u>instructional variables</u> (including a description of subjects' past performance on skills related to the topic behavior, an account of the techniques used to instruct the skill, and the length of time required to reach criterion), and <u>motivational level</u> (information about the current and past motivational levels of pupils).

The fall, 1981 (volume 4), issue of the <u>Learning Disability</u>

Quarterly published several articles (Harber, 1981; Kavale & Nye, 1981; Olson & Mealor, 1981) which surveyed the research literature for the identification criteria used to select learning disabled (LD) populations. In up to 50% of the studies reviewed (e.g., Kavale & Nye, 1981), LD subjects were selected on the basis of previous classification or diagnosis, in other words, by "label" or placement. Other criteria used variously were _exclusion_ (e.g., children with sensory handicaps - visual or auditory; children with behavioral difficulties - behavior disorders, environmental disadvantage, or mental retardation; and children with physical or communication handicaps); _discrepancy_ between subject matter knowledge and intellectual ability (e.g., magnitude of discrepancy ranged from one to five years with an average of 1.76 years across 209 studies); _process_ (e.g., perceptual problems, attention, memory, psycholinguistic, language, and cognitive style); _neurological_ (e.g., minimal brain dysfunction as indicated by "soft" or "hard" signs, and most investigators including neurological involvement as an identification criterion offered only tentative evidence and admitted that their identified LD group only possibly included subjects with neurological dysfunction); _intelligence_ (although average intelligence is considered prerequisite for LD designation, only one quarter - 26% - of the surveyed studies specified an intellectual level; most specified a total IQ (83%), while 11% stipulated a verbal IQ, and 7% specified a performance IQ only); _behavior_ (over one-half of the studies used teacher ratings as the primary indication of behavioral status - other behavioral ratings were based on measures of peer status, and social interaction) (Kavale & Nye, 1981).

In reviewing 229 LD research reports from two major LD journals, from 1978 to 1981, Harber (1981) found that (1) most of these studies were quasi-experimental in nature; (2) extraneous variables (e.g., intelligence) were not appropriately controlled; (3) comparability between experimental and control groups was not adequately established in many studies; (4) less than half of the studies used subjects classified as LD; (5) in more than two-fifths of the studies involving LD subjects, the criteria for such classification were not given; and (6) the studies which did operationally define learning disabilities utilized a wide range of criteria.

Torgesen and Dice (1980) examined almost 90 studies reported in major education/psychology journals over the previous three year period and found that none of them used any system to reduce the heterogeneity of their samples of LD children. Thus, practically all of the current LD research is being conducted on heterogeneous samples of LD children.

However, a systematic taxonomy of LD subtypes is yet to be devised (Torgesen, 1982) so the requirement of reading achievement, rather than mathematical achievement or spelling achievement, lower than the 20th percentile, for example, is at least one attempt at dealing with a more homogeneous subject population. This strategy has been tacitly supported by the many researchers who concentrate on studying reading (and language) disabilities (e.g., Leong, 1982; Mattis, French, & Rapin, 1975). For example, Das, Leong, and Williams (1978), in their second experiment (Study 2), selected only those dyslexic boys who demonstrated specific reading deficits as subjects. The 58 dyslexic boys from this study were compared with a control group of 58 boys who were above-average readers (75th percentile on Gates-MacGinitie). These two groups were equated on age (mean chronological age for LD group: 111.07 months; for NLD group: 110.93 months), and on Lorge-Thorndike nonverbal IQ (mean nonverbal IQ for LD group: 102.45; for NLD group: 107.57). [These researchers found that the reading deficit group was consistently low in simultaneous and successive tests, and poorer on two dichotic listening tasks, in spite of the fact that the two groups were matched on nonverbal IQ.] Leong also matched retarded readers and control children on nonverbal IQ in his earlier (1974) doctoral study. To have matched on verbal IQ would have eliminated the verbal processes which naturally differentiated the groups (Das et al., 1978).

For the purposes of this study, the learning disabled child was operationally defined as a male child between the ages of 9-0 and 12-0 years, whose IQ (verbal and performance) was at least 80, and whose reading achievement was at the 40th percentile for age or lower. In addition, these children had to be English-speaking (i.e., not recently arrived in Canada with English as a second language) and had no serious physical, emotional, or cultural handicaps.

<u>Normal Control Child</u>. For the purposes of this study, the normal control child was operationally defined as a male child between the ages of 9-0 and 12-0 (matched, for example, from the

next boy's name on the index child's class register whose birthday and general ability was judged closest to that of the index child by the classroom teacher), whose full scale IQ on the WISC-R was at least 80, and whose academic performance, in both reading and arithmetic, was at least at expected age and grade level ($\geq$ 50th percentile). In addition, these children had to be English-speaking (i.e., not recently arrived in Canada with English as a second language) and had no serious physical, emotional, or cultural handicaps.

By choosing the control child from the same class or school as the index child, it was anticipated that differences in socioeconomic status might be controlled.

Male children only were used as subjects because, as will become apparent after reading Chapter II, the literature review, there are well-documented sex differences in variables critical to this study (e.g., patterns of causal attributions, as well as incidence of learning disabilities).

Note that the term "LD" will often be used throughout the text and will refer either to the "learning disabled child(ren)," or to "learning disabilities;" while the term "NLD" will refer either to the "not learning disabled child(ren)," or to "no learning disabilities," i.e., normally achieving child or normal achievement.

General Theoretical Assumptions

Most psychologists who have written, for example, about intrinsic motivation and development, have worked within a Piagetian framework (e.g., Deci, 1975), with the main assumptions being that humans are active organisms in continual interaction with their environment, and that all humans are born with the basic and undifferentiated need for feeling competent and self-determining.

Also assumed is that children show qualitatively different modes of knowing at different junctures in their development and that the level of their cognitive maturity at any particular moment will place obligatory limits upon their ability to appreciate the existence of various kinds of knowledge both within themselves and in others (Chandler & Boyes, 1982; Ruble & Rholes, 1981).

Briefly, Piaget (1926) describes the ontogenetic course of knowledge acquisition as an ordered sequence beginning with a zero-order plane of material things and events and including: 1) a first order non-symbolic mode of enactive (Bruner, 1964) or sensory-motor knowing which takes material reality as its object; 2) a second order symbolic mode of knowing which "re-presents" and references what is already known on the broader, first-order plane of non-symbolic knowledge; and 3) a third or meta-representational mode of knowing which involves symbolizing symbols (i.e., metacognition), and which takes as its object second-order representational knowledge. Thus, these three modes of knowing refer to, and in part define, Piaget's <u>pre-operational</u>, <u>concrete operational</u>, and <u>formal operational</u> stages of cognitive development.

Growth in cognitive structures occurs through the processes of <u>assimilating</u> and <u>accommodating</u> to the environment. Assimilation is the process whereby the organism incorporates or merges aspects of the environment into its preexisting cognitive structures. And accommodation is the process whereby the organism adapts its own cognitive structure to fit the environment. According to Piaget, organisms are intrinsically motivated to approach activities which involve assimilation, but not completely so (i.e., which provide some challenge) and then accommodate and assimilate those situations (i.e., conquer the challenge involved).

Also assumed in this dissertation is that as the child develops and interacts with the environment, the basic undifferentiated need for competence and self-determination begins to differentiate into specific motives, such as those for achievement, self-actualization, etc. These motives or processes may be affected by one's own feelings of competence and self-worth (Darley & Goethals, 1980), and by many other factors, such as level of aspiration (Atkinson & Feather, 1966), fear of failure or fear of success (Zuckerman et al., 1980), perception of external/internal control (Crandall, Katkovsky, & Crandall, 1965; Rotter, Chance, & Phares, 1972), learned helplessness (Seligman, 1975; Abramson et al., 1978), and so forth.

Delimitation of the Study

In addition to the pertinent characteristics already mentioned under Definitions, the subjects of this study were boys only, between the ages of 9-0 and 12-0, who were English-speaking. It was important for these children to come from English-speaking homes because the parents were asked to complete Achenbach's (1981a) Child Behavior Checklist, and competence in the English language was necessary for this.

Subjects were obtained from both the public school system and the parochial school system in two metropolitan cities.

Justification of the Study

The questions posed in the Background and Statement of the Problem sections are those which have direct relevance to the health and education of school-aged children, especially those children who have difficulty in learning. Issues of motivation have been of concern to educators since the beginnings of formal education. Answers to questions concerning motivation have ranged from the use of the rod or strap, to the use of systematic incentive programs designed to promote children's interest and achievement. If motivation is central to the overall schema of instruction for normally-achieving students, think how important motivation is in optimizing instruction for those children who are having difficulties in learning.

A great number of social-psychological factors affect school performance, and a particular set of variables related to pupils' beliefs about why they do well or poorly on school tasks is especially relevant. All individuals have somewhat similar ideas about why students do well (or not) in reading, arithmetic, etc., but these same individuals may differ in the degree to which one causative factor or another is stressed. Beliefs about the causes of success and failure are known as causal attributions. Research based on the implications of various patterns of attribution has shown that the individual's belief about why a particular success or failure occurs is an important predictor both of the individual's reaction to the event, and of expectancies regarding future similar events.

Perception of control over events is an important intervening construct which is most relevant to the discussion of motivation. It has been noted that students who have been exposed to unsolvable problems or other uncontrollable events have become lethargic; their usual efforts at finding solutions have been curtailed; and their self-attitudes regarding intellectual performance and competence have become so negative that general self-esteem has suffered (e.g., Hiroto & Seligman, 1975). Most significantly, pupils who have been exposed to such failure experiences have also shown peformance deficits on tasks which they were initially able to complete successfully (Thornton & Jacobs, 1971). Teachers and other professionals dealing with LD children have often remarked that these children may not only evidence poor ability on those tasks related to their specific deficit(s), but also that they may show a lack of ability or proficiency on tasks totally unrelated to such disabilities (Douglas, 1980a; 1980b).

In the last several years, concepts such as poor self-esteem, poor motivation, and depression have been seen as direct effects of the child's overall experience of success or failure across a variety of learning situations (Beck, 1971; Coopersmith, 1967; Phares, 1973). Cognitive psychologists have highlighted the importance of internal, intervening variables which influence learning (Mischel, 1973). Children's interpretations, intentions, and expectations are now being examined as significant factors in learning (Thomas, 1979).

Therefore, it is most appropriate and worthwhile to examine the patterns of attribution of LD children, and to investigate their reactions to success or failure. This will provide information regarding the cognitive variables associated with success/failure. After such knowledge is available, instructional programs and/or management systems which take into consideration the patterns of attributions of learning-disabled children may be devised in order to optimize both learning and positive self-regard. For example, with normal achieving youngsters, it has already been suggested as desirable to change students' attributions in the direction of emphasizing ability and effort as the causes of success, and lack of effort as the cause of failure. These causal perceptions have been found to maximize the academic performance of students (e.g., Bar-Tal, 1978).

CHAPTER II

Survey of the Literature

This chapter reviews the areas of attribution theory, the theory of learned helplessness, and childhood depression, along with various theories of depression. In addition, an interdisciplinary overview of the field of learning disabilities, together with neurological substrates as these affect the learning disabled child, will be outlined.

Attribution: Theory and Research

Research on learned helplessness has often focused on attributions as indices of belief regarding control over outcomes. Specifically, attributions of failures to relatively stable factors, such as lack of ability, have been associated with performance decrements under failure conditions, while attributions of failures to relatively unstable or modifiable factors, such as lack of effort, have been associated with maintenance or increments in performance following failure (e.g., Dweck, 1975; Dweck & Reppucci, 1973; Weiner, 1972; 1974).

What is Attribution Theory?

Attribution is the process through which people attempt to understand and predict their own and others' behaviors, traits, and motives. The study of perceived causation is termed "attribution theory," attribution referring to the perception or inference of cause. The main thrust of attribution theory is that individuals interpret behavior in terms of its causes (antecedents) and that these interpretations play an important role in determining reactions to the behavior (consequences).

Origins of Attribution Theory

The field of attribution research grew out of a convergence of various lines of inquiry with a recognition of their common core problems. The earliest work grew out of the subject area known as "social perception" or, more specifically, "person perception" (see Hastorf, Schneider, and Polefka, 1970, for an excellent synopsis of the study of person perception). The attributional approach to understanding behavior first gained prominence through Heider's (1958) comprehensive work. He first outlined the conditions and effects of the perception of entities (acknowledging the theoretical contribution of Egon Brunswik, e.g., 1955), and then extended his discussion to the conditions and effects relating to "person perception." By observing others' behavior, and then inferring stable and enduring traits, motives and intentions, the naive perceiver could optimize the order, predictability and, thus, the functioning of the world. While person perception focuses on the description of the stimulus person, attribution theory deals with the loci of causality of the person's behavior (Heider, 1958).

Social scientists studying human motivation, particularly achievement motivation, have contributed to the development of attribution theory. These researchers (e.g., Atkinson and Feather, 1966; deCharms, 1968; 1972; 1976; Feather, 1967; Weiner et al., 1972) have examined cognitive factors involved in individuals' diverse reactions in achievement or success/failure situations. Work dealing with "locus of control" (Crandall, Katkovsky, & Crandall, 1965; Rotter, 1966) has also become integrated with subsequent attributional research. Relevant, as well, have been Jones' research on person perception (Jones et al., 1961) and self-presentation (Jones & Wortman, 1973), Schachter's (1964) theory of emotion, and Bem's (1967) writings on self-perception. The common themes in these diverse lines of work were identified and elucidated in theoretical papers by Jones and Davis (1965) and Kelley (1967), and these have sparked much subsequent research.

Attribution theory, then, attempts to specify the processes within the perceiver that are involved in the explanation and prediction of behavior. The elements or stages of this attribution process can be affected by any number of variables, from the perceiver's level of information to the biases inherent in different perceptual or psychological perspectives (see Haqq, 1979; Jones & Nisbett, 1972; Miller, 1976; Nisbett & Wilson, 1977; Taylor & Fiske, 1978; Weary, 1980).

For a more detailed background of attribution theory and research, the reader is referred to Jones and others (1972), Shaver (1975), the volumes edited by Harvey, Ickes, and Kidd (1976; 1978; 1981), and the review article by Kelley and Michela (1980).

<u>Attribution and Achievement</u>

Attributions have been found to be important determinants of behavior in achievement situations. The effect of attributions upon achievement strivings was first examined by Phares (1957) who found that when subjects were told that their success on a judgement task was due to skill, their expectancy of future success was higher than when success was said to be due to chance. Contrariwise, failure attributed to chance rather than skill yielded higher expectancy of future success. These outcomes were construed as reflecting the fact that skill is internal to the person (and , therefore, more controllable) while chance is external (and, hence, less controllable).

Weiner and colleagues (1972) have shown how cognitive reactions to success and failure are of great importance in understanding achievement-oriented behavior. Their model is based on the assumption that beliefs about the causes of success and failure (i.e., causal attributions) mediate between antecedent stimulus-organism transactions and resulting achievement behavior. Weiner and his associates (1972) noted that the two causes used by Phares (1957), skill versus chance, not only differed in locus (internal-external), but also varied in their perceived stability (stable-unstable) over time. They therefore identified four possible causes used to interpret and predict the outcome of an achievement-related event: ability, effort, task difficulty, and luck (Weiner et al., 1972; Weiner, 1976; 1984). These causes can be represented along two dimensions: an "internal-external dimension" (or locus of control dimension), and a "stable-unstable dimension." Ability and effort are both internal characteristics, while task difficulty and luck are external characteristics. Ability and task difficulty are both stable characteristics, while effort and luck are unstable. Thus, this model predicts that for any success or failure experience, there are four possible causal attributions, with each of these attributions associated with a likely affective reaction and an expectation regarding future performance (see Bar-Tal, 1975).

Bar-Tal (1975) also pointed out important sex differences in attribution behavior. Girls tend to differ from boys in that they are less willing to attribute success to high ability, while being more willing to see failure as caused by a lack of ability (e.g., Bar-Tal & Frieze, 1974). These findings appear to be robust as they have been reported, reviewed, or extended, by Dweck and Gilliard (1975), Dweck and Bush (1976), Deaux (1976), Bar-Tal and Frieze (1976;1977), Frieze et al. (1978), Ickes and Layden (1978), Dweck, Davidson, Nelson, and Enna (1978), Dweck and Goetz (1978), Goetz and Dweck (1980), Dweck, Goetz, and Strauss (1980), and Licht and Dweck, (1984). This sex difference persists even in adult females (e.g., Crittenden & Wiley, 1980).

It is possible that these sex differences in attribution behavior are related to the well-documented epidemiological finding that rates of depression are higher for women than for men (Weissman & Klerman, 1977; Woodruff, Goodwin, & Guze, 1974). Radloff (1975), for one, has in fact speculated that the higher levels of depression among women are best explained as a result of learned helplessness. The theory of learned helplessness may prove to be a heuristic framework within which to conduct research on depression, especially in women.

<u>Weiner's Reformulation of Achievement-related Attributions</u>

In a recent reformulation, Weiner (1979) outlines a theory of motivation based upon attributions of causality for success and failure. He identifies three central causal dimensions: _stability_, _locus_, and _control_, with these dimensions associated, respectively, with _expectancy change_, _esteem-related emotions_, and _interpersonal judgements_.

The _stability_ dimension depicts causes as either stable (invariant) or unstable (variant). For example, intelligence or task difficulty may be considered stable, whereas effort or mood may more often be considered unstable. Generally, expectancy shifts after success and failure are dependent upon the perceived stability of the cause of the prior outcome. Attribution or ascription of an outcome to stable factors results in greater typical shifts in expectancy, i.e., increments in expectancy after success and decrements after failure, than do ascriptions to unstable causes. In other words, if the conditions or causes of an outcome, success or failure, are perceived as remaining unchanged, then that outcome will be expected with a greater degree of certainty (Weiner et al., 1976).

The _locus of causality_ dimension may be conceptualized as internal or external to the individual. Weiner makes a distinction between Rotter's (1966) dimension, locus of control, and his locus of causality. In Weiner's context, locus is viewed as a "backward-looking belief" and is therefore referred to as locus of causality. Internal sources of causality may include ability, effort, mood, maturity, and health, while external sources of causality may include teacher, task, or family. However, the relative placement of a cause on this dimension may not be invariant over time or between people.

Weiner (1979, p.6) gives the example: "...health might be perceived as an internal ('I am a sickly person') or as an external ('The "flu bug" got me') cause of failure."

Weiner (1979, p.6) explains further:

> Inasmuch as attribution theory deals with phenomenal causality, such personal interpretations must be taken into account. That is, the taxonomic placement of a cause depends upon its subjective meaning. Nonetheless, in spite of possible individual variation, there is general agreement when distinguishing causes as internal or external.

The locus dimension of causality has implications for self-esteem. For example, an individual with a high self-concept of ability would believe that she or he would have a high probability of success at a task. If failure then occurred, it would probably be ascribed to unstable causes (i.e., luck or mood) which would likely not reduce expectancy of success on future tasks and would allow the individual to maintain a high ability self-concept. Success, on the other hand, would be ascribed to ability, also increasing the subsequent expectancy of success and confirming high self-esteem. Given an initial low self-concept of ability and low expectancy of success, the converse analysis would hold. Success would be ascribed to unstable factors, and failure, to low ability. These latter attributions are precisely what distinguishes "learned helpless" students from "mastery-oriented" students (e.g., Diener & Dweck, 1980). Such patterns of attributions would result in the preservation of initial sef-concept (e.g., Ames, 1978; Fitch, 1970; Gilmor & Minton, 1974; Ickes & Layden, 1978). The foregoing analysis suggests that in modification programs involving self-concept or expectancies, the perceived causes of performance must be altered or retrained. Just such "attribution retraining" efforts will be described later in this dissertation (e.g., Andrews & Debus, 1978; Chapin & Dyck, 1976; Diener & Dweck, 1978; 1980; Dweck, 1975).

A third dimension of causality (Weiner, 1979) categorizes causes as <u>controllable</u> versus <u>uncontrollable</u>. For example, both mood and effort are internal and unstable causes, but effort differs from mood in that only it is perceived as subject to volitional control. Weiner (1979) feels that this dimension plays an important role in interpersonal judgement situations.

Independent construct validation was obtained by Meyer (1980) who also found the three dimensions suggested by Weiner (1979) through a factor analysis of attribution rating data.

<u>Learned Helplessness</u>

When individuals perceive their actions as irrelevant to subsequent outcomes, they may come to exhibit "learned helplessness" (e.g. Seligman, Maier, & Geer, 1968).

The phenomenon of learned helplessness, conceptually related to the earlier view of "hopelessness" proposed by Mowrer (1960), was first studied by Seligman and Maier (1967) and Overmeier and Seligman (1967). They drew attention to the effects of control versus lack of control in operant responding through research conducted with animal subjects. In initial studies (see Maier and Seligman, 1976, for a review of the infrahuman literature) it was found that animal subjects exposed to a series of inescapable shocks, who then were given a chance to escape further punishment by the simple response of jumping from one compartment of an experimental apparatus to another, failed to learn this simple response. Rather, they often remained in the first compartment and "took their punishment." Contrariwise, animal subjects who had not previously been exposed to inescapable shocks readily learned to escape by jumping over a barrier in a shuttle box to the safe compartment. Seligman (1975) termed the maladaptive phenomenon "learned helplessness," and attributed it to the fact that the animal subjects learned that their responses were independent of reinforcement, that they could do nothing to stop the shocks. He suggested that they demonstrated lowered motivation, which caused them to make few responses in the new situation, and experienced reduced cognitive functioning, which lowered their ability to learn an effective escape response.

The effects of uncontrollable events in humans were also examined (Hiroto, 1974; Hiroto & Seligman, 1975). In the Hiroto and Seligman (1975) study, for example, subjects were first exposed to a series of either soluble or insoluble problems. Following this experience, both groups attempted to solve a series of anagrams. Those who had been exposed to the insoluble problems in the first part of the study did much worse on the anagrams, consistent with the theory of learned helplessness. Other studies replicated these findings and demonstrated that the greater subjects' experience with insoluble problems or other uncontrollable events, the greater their feelings of helplessness, and the lower their performance on later tasks (e.g., Klein, Fencil-Morse, & Seligman, 1976; Roth & Kubal, 1975; Tennen & Eller, 1977).

The basic tenet of the learned helplessness hypothesis then, is that learning that outcomes are uncontrollable (i.e., non-contingent with reinforcement) results in three types of deficits: motivational, cognitive, and emotional. The motivational deficit includes retarded initiation of voluntary responses and is interpreted as a consequence of the expectation that responding is useless. The cognitive deficit consists of difficulty in learning that responses result in outcomes. For example, if one has derived a cognitive set that A is irrelevant to B, then it becomes more difficult for one to learn later that As produce Bs when such is indeed the case. Lastly, the learned helplessness hypothesis predicts depressed affect as a consequence of learning that outcomes are independent of responding (see Garber & Seligman, 1980, or Seligman, 1975).

Many investigators subsequently refined the learned helplessness hypothesis. Benson and Kennelly (1976) concluded that only exposure to uncontrollable <u>aversive</u> events led to learned helplessness. Eisenberger, Park, and Frank (1976) found that exposure to controllable events led to corresponding increments in performance, an effect sometimes called <u>learned industriousness</u> (see also, Klein and Seligman, 1976). Generally speaking, researchers have found that it takes continued persistent failure accompanied by the perception of noncontingency of responding to produce learned helplessness.

Learned Helplessness Criticized

In order to explain the seeming paradox whereby depressed individuals and college students who have been experimentally rendered "helpless" hold two apparently inconsistent beliefs, namely, that they are both helpless to control what happens to them and are themselves to blame for failures, Janoff-Bulman (1979) has drawn a distinction between two types of self-blame--"behavioral" and "characterological." Accordingly, self-blame may be seen as either adaptive and facilitating, or maladaptive and debilitating. Behavioral self-blame is control related, entails attributions to a modifiable source (such as one's behavior), and is associated with a belief in the future avoidability of a negative outcome. Characterological self-blame, on the other hand, is esteem-related, involves attributions to a relatively non-modifiable source (such as one's character), and is associated with a belief in personal deservingness for past negative outcomes. The author gives, as an example, the case of rape where a woman can blame herself for having walked down a dark street alone at night or for having let a specific man into her apartment (behavioral blame), or , alternatively, she can blame herself for being "too trusting and unable to say no" or a "careless person who is unable to stay out of trouble (Janoff-Bulman, 1979, p. 1799)."

Janoff-Bulman (1979) points out that this distinction between characterological and behavioral self-blame corresponds to the distinctions drawn by Weiner and his associates (1972) in their scheme of attributions in achievement-related areas.

Individuals who make an attribution to lack of ability believe that there is little they can do to control the situation and succeed, because ability is stable and relatively unchangeable. Individuals who make an attribution to effort, on the other hand, can believe that as long as they try harder, they will be able to obtain a positive outcome (e.g. Dweck, 1975). Analogously, characterological self-blame corresponds to an ability attribution, while behavioral self-blame corresponds to an effort attribution, each having very different implications for perceived personal control. Thus, the dimension which best distinguishes between behavioral and characterological self-blame appears to be perceived controllability or modifiability of the factor or factors blamed in any particular instance.

Learned Helplessness Revised (1978)

Abramson, Seligman, and Teasdale (1978) reformulated the original learned helplessness hypothesis by proposing an attributional framework in order to resolve several of the theoretical controversies regarding the effects of uncontrollability in humans. Basically, the reformulated hypothesis states that when people find themselves helpless, they either implicitly or explicitly ask why they are helpless. The causal attributions subsequently made then influence the generality and chronicity of the helplessness deficits as well as later self-esteem.

Succinctly, once an individual perceives noncontingency in a given situation, he attributes his helplessness to a cause. This cause may be stable or unstable, global or specific, internal or external. The attribution chosen will influence whether expectation of future helplessness will be chronic or acute, broad or narrow, and whether or not helplessness will lower self-esteem.

Low self-esteem, in fact, is a fourth deficit of human helplessness deduced by Abramson and associates (1978) in the reformulated hypothesis (the others being motivational, cognitive, and emotional deficits). They suggest that persons who believe that desired outcomes are not contingent on acts in their repertoires but are contingent on acts in the repertoires of relevant others, will show lower self-esteem than will persons who believe that desired outcomes are neither contingent on acts in their repertoires nor contingent on acts in the repertoires of relevant others. In other words, only people in a "personal helplessness" condition should experience loss of self-esteem.

Low self-esteem has been regarded as a hallmark symptom of depression by the authors of several theoretical treatises (e.g., Beck, 1967; 1976; Bibring, 1953; Freud, 1917/1957). The universal versus personal helplessness distinction predicts that depressed persons who attribute their helplessness to internal factors (i.e., personal helplessness) will evidence lower self-esteem than will persons who make external attributions (i.e., universal helplessness). Ickes and Layden (1978) for example, found that individuals with low self-esteem tend to attribute negative outcomes to internal factors and positive outcomes to external factors, while the opposite pattern was found for high self-esteem individuals.

Validity of the Attributional Analysis of Helplessness

Recently, Abramson, Garber, and Seligman (1980) suggested that the earlier studies on human helplessness may be more easily explained by the reformulated hypothesis. For example, Douglas and Anisman (1975) found that subjects who failed on what they believed to be a simple task evidenced later cognitive deficits, whereas subjects who failed on an assumed complex task did not. It is possible that subjects attributed their failure on the simple tasks more to global and internal factors (e.g., "I'm stupid."), whereas the subjects who failed on the complex tasks likely attributed their failure more to external and specific factors (e.g., "These problems are too difficult.").

The effects of therapy and immunization are also better explained by the attributional reformulation, with the crucial attributional dimension being global-specific. Success experiences have been shown to both reverse and prevent the deficits associated with helplessness. For example, after success therapy (4 or 12 solvable cognitive problems), nondepressed subjects made helpless with uncontrollable noise and depressed subjects given no noise, subequently controlled noise successfully and showed normal expectancy changes after success and failure (Klein & Seligman, 1976). The reformulated model suggests that the therapy induced subjects to revise their original global attribution for the inescapable noise (e.g., "I'm incompetent" or "laboratory tasks are unsolvable") to a more specific attribution ("I'm only incompetent on some tasks" or "only some laboratory tasks are too difficult") after the intervening success experiences, thereby increasing an expectation of controllability. Teasdale (1978) also found that while both real success experiences and recalling past successes were equally effective in shifting attributions for initial failure from internal to external factors, only real success was effective in reversing the helplessness performance deficits.

The effects of immunization (Jones, Nation, & Massad, 1977; Klee & Meyer, 1979) may be similarly explained: Initial success experience should make the attribution for a subsequent helplessness experience less global, and consequently less likely to lead to an expectation of helplessness.

It is important to note that debriefing has been found to alter subjects' attributions (Koller & Kaplan, 1978). In spite of whether subjects had received contingent or noncontingent reinforcement during the pretreatment phase of the experiment, all subjects who were later informed that the experimenter had been controlling the tone and problem solution during the pretreatment phase, performed well on the test task (op. cit., 1978).

Additionally, Tennen and Gillen (1979), using a classic laboratory induced helplessness paradigm (with escapable or inescapable tones) found that debriefing actually facilitated performance on the test task (anagrams). The performance of debriefed subjects surpassed that of subjects in the inescapable condition who were not debriefed and matched the performance of subjects in the escapable condition. The attributional reformulation of the learned helplessness model (Abramson et al., 1978; Miller & Norman, 1979) suggests that debriefing should be effective in reversing helplessness deficits because it leads the subject to make specific rather than global causal attributions. Tennen and Gillen (1979) found that while debriefed subjects tended to attribute uncontrollability more to experimenter control than did other inescapable groups, implying more specific attributions, this difference was marginal. Tennen and Gillen (1979) cite several possible explanations for the debriefing-produced reversal, including the idea that debriefed subjects, whose faith in the experimenter is reaffirmed through verification of their pre-existing perceptions regarding the uncontrollability of the noise task, may increase their efforts on the anagram task. In any case, the role of debriefing in learned helplessness research is of paramount importance (note also Ross et al.'s, 1975, distinction between "outcome debriefing," where a subject is set straight regarding any deception, and "process debriefing," where the subject is given the same information as in outcome debriefing plus further emphasis on the personal relevance of false impression perseverance).

Several other studies have found improved rather than impaired performance by subjects exposed to uncontrollable events (Roth & Kubal, 1975; Wortman, Panciera, Shusterman, & Hibscher, 1976; Tennen & Eller, 1977; and Hanusa & Schulz, 1977). Abramson et al. (1980) propose that such facilitation may represent compensatory attempts to reassert control once the subject leaves the original situation in which he or she was helpless. (See, for example, Solomon and Corbit, 1973, for a relevant rebound theory.) In accordance with an attributional analysis of facilitation, subjects who make internal, specific, and unstable "effort" attributions for their early failure(s) may try to compensate by trying harder on subsequent task(s). Facilitation may also occur when subjects cannot find a controlling response but have not yet concluded that they are helpless.

Learned Helplessness Update (1984)

The central prediction of the 1978 reformulation (Abramson et al., 1978) was that an explanatory style in which bad events are explained by internal, stable, and global causes is associated with depressive symptoms and, in addition, such an explanatory style was claimed to be a risk factor for subsequent depression upon the experiencing of bad events. Peterson and Seligman (1984) have more recently described several investigations of the helplessness reformulation that employed five research strategies: (a) cross-sectional correlational studies, (b) longitudinal studies, (c) experiments of nature, (d) laboratory experiments, and (e) case studies. Overall, the authors (op. cit., 1984) find that these studies converge in their support for the learned helplessness reformulation.

The primary method used by these researchers to assess attributions or explanatory style has been with the Attributional Style Questionnaire (ASQ; Peterson, Semmel, et al., 1982). This self-report instrument furnishes scores for the explanation of six bad events and six good events with internal versus external, stable versus unstable, and global versus specific causes. Subjects are asked to generate their own cause for each event described and then to rate that cause along seven-point scales corresponding to the internality, stability, and globality dimensions. The questionnaire is generally group administered but may be given individually.

In addition, Peterson and Seligman (1984) regard an "attribution" or "causal explanation" as a hypothetical construct which may be measured with a number of different converging operations, no one of which defines or exhausts the construct, so that, for example, behavioral observations as well as answers to questionnaires may be relevant to knowing about an individual's causal explanations.

The authors (Peterson & Seligman, 1984) discussed how causal explanations are determined by both situational (e.g., Tennen & Eller, 1977) and dispositional (e.g., Alloy, Peterson, Abramson, & Seligman, 1984; Dweck & Licht, 1980) factors and how, if reality is ambiguous enough, an individual may project and impose habitual explanations. In such cases, the ASQ would work as a projective test and could be used to measure an individual's characteristic explanatory style. They also described converging evidence in support of the central prediction of the learned helplessness reformulation, that if an explanatory style invokes internal, stable, and global causes, then the individual tends to become depressed when bad events occur. Such an explanatory style is claimed to be a "risk factor" for subsequent depression when bad events are encountered. Also, they find that if respondents are asked to offer explanations about several (hypothetical) bad events, rather than for a single event, the chances are then greater that the average of these explanations will reflect a characteristic style.

Seligman's Learned Helplessness and Beck's Cognitive Model of Depression Criticized

Coyne and Gotlib (1983), in summarizing and evaluating the research data regarding the role of cognition in depression, suggest that neither Beck's model of depression (1967; 1976; Kovacs & Beck, 1978) nor Seligman's learned helplessness model of depression (1975; Abramson et al., 1978) has a strong empirical base. They (Coyne & Gotlib, 1983) point out the problems found in subject samples: mildly depressed college students versus non-depressed college students (perhaps the results are not generalizable to clinically depressed individuals); depressed patients versus nondepressed nonpatient controls (when a nondepressed patient control group is necessary to rule out the "psychological deviation" hypothesis). [Few studies have included two control groups.]

The authors (Coyne & Gotlib, 1983) reported that, overall, differences between depressed and nondepressed subjects regarding changes in performance expectations have not been as strong or as consistent as originally hypothesized (e.g., Prkachin et al., 1977).

Coyne and Gotlib (1983) remind the reader that person variables other than depression have been associated with low self-evaluation. For example, in the absence of differences in observer ratings, nonassertive individuals evaluate their social behavior less positively than do assertive individuals (Alden &

Cappe, 1981); in the absence of performance differences, high-test-anxious females evaluate their anagram performance less positively than do low-test-anxious females (Holroyd, Westbrook, Wolf, & Badhorn, 1978).

Regarding perceptions of environmental stimuli, from Beck's model one would postulate that individuals distort feedback in a negative manner, both selectively filtering out positive information and perceiving neutral or negative information as being more negative than it actually is. And from the learned helplessness model, one would postulate that the depressed individual, believing that his/her responses are ineffective in bringing about a desired outcome, fails to accurately perceive response-outcome dependence when consequences are, in fact, contingent upon responses.

In the research reviewed by Coyne and Gotlib (1983) no support was found for Beck's model: depressed individuals were not more inaccurate than were nondepressed individuals with respect to their perception of the evaluative nature of environmental stimuli.

No support was found for the learned helplessness model either. In a study by Abramson, Alloy, and Rosoff (1981), for example, depressed students in a "self-generated hypothesis" condition (task: contingency learning problem in which the response-outcome contingency was set at 75%; half of the subjects were asked to generate their own hypotheses concerning the contingency, and half were given a small set of hypotheses, including the correct one) were less likely to perform the correct controlling response, and judged that they exercised less control over the outcome. It was noted that although the depressed students' judgments were an underestimate of the control they could have potentially exerted, they were actual reflections of the amount of control which they actually did exert.

Overall, the studies examining recall of information, recall of feedback, and recall of positive and negative experiences, are equivocal, given Beck's hypothesis of the depressives' negative schema affecting perception and interpretation of environmental stimuli. Some studies (e.g., Gotlib, 1981) report that depressed patients recall, for example, administering fewer self-rewards and a greater number of self-punishments than was actually the case (compared with subjects in two nondepressed groups - nondepressed psychiatric inpatients and nondepressed nonpatient controls). Other studies have found no differences between depressed and nondepressed subjects (Buchwald, 1977).

A number of studies have examined depressed-nondepressed differences in attributions for experimenter-controlled success and failure. A fairly consistent finding of such studies is that depressed subjects make more internal attributions for failure than do nondepressed subjects (e.g., Rizley, 1978; Zemore & Johansen, 1980). However, two studies that examined attributions following success and failure in patient populations both failed to find hypothesized group differences (Abramson, Garber, Edwards, and Seligman, 1978; Gotlib and Olson, 1983).

Several studies have analyzed the attributions of depressed and nondepressed individuals for hypothetical good and bad events, in most part through use of the Attributional Style Questionnaire (ASQ; Seligman et al.,1979). Seligman et al. (1979) reported that, as hypothesized by the learned-helplessness model, depressed students made more internal, stable, and global attributions for bad outcomes than did nondepressed students. Metalsky, Abramson, Seligman, Semmel, and Peterson (1982) found that, for a university student sample, internal and global attributions for negative events on the ASQ were significantly correlated with an increase in depressed mood following receipt of a low grade on a midterm exam.

A number of investigations using the ASQ, however, have obtained much weaker results (e.g., Blaney et al., 1980; Golin et al., 1981). And several studies have failed to find the hypothesized depressed-nondepressed differences on any ASQ attributional dimension (e.g., Manly et al., 1982; Miller et al., 1982).

In examining whether tendencies to make particular kinds of attributions constitute a source of vulnerability to subsequent depression, Golin et al. (1981), for example, found that stable and global attributions for negative events in a university student sample were related to depressed mood one month later. However, there was no support for the hypothesis that internal attributions for bad outcomes is a causal factor in depression, since the statistically significant cross-lagged correlations for stability and globality attributions accounted for only 10% and 3% of the variance, respectively, in subsequent Beck Depression Inventory (BDI) scores. Other studies (e.g., Lewinsohn et al., 1981; Manly et al., 1982) also demonstrated that attributions did not predict subsequent depressed mood. Thus, studies examining the causal relationship of attributions to depression have yielded mixed results, and the issue needs further clarification.

Studies examining the responses of depressed and nondepressed subjects to stressful life events (e.g., Barthe & Hammen, 1981; Hammen & DeMayo, 1982) have demonstrated that depressed and nondepressed individuals do not differ consistently in their attributions for stressful events. The most consistent finding seems to be a tendency for depressed subjects, relative to nondepressed subjects, to attribute stressful events more to internal causes.

In many studies (e.g., Seligman et al., 1979; Zuroff, 1981) therefore, although depressed subjects may make more internal attributions for failure than do nondepressed subjects, their attributions for failure are nevertheless absolutely more external than internal. According to Coyne and Gotlib (1983), one explanation for this fact involves the possible heterogeneity of depression. Blatt and colleagues (Blatt, 1974; Blatt, Quinlan, Chevron, McDonald, & Zuroff, 1982) have identified two types of depression in both clinical and subclinical samples. One type focuses on helplessness and dependency, while the other focuses on feelings of inferiority, guilt, and self-criticism. Supposedly, these two types of depressives would demonstrate different attributional styles, with the helpless, dependent depressives showing attributions to external causes, and the over-responsible, self-critical depressives manifesting more internal attributions. Thus, collapsing across these two types of depression would tend to erode any real attributional differences between depressed and nondepressed subjects.

A number of researchers have found other individual characteristics important for attributions. Arkin, Appleman, and Burger (1980), for example, found a relationship between social anxiety and attributions for failure on a therapy task. They (Arkin et al., 1980) also found that socially anxious students' attributions were affected by whether they believed that their performance would be evaluated by an expert or not. Arkin et al. (1980) report this finding as support for their position that attributions reflect self-presentational strategies rather than, or as well as, internalized data-analysis processes (see also Baumeister, 1982; Tetlock, 1981).

In summary, Coyne and Gotlib (1983) suggest that while depressed individuals, from either patient or student samples, tend to make negative and self-deprecating responses to laboratory tasks and to hypothetical and real-life situations, this tendency is not as strong or as consistent as advocates of the learned-helplessness and Beck's cognitive models have assumed. They (Coyne & Gotlib, 1983) also challenge the assumption that experimental tasks capture the processes typically involved in directing behavior. People may not routinely be as reflective as researchers have hoped, but may instead behave according to more typical, automatic, or reflexive behavioral processes (Langer, 1978). Moreover, what people think probably depends more on what their external circumstances or environment provide than the learned-helplessness or Beck models assume (cf. Coyne, 1976; Gotlib & Robinson, 1982).

The Learned Helplessness Reformulation and Children

In a recent study, Seligman et al. (1984) investigated predictions of the learned helplessness reformulation among 96 eight to 13-year-old boys and girls. Seligman et al. (1984) found that children who attributed bad events to internal, stable, and global causes were more likely to report depressive symptoms than were children who attributed these events to external, unstable, and specific causes. Moreover, this depressive attributional style predicted depressive symptoms six months later, suggesting that it may be a risk factor for depression. [The children completed the Children's Depression Inventory (CDI; Kovacs & Beck, 1977), and the Children's Attributional Style Questionnaire (CASQ; see Peterson & Seligman, 1984) at two times, separated by a six-month interval.] Finally, Seligman et al. (1984) found that the mother's composite style for bad events correlated with her child's composite for bad events and with her child's depressive symptoms, that mother's depressive symptoms correlated with her child's depressive symptoms, and that father's attributional style and depression were not related to scores of his mate or their child. [Parents had been asked to complete the Beck Depression Inventory (BDI; Beck, 1967) and the adult Attributional Style Questionnaire (ASQ; Peterson et al., 1982).]

Helplessness versus Mastery-Orientation in Children

A group of studies by Dweck and her associates (e.g. Dweck, 1975; Dweck & Reppucci, 1973) demonstrated the differential effects of attributions for failure to lack of ability versus lack of effort in elementary school-aged children. These researchers also provided evidence of how self-attributions acquired during the childhood socialization process can affect subsequent behavior. Specifically, they examined the role of attributions in determining the response to failure of both "learned helpless" and "mastery-oriented" children. These children, it is important to note, start out with virtually identical performance before a failure experience - for example, equivalent speed, accuracy, and sophistication of problem-solving strategies on tasks, and similar results on standardized measures of intelligence. What later differentiates these children are their cognitions about their successes and failures. In achievement situations, helpless children may be typified as having cognitions that imply the inevitability or insurmountability of failure, whereas mastery-oriented children would be characterized as having cognitions that imply that their successes are replicable, and their errors rectifiable.

In one experiment, Dweck and Reppucci (1973) gave one group of children soluble problems, the other, insoluble ones (subjects in their studies were in grades four to six and care was taken to ensure that children in the failure conditions were subsequently given mastery experiences and made to feel that their performance had been commendable). What subsequently distinguished the two experimental groups were their attributional patterns, their characteristic ways of explaining their academic successes and failures (see Weiner, 1972; 1974). Measuring children's attributions by means of the Intellectual Achievement Responsibility Scale (Crandall, Katkovsky, & Crandall, 1965), Dweck and Reppucci (1973) found that children who persisted in the face of failure placed significantly more emphasis on motivational factors as determinants of outcomes, thus implying that failure is surmountable through <u>effort</u>, a factor that is generally perceived to be under the control of the individual. The children whose performance deteriorated tended more than persistent children to place the blame for their failures on largely uncontrollable external factors rather than effort. If they did take responsibility for failures, they were relatively more likely than the persistent children to blame their failure on lack of ability.

In another experiment (Dweck, 1975), an attempt was made to alter children's responses to failure by altering their attributions for failure. Children who showed the attributional pattern indicative of helplessness on the Intellectual Achievement Responsibility Scale (Crandall et al., 1965) were divided into two groups. One group received only success experiences in the treatment situation, a procedure recommended by advocates of the so-called "deprivation theory" of maladaptive responses to failure. The second group received attribution retraining with success experience predominating but with several failure trials each day. When failure occurred the child's actual performance was compared to criterion performance and the failure was explicitly attributed by the experimenter to a lack of effort (internal/unstable attribution). By the end of training the second group showed no appreciable impairment, and, unexpectedly, most of them showed improvement in performance as a result of failure. Children in the first group showed no improvement (they were given attribution retraining, however, at the end of the experiment).

Thus, these two studies (Dweck, 1975; Dweck & Reppucci, 1973) focused on attributions for failure as indicants of children's beliefs regarding the controllability of failure. That is, failure attributions to stable factors, such as lack of ability, imply that failure is likely to continue or recur, whereas failure attributions to less stable factors such as insufficient effort, suggest that future success remains a viable possibility (e.g. Weiner, 1972; 1974).

Note, however, that attributions were assessed (either through questionnaires or via probes within the experimental situation) at prespecified times in these two experiments, and that by assessing attributions, these researchers had ipso facto defined the situation as a failing one, in simply asking the children to explain their failure(s). There remained the possibility that without the cues given by the questionnaires, some children may perhaps not have perceived themselves to have failed at that specified point in time. Or, if acknowledging failure, would they then have spontaneously made attributions?

In order to answer these and other questions, Diener and Dweck (1978), in a later experiment, employed a procedure that would enable children (fifth graders) to tell them what their cognitions were as they occurred. In two studies, they monitored the sophistication of problem-solving strategies used by children in solving a three-dimensional, two-choice discrimination problem. In both studies, the helpless children's stategies deteriorated with the onset of failure. Conversely, the mastery-oriented children were not only able to maintain mature strategies over the failure trials, but some of them also began using more sophisticated strategies.

The critical findings came in the second of the two otherwise identical studies, where the children were asked (after the sixth of eight success training problems) to verbalize aloud as they did the task. The two groups did not differ in types of statements during the two success problems preceding the onset of failure. However, over the course of the failure trials, clear differences emerged. Helpless children began making causal attributions for failure to a lack of ability (e.g., poor memory) or to a loss of ability (e.g., confusion). They began to express negative affect toward the task and a wish to withdraw from the situation, in spite of the fact that only moments before they were quite content with it. Helpless children also gave numerous task-irrelevant statements which may have represented attempts to escape from the task cognitively, since it was not possible to do so physically (see discussion in Dweck and Licht, 1980).

In contrast, mastery-oriented children didn't make attributions for the failures. Though they acknowledged that they were making "mistakes," there was little to suggest that they regarded their present state to constitute "failure" or that they expected to remain in that state much longer. Most of their statements signified greater task involvement and increased orientation toward finding the solution. They engaged in a fair amount of self-instruction (e.g., reminding themselves to concentrate), and self-monitoring (e.g., checking to see that they were engaging in the behaviors that would expedite performance). [This categorization of verbalizations, thus, lends support to the rationale of therapeutic programs of psychologists such as Virginia Douglas (1980a; 1980b), Donald Meichenbaum (1975; 1980; Meichenbaum & Goodman, 1971), and Sebastiano Santostefano (1978), who teach just such self-instructional techniques to learning-disabled/hyperactive children.] Moreover, the mastery-oriented children gave a number of statements indicative of positive affect toward the task; they welcomed the challenge. They expressed unflagging confidence that no matter what the cause of their mistakes - bad luck, insufficient effort, greater difficulty of the task, or lesser ability than previously believed - success could be achieved either by intensifying their efforts, or changing problem-solving strategies.

In summary, when failures occurred, the cognitions of the helpless children reflected their tendency to dwell on the present, to dwell on the negative, and to seek an escape from the situation at hand. The cognitions of the mastery-oriented children, on the other hand, reflected their tendency to look toward the future, to stress the positive, and to invest their energies in actively pursuing relevant strategies for problem solution.

In a more recent study (Diener & Dweck, 1980), children performed a task on which they encountered success and then failure (the task was the same three-dimensional, two-choice discrimination problem used in the earlier, 1978, study). Half of the children were questioned about their performance after success and the other half after failure. Pronounced differences emerged. Compared to mastery-oriented children, helpless children both underestimated the number of successes and overestimated the number of failures. They did not perceive successes as indicative of ability, and did not expect successes to continue. Subsequent failure led them to devalue their previous performance, unlike the mastery-oriented children. It appeared that helpless children viewed failure as more "diagnostic" of their level of ability, whereas mastery-oriented children seemed to view success as more diagnostic (see Trope and Brickman, 1975). The authors (Diener & Dweck, 1980) concluded that for helpless children, successes are less salient, less predictive, and less enduring - in total, less successful.

A brief overview of the area of childhood depression may now provide some insight regarding differences between helpless and mastery-oriented children.

Description of Childhood Depression

In general, there is agreement on the most common symptoms and signs of depression in adults (e.g., Beck, 1967; 1976; Robins & Guze, 1970). Similarly, some feel that there is general agreement regarding symptoms of depression in children (e.g., Ling et al., 1970; McConville et al., 1973; Poznanski & Zrull, 1970; Puig-Antich et al., 1978). Kovacs and Beck (1977) list characteristics of childhood depressive disorders from nine studies published between 1968 and 1973. All of the studies reviewed concur that childhood depression involves some type of cognitive change in the negative direction, and most studies list attitudinal and motivational changes and disturbances in psychomotor functioning. However, not all of the studies place an emphasis on dysphoric mood, *per se*, as a primary symptom of childhood depression (Weinberg et al., 1973). Frommer (1968) notes that presenting complaints are most commonly of a nonspecific, somatic nature (increasing abdominal pain, for example). Frommer (1968) and Arajarvi and Huttunen (1972) list enuresis and encopresis as symptoms of depression in children. On the other hand, Pearce (1978) found enuresis and encopresis to be negatively associated with depression in children. Poznanski and Zrull (1970), based on the data records selected, listed negative self-image as the most frequent disturbance seen within the depressive symtomatology. They (Poznanski & Zrull, 1970) also noted that difficulty in handling aggression was the most frequent symptomatic behavior which initiated referral for treatment. Kuhn and Kuhn (1972), in a study of the imipramine treatment of 100 depressed children, found "morning tiredness" to be the cardinal symptom of affective depression. In general, these authors include descriptions or symptoms that closely resemble the adult depressive syndrome, sometimes noting that the character of these symptoms may be somewhat different (e.g., Krakowski, 1970).

Several researchers (Bakwin, 1972; Connell, 1972; Glaser, 1967; Lesse, 1974; Toolan, 1962) have noted that psychosomatic or behavioral complaints among children often mask an underlying affective disturbance. Glaser (1967), for example, observed that the following symptom pictures may indicate or mask an underlying depression in older children and adolescents: (1) behavioral problems and delinquent behavior; (2) psychoneurotic reactions; and (3) psychophysiologic reactions.

Cytryn and McKnew (1974) also view "masked depressive reaction" as the most common form of depression in children and include these signs of masked depression in their description: hyperactivity, aggressiveness, school failure, delinquency, and psychosomatic symptoms. These authors note, however, that among latency-age children, there is a group that tends to present a more clearly identifiable depressive syndrome, with accompanying symptoms such as sad affect, social withdrawal, hopelessness, helplessness, psychomotor retardation, anxiety, school and social failure, eating and sleeping disturbances, and suicidal ideation.

Other authors view depression as masked, or as evidenced in depressive equivalents, at various phases of development. For example, in addition to the symptoms noted by others (as above), Renshaw (1974) asserts that fire setting is a means of acting out childhood depression, and Malmquist (1972) includes anorexia nervosa and obesity syndromes as depressive equivalents.

Kovacs and Beck (1977, p.11), however, suggest that the term "masked" depression may be misleading and unnecessary:

> We know from adult clinical practice that patients often present with either nonspecific somatic complaints or general malaise. Yet we do not refer to such adult presenting complaints as "masking" depression. We view them either as "somatizations" or as culturally accepted ways of construing or manifesting psychological discomfort. Consequently, concepts such as masked depression in childhood are unnecessary. The concept seems to have no clinical or heuristic significance and essentially signifies: (1) events that initiate referral, or (2) manifestations of a psychological disturbance acceptable or appropriate to that age category.

Welner (1978) provided an excellent overview of the psychiatric literature on childhood to that date. She felt that there is no general agreement on criteria for childhood depression. Instead, she found that the diagnosis of depression in childhood was based upon clinical impression (e.g., Cytryn & McKnew, 1972; Frommer, 1968), arbitrarily selected criteria (e.g., Anthony & Scott, 1960; Weinberg et al., 1973), or on a favorable response to antidepressant drug therapy (e.g.,Frommer, 1968; Rapoport et al., 1974). No distinction was made between primary and secondary depression in the literature. In longitudinal studies, Robins (1966) found that less than one per cent of the children who were seen in a child guidance clinic early in life later developed depressive illness; and Dahl (1972), in his follow-up study of a large series of severely disturbed Danish children, did not find a single case of manic-depressive psychosis. In the Isle of Wight epidemiological study of 2,199 children between the ages of 10 and 11, Rutter, Tizard, and Whitmore (1970) discovered that the rate of "pure" depression was low: 0.1 per cent. Rutter et al. (1970) identified three groups of disturbed children: a group with conduct disorders, a group with emotional disorders, and a mixed group containing components of both types. They (Rutter et al., 1970) found that the disturbed children, in general, had more depressive symptoms than nondisturbed children, but that there was no difference among the three subgroups either in the presence of or the rate of depressive symptoms.

Welner, Welner, McCrary, and Leonard (1977) found, based on their study of children of depressed parents, that the clinical symptomatology of depression in children is very similar to that found in adults. Five of the 75 youngsters (about 7%) who were evaluated in the study met the adult diagnostic criteria (Feighner et al., 1972). Only one, however, was a prepubertal child. Welner et al. (1977) judged that it would seem reasonable to use the adult criteria (Feighner et al., 1972), with some minor modification, in clinical studies of children. They (Welner et al., 1977) also felt that since they found a significant number of children with depression, and yet did not find more hyperactivity, learning, or behavior problems in this high risk group, the theory of "masked" depression lost support.

Welner (1978, p. 59) concluded: "It is not unusual to find depressive symptoms as well as low self-esteem in children with disorders other than depression. Children with learning problems, hyperactivity, and even behavior problems are known to have low self-esteem and to express unhappiness (26,35). In our study of hyperactive children and their siblings (40) we also found that the hyperactive probands had significantly more depressive symptoms than the normal controls. Yet, as mentioned earlier, based on follow-up and family studies of hyperactive children, they are not at a high risk to develop primary affective disorder. Therefore, in our opinion, the unhappiness of hyperactive children is secondary to their hyperactivity rather than a manifestation of depressive illness." [References 26, 35, and 40 refer, respectively, to Mendelson, Johnson, and Stewart, 1971; Rutter, Tizard, and Whitmore, 1970; and Welner, Welner, Stewart, Palkes, and Wish, 1977.]

Lefkowitz and Burton Criticize the Concept of Childhood Depression. Lefkowitz and Burton (1978) discussed the various points of view regarding childhood depression in terms of its existence, prevalence, and long-term outcome. They admonished, for example, that any clinical diagnosis of childhood behavior should be based upon knowledge of the incidence of such behavior in the normal population and the variations in incidence as a function of development. They surveyed several epidemiological studies (e.g., Chess & Thomas, 1972; Kovacs & Beck, 1977; Lapouse, 1966; MacFarlane et al., 1954; Pearce, 1977; Shepherd et al., 1971; Werry & Quay, 1971) and concluded that since the incidence of several behaviors seemingly associated with depression did not meet the criterion of 10% or less established by some epidemiologists (Shepherd, Oppenheim, & Mitchell, 1971) for being considered statistically deviant, such behaviors should be regarded as transient developmental phenomena which, if left alone, would diminish with the passage of time.

They (Lefkowitz & Burton, 1978) approached the phenomenon of childhood depression from the epidemiological perspective of statistical deviations from norms according to age and other variables (sex, socioeconomic status, etc.), rather than from a clinical perspective of childhood depression as a disease process and an independent entity.

Costello Rebuts Lefkowitz and Burton. While agreeing with Lefkowitz's and Burton's (1978) concern regarding reliable and valid methods of assessment for childhood depression, and with their call for more rigorous research in the area of childhood depression, Costello (1980), nevertheless, questioned three assumptions put forth in the Lefkowitz and Burton (1978) critique. These three assumptions were: (1) If the behaviors thought to make up the syndrome of depression are prevalent in normal children, they cannot be regarded as pathological, and therefore the syndrome does not exist. (2) If the behaviors thought to compose the syndrome of depression are discovered to disappear as a function of time, they cannot be regarded as pathological. (3) Those problems that remit spontaneously do not require clinical intervention.

Regarding the first assumption, Costello (1980) pointed out that Shepherd et al. (1971) had used an arbitrary criterion of 10% for "operational purposes," and that they emphasized distinguishing between statistical and clinical abnormality. Rather than looking at prevalence data for specific behaviors, Costello (1980) advocated obtaining data on the prevalence of the <u>constellations</u> of behaviors considered to constitute the syndrome of depression (see Lapouse, 1966; Achenbach & Edelbrock, 1978). Achenbach (1978) also found a syndrome of depression in his study of the behavior problems of boys aged six through eleven. As he did not find such a syndrome in his earlier work (Achenbach, 1966), he commented that the emergence of such a factor for boys may have resulted from cultural changes leading to a greater incidence of depression in young boys. Costello (1980) also noted that although a specific problem or behavior may occur with high frequency in normal children of a certain age, such behaviors may occur with significantly higher frequency among children who have a number of behavior problems (e.g., Richman, 1977).

Regarding the second assumption, Costello (1980) felt that data on prevalence as a function of age are not a sufficient base upon which to judge normality and abnormality. He gave the example of arguing that hysteria is normal, since historical data have shown that hysteria was prevalent among women in Austria in the 19th century. Rather, Costello (1980) suggested that it is the degree of transitoriness of constellations of behaviors that is important.

And, regarding the third assumption, Costello (1980) questioned the wisdom of providing clinical intervention only when a problem persists, arguing that while a problem may last a short time, it might be well to try to shorten it further or prevent it altogether because of its possible functional relationship to later more persistent difficulties. He gave the example of childhood fears such as fears of the dark, of being alone, and of strangers, which Solyom, Beck, Solyom and Hugal (1974) found to be more common in adult phobic patients than in matched normal controls.

While Lefkowitz and Burton (1978) cautioned against labeling a child depressed so that the labeling itself might not have iatrogenic effects, Costello (1980) suggested that it may be advisable to intervene even though the "interventions might be better directed at the labeling processes of the child's observers than at the child's behavior (Costello, 1980, p.188)." Costello also felt that the data indicating that children who attend clinics don't have a greater risk of adult disorder (Rutter, 1972) are very difficult to interpret, since some of the referred children would likely have received effective therapy. Costello (1980, pp. 188-189) commented, "A related reason for the difficulty in researching this problem is that the occurrence of the childhood problem behavior will probably have significance in relation to the probability of adult disorder only when the behavior occurs in the presence of one or more other organismic or environmental factors. The role played by the behavior may be similar to that played by temperamental characteristics in the work of Rutter and his colleagues (e.g., Graham, Rutter, & George, 1973; Rutter, 1978). They found that children living in disharmonious families who had negative temperamental characteristics such as low malleability were three times as likely as other children to develop psychiatric problems during the four-year follow-up period of the study."

Costello (1980) concluded that studies of childhood depression should account for and evaluate issues such as (1) the distinction between symptoms and syndromes, (2) knowledge of what constitutes the same behavior at different ages, (3) the limits of a statistical criterion of abnormality, and (4) the likely complexities of the relationships between transient problems of childhood and adult psychopathology. [See Lefkowitz (1980) for a further reply to Costello (1980).]

Current Thoughts Regarding Learning Disabilities and Depression

Many clinicians and researchers have hypothesized that learning disabilities or underachievement lead to depression (Bemporad, 1982; Kashani, 1982; Shapiro, 1985; Stevenson & Romney, 1984).

Stevenson and Romney (1984), for example, investigated the prevalence of depression amongst LD children. First they had 103 children enrolled in LD classes complete the Children's Depression Inventory (CDI) (Kovacs & Beck, 1977). They designated students scoring in the top quartile of the CDI "most depressed" and the bottom quartile "least depressed" (25 in each group). These chosen subjects were then visited at home and orally administered the Children's Personality Questionnaire (CPQ) (Porter & Cattell, 1979), and the Culture-Free Self-Esteem Inventory for Children (SEI) (Battle, 1981). No differences were found between the two groups - "most depressed" versus "least depressed" - with respect to age, sex, intelligence (measured by the WISC-R), type of learning disability (academic, e.g., reading, writing; or developmental, e.g., attention deficit, perceptual or expressive disorders), or parental expectations. The "most depressed" group was found to be much lower in self-esteem, tended to be oversensitive, and shared traits associated with neuroticism. The authors (Stevenson & Romney, 1984) suggest that in dealing with depressed LD children, their affective state and their personality be taken into account as well as their obvious cognitive handicap.

As mentioned earlier, Bemporad (1982) described a youngster with a severe learning disability who was unconcerned with her problem at age five, but who, at age nine, felt very inadequate and blamed herself for her academic difficulties and had developed depressive symptoms secondary to her basic learning disability. The author explained how, during middle childhood, a child's gratification comes "from a direct apprehension of the environment and is not yet generated from within in the form of deeper evaluations of one's own self and others (Bemporad, 1982, p.277)."

The older a child becomes, the greater seems the cognitive component involved in depression. For example, Poznanski and Zrull (1970) reported that maturing latency-aged children reacted less to unpleasantness in the environment and more to a feeling of disappointment within themselves. Similarly, McConville et al. (1973) found that depressed youngsters, aged eight through ten, expressed ideas of low self-esteem, ideas which had been absent in younger dysphoric children.

Once a sense of dysphoria is generated from within, evaluations may remain stable across multiple situations. Thus, older children may remain despondent despite an amelioration of their surroundings, and their unhappiness may affect many activities, such as relationships with peers and school work, as well as behavior at home (Bemporad, 1982).

Bemporad (1982) feels that a child with learning disabilities, who finds his/her poor school performance a source of shame and humiliation, may retreat from society back to the security of the family. This may create problems for independence and autonomy in late adolescence and early adulthood. Therefore, therapy with such children often involves providing activities outside the family to help the child form a new estimation of the self that is based on less demanding, or at least less distorted, expectations.

Other researchers have hypothesized that depression affects learning (Brumback & Staton, 1983; Colbert et al., 1982; Goldstein & Dundon, 1985-1986).

For example, Colbert et al. (1982) feel that teachers may be misdiagnosing depressed children as having a specific learning problem. Their study indicated that depression resulted in poor school performance in children who were intellectually capable and without a specific learning disability. The subjects of their study were 212 children admitted to the Family Psychiatric Unit of the Royal Jubilee Hospital in Victoria, British Columbia, between Feb., 1974, and June, 1977. All children had scores from the WISC-R (Wechsler Intelligence Scale for Children - Revised), the WRAT (Wide Range Achievement Test), and the PIAT (Peabody Individual Achievement Test). Where learning problems were suspected, more in-depth testing was done with instruments such as the Beery-Buktenica Developmental Test of Visual-Motor Integration, and so forth. Informal tests and observations were also conducted. An independent observer reviewed the child's chart in order to determine whether a child was depressed or not. The DSM III criteria, as described in Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 1978), were applied.

The subjects in this Colbert et al. (1982) study were truly a clinical sample. The study identified 153 children (54%) as depressed. Of these, 117 were boys and 36 were girls. [In the age group of 9 to 11 years, the ratio was three boys to one girl.] Results of the I.Q. tests of the 153 children showed a normal curve skewed slightly to the lower end. Seventeen children (11%) tested in the mildly retarded range of intelligence; 34 (22%) tested in the low normal range; 73 (48%) tested in the average range; 25 (16%) tested in the high normal range; and 4 (.03%) tested in the superior range. When admitted to the Family Psychiatric Unit, 111 children (73%) were in regular classes, while 42 (27%) attended special classes. These special classes varied and included programs for mentally retarded, autistic, severely disturbed, and learning disabled youngsters. Of the 111 children in regular classes, 79 (71%) were judged to be significantly underachieving one year or more below grade level in one or more academic areas in relation to expectations based on their intelligence and grade placement. Thirty children (27%) were judged to be doing average work, while two children (2%) were considered overachievers. Despite the disproportionate number of underachievers (79 children or 71%), only 11 (7.2%) were diagnosed as having specific learning disabilities, using the battery of tests previously described together with the unit classroom teachers' observations. [The authors (Colbert et al., 1982) used very strict LD criteria - explained as a function of defective cerebral processes.] They found that many of these children, when appropriately treated for their depression, responded well to the learning situation without any particular remedial education and began producing schoolwork that was pleasing to themselves, their teachers, and their parents. They feel that learning retardation is often a result of the lessened energy and attention available to the depressed child.

While acknowledging that it is sometimes difficult to recognize the depressed child in a large classroom setting, Colbert et al. (1982, pp. 335-336) outline certain behaviors that may be useful indicators of childhood depression, including: "dysphoria; sadness; hopelessness; loss of appetite; sleep disturbance; psychomotor retardation; loss of pleasure; low self-esteem; decreased concentration; aggressive behavior; suicidal behavior; social, family, and general school disturbances; guilt; loss of interest; somatic complaints; separation anxiety; restlessness; sulkiness; loss of energy; and irritability (Cytryn, McKnew, & Bunney 1980)."

Brumback and Staton (1983) also believe that the examination of a child who is experiencing academic school problems must include evaluation for depression-induced or depression-aggravated cognitive dysfunction. They (op. cit., 1983) suggest that antidepressant treatment of childhood endogenous depressive illness results in marked improvement in cognitive functioning (Brumback et al., 1980; Staton et al., 1981). For reactive childhood depression, Brumback et al. (1980) suggest counselling and supportive psychotherapy.

In many respects it is not fruitful to argue about the direction of depressive illness and learning disabilities in children -- whether depression affects learning or whether learning disabilities bring about depression. As Poznanski (1982, p. 306; italics in the original) has commented: "With some young children it is very difficult to sort out whether the child's *learning disabilities* have precipitated a secondary depression or whether a primary depression has interfered with learning at school.... Where a parent can give a good history, this may help to separate which condition, the learning problems or the depression, occurred first in the child's life. In one sense, of course, the question is academic. An improvement in the child's depression, whether it is primary or secondary, will generally lead to improved school performance."

Assessment of Childhood Depression

As one can determine from the preceding section, a number of classificatory schemata exist for the identification of the depressed child. The lack of agreement on nosology notwithstanding, however, a number of researchers have attempted to develop reliable standardized tools for the assessment of depression in school-aged children. Structured psychiatric interviews (some as yet unpublished) have been developed for the clinical evaluation of children (Kovacs, 1978; Puig-Antich et al., 1978), and several types of rating scales have been developed to assess childhood depression. Some of the children's scales have been modeled after adult instruments such as Beck's self-report inventory (Beck & Beamesderfer, 1974) and Hamilton's (1960) clinician-rated psychiatric scale. The types of scales developed include self-report scales [e.g., Children's Depression Inventory (CDI; Kovacs, 1978; 1980/1981); Children's Depression Scale (CDS; Lang & Tisher, 1978)], clinician-rated scales [e.g., Children's Depression Rating Scale (CDRS; Poznanski et al., 1979; Bellevue Index of Depression (BID; Petti, 1978)], and a newly developed peer-nomination scale (Lefkowitz & Tesiny, 1980). In addition, several rating scales have been developed for "relevant others" to complete. One excellent example of this type of scale is Achenbach's (1981a) Child Behavior Checklist for Ages 4-16 (Achenbach, 1978; 1979; Achenbach & Edelbrock, 1979; 1983). The advantage of this type of scale is that it allows the clinician or researcher to determine if other types of psychopathology are to be found together with depression. [The Child Behavior Checklist for Ages 4 - 16 (e.g., Achenbach & Edelbrock, 1983) will be reviewed in Chapter IV of this dissertation.]

The following major section examines the literature in the field of learning disabilities.

Learning Disabilities

Definition

On Sept. 22, 1984, the Board of Directors of the (U.S.) Association for Children and Adults with Learning Disabilities adopted the following definition of the condition, Specific Learning Disabilities:

> Specific Learning Disabilities is a chronic condition of presumed neurological origin which selectively interferes with the development, integration, and/or demonstration of verbal and/or non-verbal abilities.
>
> Specific Learning Disabilities exists as a distinct handicapping condition in the presence of average to superior intelligence, adequate sensory and motor systems, and adequate learning opportunities. The condition varies in its manifestations and in degree of severity.
>
> Throughout life the condition can affect self-esteem, education, vocation, socialization, and/or daily living activities.

An important point to realize is that while no definition of learning disabilities is universally accepted by parents, educators, psychologists, or doctors, most definitions agree in stating that "there is a discrepancy between actual achievement or development and what might be expected on the basis of estimates of capacity or mental ability, and that learning disabilities as so defined are not secondary to general mental retardation, cultural, sensory and/or educational deprivation, or serious emotional disturbance (Crichton et al., 1981, p. 13)."

In DSM-III (American Psychological Association, 1980), learning disabilities are categorized under the Axis II heading, Specific Developmental Disorders.

Among these disorders are included developmental reading disorder ("dyslexia"); developmental arithmetic disorder; developmental language disorder (which involves difficulty in comprehending oral language - receptive type, or difficulty in expressing verbal language - expressive type); mixed specific developmental disorder (when there is more than one specific developmental disorder, but none is predominant); and atypical specific developmental disorder (for those not covered by any of the previous specific categories).

Age of onset, course, impairment, complications, predisposing factors, and sex ratio, are discussed under the general Specific Developmental Disorders heading, while the more specific disorders (e.g., Developmental Reading Disorder) include a discussion of associated features, prevalence, familial pattern, and differential diagnosis. [See the article by Forness and Cantwell, 1982, for DSM III psychiatric diagnoses and special education categories.]

Characteristics of Learning Disabilities

Many characteristics have been ascribed to children with learning disabilities. The ten most frequently mentioned characteristics (culled from several studies) listed by Clements (1966) were:

1. Hyperactivity
2. Perceptual-motor impairments

3. Emotional lability

4. General orientation defects

5. Disorders of attention (e.g., short attention span, distractibility)

6. Impulsivity

7. Disorders of memory and thinking

8. Specific learning disabilities: reading, arithmetic, writing and spelling

9. Disorders of speech and hearing

10. Equivocal neurological signs, and electroencephalographic irregularities.

Related Diagnostic Labels. Diverse terminology and varying conceptualizations have been used by different researchers and clinicians in defining children who exhibit the clinical characteristics listed in the previous section. Some of the terms used include: minimal cerebral dysfunction (MCD), minimal brain dysfunction (MBD) (Rutter & Chadwick, 1980), specific learning disabilities (Satz & Friel, 1973), learning disorders, dyslexia, strephosymbolia (Orton, 1928), hyperkinetic syndrome, hyperkinetic impulse disorder, psychoneurological learning disability, specific developmental dyslexia (Ingram, 1960; Critchley, 1962), and attention deficit disorder (DSM-III).

The Concept of Minimal Brain Dysfunction (MBD). Crichton et al. (1981) point out that, from the medical aspect, learning disabilities involve the concept of "minimal brain dysfunction," defined as a subtle and mild abnormality in brain function which may manifest itself in any of the four spheres of brain activity

– motor, sensory, intellectual, or electrical. In other words, it refers to a syndrome encompassing:

1. Minimal motor defects, like clumsiness or very mild cerebral palsy,

2. Minimal sensory defects, like perceptual disorder or disturbances of kinesthetic (body movement) information,

3. Minimal intellectual defects, like difficulties with abstract concepts or concept formation, and

4. Minimal electric disturbances, like spike-wave discharges without frank seizures.

> In any event, it is agreed that minimal brain dysfunction encompasses a wide and heterogeneous group of disorders which may all be found in children who have difficulties with learning. (Crichton et al., 1981, p. 21).

Rutter (1977), upon reviewing the evidence for "brain damage" in what he termed "psychiatric disorder" in children, concluded that it is "highly likely that in addition to those children with cerebral palsy and obvious neurological conditions, there are many others with some degree of damage or dysfunction of the brain (Rutter, 1977, p.9)."

Of relevance to this dissertation is Rutter's (1977, p.13) paragraph regarding the association between brain damage and specific reading difficulties:

> However, quite apart from low I.Q., brain damage is also associated with specific reading difficulties. This was found in the Isle of Wight study of children with neuro-epileptic disorders (Rutter *et al.*, 1970 a), and again in the North London study (Seidel *et al.*, 1975). Half

the cerebral palsied children in the latter study had severe reading difficulties compared with only 15% of children with other crippling disorders not involving brain pathology. Similarly, in the head injury study, 38% of the children (whose mean I.Q. was 97) were at least two years backward in reading (Chadwick and Shaffer, 1975). As shown in several studies (see Rutter _et al_., 1970 a; Rutter _et al_., 1970 b) both low I.Q. and reading difficulties are associated with an increased risk of behavioral deviance at school and , to lesser extent, with psychiatric disorder as shown at home. Thus, the cognitive sequelae of brain damage are one of the important mechanisms leading to psychiatric disorder.

[Chadwick and Shaffer, 1975, was a personal communication to M. Rutter, cited in Rutter (1977).]

Rutter, Chadwick, and Schachar (1980, p. 41) added that "the concept of an MBD as a genetic or metabolic syndrome remains an interesting hypothesis worth further study but it is just that -- a speculative idea of interest and not a fact...nevertheless, the field of study of hyperkinesis and of psychiatric syndromes due to organic brain dysfunction remains a rich source of ideas which warrant further exploration."

<u>Prevalence of Learning Disabilities</u>

Prevalence rates are greatly dependent upon the criteria used to determine learning disabilities. In one study, for example, 2,800 children in the third and fourth grades in a U.S. public school population were screened as part of a research project at Northwestern University (Myklebust & Boshes, 1969). Using an educational-discrepancy definition of learning disabilities, with a criterion of underachievement a ratio or learning quotient of less than 90, 15 percent of the research population were identified as underachievers. Using more stringent criteria, the prevalence rate was determined to be 7 to 8 percent.

The U.S. National Advisory Committee on Handicapped Children (1968) recommended that 1 to 3 percent of the school population be considered as a prevalence estimate, at least until further research provides objective criteria for more clearly identifying these children.

In their Isle of Wight study, Rutter et al. (1970a) found a 3.7% prevalence rate, among 2,334 9-11 year olds, for specific reading retardation (defined as reading 28 months or more below level of predicted reading age).

Extending their study to London school children, Rutter and Yule (1975) and Berger, Yule, and Rutter (1975) found a higher prevalence rate - 6 to 8% - than that found among Isle of Wight children.

There is a preponderance of males with learning disabilities, with male/female sex ratios ranging from 3.3:1 (Rutter, Tizard, & Whitmore, 1970b) to 6.8:1 (three sources) and 8.0:1 (school) (in a study by Lambert and others, 1978).

For further information, see Belmont's (1980) review of the literature regarding the epidemiology of learning disorders and MBD in the H.E. Rie and E.D. Rie (editors) handbook (1980).

Etiology or Types of Learning Disability

Learning disabilities may be attributed to any factor or factors which may affect neurologic functioning adversely (Illingworth, 1980). Such factors include genetic variations (Finucci et al., 1976; Sladen, 1972; Stewart, 1980; Zerbin-Rudin, 1967) , low birth weight (Dunn, in preparation; Wiener et al., 1968), biochemical irregularities (Lansdell, 1980), perinatal insults such as anoxia or trauma (Towbin, 1971; 1978; 1980) or other illnesses or injuries, especially brain injuries (Brown et al., 1981; Chadwick et al., 1981; Rutter, 1977; Rutter et al., 1980) sustained during the years which are critical for the development and maturation of the central nervous system. Such postnatal brain damage may result from meningitis, progressive hydrocephalus, cerebro-vascular accidents, status epilepticus, and severe intoxications from drug ingestion or poisonous fumes (Schain, 1977). In addition, environmental factors (Werner, 1980) such as early severe sensory deprivation, parental illness, poor nutrition (Birch & Gussow, 1970), raised lead levels (Rutter, 1980), differing cultural norms, and poor or inappropriate instructional techniques, have also been implicated in the etiology of learning disabilities. [Recent research by Smith, Kimberling, Pennington, and Lubs (1983) has pointed to a gene on chromosome 15 as playing a major etiologic role in one form of reading disability. Linkage analysis in families with apparent autosomal dominant reading disability produced a lod score of 3.241, and since the traditionally accepted significance level for linkage is a lod score of 3.0, the authors are encouraged and will continue their study until a lod score of at least 5 is obtained.]

With such a plethora of etiological factors to choose from, it is no wonder that researchers have great difficulties in relating educational phenomena to brain functions or external influences.

Nevertheless, Crichton, Catterson, Kendall, and Dunn (1981, p. 23) have outlined a two-category schema which lends some coherence to the epidemiology of learning disabilities. In brief, they distinguish two broad groups of learning-disabled children: those in whom there is probably an inherited and therefore "constitutional" abnormality of language (i.e., reading) which is largely specific; and those in whom there are reasonable grounds for postulating the disorder to be more diffuse and largely acquired through conditions such as perinatal anoxia or severe head injury. The authors point out that "The importance of making the distinction is twofold: (1) the more specific, so-called constitutional disability may also be found in other members of the family, and (2) the response to stimulant drugs may be better in the second type and may be of great help in management (Crichton et al., 1981, p.22)."

In an earlier follow-up study of specific reading disability, Silver and Hagin (1964) distinguished between a "developmental group," synonymous with Rabinovitch's concept of primary reading disability (Rabinovitch et al., 1954), and an "organic group," having the basic syndrome plus evidence of structural organic defect. Comparing their patients after a ten to twelve year interval, Silver and Hagin (1964) found that the tendency for the individual with "organic" reading disability was to retain his perceptual difficulties in all areas, while the person with "developmental" reading disability recovered partially or adopted cues that enabled him to deal with his temporal and spatial problems. They recommended the contrivance of new teaching procedures appropriate to the pattern of the "organic's" neurological and perceptual deficiencies. Thus, it appears important to distinguish between the types of learning disabilities from a prognostic and educational management perspective as well.

Follow-up of Children with Learning Disabilities: Outcomes and Predictors

In this area, especially, the caveat to keep in mind is that outcomes for learning-disabled children, regarding personality, education, and long-term life goals, are dependent upon many intrinsic and extrinsic variables, and each study must be evaluated according to the specific population characteristics and variables examined.

Helper (1980) outlined and reviewed the salient factors and findings of 33 follow-up studies. Only five studies had a majority of subjects 12 years and under, and another five studies concerned subjects aged 19 and over. The majority examined adolescents between 12 and 18 years of age. Most subjects were male, with ratios ranging from 64 male, 4 female (Weiss et al, 1971) to 34 male, 13 female (Eaves and Crichton, 1974-1975), in studies not limited by design to males only. Regular and summer school, reading clinic, hospital clinic, and private client/patient sources were tapped by these investigations. Mean intervals between diagnosis and follow-up varied between approximately two years (Riddle and Rapaport, 1976), and about 24 years (Menkes, Rowe, and Menkes, 1967; Rawson, 1968).

Few of the studies employed control groups, either at the time of initial diagnosis or at follow-up. Notable exeptions are studies by Ackerman, Dykman, and Peters (1977a; 1977b), and Silver and Hagin (1964). The latter investigators (Silver and Hagin, 1964) selected their control group from children evaluated in the same setting as the MBD children, but who were found to have some other identifiable problem (thus controlling for the effects of being evaluated, labelled, etc.).

Treatment given the LD/MBD children included medication, counseling or psychotherapy and special educational management. Helper (1980), who restricted his review to studies with follow-up interval of at least two years, comments that "No study was found in which a program combining medical, psychotherapeutic and educational management was carried out over a period of years (Helper, 1980, p. 85)." [Satterfield, Cantwell, and Satterfield, in 1979, reported the results of multimodality treatment at the end of the first year of a three-year prospective study of 84 hyperactive boys. Measures of the child's behavior at home and at school, academic performance, delinquent behavior, and emotional status were obtained initially and at one-year follow-up. Their results suggest that the combination of a clinically useful medication, together with appropriate psychological treatment and educational management, simultaneously directed to each of the child's disabilities, is associated with an unexpectedly good outcome. Only further follow-up will show whether these good results will continue.]

It is difficult to summarize or generalize from the data of these follow-up studies. One can say that, in general, there is a persistence, over time, of deficits in attention and information processing, and a persistence in deficits in learning skills (e.g. Ackerman, Dykman, and Peters, 1977a; 1977b). Yule (1973), in a four-and five-year follow-up of children in the Isle of Wight studies, found that the presence of severe reading disability at age 9 to 11 had ominous implications for future reading progress and that the presence of high IQ could not be considered to offer much hope for reading progress, though it might for progress in mathematics.

The five-year follow-up of MBD children by Eaves and Crichton (1974-1975) is representative of outcome research in the field of learning disabilities. They found that only seven of the 39 children originally diagnosed MBD had no school problems at follow-up, and only three of those seven were also free of behavioral symptoms at home. Thus, only 3 of the 39 cases diagnosed as MBD were found to be free of both learning and behavior problems at follow-up (at mean age of twelve years, two months). Twenty-five to 35% of the children were still reported distractable, restless, or overactive; and almost 60% were below grade level in academic subjects. Thus, in this study, with a clinic sample admittedly more severe than a random or school sample would likely be, there was a strong tendency for problems to persist.

In her doctoral dissertation, Eaves (1983) reported the findings of a follow-up of a random sample of 2,000 kindergarten children, tested in the spring of 1972 with the De Hirsch battery (De Hirsch et al., 1966). She found that between kindergarten and grade three, five out of 106 children originally diagnosed LD had caught up to grade level, but that after grade three, no more such children caught up to grade level.

Are there any variables which presage a better outcome?

Rawson (1968) reported highly favorable outcomes for 20 dyslexic boys from a private school, acknowledging that her group was unusually intelligent at the outset, and received exceptionally intensive and systematic remedial instruction. The average IQ of the 20 dyslexic boys was 122 on the Stanford-Binet, while the 36 control non-dyslexic boys had even higher IQs; average IQ for all 56 boys was reported as 131.

Upon follow-up at intervals between 17 - 35 years (at a mean age of 33 years), these dyslexic boys had completed an average of 6.0 years of post high school education, slightly more than the non-dyslexics. Eighteen of the 20 were college graduates and 10 had advanced degrees; two were physicians, one a lawyer, two professors, two scientists, and four were school principals or teachers. Two were in laboring jobs, one a foreman and one a skilled laborer. A number of these subjects, however, reported that reading and spelling were still difficult in adulthood.

Relatively good outcomes were also reported by Robinson and

Smith (1962; 10-year follow-up), and Preston and Yarington (1967; 8-year follow-up) who studied ex-clients of university reading clinics (University of Chicago and University of Pennsylvania, respectively). The median IQ of the Robinson and Smith (1962) subjects was 120, while the mean reported by Preston and Yarington (1967) was 98.

Robinson and Smith (1962) found that 33 of their 44 subjects were reported by their parents to read as much as or more than average; forty-one of the 44 were high school graduates; and 27 were college graduates. Only one subject was out of school and out of work.

Preston and Yarington (1967) used population data as reference points and found no elevation of dropout rates and only 4 of the 50 subjects unemployed and out of school. About 25% of those of college age were in college, and 12 of the 21 who were employed had whitecollar jobs.

None of the latter-mentioned studies (Preston & Yarington, 1967; Rawson, 1968; Robinson & Smith, 1962), however, made mention of emotional or behavioral difficulties. It would have been instructive to know what, if any, problems arise in the adult years of dyslexics who were bright but poor readers when young. Many of their difficulties apparently persist, but presumably, especially because of their higher intelligence, they are able to adapt more successfully. These studies do demonstrate the general finding that the LD/MBD child has a better prognosis, both for academic achievement and vocational success, when his/her IQ is high, social status is high, and intensive and systematic educational efforts have been undertaken.

In a recently published ten-year follow-up study from Stanford Medical School (Hartzell & Compton, 1984), interview data revealed significantly lower levels of school attainment, academic success, and social success for 144 LD students, when compared with 144 siblings without learning disabilities. No difference was found in level of job satisfaction. Significant positive factors which contributed to school success in the LD group included high IQ, less severe learning disability, positive personality characteristics in the child, effective family function, strong family support, high occupational level of family breadwinner, and high education level attained by the mother. Negative factors included a more severe degree of learning disability, the presence of hyperactivity, and a concomitant disability in mathematics.

More comprehensive longitudinal research should be undertaken in the future, using well-defined populations, controlling for IQ and socioeconomic status, and examining cognitive and behavioral aspects of learning disabilities, both separately and in interaction. Short-term and long-term evaluations of multi-faceted interventions (pharmacological, remedial education, behavior management, psychotherapeutic, etc.) would contribute to the knowledge, now sparse and equivocal, that professionals working with learning-disabled children so badly need.

<u>The Brain and Learning Disabilities</u>

A thorough discussion of the brain and neurological substrates involved in learning disabilities is beyond the scope of this dissertation. However, the author has found many recent studies which would prove exciting and heuristic for those particularly interested in such topics. One example follows to give the reader an idea of the type of research being done.

Most exciting research has been carried out recently by Duffy and colleagues (1980a; 1980b). In the first study reported (Duffy et al., 1980a), EEG and evoked potential data were recorded during behavioral testing from 8 dyslexic and 10 normal boys aged 9 to 11 years. (These researchers adopted the distinction between "dyslexia-pure" and "dyslexia-plus" proposed by Hughes and Denckla, reported in Hughes, 1978, and limited their considerations to dyslexia pure - the "plus" referring to the common accompanying symptoms of hyperactivity, dyscalculia, and motor incoordination).

Spontaneous EEG was recorded during ten different testing conditions or states, which were designed to permit recording during simple resting brain activity (with eyes open or closed), and during tests designed to activate the left hemisphere (speech and reading tasks), the right hemisphere (music and geometric figures), and both hemispheres at once (paired visual-verbal associations).

The three evoked potential (EP) test states were: (1) visual evoked potential (VEP) - over 500 flashes from a Grass PS-2 strobe stimulator presented at random interstimulus intervals always exceeding one second; the unit was set at intensity 8 and placed 20 cm. from the subject's closed eyes; (2) auditory evoked potential (AEP) - over 500 clicks similarly presented via earphones at 92 db sound pressure level; and (3) "tight-tyke" auditory evoked potential (TTAEP) - over 250 presentations of the tape-recorded word tight randomly presented, and intermixed with a similar number of the word tyke; subjects were asked to count the number of tights heard for half the presentation and tykes for the remainder of the presentation.

Topographic mapping of the subjects' brain electrical activity disclosed four discrete regions of difference between the two groups, involving both cerebral hemispheres, the left more than the right. Aberrant dyslexic physiology was not restricted to a single locus but was found in much of the cortical region generally involved in reading and speech. Conspicuous group differences were noted in the bifrontal area in addition to the more expected left temporal and left posterior quadrant regions. Although activation tasks produced more prominent group differences, dyslexics differed from normal subjects even when at rest. EEG alpha activity was increased for the dyslexics, suggesting relative cortical inactivity in that group when compared with the normals.

Having demonstrated differences in the topographic distribution of brain electrical activity between eight dyslexic and ten normal boys (Duffy et al., 1980a), Duffy et al. (1980b) then went on to explore the usefulness of quantified measures of such brain activity in the diagnosis of dyslexia. EEG and EP data recorded from 13 normal and 11 dyslexic boys were used. Regional measurements taken from the subsequent topographic maps were used to: (1) calculate the statistical significance of the difference between dyslexic and control subjects by multivariate analysis, (2) develop a formal set of diagnostic rules, and (3) test rule validity on subjects not used for the rule development. Using a statistically based technique, the authors developed rules for classification that accurately identified 80 to 90% of subjects not used in the initial rule development. The nature of the most helpful measurements suggested that aberrant neurophysiology in dyslexia involves both hemispheres and is present at rest as well as during complex testing. (It should be noted also that an area previously unexplored in dyslexia, in the left anterior region, provided the best features derived from EEG data.)

While such prospective success suggests that measurements of brain electrical activity (BEAM methodology) may prove useful in the clinical diagnosis of dyslexia, and in dyslexia research, the authors (Duffy et al., 1980b) do suggest that their results do not yet justify the routine application of their method. They feel that they have not yet demonstrated the relative specificity that would allow dyslexia to be diagnosed from among other forms of learning disability, and note the caveat raised by Ransohoff and Feinstein (1978), who emphasized that failure to include tests of specificity in addition to sensitivity has been a major reason why promising diagnostic tests have failed when put into practice.

Nevertheless, the work of Duffy and colleagues (1980a; 1980b), using such objective neurophysiological testing, offers exciting possibilities. Clinically, it allows freedom from subjective social and cultural bias in diagnosis. It may also be used prophylactically at the preschool level, before school failure can lead to secondary symptomatology. From a research viewpoint, it may soon be possible to determine whether there is only one syndrome of dyslexia, or many syndromes, whether dyslexia represents a developmental or maturational lag or a "different" brain organization, and whether dyslexia physiology responds to therapy of whatever sort.

The newer techniques for assessing brain structure and function are at present infrequently used with learning disabled youngsters (except for the commonly given neuropsychological and educational tests). But those procedures found safe and helpful may one day give researchers some insight into better methods of classroom instruction and behavioral management for learning disabled youngsters.

The next brief chapter will outline the hypotheses of this study. A discussion of the rationale for the hypotheses will also be given.

CHAPTER III

Hypotheses

[For convenience in testing, and because the literature is not altogether clear with respect to many of the measures, the writer has chosen to state these hypotheses in the null form, although the conjecture is that in many cases the alternative hypotheses will hold. Rationale for the hypotheses will follow this listing.]

PRE-TASK ATTRIBUTIONS:

Hypothesis I.

There will be no group effect (LD/NLD) in external attributions (ease of the task or luck) on the "academic success" pre-experimental task attribution questionnaire.

Hypothesis II.

There will be no group effect (LD/NLD) in internal attributions (lack of ability or lack of effort) on the "academic failure" pre-experimental task attribution questionnaire.

POST-TASK ATTRIBUTIONS:

Hypothesis III.

There will be no group effect (LD/NLD) in external attributions (ease of the task or luck) after success on the experimental task.

Hypothesis IV.

There will be no group effect (LD/NLD) in internal attributions (lack of ability or lack of effort) after failure on the experimental task.

PERFORMANCE ON PRE-, POST-MEASURES:

Hypothesis V.

1. There will be no group effect (LD/NLD) on the six pre-, post-measures scores.

2. There will be no condition effect (easy/difficult/no task) on the six pre-, post-measures scores.

3. There will be no significant joint effects of group membership and condition on the six pre-, post-measures scores.

Hypothesis VI.

In the difficult (failure) condition, there will be no group effect (LD/NLD) regarding performance change on those post-measures, Serial Recall and Color Naming, which are most related to specific learning disabilities.

EXPECTANCY FOR SELF:

Hypothesis VII.

1. There will be no group effect (LD/NLD) on the post-task "expectancy for self" measure.

2. There will be no condition effect (easy/difficult) on the post-task "expectancy for self" measure.

3. There will be no significant joint effects of group membership and condition on the post-task "expectancy for self" measure.

EXPECTANCY FOR OTHER

Hypothesis VIII.

1. There will be no group effect (LD/NLD) on the post-task "expectancy for other" measure.

2. There will be no condition effect (easy/difficult) on the post-task "expectancy for other" measure.

3. There will be no significant joint effects of group membership and condition on the post-task "expectancy for other" measure.

CHILD BEHAVIOR CHECKLIST

Hypothesis IX.

There will be no group differences (LD/NLD) on the various subscales of Achenbach's (1981a) Child Behavior Checklist (especially the Depression subscale).

Rationale of the Hypotheses

Hypotheses I and II and Hypotheses III and IV are based in great part upon the experimental findings of two recent studies - Bryan and Pearl, 1979, and Pearl, Bryan, and Donahue, 1980. Pearl et al. (1980) found that learning-disabled children are more likely than nondisabled children to have negative self-concepts, to believe that their successes are the result of luck or other people, and that their failures are insurmountable. They found that these maladaptive beliefs and attributions are established by about nine years of age and become increasingly more negative with age (through grade eight, at least). [The Bryan and Pearl (1979) article reported the general findings which were subsequently published with full methodology and results sections in Pearl, Bryan, and Donahue, 1980.]

In a later study, Pearl (1982) examined third and fourth grade LD children's attributions for success and failure. The subjects in this study differed from those in the Pearl et al. (1980) study in that these subjects had received the "label" of LD - they had been identified as such by school personnel, and were receiving daily assistance from a learning disability teacher in a resource room. Results indicated that the pessimistic beliefs about the causes of their successes and failures that were held by the underachieving children in the Pearl et al. (1980) study were also held by formally labeled LD children. One difference between the results of the two Pearl studies is that the LD children in the more recent study (Pearl, 1982) attributed failures less to a lack of effort than the control children only for failures in reading and on puzzles, not for social situations. In other words, the LD children in this study believed that further effort could be effective in overcoming <u>social failure</u>. The author suggested that it may be that the label "learning disabled" allows the children to limit their negative self-evaluations to their performance in achievement-related activities.

These Pearl studies asked children to rate the importance of the four factors (ability, effort, luck, task ease/difficulty) for success and failure in reading, on puzzles, and in social situations <u>in structured interviews</u>. There was no actual experimental manipulation of success/failure. Therefore, the rationale for Hypotheses I and II stems directly from the

Pearl et al. (1980) and the Pearl (1982) studies, while Hypotheses III and IV are an extension of the same studies. The expectation is that success will be attributed to external factors (easy task or luck), while failure will be attributed to internal factors (absence of ability or lack of effort).

The rationales for Hypotheses V. 1., 2., and 3. stem from a number of findings in the attribution literature. For example, it has been found that success generally facilitates performance on <u>similar</u> tasks - in this study, parallel forms of the same tasks (e.g., Weiner et al., 1972). Regarding expectancy of success on future tasks, however, (Hypotheses VII, 1., 2., and 3.) such expectancy is related as well to the <u>stability</u> of the causal attribution made to explain the outcome (e.g., Fontaine, 1974; McMahan, 1973; Valle and Frieze, 1976; Weiner, Nierenberg, & Goldstein, 1976). Attributions to relatively stable causes, such as ability or ease/difficulty of the task, produce expectancies that outcomes will continue to be the same on similar tasks, whereas more unstable attributions, such as to luck, effort, or mood, tend to produce expectancy shifts away from the originally anticipated outcome.

In general, too, unexpected outcomes, or outcomes that vary widely from initial expectancy, tend to be attributed to unstable causes (such as luck), while expected outcomes are more likely to be attributed to stable factors (such as ability) (e.g., Feather & Simon, 1971a; 1971b; Valle & Frieze, 1976). Thus, an expected outcome is attributed to stable factors (e.g., Simon & Feather, 1973; Valle & Frieze, 1976), which in turn leads to an expectancy that future outcomes will continue at the same level. If the outcome is unexpectedly high or low, however, an attribution will be made to unstable factors which in turn leads to the belief that this specific outcome was unusual and will not continue, resulting in little change in future expectancy from the initial pretest expectancy (Valle & Frieze, 1976). This has been seen to lead to a self-fulfilling prophecy where those who expect to do well will continue to hold high expectations, while those who have low expectations will maintain them regardless of how they actually perform (see Frieze, 1980, for a thorough discussion of expectancies).

Studies have also shown that LD children are lower in self-esteem than are NLD children (e.g., Boersma & Chapman, 1981; Patten, 1983; Stevenson & Romney, 1984; Thomas, 1979) and that this lower self-esteem leads to a lower expectancy for self regarding future tasks (Boersma & Chapman, 1981). This lower self-esteem in LD children (e.g., Black, 1974; Patten, 1983) has been hypothesized to affect task performance (Hypotheses V, 1., 2., and 3.) as well as expectancy for self on future tasks (Hypotheses VII, 1., 2., and 3.).

Also, according to the reformulated model of learned helplessness (Abramson et al., 1978), failure is a subset of helplessness, primarily overlapping with personal helplessness (Abramson, Garber, & Seligman, 1980; Abramson et al., 1978). The LD child would likely have experienced more instances of learned helplessness (noncontingency of responses and outcomes) than the control child, thereby leading to stable, global, and internal attributions for failure. If the LD child attributes failure internally (i.e., lack of ability), and especially if this child feels that other children would probably have the ability to succeed, she or he would experience "personal helplessness," accompanied by a loss of self-esteem (Abramson et al., 1978; also see the section entitled Learned Helplessness Revised in Chapter II of this dissertation).

Hypothesis IX stems from information given by Achenbach (1981b) at a conference entitled Clinical Concerns in Child Development: A Focus on Cognition. He has found that the two best discriminators for children needing special professional help are "unhappy, sad, or depressed" and "poor schoolwork" (also see Achenbach and Edelbrock, 1983). He finds that children are seldom referred for depression, but that sad mood may be a by-product or end point of some other difficulty. Regarding poor schoolwork, some disorders or behavior problems may preclude efficient learning, while some children may have specific learning disabilities. Information regarding any differences between LD and NLD children on Achenbach's (1981a) Child Behavior Checklist should prove helpful for professionals providing special services to LD children. [The sections dealing with Childhood Depression in Chapter II outline the various current theories and thoughts regarding LD and depression - some hypothesizing that LD or underachievement lead to depression (Stevenson & Romney, 1984), some hypothesizing that depression affects learning (Brumback & Staton, 1983; Colbert, Newman, Ney, & Young, 1982; Goldstein & Dundon, 1985-1986), while still others have commented on the bidirectionality of, for example, affect and cognition (Barden et al., 1981; Barnett et al., 1982; Cairns & Valsiner, 1984)].

Hypothesis VI was generated from the literature dealing with cognitive learning styles of LD children. One might predict that LD children would have particular difficulty with the Serial Recall task, which involves sequential or successive processing, and with the Color Naming task, which involves speed of mental processing as well as verbal responding (Das et al., 1979; Das et al., 1980).

Bannatyne's recategorization of WISC-R (Wechsler Intelligence Scale for Children - Revised) subtest scores could be useful in the resolution of this question. His earlier categorization (Bannatyne, 1968) was revised in 1974 (see Bannatyne, 1974), giving the following conceptual categories for four areas:

Spatial: Picture Completion, Block Design, Object Assembly;

Conceptual: Comprehension, Similarities, Vocabulary;

Sequential: Digit Span, Arithmetic, Coding;

Acquired Knowledge: Information, Arithmetic, Vocabulary.

In his earlier work, Bannatyne (1968; 1971) reported that children with genetic dyslexia scored highest in the Spatial category, intermediate in the Conceptual category, and lowest in the Sequential category. This same ordering was found by Rugel (1974) who reviewed 25 published and unpublished studies of reading disabled children which reported WISC subtest scaled scores. Factor analytic research (e.g., Bortner & Birch, 1969; Rugel, 1974) has also provided justification for Bannatyne's categorization (as well as being instrumental in Bannatyne's

1974 decision to drop the Picture Arrangement subtest from the Sequential category and to replace it with the Arithmetic subtest). In later research, Smith et al. (1977) reported the same Spatial>Conceptual>Sequential pattern for school-verified LD children.

Given the Spatial>Conceptual>Sequential pattern for LD children, it would be reasonable to predict greatest disruption of performance on those tasks involving sequencing, i.e., tasks tapping successive processing, such as serial recall, although a study by Das et al. (1978) has demonstrated that disabled readers perform poorly on <u>both</u> successive and simultaneous tasks (such as the Raven's Coloured Progressive Matrices; Raven, 1956, 1962).

The reader is also reminded that the "Sequential" category outlined by Bannatyne (1974) is identical to the "Freedom from Distractibility" factor (Arithmetic, Digit Span, and Coding triad) outlined by Kaufman (1975; 1979a; 1979b; 1981) through his factor analytic work with the WISC-R.

CHAPTER IV

Method

Subject Sample

Experimental subjects were boys between the ages of 9-0 and 12-0 years, in Grades Four, Five, or Six, whose IQs as measured by the Wechsler Intelligence Scale for Children - Revised (WISC-R) were at least 80 on both the verbal and performance scale, and whose reading achievement as measured by the reading cluster score of the Woodcock-Johnson Psycho-educational Battery was at the 40th percentile or lower. These youngsters were English-speaking (i.e., not recently arrived in Canada with English as a second language) and did not have serious physical, emotional, or cultural handicaps. The stipulation of IQ > 80 (low average range) stems from the consideration that the LD child should demonstrate a normal potential to learn. While for clinical purposes this means an IQ of at least 70, for research purposes, many professionals (e.g., Douglas, 1981) suggest an IQ of at least 80. A reading percentile of 20 or lower was used as the operational definition for learning disability (i.e., reading disability) since this figure is comparable to the typical definition of LD in the higher elementary grades of children reading one and one-half grades below grade level (e.g., Bryan & Bryan, 1980; Kavale & Nye, 1981).

Control subjects were boys, aged 9-0 to 12-0, in Grades Four, Five, or Six, chosen from the same classrooms (or at least the same school) who met the same criteria - IQ > 80 (measured on the WISC-R), English-speaking, and free from serious physical, emotional, or cultural handicap. They were within the normal range ($\geq$ 50th percentile) in reading achievement as measured by the reading cluster score of the Woodcock-Johnson Psycho-educational Battery.

Boys only were used as subjects because, as outlined in Chapter II, there are well-documented sex differences in variables critical to this study (e.g., incidence of learning disabilities, and patterns of causal attributions).

From an original sample of 108 children (50 LD; 58 NLD), 10 children were eliminated from the analyses because they did not meet the reading achievement criterion: six originally-designated LD children had reading achievement percentile scores $>$ 50th percentile; four originally-designated NLD children had reading achievement percentile scores $<$ 50th percentile.

Upon initial analyses of the descriptive data, it was found that a large discrepancy existed between the two groups (LD;NLD) on all scales of the WISC-R. Therefore, a decision was made to equate the two groups of children, LD and NLD, on performance IQ alone, as it has been demonstrated that for LD children the performance IQ score provides a more valid indication of intellectual potential than do either the verbal IQ score or the full scale IQ score (Torgesen, 1975).

The verbal scale encompasses the Acquired Knowledge (Bannatyne, 1974) constellation of subtests (Information, Arithmetic, and Vocabulary) which is known to be adversely affected by learning disabilities, especially reading disabilities (Sattler, 1982).

The full scale IQ score, composed as it is of a combination of verbal scale IQ and performance scale IQ, may be an invalid indicator of intelligence for LD children, particularly when there is a statistically significant discrepancy between the verbal and performance scales (performance > verbal) (Kaufman, 1979a; 1979b; Sattler, 1982).

Kaufman (1979b) discusses the distinction between ability and achievement. Reading and learning disabled populations have been found to score low on two of the three subtests, i.e., Information and Arithmetic, listed in Bannatyne's (1974) Acquired Knowledge grouping (e.g., Clarizio & Bernard, 1981; Smith, Coleman, Dokecki, & Davis, 1977). "Consequently, depressed V and FS IQs may be a direct <u>effect</u> of poor school achievement and inadequate acquired learnings for these youngsters, thereby providing an incorrect estimate of their so-called ability, potential, capacity, etc. Any definitions of learning or reading disorders that include the stipulation of normal intelligence as a prerequisite for classification are therefore suspect (Kaufman, 1979b, p.20)." Torgesen (1975, p. 418) concludes: "Investigators who ascribe a large role to verbal processes in reading failure often use the performance scale of a test like the Wechsler Intelligence Scale for Children (WISC) to identify poor readers with otherwise normal intellectual ability."

Consequently, a rank ordering of both LD and NLD groups on performance IQ was made and the groups were matched by taking the highest 30 LD children and the lowest 38 NLD children on performance IQ. Thus, the final sample of subjects had 30 LD and

38 NLD children (68 total), matched on performance IQ.

In terms of racial/ethnic background, subjects included 60 Caucasian, three Chinese, one Japanese/Caucasian, two East Indian, one native Indian, and one native Indian/Caucasian child. Of the LD subjects, 27 were Caucasian, one Chinese, one East Indian, and one native Indian. Of the NLD subjects, 33 were Caucasian, two Chinese, one Japanese/Caucasian, one East Indian, and one native Indian/Caucasian.

Sixty-five children were students in the public school systems of two metropolitan school districts (55 from one district and 10 from another district), while three children were students from two urban parochial schools.

Identification of both LD and NLD subjects was facilitated by examination of the school-recorded Canadian Test of Basic Skills (King et al., 1981) results, available for all students in both public school districts. Percentile scores were available for vocabulary and reading (comprehension). In addition, classroom teachers, learning assistance teachers, and principals aided in selection of LD and NLD subjects according to the experimental criteria outlined earlier. (See Appendix 1 for Letter to Principal and Teachers.)

Research Design

Using the conventional notation of Campbell and Stanley (1963), the quasi-experimental design was:

LD	O_1	O_2	R	X easy	O_3	[n=12]
LD	O_1	O_2	R	X difficult	O_3	[n=10]
LD	O_1	O_2	R	X (no task)	O_3	[n= 8]

NLD	O_1	O_2	R	X easy	O_3	[n=12]
NLD	O_1	O_2	R	X difficult	O_3	[n=16]
NLD	O_1	O_2	R	X (no task)	O_3	[n=10]

where LD stands for learning disabled experimental subject; NLD stands for normally achieving control subject; O_1 refers to observations taken during Session I; O_2 refers to observations taken during Session II; and O_3 refers to observations taken during Session III. Fourteen days (or more in a few instances due to illness of subject or school professional day) separated O_2 from O_3 to prevent confounding due to practice effects. R stands for random assignment to the experimental condition, and X (easy task; difficult task; no task) represents the experimental event or manipulation.

Summary of Method and Procedures

Parents received a covering letter (Appendix 2), consent form (Appendix 3), and Child Behavior Checklist , together with a stamped return envelope. If consent was granted, parents completed the Child Behavior Checklist (Achenbach, 1981a), and all children (LD and NLD) participated in three testing sessions over a two to two and one-half week period, with each testing session lasting from one to two hours. (See Appendix 4 for Student Consent Form.)

Session I. (O_1)

Administration of:

1. Affect measure (Appendix 5)

2. WISC-R (Wechsler Intelligence Scale for Children - Revised)

3. Woodcock-Johnson Psycho-educational Battery - Reading Cluster (three subtests: Letter-Word Identification; Word Attack; Passage Comprehension)

4. Affect measure

Session II. (O_2)

Attribution rating scale training (Appendix 6) and administration of:

1. Affect measure

2. Pre-task attribution questionnaire (ability, effort, luck, and task difficulty) (Appendix 7)

3. Intellectual Achievement Responsibility (IAR) Scale, in order to determine helplessness vs. mastery-oriented categories (Diener & Dweck, 1978; 1980) (Appendix 8)

4. Pre-measures (counterbalanced with post-measures, also listed below):

(a) Raven's Coloured Progressive Matrices, Form A or A_B (Raven, 1956, 1962)

(b) Free Recall and Serial Recall, first or second set of 12 word groups (Das et al., 1979)

(c) Color Naming (Das et al., 1979), I or II

(d) Ideational Fluency (Hakstian & Cattell, 1976), I or II

(e) Aiming (Hakstian & Cattell, 1976), I or II (Appendix 9)

5. Affect measure

<u>Session III</u>. (O_3)

Administration of:

* 1. Pre-affect measure
* 2. Expectancy of success measure for self (Appendix 10)
* 3. Expectancy of success measure for other (Appendix 10)
* 4. Experimental manipulation: task = Round-Robin Racing, a board game (easy, difficult, or no task condition) (Appendix 11)
* 5. Post-task attribution questionnaire (ability, effort, luck, and task ease/difficulty) (Appendix 12)
* 6. Expectancy of future success measure for self (Appendix 13)
* 7. Expectancy of future success measure for other (Appendix 13)
* 8. Post-task affect measure

9. Post-measures (counterbalanced with pre-measures listed in Session II.): Parallel forms of 3. a, b, c, d, e.

10. Debriefing (including the administration of the easy task and the attribution questionnaire for the easy task those initially given the difficult task)

11. Final affect measure

* A second experimenter administered steps 1 through 8 in Session III. in order to reduce experimenter bias. This assistant randomly assigned experimental and control subjects to the easy, difficult, or no experimental task treatment conditions.

Preliminary Measures

Child Behavior Checklist

Parents were asked to complete a Child Behavior Checklist for Ages 4 - 16 (Achenbach, 1981a) for their child. This checklist provided information for answering Hypothesis IV: On Achenbach's (1981a) Child Behavior Checklist, LD children will differ from the NLD children at the conventional level of significance ($p < .05$) on the various subscales, in particular on the Depression subscale, while the NLD children will correspond to Achenbach's non-clinic norm group.

Achenbach's goal in developing the Child Behavior Checklist was to develop a descriptive classification system that could be used to group children for research and clinical purposes, to reflect adaptive competencies as well as behavior problems, and to facilitate quantitative assessment of behavioral change. This descriptive classification system is embodied in a series of Child Behavior Profiles that are standardized separately for children of each sex at ages 4-5, 6-11, and 12-16. The Child Behavior Profile used in this study was for boys aged 6-11. The Child Behavior Checklist is comprised, then, of social competence items as well as behavior problem items.

Social Competence Items. The social competence scale taps involvement and attainment in the three areas described below.

Activities Scale. This scale consists of scores for the amount and quality of a child's participation in (a) sports; (b) nonsports hobbies, activities, and games; and (c) jobs and chores.

Social Scale. This scale consists of scores for (a) the child's membership and participation in organizations; (b) number of friends and contacts with them; and (c) behavior alone and with others.

School Scale. The school scale consists of scores for (a) the average of the child's performance in academic subjects; (b) placement in a regular or special class; (c) being promoted regularly or held back; and (d) the presence or absence of school problems.

Behavior Problem Scales. For boys, aged 6-11, factor analysis of 450 disturbed boys yielded nine behavior problem scales labeled Schizoid, Depressed, Uncommunicative, Obsessive-Compulsive, Somatic Complaints, Social Withdrawal, Hyperactive, Aggressive, and Delinquent (narrow band scales).

After successive revisions of pilot editions, Achenbach (1981a) finalized 118 behavior problem items. Note that space was allotted for parents to indicate "other physical problems without known medical cause" (Item 56h) and "any problems your child has that were not listed above" (Item 113).

A three-step response scale (0,1,2) was chosen since it is typically easier than a present versus absent scale for most untrained raters. For each item that describes the child currently or within the last six months, parents are asked to circle 2 if the item is "very true" or "often true" of their child; the 1 if the item is "somewhat" or "sometimes true" of their child; and 0 if the item is "not true" of their child.

The first five problem scales load on a second-order factor labeled Internalizing, while the last three load on a factor labeled Externalizing (the one mixed syndrome is represented by the Social Withdrawal scale) (Achenbach, 1978; Achenbach & Edelbrock, 1983). The Internalizing - Externalizing dichotomy is based on the two broad-band groupings of behavior problems repeatedly identified in other multivariate analyses (for reviews, see Achenbach and Edelbrock, 1978; Quay, 1979), and reflects a distinction between fearful, inhibited, overcontrolled behavior on the one hand, and aggressive, antisocial, undercontrolled behavior on the other. These broad-band groupings have been variously referred to as Personality Problem versus Conduct Problem (Peterson, 1961), Inhibition versus Aggression (Miller, 1967), Internalizing versus Externalizing (Achenbach, 1966), and Overcontrolled versus Undercontrolled (Achenbach & Edelbrock, 1978).

For boys aged 6-11, the Internalizing Syndromes found through factor analysis of the Child Behavior Checklist (syndromes are listed in descending order of the loadings shown for the second-order Internalizing and Externalizing factors) include:

Schizoid or Anxious	.81
Depressed	.74
Uncommunicative	.73
Obsessive/Compulsive	.68
Somatic Complaints	.64

The Externalizing Syndromes include:

Delinquent	.87
Aggressive	.85
Hyperactive	.63

The one mixed syndrome is the Social Withdrawal scale.

Though the Internalizing and Externalizing groupings outline contrasting types of behavior problems, they are not mutually exclusive. The degree and direction of correlation between the two broad-band groupings depends upon characteristics of the sample studied. Through factor analyses, Achenbach and Edelbrock (1983, p. 33) report the average Pearson correlation between total Internalizing and total Externalizing T scores in six clinical samples to be .48. Across their six normative samples, the average correlation was .63. (These correlations were computed by deleting the few items that are scored on both an Internalizing scale and an Externalizing scale, but Appendix E, in Achenbach and Edelbrock, 1983, presents the correlations for all sex/age groups without deletion of redundant items. These Pearson correlations between total Internalizing and total Externalizing T scores for boys aged 6-11 were .59 for their clinical sample, and .73 for their non-clinical sample.)

Achenbach and Edelbrock (1983) report that even without the few overlapping items, there is a positive association between behaviors that are often viewed as opposites. They explain that this is because there is a general dimension among behavior problems that resembles the general (g) dimension among ability tests, so that individuals who score very high in one area tend to be above average in other areas as well, while individuals who score very low in one area tend to be low in other areas. Despite the positive association found in their samples as a whole, however, the authors feel that some children's problems are primarily Internalizing and other children's problems are primarily Externalizing. They feel that this is analogous to the relation between the Verbal IQ and the Performance IQ on the Wechsler intelligence tests - across groups, there is a positive correlation between the Verbal and Performance IQ, but some individuals have much lower scores in one area than in the other.

Socio-economic Status

Of the status variables having an impact upon the behavior of children at risk for learning disabilities or behavior disorders, none is seen as more critical than that of parental socio-economic status or SES (Robins, 1979; Werner, 1980). For example, Werner and Smith (1977) reported that three out of four children considered in need of placement in an LD class came from low SES homes. And in a comparison of low achievers (in reading/spelling) with academically successful controls, matched by IQ and race, Broman (1977) showed that indices of SES prior to birth and at age seven were more strongly related to low achievement than Apgar scores, obstetrical complications, and neurological soft signs at age seven (though the latter were significantly more frequent among both black and white underachievers than among IQ matched controls). Thus, calculation of SES was included in this study.

Mueller and Parcel (1981), in their review of relevant literature, concluded that in the study of social stratification, three dimensions - economic, power, and prestige - are theoretically relevant, and that occupational status represents the single best indicator of SES. These authors recommend using the Duncan SEI (Duncan, 1961) or the Siegel Prestige Scoring System (Siegel, 1971), both measures requiring the same raw data, the three-digit U.S. Census occupation codes. (They do not recommend use of the Hollingshead Two-Factor Index of Social Position, 1957, because it is outdated.)

There is now available, however, a revised socioeconomic index for occupations in Canada (Blishen & McRoberts, 1976), based on income level and educational status, using information from the Dominion Bureau of Statistics, 1963, and Statistics Canada, 1971, 1972. In the present scale, income level is expressed as the percentage of males who worked in an occupation in 1970 and whose 1970 employment income was $6,500 or over. The education variable is expressed as the percentage of males who worked in an occupation in 1970 and who had attended at least grade 12 if the province of schooling was Prince Edward Island, New Brunswick, Ontario, British Columbia, Yukon, or outside Canada, or who had attended at least grade 11 if their schooling had been undertaken in Newfoundland, Nova Scotia, Quebec, Manitoba, Saskatchewan, or Alberta, thus taking provincial differences into account.

SES data for this study were recorded from the occupational indices listed by Blishen and McRoberts (1976). On Achenbach's (1981a) Child Behavior Checklist for Ages 4-16, there are spaces provided for "Father's Type of Work" and "Mother's Type of Work." If both parents reported paid occupations, the higher-status occupation was used to score SES according to the socioeconomic indices of Blishen and McRoberts (1976). This is the procedure used by Achenbach and Edelbrock (1983), although they use Hollingshead's seven-point scale for assessing SES.

Wechsler Intelligence Scale for Children - Revised (WISC-R)

Description. The WISC-R (Wechsler, 1974) was published twenty-five years after the original publication of the WISC (Wechsler, 1949), which was developed, in turn, as a downward extension of the adult intelligence tests, the Wechsler-Bellevue I (1939), and the Wechsler-Bellevue II or Army Wechsler (1942). The WISC-R was designed to test children whose ages range from 6-0 to 16-11 years, and contains twelve subtests.

Wechsler (1974, p. 5) conceptualized intelligence as a "multidimensional and multifaceted entity rather than an independent, uniquely defined trait," and the construction of the WISC-R reflects this conceptualization.

On the WISC-R, six of the subtests form the Verbal Scale -

Information, Similarities, Arithmetic, Vocabulary, Comprehension, and Digit Span - while another six form the Performance Scale- -Picture Completion, Picture Arrangement, Block Design, Object Assembly, Coding, and Mazes. The WISC-R provides three separate IQ scores: a Verbal Scale IQ, a Performance Scale IQ, and a Full Scale IQ. All three IQs are deviation IQs, obtained by comparing the subjects' scores with the scores earned by a representative sample of their own age group (the WISC-R was standardized on 2,200 white and nonwhite American children reasonably representative of the population based on 1970 U.S. census data). Deviation IQs are standard scores, so that each of the three IQs has a mean of 100 and a standard deviation of 15.

<u>Bannatyne's Recategorization of WISC-R Scores</u>

Bannatyne (1968; 1971; 1974) developed a recategorization of the WISC-R subtests so that each category represents a specific ability, thus diverging from Wechsler's (e.g., 1974) verbal-performance dichotomy. The groupings, together with the WISC-R subtests included, are as follows:

Spatial = Picture Completion, Block Design, and Object Assembly;
Conceptual = Comprehension, Similarities, Vocabulary;
Sequential = Arithmetic, Digit Span, Coding;
Acquired = Information, Arithmetic, Vocabulary.

Bannatyne (1974) has hypothesized that LD children score highest on Spatial tasks, next highest on Verbal Conceptualizing tasks, and lowest on Sequencing tasks (Spatial>Conceptual>Sequencing). This pattern has been found for both reading-disabled (Rugel, 1974) and learning-disabled (Smith et al., 1977) youngsters. Recall also that Bannatyne's Sequencing category is identical to Kaufman's (1979a) Freedom from Distractibility factor (Arithmetic, Digit Span, and Coding) and that the Spatial category comprises the three WISC-R subtests that have been found to be closely associated with field independence (e.g., Witkin et al., 1974; Witkin et al., 1977). In addition, Kaufman (1979a) suggests that the higher Spatial/low Sequencing pattern may relate to superior simultaneous/holistic processing coupled with inadequate successive/sequential processing (see also, Kaufman, 1975).

The WISC-R data from this study were analyzed so that Bannatyne's Spatial>Conceptual>Sequential pattern for LD children could be examined.

Woodcock-Johnson Psycho-Educational Battery - Reading Cluster

The Woodcock-Johnson Psycho-Educational Battery (Woodcock, 1977; 1978; Woodcock & Johnson, 1977)) is a comprehensive set of 27 tests, individually administered, that assesses three areas of functioning: cognitive ability, achievement, and interest.

The Tests of Cognitive Ability, Part I of the battery, include twelve subtests that cover a variety of domains such as vocabulary, spatial relations, and so forth. The Tests of Achievement in Part II include ten achievement areas, including reading, spelling, capitalization, punctuation, and knowledge of science, humanities, and social studies. The Tests of Interest, in Part III, cover five areas: preference for participation in reading, mathematics, language, physical activities, and social activities.

In this study, all children (LD/NLD) were given the three reading subtests (Letter-Word Identification; Word Attack; Passage Comprehension) from The Tests of Achievement in Part II of the Woodcock-Johnson Psycho-Educational Battery (Woodcock & Johnson, 1977) to determine reading percentile (for age) levels.

Intellectual Achievement Responsibility Questionnaire

The Intellectual Achievement Responsibility Questionnaire (IARQ) (Crandall et al., 1965) was designed to measure an individual's belief in his own control over, and responsibility for, intellectual-academic successes and failures. The scale is composed of 34 forced-choice items, with each item stem describing a positive or negative achievement event which commonly occurs in a child's day-to-day experience. Each stem is followed by one alternative stating that the event was caused by the child (e.g., good work, effort) and another alternative ascribing the event to the behavior of someone else important in the child's environment (e.g., parent, teacher, peer). One half of the items tap the child's acceptance of responsibility for positive events (I^+, or internal responsibility for successes) and the other half tap the child's acceptance of responsibility for negative events (I^-, or internal responsibility for failures). The sum of the I^+ and I^- scales gives a total I score (total internal or self-responsibility).

Crandall et al. (1965) administered the scale orally by means of a tape recorder, to children below the sixth grade, and allowed children above the sixth grade to do the scale on their own. In the present study, the IARQ was administered orally, by the author and without a tape recorder. The experimenter placed her chair in such a way as to afford privacy to each child (LD or NLD) as he made his responses to the questionnaire. The decision to administer all questionnaires, scales, measures, and so forth, orally, without the use of a tape recorder, was based upon practical considerations. It was felt that the human voice could be better and more swiftly altered to provide optimum stimulation given each testing situation.

From their total sample of 923 elementary- and high-school students, Crandall et al. (1965) reported the following means and standard deviations for boys in Grades 4, 5, and 6, on the IARQ:

	Total I		I^+		I^-	
	M	S.D.	M	S.D.	M	S.D.
Grade 4 (n=59)	24.83	3.00	12.41	2.07	12.42	2.08
Grade 5 (n=52)	24.04	3.69	12.38	2.52	11.65	2.46
Grade 6 (n=93)	24.74	4.57	12.99	2.54	11.75	2.79

Crandall et al. (1965) reported variable, but generally low, relations between I^+ and I^- scales (data include boys and girls, grades 3 to 12). For grades 4 to 6, the correlations were:

	I^+ versus I^-
Grade 4 (n=103)	.11
Grade 5 (n= 99)	.11
Grade 6 (n=166)	.38*

---

* $p < .001$

Crandall et al. (1965) suggested that the low association of subscale scores for children in the lower grades may result from the possibility that self-responsibility for successes and failures may be learned separately, and that the young child may assume more responsibility for the one than for the other.

A subset of 10 items on the IARQ specifically taps a child's attributions of failure to lack of effort. Diener and Dweck (1978; 1980) describe how this subset may be used to classify children into helplessness and mastery-oriented categories. Those children obtaining scores greater than seven are classified as mastery-oriented, while those scoring below seven are designated as helpless. A "Dweck" score was calculated for all children in this study.

Pre-, and Post-Measures

Selection Rationale. An attempt had been made to choose these measures according to some heuristic rationale. Apart from usefulness in testing the hypotheses of this study, it was hoped that such an attempt might provide important information regarding possible differences between normal-achieving and LD children in information processing and task performance, thus pointing the way to future studies with LD and NLD populations.

Parallel forms of these tests were used to reduce practice effects, although it was recognized that knowledge of the task demands, alone, might result in advantage to the subjects (both LD and NLD) at time two. If differences, especially decrements in the difficult condition, had been noted for the post-measures, these would have represented very strong evidence for the effects of the experimental manipulation. Overall, however, strict matching of the task forms was not paramount because the point of interest was the degree of shift, or the degree of interaction, rather than the absolute scores obtained by the LD and NLD groups in the easy, difficult, or no experimental task conditions.

Information regarding the neurological correlates of the tasks, outlined below, will be given as available.

Simultaneous/Successive Processing Model. Intellectual behavior has been studied through several approaches or models. These include the familiar abilities approach, as exemplified by the work of Cattell (e.g., 1963; 1971; Hakstian & Cattell, 1974), Thurstone (e.g., 1938; Thurstone & Thurstone, 1962), Guilford (e.g., 1967; Guilford & Hoepfner, 1971), and many others. Other researchers have approached an understanding of intellectual behavior from a developmental perspective (e.g., Elkind, 1969; 1974; Kagan et al., 1963; 1964; Piaget, 1926).

More recently, researchers, instead of assuming that "ability" differences underlie differences in performance, have advocated a "process" approach, consistent with the view that an analysis of learning processes underlying an ability is much more useful (Estes, 1974). For example, information processing models have been outlined by Hunt and colleagues (Hunt, 1971; 1973; Hunt & Lansman, 1975; Hunt, Lunneborg, & Lewis, 1975). In addition, an attempt to describe the traditional primary mental abilities, in terms of the cognitive processes and memory stores which underlie them, has been made by Carroll (1976).

In recent years, a great deal of understanding of intellectual functions in terms of the workings of the brain has been accomplished, in great part, through the collaboration of North American and Soviet scientists (e.g., Pribram and Luria, 1973). Das, Kirby, and Jarman (1975) have outlined an information processing model which has evolved from Soviet neuropsychology. In an interview, Das explains: "An alternative to an ability approach is a process model, which provides useful information by opening up the possibility for looking at strategies used by the individual learner. These strategies could be directly related to ways of structuring input. Then, of course, the manner in which input is organized is related to instructional methods. So you see the educational implications of a process model are quite different from those based on an abilities model, which focuses solely on output (Das & Malloy, 1981, p. 350)."

Based on Luria's (1966a; 1966b; 1973) neurological investigations, Das et al. (1975) postulate that human information processing may be described in terms of a model containing four components: external input, sensory registration, central processing, and output. Stimuli may be presented for external input in either a simultaneous or successive manner. The stimuli are immediately subject to sensory registration, and depending upon the nature of the task, may be passed on for central processing. This processing in the central unit may take one of two basic forms -- simultaneous synthesis or successive synthesis. Simultaneous synthesis refers to the organization of information into composites or groups, such that the relationship of elements to one another may be determined. This organization may be spatial, or it may be represented in speech in complex logical-grammatical structures. Contrariwise, successive synthesis is a form of information organization which does not permit analysis of the relationship of multiple elements to one another. Instead, information is organized in a temporal, sequence-dependent fashion, with only limited acquisition to individual elements. Simultaneous and successive syntheses are merged with a planning and decision-making component in the central processing unit, with reciprocal relationships between them. Planning and decision making is dependent upon the two forms of synthesis - simultaneous and successive - and also determines the form of synthesis for some tasks. And, finally, the output unit uses the information organized by the central processing unit for task completion (Das, 1980).

The two forms of synthesis are found in perceptual, mnestic (memory), and conceptual tasks. Moreover, the types of synthesis are not dependent upon the form of information input - either successive or simultaneous input in any of the modalities may result in one or the other form of synthesis. The type of synthesis entailed in a particular task is determined mainly by the planning function, and the demands of the task itself.

Regarding the neurological correlates of this theory (Das et al., 1975), simultaneous synthesis is seen as a function of the occipital-parietal area, being concerned with the processing of information in forms which are non-linear, and for which the parts are mutually surveyable and accessible (Luria, 1966a; 1966b; 1973). For example, arithmetic problem-solving is regarded as simultaneous processing because lesions in the occipital-parietal lobe result in acalculia (Das et al., 1979). Lesions in the parieto-occipital regions have been reported to result in a general inability "...to integrate individual visual or tactile stimuli into <u>simultaneous and, in particular, spatially organized groups</u> (Luria, 1966b, p. 125, italics in the original)."

Successive synthesis is seen as a function of the anterior (fronto-temporal) regions, and refers to the processing of information in a temporal, sequence-dependent form, with only limited acquisition, therefore, to individual elements. Lesions in the frontal and fronto-temporal regions have been reported to result in a general inability "... to integrate individual motor and acoustic stimuli into successive, serially organized groups (Luria, 1966b, p. 125, italics in the original)."

Measure One:

Raven's Coloured Progressive Matrices (RCPM)

The first pre- and post-measure used in this study was Raven's Coloured Progressive Matrices test (Raven, 1956; 1962; 1965), a task that loads highly on the simultaneous factor described by Das et al. (1975; 1979), since solutions require the construction of a spatial pattern or scheme.

The ease of administration and the requirement of few verbal instructions has resulted in wide use of the RCPM as a culturally-reduced test of intellectual reasoning for children between 5-0 and 11-11 years. Consisting of 36 matrices or designs, each having a piece which has been removed, the task is to choose the missing insert from six possible alternatives. The 36 matrices are grouped into three series, with each series comprising 12 matrices of increasing difficulty. Set A requires the ability to complete continuous patterns which, towards the end of the set, change first in one and later in two directions at the same time. Set A_B requires the ability to see discrete figures as spatially related wholes, and to choose a figure which completes the missing part. Set B includes problems involving analogies and should show whether or not an individual is capable of abstract thinking.

Weidl and Carlson (1976) administered the RCPM to 180 first, second, and third grade children. Factor analysis revealed three orthogonal factors which were interpreted as (1) concrete and abstract reasoning, (2) continuous and discrete pattern completion, and (3) pattern completion through closure.

A factor analytic study by Royce and others (1976), which was concerned with identifying the brain correlates of cognitive factors, found that Ravens Coloured Progressive Matrices I, II, and III, loaded on Factor V, tentatively interpreted as pattern recognition (factor loadings = -.64, -.63, and -.41, respectively).

> Poor pattern recognition is associated with damage to the left parietal and occipital areas while pattern recognition is better for those with damage to the left frontal region. The correlation of this factor with only the left hemisphere is not consistent with the findings of several researchers (Costa, Vaughan, Horowitz, & Ritter, 1969; Colonna & Faglioni, 1966; DeRenzi & Faglioni, 1965; and Piercy & Smyth, 1962) who found bilateral temporal lobe impairments for the Ravens Progressive Matrices (Royce et al., 1976, pp. 399-400).

Thus, the first-order factor V, pattern recognition, on which the Ravens loads, is more neurally diffuse. Classified by major neural correlates, pattern recognition is included in the occipital lobe, left hemisphere; and temporal lobe, right hemisphere (Royce et al., 1976, Table 11, p. 410).

In discussing the multidimensional scaling of a large battery of mental tests (the closer two points are in two-dimensional space, the more strongly these two tests are correlated), Snow

(1980, pp. 35-36) explains:

> ... The more central tests correlate with a wider range of other tests (hence the term <u>general</u>), and G_f tests appear to be the most central. Perhaps they represent to a greater degree the kinds of assembly and control processes needed to organize on a short-term basis adaptive strategies for solving novel problems. The more complex and varied the sequence of novel problems, the more adaptive the processing system needs to be. The Raven Progressive Matrices Test is perhaps the archetypical example of such a task, and one usually finds it in the center, as in Fig. 2.2. The central tests may also share particular performance processes, and/or similar organizations of such processes, with other tests....

In this study, therefore, the Raven's Coloured Progressive Matrices (RCPM) were used as a measure of simultaneous cognitive processing (Das & Molloy, 1975); as a measure of abstract reasoning; as a measure of G_f or "fluid ability" (Cattell, 1971); as a measure that is more general, central, and complex than most (Snow, 1980); and as a measure which engages both cerebral hemispheres, particularly the occipital lobe in the left hemisphere, and the temporal lobe in the right hemisphere (Royce et al., 1976).

For the pre-measure, Series A was administered to one-half of all subjects, while Series A_B was administered to the second half of all subjects. For the post-measure, those who had been given Series A as a pre-measure were given Series A_B, while those initially given Series A_B were given Series A. The choice of these two series stems from the factor loadings found by Royce et al.,1976 (-.64 for RCPM I; -.63 for RCPM II; and -.41 for RCPM III), so that the first two sets appear most similar. Also, series B involves analogies, and may therefore be more unlike the other two sets. The aim was to use two as nearly parallel forms of a test as possible, even though this feature was not essential to the study.

Measure Two: Serial Recall (SR)

The second pre, post-measure used was Serial Recall, which loads highly on the successive factor described by Das et al. (1979).

Description of Serial Recall (SR)

Stimuli were presented orally to each subject. The subject's task was to recall, verbally, immediately following each presentation, groups of four words which were either acoustically similar (e.g., man, mat, mad, cab) or neutral (e.g., day, hot, cow, book). Each series of four words was scored for words in the correct serial position. There were 24 groups of four words, so that 12 groups could be used as the pre-measure, while 12 groups could be used as the post-measure.

By exchanging items 12 and 13 (Das et al., 1979, pp. 213-214), one derives two parallel tests of groups of four words, each with six acoustically similar and six acoustically neutral word groupings.

Examples for practice session:

a. big	long	great	tall
b. cow	day	key	few
c. man	mad	map	pan

First set of 12 groups:

1.	key	hot	cow	pen	7.	key	few	hot	book
2.	cab	cat	mad	can	8.	can	pan	tap	cab
3.	day	cow	wall	bar	9.	tap	mat	pan	cat
4.	man	mad	pan	mat	10.	key	day	cow	bar
5.	pen	wall	book	key	11.	cab	cap	cat	tap
6.	book	bar	wall	hot	12.	cab	man	mad	map

Second set of 12 groups:

1.	bar	pen	few	day	7.	few	day	cow	book
2.	mat	can	cap	man	8.	cap	man	mad	tap
3.	few	pen	hot	wall	9.	key	book	day	hot
4.	day	cow	bar	wall	10.	cab	tap	man	cat
5.	cap	pan	cat	can	11.	can	cap	pan	mad
6.	man	mad	mat	pan	12.	pen	few	wall	cow

<u>Instructions for Serial Recall</u>

"I am going to say some words. When I am finished I want you to say the words just the way I said them. There will be four words in each group. I'll repeat the instructions. I am going to say some groups of words. When I am finished I want you to say the words just the way I said them. Let's try a group of words. Ready? <u>big</u>, <u>long</u>, <u>great</u>, <u>tall</u>. (Pause) You should have said, <u>big</u>, <u>long</u>, <u>great</u>, <u>tall</u>. Each time I say a group of four words, I want you to say the words in exactly the same order that I do. Let's try another group of words. Ready? <u>cow</u>, <u>day</u>, <u>key</u>, <u>few</u>. (Pause) You should have said, <u>cow</u>, <u>day</u>, <u>key</u>, <u>few</u>. Let's try one more group of words. Ready? <u>man</u>, <u>mad</u>, <u>map</u>, <u>pan</u>. (Pause) You should have said, <u>man</u>, <u>mad</u>, <u>map</u>, <u>pan</u>. You see, when I say a group of words, I want you to say the same words just as I do. Now let's try some other groups of words. Ready? (Begin test.)

(from Das et al., 1979, p. 214)

Measure Three: Free Recall (FR)

The Serial Recall test was scored on a free recall basis, thus creating a second score from the one administration (serial position was not required, only recall of all four words in each series was counted).

Measure Four: Color Naming (CN)

This task taps the speed of processing factor outlined by Das et al. (1979). It is based on one of the three tasks developed by Stroop (1935) (also see Jensen and Rohwer, Jr., 1966). Eight rows of colored bars with five positions in a row were presented on a white background card measuring 28" x 30". The colored bars were 3" long and 3/4" wide, with red, green, yellow, and blue bars alternating, for a total of 10 presentations of each color, thus replicating the Stroop (1935) task.

After a preliminary check for color blindness, the subject was placed seven feet from the card, and then was asked to name each color successively, by rows. The score was the time, in seconds, that it took the child to complete the task.

For the post-measure, the white background card was simply turned upside-down, providing a parallel form of the task (original order of colored bars = Form I; upside-down version = Form II).

Instructions for Color Naming:

"I have here a board with strips of different colored bars. The colors are red, blue, green, and yellow. When I turn the board over, I want you to start here at the top left (point) and name the colors going across. When you finish the first row, go here (point to the second row left) and work across. Name all the colored bars in this way (demonstrate the pattern with your finger). Remember, you are being timed, so name the colors as quickly as you can. Are you ready? (Turn board over.) Begin. (Start stopwatch.) (adapted from Das et al., 1979, p. 217)

Color Chart

Red	Green	Yellow	Green	Blue
Green	Blue	Yellow	Red	Blue
Blue	Green	Red	Yellow	Red
Yellow	Red	Blue	Green	Yellow
Blue	Yellow	Red	Blue	Green
Yellow	Red	Green	Yellow	Blue
Blue	Green	Red	Yellow	Green
Red	Yellow	Blue	Green	Red

Measure Five: Ideational Fluency (Fi)

The last two pre-, post-measures are taken from the Comprehensive Ability Battery, or CAB (Hakstian & Cattell, 1976). The guiding principle in the development of the CAB was to provide a broad battery of short tests providing researchers with an economical vehicle for assessing a wide, or comprehensive (Hakstian & Bennet, 1977) range of the important ability constructs. There are 20 tests in the CAB, each one designed to measure a single ability factor.

The fifth pre-, post-measure, Ideational Fluency (Fi), from the CAB, is concerned with producing ideas about a given topic rapidly and without much attention to quality. This Fi task is of the "attribute-listing" type, in which subjects must list as many adjectives as they can, in a fixed time, that could be applied to a given thing. Ideational fluency is important in school and occupational situations in which fluent and productive idea generation is required.

Directions for Ideational Fluency (Fi) Measure

The directions in the CAB booklet require written responses. However, in order to lessen the difficulty of the task, especially for the LD children, oral responses were requested and recorded by the examiner. The directions were also simplified for use with school-aged children and were elaborated when necessary:

"In this test, you are to tell me as many single words (adjectives) as you can that describe a certain thing. Remember, an adjective is a word that describes or tells about something. For example, if I say 'blue sky,' 'blue' is a word or adjective that describes 'sky;' it tells me what kind of sky it is. If I say 'little puppy,' 'little' is an adjective that describes 'puppy.'

Can you tell me an adjective that you might use to describe 'cake?' ... Good. Can you tell me an adjective that you might use to describe a 'dark cave?' ... Good.

Do not tell me objects related to the thing, like 'children' for CLASSROOM. Do not tell me more than one word that means the same thing, such as 'big,' 'large,' 'enormous,' and so forth, because you would get only one point for all of them. But you <u>may</u> use opposites, so that 'big' and 'small,' to describe a CLASSROOM, would each get a point.

Now try the following example:

Example X (30 seconds)

Tell me as many words (adjectives) as you can that might describe a <u>MOUNTAIN STREAM</u>

____

____

______________________________ ...

You might have listed: cold, warm, gurgling, rushing, beautiful, etc. But saying 'fish,' for example, would <u>not</u> get a point."

<u>Ideational Fluency I (Fi I)</u>:

"Now you will have two minutes to tell me as many words as you can that describe a <u>NEW RED CAR</u>."

<u>Ideational Fluency II (Fi II)</u>:

"Now you will have two minutes to tell me as many words as you can that describe a <u>LARGE CITY</u>."

[The CAB allows 1 1/2 minutes for this test, but this time limit was modified to two minutes for all children, LD and NLD.]

Hakstian and Cattell (1976) assess Ideational Fluency by taking the sum of an individual's scores on Fi-Part I, Fi-Part II, and Fi-Part III, but for the purposes of this study, Ideational Fluency Part I (or Part II for counterbalancing) was taken as the pre-measure score, and Ideational Fluency Part II (or Part I for counterbalancing) was taken as the post-measure score. [The Ideational Fluency scores for the post-measures were calculated by the main investigator before the children were finished with the session, and, therefore, before becoming aware of the children's experimental condition assignment.]

Measure Six: Aiming (A)

The Aiming (A) pre-, post-measure was also taken from the Comprehensive Ability Battery (CAB) (Hakstian & Cattell, 1976). Aiming refers to the carrying out of precise movements which require eye-hand coordination and which are done under timed conditions. Aiming is a psychomotor ability which may be considered one of fine muscle dexterity, primarily manual. On the Aiming test, the examinee draws finely controlled pencil lines, as quickly as he can, in specially constructed figures. This test was chosen because this researcher is interested in eye-hand coordination skills, skills which are important in both school and work situations. This test also seemed more "pure" as a test of visual-motor coordination than the Bender Visual Motor Gestalt Test (Bender, 1938) or the Beery/Buktenica Developmental Test of Visual-Motor Integration (Beery, 1967), or the various coding tasks which have been used in other studies. Coding tasks, in general, involve short-term visual memory, visual perception for directionality of symbols, good fixation ability for keeping one's place while working, together with some understanding of a code's concept, in addition to eye-hand control and motor speed. The CAB Aiming test, on the other hand, uses only one figure so that it becomes more exclusively a task of eye-hand coordination and motor speed. While the Color Naming test required a verbal response, under timed conditions, this test required a paper-and-pencil motor response under timed conditions, and should thus provide additional information regarding respective performances of LD and NLD children on similar skills important for school success.

Directions for Aiming (A):

The directions were identical to those provided in the CAB test booklet. Each subject was given two sharp pencils and the instruction page was read aloud by the examiner as the subject read along. If necessary, the directions were repeated, extended, or elaborated until the examiner was satisfied that they were understood. [See Appendix 9 for the complete page of directions along with a sample of the Aiming task.]

Either Aiming, Part I or Aiming, Part II was given as a pre-, or post-measure. Both Part I and Part II were identical and consisted of 35 test figures to be completed within a 2 1/2 minute time limit. The score was the number of correctly drawn figures completed within the time limit. [The Aiming scores for post-measures were calculated by the main investigator before the children were finished with the session, before the main investigator became aware of the children's experimental condition assignment.]

Experimental Task: Description and Procedure

Cover Story

For those subjects randomly assigned to the experimental manipulation (easy or difficult conditions), the confederate experimenter was introduced as a friend who was helping out and when ushered into the testing room alone with the subject, she said: "While we're waiting for Mrs. Haqq to do some more things with you, I wonder if you'd be kind enough to try out a board game that we're developing for children between the ages of eight and 12. Usually, two or three children would play it together, but since we're still making it up, we'd like to give it to children one at a time to see if it will work all right." [Confederate experimenter lays out board game, with toy cars, stimulus cards, etc. A schematic drawing of the board game, Round-Robin Racing, may be found in Appendix 11.]

Game Instructions for Round-Robin Racing

"This is a road race game. You begin by choosing either the red, yellow, or blue car. Beside each car you see a pile of cards in the same color as the car. So, for example, if you choose the red car, your game cards are the red cards. You get to move one square closer to the finish line each time you can tell me what is on the face or front of a card. Some of the cards you will find easy, and others may be more difficult, but they are all pictures or silhouettes of ordinary things. A silhouette is like this: (pointing to silhouette of a cow). On each card you will see a letter in the upper left-hand corner, like this ...(pointing)... so you tell me, for example, 'I think Card A is an elephant'... or, 'I think Card A is a carrot,' or whatever. There are 10 cards in each pile, and you have to get at least seven cards right in order to reach the winner's box. When two or three children play the game, when one child misses a card, the turn goes to the child in the next clockwise position, but since we are just trying this game out, you can go through all ten of the cards in a row. Do you have any questions?" [The confederate experimenter ensured that the directions were understood and then administered the expectancy of success measure for self and for other - Appendix 10.]

Then the confederate experimenter continued: "O.K. Now turn over the first card and give me the letter on it and tell me what it is." [Confederate experimenter recorded the responses.]

<u>Stimuli and Sequence for the Picture Cards</u>

	Easy Condition	Difficult Condition
1. rabbit (A) [top card]	easy	easy
2. hand (I)	easy	difficult
3. chair (B)	difficult	easy
4. umbrella (U)	easy	difficult
5. scissors (K)	easy	difficult
6. apple (S)	difficult	easy
7. lamp (R)	easy	difficult
8. basket (J)	easy	difficult
9. tree (M)	easy	difficult
10. cup (C)	easy	difficult

[The experimental picture cards are adapted from the Higgins-Wertman Test: Threshold of Visual Closure, 1968. The easy cards are from frame 1 of the booklets, and the difficult cards are from frame 13 of the booklets. The letters in parentheses after each stimulus item served as the identification for that card.]

An attempt had been made to choose an experimental task that would be straightforward in manipulating easy/difficult conditions, and also one that would not differentially penalize LD children. The former criterion is met more easily, however, than is the latter. It has been found (Rusch, 1971), for example, that good readers in Grade One scored higher on the Higgins-Wertman Test of Visual Closure than poor readers ($p < .01$). However, there may be no task on which no differences would be apparent, and with which one might easily manipulate easy versus difficult conditions. So it was decided to use the relevant frames of the Higgins-Wertman Test: Threshold of Visual Closure, which does require abilities that should be common to all children, whether learning disabled or not. The test requires knowledge of common objects and their structure or parts, and good visual functioning skills. Pilot testing had revealed that the stimuli and sequence of presentation of the stimuli were sufficient for manipulating easy versus difficult experimental conditions. (See Rusch, 1970, for reliability of the Higgins-Wertman Test of Visual Closure.)

Post-experimental Task Attribution Questionnaire

Each child in the easy condition was given the post-experimental task attribution questionnaire for evaluating the perceived contribution of the four causal factors - effort, luck, ability, and ease of the task - in successfully getting a racing car to the winner's box.

Each child in the difficult condition was given the post-experimental task attribution questionnaire for evaluating the perceived contribution of the four causal factors - effort, luck, ability, and difficulty of the task - in failing to get a racing car to the winner's box. [See Appendix 12 for the Post-Experimental Attribution Questionnaires.]

Expectancy of Future Success for Self and Other

Each child in either the easy or difficult condition was then given an expectancy of future success measure for self and for other. [See Appendix 13 for the Expectancy of Future Success for Self and Other measures.]

Ancillary Measures

Mood Measure

At the beginning and end of each testing session, each child (LD/NLD) in all conditions was given a mood measure (see Appendix 5), which consisted of a page with seven "faces" arranged vertically, labelled "very, very good" at the top, and "very, very bad" at the bottom. The faces had smiles or frowns representative of the range of affect from "very, very happy" to "very, very sad." The instructions were: "Please put an 'X' beside the face which best shows how you feel right now." Scores were recorded for the pre-experimental task affect measurement, and the post-experimental task affect measurement.

This mood measure has been used by several researchers (e.g., Rholes et al., 1980) in order to tap children's affect.

Debriefing

Easy Condition

Upon completing the administration of the post-measures (including the immediate marking of the Ideational Fluency and Aiming tasks), the primary investigator (D. Haqq), who was theretofore unaware of the experimental condition assignment of the specific child, said: "That's great, we're all finished. Just wait a moment and I'll see if Mrs. Healey wants to ask you about anything else." [Mrs. Healey waited just outside the testing room at this time.] Upon seeing that the post-measures had been given, Mrs. Healey said, "No, that's fine, we're all finished too."

Then, in the easy condition, the child was thanked for his participation and cooperation and the importance of the research - "Finding out what children really think about things" and "learning how children perform on various tasks such as remembering words, thinking up adjectives, and so forth" - was emphasized. It was pointed out to each child that, no matter what else, "trying hard" was the most important factor involved in school success. Each child was queried to find out if he had any questions about the research, and to check that the experience had been enjoyable.

Difficult Condition

In the difficult condition, following the administration of the post-measures (including the immediate marking of the Ideational Fluency and Aiming tasks), the primary investigator, who was theretofore unaware of the experimental condition assignment of the particular child, said: "That's great, we're all finished. Just wait a moment and I'll see if Mrs. Healey wants to ask you about anything else." [Mrs. Healey, the confederate experimenter, waited just outside the testing room at this time.] Upon seeing that the post-measures had been given, Mrs. Healey said: "Oh, Mrs. Haqq, I'm so sorry, but I'm afraid that I made a terrible mistake when I gave [child's name] the board game. Unfortunately, the cards got mixed up, and I gave him the cards that are meant for the <u>ADULT VERSION</u> of the game! [A discussion then ensued about how no child would be expected to get his car to the winner's box given the cards that were meant for adults. In fact, it was pointed out that even adults had difficulty with the adult cards.]

Mrs. Healey then had the child do the "easy" or success version of the board game, and upon successful completion, she administered the post-experimental task attribution questionnaire for the easy condition. The child was then thanked for his cooperation and debriefed in the same manner as described above (easy condition).

[In exchange for the privilege of using children from the two public school districts and the two parochial schools, especially since the WISC-R is an important diagnostic tool which should not be re-administered within a two-year period, the author submitted a psychoeducational report for children, both LD and NLD, to the respective school principal upon completion of all testing [with the consent of parent(s)/guardian(s)]. In many cases the author conferenced with principals, teachers, and parents for the LD and some NLD children in the study. In a few cases there was also communication with family physicians and hospital personnel. As well, parents of gifted NLD children were contacted by the author. If a medical problem became suspect during the testing, both school and parents were notified (e.g., suspected hearing impairment). Although parental permission was requested for release of certain scores (i.e., WISC-R and Woodcock-Johnson reading scores) to the school, the children in the study seemed unmindful of being specifically evaluated on these measures.]

CHAPTER V

Results of the Study

Demographic and Selection Variables

As shown in Table 5.1, results indicated that there were no statistically significant differences between the LD and NLD children on the age variable, F (1,66) = .12, p < .73, on socioeconomic status (SES), F (1,66) = .63, p < .43, or grade level, F (1,66) = 3.46, p < .07.

Results also indicated that there was no statistically significant difference between the two groups, LD and NLD, on Performance IQ as measured by the Wechsler Intelligence Scale for Children - Revised (WISC-R). Means of the LD and NLD groups for performance scale IQ were 111.77 and 111.47, respectively, F (1,66) = .02, p < .88. Recall that the two groups had deliberately been matched on Performance IQ, a more valid indication of intellectual potential for LD children than either the verbal IQ or the full scale IQ score.

The two groups (LD/NLD), however, were significantly different with respect to reading ability, with the mean for the LD group on reading achievement percentile = 19.93 (S.D.= 10.64), and the mean for the NLD group = 76.34 (S.D.= 14.55), F (1,66) = 316.71, p < .0001, thus validating subject selection criterion of reading percentile $\leq$ 40 (for age) for the LD subjects, and $\geq$ 50 (for age) for the NLD subjects.

[The statistical hypotheses tested were of the form: H_0: $mu_1 - mu_2 = 0$; H_1: $mu_1 - mu_2 \neq 0$. There will be no significant effect of group at the .05 level of significance on the variables listed.]

Table 5.1. Analysis of Variance Results for Descriptive Variables.

Variable		Mean	S.D.	$F(1,66)$	p
Age (in mos.)					
	LD[a]	127.67	8.92	.12	<.73
	NLD[b]	128.47	10.16		
Grade					
	LD	4.63	.81	3.46	<.07
	NLD	5.00	.80		
SES					
	LD	45.78	13.62	.63	<.43
	NLD	49.03	18.77		
Verbal IQ					
	LD	100.00	6.65	57.03	<.0001*
	NLD	116.18	10.13		
Performance IQ					
	LD	111.77	8.17	.02	<.88
	NLD	111.47	8.20		
Full Scale IQ					
	LD	105.70	6.21	28.11	<.0001*
	NLD	115.50	8.48		
Reading Percentile					
	LD	19.93	10.64	316.71	<.0001*
	NLD	76.34	14.55		

Reading Subtests				
Word Identification				
LD	30.97	4.14	102.71	<.0001*
NLD	39.92	3.15		
Word Attack				
LD	9.43	3.70	173.27	<.0001*
NLD	20.34	3.13		
Passage Comprehension				
LD	13.07	2.75	69.38	<.0001*
NLD	18.53	2.63		

[a] n = 30. [b] n = 38.

*p < .0001.

Pre-Task Attributions:

Hypothesis I.

There will be no group effect (LD/NLD) in external attributions (ease of the task or luck) on the "academic success" pre-experimental task attribution questionnaire.

Hypothesis II.

There will be no group effect (LD/NLD) in internal attributions (lack of ability or lack of effort) on the "academic failure" pre-experimental task attribution questionnaire.

[The statistical hypotheses tested were of the form: H_0: $mu_1 - mu_2 = 0$; H_1: $mu_1 - mu_2 \neq 0$. There will be no significant group effect at the .05 level of significance on external or internal attributions.]

Table 5.2. Analysis of Variance Results of Attributions for Academic Success (Pre-experimental Questionnaire).

Variable	Mean	S.D.	$F(1, 66)$	p
Effort Attribution				
LD	6.60	.62	.00	<.97
NLD	6.60	.68		
Luck Attribution				
LD	4.63	2.08	10.52	<.01*
NLD	3.05	1.93		
Ability Attribution				
LD	5.80	1.60	.42	<.52
NLD	5.58	1.22		
Ease/Difficulty Attribution				
LD	5.43	2.03	8.61	<.01*
NLD	4.00	1.98		

*$p < .01$.

A multivariate analysis of variance (MANOVA; SPSS^{X} Users Guide, New York: McGraw-Hill Book Company, 1983) examining group differences regarding causal attributions for academic success revealed group differences significant at the .01 level: F (4,63) = 3.53, $p < .01$. Further univariate analyses of variance (ANOVA) revealed significant group differences on attribution to luck, F (1,66) = 10.52, $p < .01$, and on attribution to ease of the task, F (1,66) = 8.63, $p < .01$. Thus, LD children, to a greater extent than NLD children, attributed academic success to luck or ease of the task, both external attributions. This finding is consistent with the literature (e.g., Bryan and Pearl, 1979; Pearl, Bryan, and Donahue, 1980). Hypothesis I. is therefore not supported, and the alternative hypothesis is tenable.

Table 5.3. Analysis of Variance Results of Attributions for Academic Failure (Pre-experimental Questionnaire)

Variable	Mean	S.D.	$F(1,66)$	p
Effort Attribution				
LD	3.90	2.31	4.72	<.03*
NLD	5.08	2.15		
Luck Attribution				
LD	3.17	2.20	1.13	<.29
NLD	2.66	1.74		
Ability Attribution				
LD	3.00	2.18	.06	<.80
NLD	3.13	2.12		
Ease/Difficulty Attribution				
LD	4.87	1.81	.59	<.44
NLD	4.53	1.81		

* $p < .05$.

A multivariate analysis of variance (MANOVA; SPSS^{X}, 1983) examining group differences regarding all four causal attributions - effort, luck, ability, and difficulty - for academic failure, failed to reach statistical significance. [A further univariate analysis of variance (ANOVA), however, revealed that NLD children were significantly more willing to ascribe academic failure to their own lack of effort, F (1,66) = 4.72, $p < .03$. Dweck (1975) has demonstrated that willingness to ascribe failure to effort is a characteristic of mastery-oriented children, children who persevere in the face of difficulty.]

Hypothesis II is therefore tenable. There was no difference between the LD and NLD groups in the causal ascription of lack of ability for academic failure, F (1,66) = .06, $p < .80$. However, they did differ in the ascription of lack of effort for academic failure, F (1,66) = 4.72, $p < .03$.

Post-Task Attributions:

Hypothesis III.

There will be no group effect (LD/NLD) in external attributions (ease of the task or luck) after success on the experimental task.

Hypothesis IV.

There will be no group effect (LD/NLD) in internal attributions (lack of ability or lack of effort) after failure on the experimental task.

[The statistical hypotheses tested were of the form: H_0: $mu_1 - mu_2 = 0$; H_1: $mu_1 - mu_2 \neq 0$. There will be no significant effect of group at the .05 level of significance on external or internal attributions.]

Table 5.4. Table of Means and Standard Deviations for the Post-Task Attributions According to Group and Condition.

EFFORT ATTRIBUTION

	Easy Condition		Difficult Condition	
	M	SD	M	SD
LD	5.33	1.56	2.20	1.81
NLD	6.08	1.00	2.69	1.74

LUCK ATTRIBUTION

	Easy Condition		Difficult Condition	
	M	SD	M	SD
LD	1.83	1.19	3.70	2.58
NLD	3.08	1.98	2.12	1.41

ABILITY ATTRIBUTION

	Easy Condition		Difficult Condition	
	M	SD	M	SD
LD	5.50	1.51	3.00	2.05
NLD	5.25	1.36	2.56	1.46

EASY/DIFFICULT ATTRIBUTION

	Easy Condition		Difficult Condition	
	M	SD	M	SD
LD	4.42	1.78	4.50	2.17
NLD	3.83	2.25	4.50	1.71

A multivariate analysis of variance (MANOVA; SPSS[x], 1983) revealed no significant group differences, and no significant group by condition differences. There was a highly significant difference due to condition, however, $F\ (4,43) = 18.21$, $p < .01$. Both LD and NLD children ascribed greater causality to effort and ability in the easy (success) condition. The univariate F-test for effort was $F\ (1,46) = 54.08$, $p < .01$; the univariate F-test for ability was $F\ (1,46) = 33.35$, $p < .01$.

Mention should be made as well of one significant group by condition interaction effect for luck, univariate $F\ (1,46) = 7.51$, $p < .01$. In the easy condition, the NLD children made greater external attributions to luck, while in the difficult condition, the LD children made greater external attributions to luck.

Overall, therefore, Hypotheses III and IV are tenable, since there were no group effects. There was, however, a significant effect due to condition.

Performance on Pre-, Post-Measures:

Hypothesis V.

1. There will be no group effect (LD/NLD) on the six pre-, post-measures scores.
2. There will be no condition effect (easy/difficult/no task) on the six pre-, post-measures scores.
3. There will be no significant joint effects of group membership and condition on the six pre-, post-measures scores.

[The statistical hypotheses were of the form: H_0: $mu_1 - mu_2 = 0$; H_1: $mu_1 - mu_2 \neq 0$. There will be no group effect, no condition effect, and no joint effects of group membership and condition at the .05 level of significance on the six pre-, post-measures.]

[Refer to Appendix 14 for the Table of Means and Standard Deviations for Pre-Measures According to Group, Condition, and Order, and to Appendix 15 for the Table of Means and Standard Deviations for Post-Measures According to Group, Condition, and Order.]

Hypotheses V. 1., 2., 3., were studied through a series of repeated measures analyses of variance (BMDP:2V, University of California Press, 1981; see Dixon, 1981), multivariate analyses of variance (MANOVA; $SPSS^x$, 1983), and discriminant analyses ($SPSS^x$, 1983). Initial analyses.

Two omnibus repeated measures analyses of variance were performed (taking LD and NLD data separately) with two grouping variables, condition at three levels (easy, difficult, and no task), and order of presentation of pre-, post-measures at two levels (Set A first; Set A_B first) (BMDP:2V, University of California Press, 1981; see Dixon, 1981). The dependent variables were the six pre-, post-measures at two occasions and six (number of measures) levels. Results of these two initial analyses demonstrated significant effects for measures only. The scores on the six measures differed significantly for the two groups, LD and NLD. There were no significant level of condition, order of presentation, or occasion effects, and only a very minor occasion x measure x order effect. Therefore, Hypothesis V.1. is not supported. There was a significant group effect on all six measures. Hypotheses V.2. and V.3., however, are tenable, since no condition effects and no joint group by condition effects were found.

Hypothesis VI.

In the difficult (failure) condition, there will be no group effect (LD/NLD) regarding performance change on those post-measures, Serial Recall and Color Naming, which are most related to specific learning disabilities.

Repeated measures analyses (BMDP:2V, University of California, 1981; see Dixon, 1981) examining pre-, post-measures alone revealed no interaction for LD children, and very weak ordinal interaction for the NLD children.

While there were no significant pre-, post-, differences, the two groups' performances were significantly different on the six measures.

A multivariate analysis of variance (MANOVA; $SPSS^{x}$, 1983) on the pre-measures according to group (1,2), condition (1,2,3), and order (1,2), demonstrated significant order effects, $p < .02$, and group effects, $p < .01$. The discriminant analysis showed that the major contributing measure for group differences was the Serial Recall task (standardized discriminant function coefficient = -.76).

A multivariate analysis of variance (MANOVA) on the post-measures according to group (1,2), condition (1,2,3), and order (1,2), demonstrated a significant group x condition x order effect ($p < .05$), a significant group x condition effect ($p <$

.02 to $p < .06$), and a significant group effect ($p < .01$). The discriminant analysis showed that two measures contributed to group differentiation: Serial Recall (-.72) and Color Naming (.54) (standardized discriminant function coefficients for group effect).

A separate discriminant analysis ($SPSS^{X}$, 1983) also demonstrated that the two groups, LD/NLD, were differentiated mainly on the Serial Recall task (standardized canonical discriminant function coefficient = .90) on the pre-measures, and on Serial Recall and Color Naming (standardized canonical discriminant function coefficients = .70, and .50, respectively) on the post-measures.

Thus, the LD children performed significantly poorer on Serial Recall, a task involving successive or sequential processing, both on the pre-measure and on the post-measure. The LD children also demonstrated slower speed of processing on the Color Naming post-measure task. Thus, Hypothesis VI is not supported, but the alternative hypothesis of a group effect on Serial Recall and Color Naming is tenable.

<u>Expectancy Measures</u>:

<u>Expectancy for Self</u>.

<u>Hypothesis VII</u>.

1. There will be no group effect (LD/NLD) on the post-task "expectancy for self" measure.
2. There will be no condition effect (easy/difficult) on the post-task "expectancy for self" measure.

3. There will be no significant joint effects of group membership and condition on the post-task "expectancy for self" measure.

Before discussing the results of the hypotheses regarding the post-task "expectancy for self" measure, it should be pointed out that, on the pre-task "expectancy for self" measure, there was no difference between the LD and NLD groups, $F\ (1,48) = .01$, $p < .94$. Means of the LD and NLD groups were 7.00 and 7.04, respectively. [See Table 5.5.]

Table 5.5. Analysis of Variance Results for Expectancy for Self Pre-Task According to Group

Source	Sum of Squares	df	Mean Square	F	p
Group	.02	1	.02	.007	.94
Residual	134.96	48	2.81		
Total	134.98	49	2.76		

Post-task "expectancy for self" was examined through an analysis of covariance (SPSS^{X}, 1983) with two levels of group (LD/NLD) and condition (easy/difficult) with pre-task "expectancy for self" as the covariate.

[The statistical hypotheses, for main effects, were of the forms: $H_0: \alpha_i = 0$; $H_0: \beta_j = 0$; while the statistical hypothesis for the interaction effect was of the form: $H_0: \alpha\beta_{ij} = 0$. The corresponding statistical hypotheses tested were: There will be no significant effect of group at the .05 level of significance on the variable "post-task expectancy for self" when adjusted on "pre-task expectancy for self;" there will be no significant effect of condition at the .05 level of significance on the variable "post-task expectancy for self" when adjusted on "pre-task expectancy for self;" and there will be no significant joint effects of group and condition at the .05 level of significance on the variable "post-task expectancy for self" when adjusted on "post-task expectancy for self."]

Table 5.6. Table of Means and Standard Deviations for Expectancy for Self According to Group and Condition, Pre-, and Post-Task.

EXPECTANCY FOR SELF PRE-TASK

	Easy Condition			Difficult Condition			
	Mean	S.D.		Mean	S.D.		
LD	7.25	1.71	(n=12)	6.70	1.64	(n=10)	[6.98]
NLD	6.92	1.78	(n=12)	7.12	1.67	(n=16)	[7.02]
	[7.08]			[6.91]			[7.02]

EXPECTANCY FOR SELF POST-TASK

	Easy Condition			Difficult Condition			
	Mean	S.D.		Mean	S.D.		
LD	8.25	1.71	(n=12)	6.20	2.10	(n=10)	[7.22]
NLD	6.83	1.85	(n=12)	5.81	1.22	(n=16)	[6.32]
	[7.54]			[6.01]			[6.72]

Note. Marginal means are given in brackets.

Table 5.7. Analysis of Covariance Results for Expectancy for Self Post-Task According to Group and Condition with Pre-Task Expectancy for Self as the Covariate

Source	Sum of Squares	df	Mean Square	F	p
A Group	10.31	1	10.31	4.28	.04
B Condition	25.96	1	25.96	10.78	.01
AB	1.51	1	1.51	.63	.43
Error	108.33	45	2.41		
		48			

[A test for the equality of the slopes of the regression lines for each group was carried out. The test indicated that the null hypothesis of equality of slopes was tenable at the alpha = .01 level of significance.]

The analysis of covariance (refer to Table 5.7) revealed significant group differences, F (1,45) = 4.28, $p < .04$; significant differences according to condition, F (1,45) = 10.78, $p < .01$; and there was no significant joint effect of group and condition, F (1,45) = .63, $p < .43$. Therefore, Hypotheses VII, 1. and 2., are not supported, but Hypothesis VII, 3., is tenable.

Following the analysis of covariance, the means were adjusted for the covariate and are presented in Table 5.8. One notes that the adjusted means differ very little from the unadjusted means.

Table 5.8. Summary Table of Adjusted Means for Expectancy for Self (Post-Task).

	Unadjusted Mean	Adjusted Mean
Group		
LD	7.22	7.24
NLD	6.32	6.32
Condition		
Easy	7.54	7.52
Difficult	6.01	6.06

Overall, the LD children expected to do better than did the NLD children, and both LD and NLD children in the easy condition had greater post-task self-expectancy.

Expectancy for Other.

Hypothesis VIII.

1. There will be no group effect (LD/NLD) on the post-task "expectancy for other" measure.

2. There will be no condition effect (easy/difficult) on the post-task "expectancy for other" measure.

3. There will be no significant joint effects of group membership and condition on the post-task "expectancy for other" measure.

[The statistical hypotheses, for main effects, were of the form: $H_0: \alpha_i = 0$; $H_0: \beta_j = 0$; while the statistical hypothesis for the interaction effect was of the form: $H_0: \alpha\beta_{ij} = 0$. The corresponding statistical hypotheses tested were: There will be no significant effect of group at the .05 level of significance on the variable "post-task expectancy for other" when adjusted on "pre-task expectancy for other;" there will be no significant effect of condition at the .05 level of significance on the variable "post-task expectancy for other" when adjusted on "pre-task expectancy for other;" and there will be no significant joint effects of group and condition at the .05 level of significance on the variable "post-task expectancy for other" when adjusted on "pre-task expectancy for other."]

Before discussing the results of the hypotheses regarding the post-task "expectancy for other" measure, it should be pointed out that, on the pre-task "expectancy for other" measure, there was a trend for the LD subjects to expect more of "another boy" than for the NLD subjects, $\underline{F}$ (1,48) = 2.96, $\underline{p}$ < .09. Means of the LD and NLD groups were 7.77 and 6.79, respectively. [See Table 5.9.]

Table 5.9. Analysis of Variance Results for Expectancy for Other, Pre-Task, According to Group

Source	Sum of Squares	df	Mean Square	F	p
Group	12.00	1	12.00	2.96	.09
Residual	194.58	48	4.05		
Total	206.58	49	4.22		

Post-task "expectancy for other" was examined through an analysis of covariance ($SPSS^{X}$, 1983) with two levels of group (LD/NLD) and condition (easy/difficult) with pre-task "expectancy for other" as the covariate. [See Tables 5.10 and 5.11.]

Table 5.10. <u>Table of Means and Standard Deviations for Expectancy for Other According to Group and Condition, Pre-, and Post-Task</u>.

EXPECTANCY FOR OTHER PRE-TASK

	Easy Condition			Difficult Condition			
	M	*SD*		*M*	*SD*		
LD	8.17	1.70	(*n*=12)	7.30	2.36	(*n*=10)	[7.74]
NLD	6.67	1.87	(*n*=12)	6.88	2.16	(*n*=16)	[6.78]
	[7.42]			[7.09]			[7.22]

EXPECTANCY FOR OTHER POST-TASK

	Easy Condition			Difficult Condition			
	M	*SD*		*M*	*SD*		
LD	8.58	1.68	(*n*=12)	7.10	1.66	(*n*=10)	[7.84]
NLD	6.67	2.39	(*n*=12)	5.69	1.54	(*n*=16)	[6.18]
	[7.62]			[6.40]			[6.90]

Note. Marginal means are given in brackets.

Table 5.11. Analysis of Covariance Results for Expectancy for Other Post-Task According to Group and Condition with Pre-Task Expectancy for Other as the Covariate

Source	Sum of Squares	df	Mean Square	F	p
A Group	14.40	1	14.40	6.96	.01
B Condition	13.18	1	13.18	6.37	.02
AB	.03	1	.03	.02	.90
Error	93.07	45	2.07		
		48			

[A test for the homogeneity of the slopes of the regression lines for each group was carried out. The test indicated that the null hypothesis of equality of slopes was tenable at the alpha = .05 level of significance.]

Results of the analysis of covariance indicated a significant group effect, $F\ (1,45) = 6.96$, $p < .01$, a significant condition effect, $F\ (1,45) = 6.37$, $p < .02$, but no significant group x condition interaction effect, $F\ (1,45) = .02$, $p < .90$. Therefore, Hypotheses VIII, 1. and 2., are not supported, but Hypothesis VIII, 3., is tenable.

Following the analysis of covariance, the means were adjusted to take the covariate into account, and the adjusted means are presented in Table 5.12. One notes that the adjusted means differ very little from the unadjusted means.

Table 5.12. Summary Table of Adjusted Means for Expectancy for Other (Post-Task).

	Unadjusted Mean	Adjusted Mean
Group		
LD	7.84	7.55
NLD	6.18	6.43
Condition		
Easy	7.62	7.51
Difficult	6.40	6.47

Overall, the LD children expected "another boy" in their class to do better than did the NLD children. Both LD and NLD children had a higher post-task "expectancy for other" in the easy experimental condition.

Hypothesis IX.

There will be no group differences (LD/NLD) on the various subscales of Achenbach's (1981a) Child Behavior Checklist (especially the Depression subscale).

[The statistical hypotheses tested were of the form: H_0: $mu_1 - mu_2 = 0$; H_1: $mu_1 - mu_2 \neq 0$. There will be no significant effect of group at the .05 level of significance on the Social Competence and Behavior Problem scales of the Child Behavior Checklist.]

Child Behavior Checklist

Social Competence Scales

A multivariate analysis of variance (MANOVA; $SPSS^{X}$, 1983) examining the social competence items revealed group (LD/NLD) differences significant at the .01 level, F (3,64) = 42.86. Further univariate analyses of variance (ANOVA) revealed significant group differences on Social Competence Social, F (1,66) = 6.16, $p < .02$, on Social Competence School, F (1,66) = 127.57, $p < .01$, and on the Total Social Competence score, F (1,66) = 22.31, $p < .01$. There was no group difference on Social Competence Activities, F (1,66) = .73, $p < .40$. [See Table 5.13.]

Table 5.13. Analysis of Variance Results for the Social Competence Scales (Achenbach, 1981)

Scale	Mean	S.D.	F(1,66)	p
Social Competence Activities				
LD	7.92	1.89	.73	<.40
NLD	8.30	1.73		
Social Competence Social				
LD	6.41	1.86	6.16	<.02*
NLD	7.56	1.92		
Social Competence School				
LD	3.06	1.01	127.57	<.01**
NLD	5.15	.46		
Social Competence Total Score				
LD	17.40	3.38	22.31	<.01**
NLD	21.02	2.95		

* $p < .02$.

** $p < .01$.

Behavior Problem Scales

A multivariate analysis of variance (MANOVA; SPSS^X, 1983) examining the behavior problem scales revealed significant group (LD/NLD) differences, F (12,55) = 2.16, $p < .03$. Further univariate analyses of variance (ANOVA) revealed significant group differences at $p < .01$, or better, on the Depressed scale, F (1,66) = 7.61, $p < .01$, the Hyperactive scale, F (1,66) = 18.06, $p < .01$, for the Total Behavior Problem score, F (1,66) = 7.71, $p < .01$, and on the two second-order scales, Internalizing F (1,66) = 6.84, $p < .01$, and Externalizing F (1,66) = 9.11, $p < .01$. Univariate analyses of variance (ANOVA) revealed significant group differences at alpha level .05 on the Obsessive/Compulsive scale, F (1,66) = 4.91, $p < .03$, the Aggressive scale, F (1,66) = 3.83, $p < .05$, and the Delinquent scale, F (1,66) = 5.57, $p < .02$. [See Table 5.14.]

Table 5.14. Analysis of Variance Results for the Behavior Problem Scales.

Scale	Mean	S.D.	$F(1,66)$	p
Schizoid				
LD	1.70	1.76	3.36	<.07
NLD	1.08	1.00		
Depressed				
LD	5.43	5.06	7.61	<.01**
NLD	2.84	2.51		
Uncommunicative				
LD	2.87	2.49	2.67	<.11
NLD	1.97	2.02		
Obsessive/Compulsive				
LD	4.30	3.80	4.91	<.03*
NLD	2.63	2.38		
Somatic Complaints				
LD	1.33	1.09	2.35	<.13
NLD	.79	1.68		
Social Withdrawal				
LD	2.17	2.17	3.37	<.07
NLD	1.37	1.40		
Hyperactive				
LD	6.47	4.58	18.06	<.01**
NLD	2.76	2.50		
Aggressive				
LD	10.73	7.85	3.83	<.05*
NLD	7.50	5.78		

Delinquent				
LD	2.73	3.25	5.57	<.02*
NLD	1.34	1.46		
Other Problems				
LD	4.77	3.94	1.90	<.17
NLD	3.60	3.01		
Internalizing				
LD	12.93	10.44	6.84	<.01**
NLD	7.71	5.82		
Externalizing				
LD	18.17	12.78	9.11	<.01**
NLD	10.58	7.81		
Total Behavior Problem Score				
LD	34.40	24.80	7.71	<.01**
NLD	21.18	13.98		

* $p < .05$

** $p < .01$

Overall, Hypothesis IX is not supported. Rather, the alternative hypothesis is tenable. The LD children do differ significantly from the NLD children on two of the social competence scales, Social Competence Social, and Social Competence School, as well as on the Total Social Competence score; and they differ significantly on five of the nine behavior problem scales (Depressed, Obsessive/Compulsive, Hyperactive, Aggressive, Delinquent) as well as on the second-order factors of Internalizing and Externalizing, and on the Total Behavior Problem score.

As well, data from the NLD children do not differ from the norm group data reported for non-clinic children by Achenbach and Edelbrock, 1983, in Appendices 16 and 17. In order to evaluate the correspondence of Achenbach's non-clinic norm group with the NLD group from this study, the MINITAB program (Ryan, Joiner, and Ryan, Pennsylvania State University, 1981) was used since this program allows one to set the mean (mu) of one group to a single value. The mean scale scores for boys aged 6 - 11, non-clinic group (Appendix D, p. 211, in Achenbach and Edelbrock, 1983) were compared with the scale scores from the NLD data. [See Table 5.15 and Table 5.16.]

Table 5.15. Comparison of Means and Standard Deviations of the NLD Group with the Achenbach and Edelbrock (1983) Non-clinic Norm Group on the Social Competence Scales.

Scale	Mean	S.D.	T	p
Social Competence Activities				
NLD	8.30	1.73	1.42	<.16
Non-clinic	7.9	1.9		
Social Competence Social				
NLD	7.56	1.92	1.16	<.25
Non-clinic	7.2	1.7		
Social Competence School				
NLD	5.15	.46	3.33	<.01*
Non-clinic	4.9	1.0		
Social Competence Total Score				
NLD	21.02	2.95	1.93	<.06
Non-clinic	20.1	3.2		

* $p < .01$

Table 5.16. Comparison of Means and Standard Deviations of the NLD Group with the Achenbach and Edelbrock (1983) Non-clinic Norm Group on the Behavior Problem Scales.

Scale	Mean	S.D.	T	p
Schizoid				
NLD	1.08	1.00	-1.37	<.18
Non-clinic	1.3	1.4		
Depressed				
NLD	2.84	2.51	- .88	<.39
Non-clinic	3.2	3.4		
Uncommunicative				
NLD	1.97	2.02	- .08	<.94
Non-clinic	2.0	1.9		
Obsessive/Compulsive				
NLD	2.63	2.38	- .70	<.49
Non-clinic	2.9	2.8		
Somatic Complaints				
NLD	.79	1.68	- .04	<.97
Non-clinic	.8	1.3		
Social Withdrawal				
NLD	1.37	1.40	-1.46	<.15
Non-clinic	1.7	1.8		
Hyperactive				
NLD	2.76	2.50	-1.08	<.29
Non-clinic	3.2	2.9		
Aggressive				
NLD	7.50	5.78	.21	<.83
Non-clinic	7.3	5.7		

Delinquent				
NLD	1.34	1.46	1.45	<.16
Non-clinic	1.0	1.7		
Internalizing				
NLD	7.71	5.82	- .73	<.47
Non-clinic	8.4	6.7		
Externalizing				
NLD	10.58	7.81	- .17	<.86
Non-clinic	10.8	8.2		
Total Behavior Problem Score				
NLD	21.18	13.98	- .23	<.82
Non-clinic	21.7	15.0		

The NLD group was not significantly different from Achenbach's non-clinic norm group on the Social Competence Activities scale, $T = 1.42$, $p < .16$, the Social Competence Social scale, $T = 1.16$, $p < .25$, or on the Social Competence Total Score, $T = 1.93$, $p < .06$. However, the NLD group did have a higher mean on the Social Competence School scale (5.15 vs. 4.90), $T = 3.33$, $p < .01$.

There were no significant differences between the NLD group and Achenbach's non-clinic norm group on any of the Behavior Problem scales: Schizoid, $T = -1.37$, $p < .18$; Depressed, $T = -.88$, $p < .39$; Uncommunicative, $T = -.08$, $p < .94$; Obsessive/Compulsive, $T = -.70$, $p < .49$; Somatic Complaints, $T = -.04$, $p < .97$; Social Withdrawal, $T = -1.46$, $p < .15$; Hyperactive, $T = -1.08$, $p < .29$; Aggressive, $T = .21$, $p < .83$;

Delinquent, $T = 1.45$, $p < .16$; Internalizing, $T = -.73$, $p < .47$; Externalizing, $T = -.17$, $p < .86$; Total Behavior Problem Score, $T = -.23$, $p < .82$.

In the main, therefore, the NLD group did not differ from Achenbach's non-clinic norm group. [The one exception of the Social Competence School scale may be explained because the NLD group for this study was selected a priori as average or above in reading ability, a criterion which would facilitate higher scholastic achievement. The Achenbach norm group was not selected on this basis.]

While the LD and NLD groups differed significantly, and the NLD group corresponded generally with Achenbach's non-clinic norm group, it should be noted that the LD children were also significantly different from the clinic groups in Achenbach's studies. [See Table 5.17 and Table 5.18.]

Table 5.17. Comparison of Means and Standard Deviations of the LD Group and the Achenbach and Edelbrock (1983) Clinic Group on the Social Competence Scales.

Scale	Mean	S.D.	T	p
Social Competence Activities				
LD	7.92	1.89	4.71	<.01*
Clinic	6.3	2.3		
Social Competence Social				
LD	6.41	1.86	4.73	<.01*
Clinic	4.8	1.9		
Social Competence School				
LD	3.06	1.01	-2.90	<.01*
Clinic	3.6	1.2		
Social Competence Total Score				
LD	17.40	3.38	3.89	<.01*
Clinic	15.0	3.7		

* $p < .01$.

The LD children had greater social competence in the areas of activities, socializing, and on the total social competence score than did the Achenbach and Edelbrock (1983) clinic group. [Note, however, that the Social Competence School mean is lower for the LD children in this study as they had been selected *a priori* because of low reading ability, a factor associated with lower scholastic performance.]

Table 5.18. Comparison of Means and Standard Deviations of the LD Group and the Achenbach and Edelbrock (1983) Clinic Group on the Behavior Problem Scales.

Scale	Mean	S.D.	T	p
Schizoid				
LD	1.70	1.76	-5.59	<.01*
Clinic	3.5	2.6		
Depressed				
LD	5.43	5.06	-5.05	<.01*
Clinic	10.1	6.4		
Uncommunicative				
LD	2.87	2.49	-5.14	<.01*
Clinic	5.2	2.9		
Obsessive/Compulsive				
LD	4.30	3.80	-4.76	<.01*
Clinic	7.6	4.6		
Somatic Complaints				
LD	1.33	1.09	-2.84	<.01*
Clinic	1.9	2.3		
Social Withdrawal				
LD	2.17	2.17	-6.66	<.01*
Clinic	4.8	3.1		
Hyperactive				
LD	6.47	4.58	-3.15	<.01*
Clinic	9.1	4.1		

Aggressive				
LD	10.73	7.85	-5.84	<.01*
Clinic	19.1	9.2		
Delinquent				
LD	2.73	3.25	-4.33	<.01*
Clinic	5.3	4.1		
Internalizing				
LD	12.93	10.44	-5.34	<.01*
Clinic	23.1	12.2		
Externalizing				
LD	18.17	12.78	-5.2[illegible]	<.01*
Clinic	30.5	13.1		
Total Behavior Problem Score				
LD	34.40	24.80	-5.41	<.01*
Clinic	58.9	24.0		

* $p < .01$.

Thus, although the LD children displayed significantly more behavioral problems in some areas than did the NLD children in this study, they are not so behaviorally disordered as are a group of children referred to a child psychiatric facility. And, in the main, correspondence was demonstrated between the NLD group in this study and the norm group described by Achenbach and Edelbrock (1983).

Results of Ancillary Measures:

Attributions to Baseball Game (from attribution rating scale training).

Multivariate analyses of variance (MANOVAS; SPSS^{X}, 1983) were significant for group effects at the .01 alpha level for winning a baseball game, $F\ (4,63) = 4.14$, $p < .01$, and at the .02 alpha level for losing a baseball game, $F\ (4,63) = 3.32$, $p < .02$. In both situations the LD children attributed greater causality to _luck_ than did the NLD children. Univariate analyses for "winning game" revealed a significant group effect for luck, $F\ (1,66) = 10.05$, $p < .01$, and for "losing game," a significant group effect for luck, $F\ (1,66) = 10.27$, $p < .01$. [See Tables 5.19, and Table 5.20.]

Table 5.19. Analysis of Variance Results for Attributions for Winning Game.

WIN GAME

Attribution	Mean	S.D.	$F(1,66)$	p
EFFORT				
LD	6.43	.94	.87	<.36
NLD	6.18	1.20		
LUCK				
LD	4.13	2.19	10.05	<.01*
NLD	2.63	1.72		
ABILITY				
LD	5.93	1.01	.80	<.37
NLD	6.13	.81		
EASE				
LD	4.10	2.31	2.45	<.12
NLD	3.37	1.53		

* $p < .01$.

Table 5.20. Analysis of Variance Results for Attributions for Losing Game.

LOSE GAME

Attribution	Mean	S.D.	$F(1,66)$	p
EFFORT				
LD	4.10	2.34	1.87	<.18
NLD	4.82	1.97		
LUCK				
LD	3.93	2.08	10.27	<.01*
NLD	2.50	1.61		
ABILITY				
LD	3.03	1.96	.34	<.56
NLD	3.32	1.99		
DIFFICULTY				
LD	4.50	2.24	.00	<.96
NLD	4.53	1.83		

* $p < .01$.

Intellectual Achievement Responsibility Scale (IAR) (Crandall, Katkovsky, and Crandall, 1965), and Dweck's Measure of Mastery-Orientation versus Helplessness (Deiner and Dweck, 1978; 1980).

A multivariate analysis of variance (MANOVA) is inappropriate for analyzing the IAR scale because the subscales are linearly dependent. However, a univariate analysis of variance (ANOVA; SPSS^{X}, 1983) demonstrates that NLD children accept more personal credit (i.e., make internal attributions) for positive events (I^{+}) than do LD children. There were no group differences in ascription of responsibility for negative events (I^{-}), or for the total internalizing score (Total I). As well, there was no group difference on the Dweck mastery-orientation/helplessness measure, a subset of 10 items on the IAR scale (refer to Appendix 11). The median score on the Dweck measure was seven out of a possible ten, and it failed to discriminate between the two groups. [Diener and Dweck (1978; 1980) designate those scoring eight or more on this scale as mastery-oriented, and those scoring six or less as helpless. Those scoring seven, at the median, are dropped from the analyses.] [See Table 5.21.]

Table 5.21. Analysis of Variance Results for the Intellectual Achievement Responsibility Scale and Dweck's Measure of Mastery-Orientation versus Helplessness.

Scale	Mean	S.D.	$F(1,66)$	p
I^+ Scale				
LD	13.17	2.91	4.26	<.04*
NLD	14.37	1.87		
I^- Scale				
LD	11.40	2.66	.12	<.72
NLD	11.63	2.70		
Total I Score				
LD	24.57	4.20	2.20	<.14
NLD	26.00	3.76		
Dweck Measure				
LD	6.90	1.84	.90	<.34
NLD	7.34	1.95		

* $p < .05$.

Crandall et al. (1965) reported variable, but generally low, relations between I^+ and I^- scales (data include boys and girls, grades three to 12. For grades four to six, the correlations were:

Grade 4 (n = 103) r = .11

Grade 5 (n = 99) r = .11

Grade 6 (n = 166) r = .38*

* $p < .001$.

In this study, correlations between the I^+ and I^- scales were $r = .13$, $p < .24$, for LD students, and $r = .33$, $p < .02$, for NLD students.

Affect or Mood Measure

The affect or mood measures were analyzed through analyses of variance (ANOVAS; SPSS^x, 1983). The two groups, LD/NLD, did not differ on pre-experimental task affect, $F(1,66) = .115$, $p < .74$. Nor did the two groups, LD/NLD, differ on post-experimental task affect, no matter to which experimental condition they were randomly assigned:

Main effect for group: $F(1,46) = .004$, $p < .95$,

Main effect for condition: $F(1,46) = .325$, $p < .32$,

Group x Condition interaction: $F(1,46) = .408$, $p < .40$.

Thus, this was one check that there were no differential deleterious effects due to random assignment to the "difficult" experimental condition: affect scores were not influenced by either group membership or experimental condition. [See Table 5.22 and Table 5.23.]

Table 5.22. Pre-Task Affect Mean Scores According to Group.

LD (n=30)	5.67
NLD (n=38)	5.58

Table 5.23. <u>Post-Task Affect Mean Scores According to Group and Condition</u>.

	Easy Condition	Difficult Condition
LD	6.17 (n=12)	5.80 (n=10)
NLD	6.00 (n=12)	6.00 (n=16)

In addition, for those LD and NLD subjects randomly assigned to the difficult condition, a <u>last affect</u> measure was taken after the child subsequently completed the easy experimental task (upon debriefing). There were no significant differences between the LD and NLD children on this measure, F (1,24) = .70, p < .41. [See Table 5.24.]

Table 5.24. <u>Means and Standard Deviations for Last Affect</u>.

	Mean	Standard Deviation
LD (n=10)	5.90	1.37
NLD (n=16)	6.25	.77

<u>Enjoyment of the Experimental Task - Round Robin Racing</u>.

On the post-experimental task attribution questionnaire (see Appendix 12), each child in both the easy or difficult condition was asked: "How enjoyable did you find this game?" His response was recorded on a seven-point rating scale from "very, very enjoyable" to "not enjoyable at all." There was a significant group x condition interaction, F (1,46) = 4.82, p < .03. In the <u>easy condition</u> the <u>NLD</u> children expressed greater enjoyment of the experimental task, while in the <u>difficult condition</u>, the <u>LD</u> children expressed greater enjoyment. [See Table 5.25.]

Table 5.25. Means and Standard Deviations for Enjoyment of the Experimental Task According to Group and Condition.

	Easy Condition		Difficult Condition	
	Mean	S.D.	Mean	S.D.
LD	5.75	.87	6.40	.84
NLD	5.83	.94	5.31	1.01

Total Mean for LD = 6.04; Total Mean for NLD = 5.54

Bannatyne's Recategorization of WISC-R Scores

Recall that Bannatyne (1974) hypothesized a Spatial>Conceptual>Sequential pattern for LD students' WISC-R subtest scores and that this pattern has been consistently found for both reading disabled (Rugel, 1974) and learning disabled (Smith et al., 1977) children.

In this study, 19 out of 30, or 63.33% of the LD children, and seven out of 38, or 18.42% of the NLD children follow this Spatial>Conceptual>Sequential pattern. This represents a significant group difference, chi-square (1, N = 68)= 12.48, p < .01. A parallel analysis of variance reveals F (1,66) = 17.60, p < .01. Thus, for this sample, Bannatyne's hypothesized pattern of Spatial>Conceptual>Sequential for LD subjects is upheld. [See Table 5.26.]

The two groups were not differentiated by the Spatial category (Picture Completion, Block Design, and Object Assembly). However, the two groups were significantly differentiated by the Conceptual category (Comprehension, Similarities, and Vocabulary), the Sequential category

(Arithmetic, Digit Span, and Coding), and by the Acquired category (Information, Arithmetic, and Vocabulary):

Spatial category:

x^2 (16, N = 68) = 8.05, p < .95;

F (1,66) = .02, p < .88;

Conceptual category:

x^2 (23, N = 68) = 35.88, p < .04;

F (1,66) = 33.09, p < .01;

Sequential category:

x^2 (22, N = 68) = 34.41, p < .04;

F (1,66) = 29.40, p < .01;

Acquired category:

x^2 (24, N = 68) = 50.46, p < .01;

F (1,66) = 79.03, p < .01.

Table 5.26. Means and Standard Deviations for Bannatyne's Recategorization of WISC-R Scaled Scores

	Spatial		Conceptual		Sequential		Acquired	
	M	S.D.	M	S.D.	M	S.D.	M	S.D.
LD	36.93	4.47	32.00	4.16	26.93	4.14	28.37	3.54
NLD	37.10	4.48	38.95	5.48	32.53	4.28	37.16	4.41

Note. The means listed indicate the average of the summed scaled scores for the three relevant subtests.

CHAPTER VI

Discussion and Recommendations

Overview

Professionals working with learning disabled children have long been frustrated by the slow academic progress shown by such children even after thorough medical, psychological, and educational diagnoses and recommendations have been given and implemented. In recent years it has been recognized that academic achievement is not solely determined by academic or intellectual factors. Rather, several researchers (e.g., Weiner and colleagues, and Dweck and colleagues) have shown how cognitive/emotional reactions to success and failure are of great importance in understanding achievement-oriented behavior. A child's beliefs or attributions regarding the causes of behavior may mediate between antecedent transactions and resulting achievement behavior (e.g., Butkowsky & Willows, 1980). In this study, the contribution of cognitive, motivational, and behavioral factors, in particular, attributions for performance, was examined in order to evaluate the role such factors play in the academic progress of learning disabled children.

The experimental manipulation, the "Round-Robin Racing" board game, was successful. All children (LD/NLD) randomly assigned to the easy (success) condition did, indeed, succeed on the experimental task. Three of the LD subjects and one of the NLD subjects originally assigned to the difficult condition also managed to succeed on the task, thus becoming part of the "success" group. All other subjects randomly assigned to the difficult condition failed to succeed on the experimental board game task.

On the whole, while this study supports the results of earlier studies regarding learning disabled children's maladaptive attributions for imagined success/failure events, no support was found for differential LD/NLD attributions given an actual success or failure experience. In addition, several cognitive processing and behavioral differences between LD and NLD children were noted.

Results pertaining to the dissertation hypotheses will be discussed along with ancillary results as these relate to the hypotheses. Following the discussion of the results, an outline of the psychological and educational implications of the study will be given. Finally, some thoughts regarding future pertinent research will be outlined.

<u>Causal Attributions</u>

<u>Pre-Task Attributions</u>. The results of Hypothesis I revealed that learning disabled boys, compared with normally-achieving boys, aged 9-0 to 12-0, give evidence of a maladaptive attributional system when ascribing causes for an <u>imagined</u> successful academic performance. Given the pre-experimental task attribution questionnaire for "academic success on a test," the LD boys gave significantly greater causal ascriptions to "luck" and to "ease of the task," both external attributions. They viewed external forces as having a greater role in their success than did the NLD boys. This finding is consistent with the

literature (e.g., Bryan & Pearl, 1979; Pearl, 1982; Pearl, Bryan, & Donahue, 1980). Recall that Abramson et al. (1978) emphasize that internal, stable, and global attributions (i.e., ability and consistent effort) for success or positive events remain most adaptive. Note, however, that the LD boys, like the NLD boys, did ascribe quantitatively greater causality to ability and effort; they simply also ascribed a greater role to the external factors of luck and task ease. Given personal histories of academic failure, or at least lesser academic ease, this pattern would seem logical.

Results of Hypothesis II revealed that the LD and NLD boys ascribed similar levels of causality to bad luck, task difficulty, and lack of ability, in attributions for academic failure (pre-experimental task attribution questionnaire). This is inconsistent with the literature which has generally reported greater ascription of lack of ability for failure on the part of LD children (e.g., Pearl et al., 1980), and on the part of "helpless-oriented" children (Diener & Dweck, 1978; Dweck & Wortman, 1982). Recall that the central prediction of the learned helplessness reformulation (Abramson et al., 1978) is that individuals who have an explanatory style that invokes internal, stable, and global causes (i.e., ability) for bad events tend to become depressed when bad events occur. However, counterintuitively, in this study it was found that there were nearly equal numbers of mastery-oriented (13 LD; 17 NLD) or helpless-oriented (11 LD; 13 NLD) children.

The LD and NLD boys did differ, however, in the emphasis placed upon "effort." The NLD boys were significantly more willing to ascribe academic failure to their own lack of effort. Dweck and her colleagues (Dweck, 1975; Dweck & Reppucci, 1973) have demonstrated that willingness to attribute failure to a lack of effort is a characteristic of mastery-oriented children, children who persevere in the face of difficulty. An attribution to effort reflects an acknowledgement of "personal control," something which the LD child may not endorse as readily as the NLD child.

In a recently published study, Licht et al. (1985) examined the causal attributions of LD and NLD boys and girls. Measuring causal attributions through an EAX (Effort vs. Ability vs. External) Scale (modified from the scale used by Nicholls, 1979, and Pearl, 1982), the authors (Licht et al., 1985) found that in comparison with NLD boys, LD boys were less likely to attribute their failures to insufficient effort, and more likely to blame external factors. However, the LD boys did not differ from the NLD boys in the extent to which they attributed their failures to insufficient ability. Thus, the findings of this study correspond with the Licht et al. (1985) results, even though the measuring instruments for tapping causal attributions differed.

<u>Post-Task Attributions</u>. The unique part of this dissertation pertains to LD/NLD attributions after an actual easy (success) or difficult (failure) situation. There were no significant group differences in attribution patterns, overall. Results showed that both LD and NLD boys ascribed greater causality to "effort" and "ability" in the success (easy) condition, a most

adaptive pattern. There was demonstrated a significant effect due to experimental condition, thus providing evidence for the effectiveness of the success/failure or easy/difficult manipulation.

In addition, there was an interesting group by condition interaction effect for "luck" where, in the easy condition, the NLD children made greater external attribution to luck, while in the difficult condition, the LD children made greater external attribution to luck. This appears to be contrary to what is suggested by the literature. For example, in most studies, causal attributions of mastery-oriented subjects are to their abilities in success situations, and to changeable factors (such as luck) in failure situations. Helpless subjects generally do just the reverse (Dweck & Reppucci, 1973). However, here again, it is wise to recall that in this study the LD and NLD subjects were not differentiated by the Dweck mastery-orientation/helplessness-orientation measure. There were fairly equal numbers of mastery-oriented and helpless boys within each group (LD = 13 mastery-oriented and 11 helpless boys; NLD = 17 mastery-oriented and 13 helpless boys).

Generally, the most salient cue for luck attributions is the structure of the task. For example, flipping a coin, or drawing a playing card from a shuffled deck, will logically result in luck ascriptions for both success and failure. The more valid information for attribution to luck, however, comes from the pattern of outcomes. Independence and randomness of outcome, generally, indicate that luck is the causal factor responsible (although there can be a misperception of a chance task as skill-determined). Unique events may also yield luck attributions, e.g., finding money on the street or experiencing failure after a series of successes (e.g., Feather, 1969; Feather & Simon, 1971b). The experimental task, as it was administered only one time, may accurately have been perceived as a unique event. [Parenthetically, it should be recalled that the LD boys gave greater ascriptions to "luck" for <u>both winning and losing</u> a baseball game, during the attribution rating scale training.]

It seems that the NLD boys perceived a greater element of chance in the experimental task given the easy (success) condition, while the LD boys perceived a greater contribution of chance in the difficult (failure) condition. Perhaps the LD boys made greater luck ascriptions in the difficult condition as a means of saving face. The clearest finding of what appears to be a motivated error in attribution is that individuals are prone to accept credit for success while placing the blame for failure on an external cause (e.g., Miller, 1976; Miller & Ross, 1975).

Objectively, there was only the slightest element of chance in the experimental task. The visual closure type of task was chosen to manipulate success/failure but with an allowance for the possibility of success under both experimental conditions. Insoluble anagrams, for example, seemed too manipulative and arbitrary, and it was desired that the children perceive some possibility of success under either condition. All children randomly assigned to the easy condition succeeded; and three of the LD subjects and one of the NLD subjects originally assigned to the "difficult" condition managed to succeed on the experimental task, thereby ending up in the "success" or "easy" experimental condition. So while the cards were literally "stacked against them" in the difficult condition, there also remained some outside chance of success. [Pilot testing of the experimental manipulation was carried out before the study began.]

Subjective task difficulty is, in part, a function of the perceived performance of other individuals at the task. If many other individuals succeed, then the task is "easy;" but if few succeed, then it is "difficult." Thus, consensus information is a key cue in inferring difficulty. But in this study, no information was given regarding the performance of others on the experimental task. In giving the instructions for the experimental board game, the confederate experimenter said only: "Some of the cards you will find easy, and others may be more difficult, but they are all pictures or silhouettes of ordinary things."

The easy/difficult task attribution revealed no group differences. Indeed, the mean attribution to task difficulty in the difficult or failure condition was identical for both LD and NLD subjects. This finding was heartening in that the task was deliberately and painstakingly chosen to be equally easy/difficult for both LD and NLD subjects. The desire was to find a task which would not differentially penalize the LD student: the results suggest that this was indeed the case.

While the two groups (LD/NLD) were not differentiated on the Dweck mastery-orientation versus helplessness measure, they were differentiated on the I^+ measure of the Intellectual Achievement Responsibility Scale (Crandall et al., 1965). The LD boys accepted far less credit or responsibility for positive events than did the NLD boys. This corresponds with the finding that the LD boys gave significantly greater causal ascriptions to "luck" and "ease of the task" (external factors) on the pre-experimental task attribution questionnaire. The results of both these measures provide evidence of a sense of <u>lack of personal control or self-efficacy</u> (e.g., Bandura, 1977; 1981; Schunk, 1981) regarding positive outcomes or events on the part of the LD children.

The two groups did not differ in ascription of responsibility for negative events, I^-, or on the Total I score, which combines scores for both positive and negative events.

Thus, the LD and NLD groups differed more on their attributions for "success" than for "failure." The LD boys attributed success on the pre-experimental task questionnaire to "luck" and "ease of the task" significantly more than did the NLD boys; and they attributed winning the baseball game (attribution rating scale training) to "luck" more than did the NLD boys. As Licht (1983) has remarked: "It has been noted, however, that when explanations for success and failure are examined separately, the tendency for LD children to make external attributions occurs primarily when explaining their successes (Boersma & Chapman, 1981; Chapman & Boersma, 1979b; Pearl et al., 1980; ...)."

The LD boys in this study, on both the pre-experimental and post-experimental attribution questionnaires, did not attribute failure to "lack of ability," as in other reported studies (e.g., Pearl et al., 1980). It is unlikely that this is due to subject population differences since researchers in this area have used both American and Canadian subjects. Much of the learned helplessness research has used Canadian populations (e.g., Boersma & Chapman, 1978; 1981; Butkowsky & Willows, 1980; Chapman & Boersma, 1979(a); Kuiper, 1978; Thomas & Pashley, 1982). Butkowsky and Willows (1980), for example, reported that poor readers displayed characteristics indicative of learned helplessness, i.e., attributions of failures to lack of ability.

Ability inferences are primarily determined by information about the past. Repeated success or failure, in part, suggests whether an individual "can" or "cannot" (Heider, 1958, gave the label "can" to one's perceived level of ability in relation to the perceived difficulty of the task). Therefore, consistency is an important cue for ability inferences. But learning disabled students are notorious for their variable and inconsistent performance. On some days an LD child will accomplish very little, while on other days he or she will astound classroom teachers by producing quite praiseworthy schoolwork. Thus, the inconsistency of overall performance may lead the LD child to ascribe failure to causes other than lack of ability, since there are some occasions when school performance demonstrates good ability.

Regarding effort attributions, individuals generally use performance or outcome information to infer how hard they tried, even in chance situations (e.g., Kukla, 1972; Weiner & Kukla, 1970). One attributional explanation of this perception (or misperception) is that, in one's life, effort and outcome generally covary. Therefore, given a positive outcome, an individual infers the presence of effort, while given a negative outcome, the individual infers the absence of effort (Weiner, 1980). In this regard, the LD boys were no different from the NLD boys. Given the easy (success) condition, they ascribed success to good effort, but given the difficult (failure) condition, they ascribed a lesser role to effort.

Pre-, Post-Measure Differences

It had been hoped, as outlined in Chapter IV, the Method chapter, that the selected pre-, post-measures might prove heuristic for future studies comparing the performances of LD and NLD children. Results of this study showed that the tasks which most differentiated the LD and NLD children were the "Serial Recall" (on both pre- and post-measures) and "Color Naming" (post-measure only) tasks (see Das et al., 1979).

The Serial Recall task has been found to contribute to a "successive factor" in many factor analytic studies (e.g., Das, 1980; Das et al., 1975; Das, Leong, & Williams, 1978). Successive synthesis is a form of information organization which does not permit analysis of the relationship of multiple elements to one another. Instead, information is organized in a temporal, sequence-dependent fashion, with only limited acquisition to individual elements (see Das et al., 1979).

Successive synthesis is seen as a function of the anterior (fronto-temporal) regions. Lesions in the frontal and fronto-temporal regions have been reported to result in a general inability "...to integrate individual motor and acoustic stimuli into successive, serially organized groups (Luria, 1966b, p. 125, italics in the original)."

Duffy et al. (1980a; 1980b), who topographically mapped their dyslexic subjects' brain electrical activity, disclosed four discrete regions of difference between the two groups (dyslexics and normals), involving both cerebral hemispheres, the left more than the right. Aberrant dyslexic physiology was not restricted to a single locus but was found in much of the cortical region generally involved in reading and speech. Conspicuous group differences were noted in the bifrontal area in addition to the more expected left temporal and left posterior quadrant regions. They noted also that an area previously unexplored in dyslexia, in the left anterior region, provided the best features derived from EEG data. Ongoing and future research will undoubtedly further illuminate the neurological correlates of learning disabilities.

The Color Naming task taps a "speed of processing" factor outlined by Das et al. (1979). Color Naming has been found to contribute to a "speed" factor in many factor analytic studies (e.g., Das et al., 1975; Das et al., 1978). [The speed factor is generally unrelated to the simultaneous-successive tests.]

One can gain an understanding of this Stroop-type task from the thorough review article by Jensen and Rohwer, Jr. (1966). These reviewers found that the most basic of the Stroop factors is probably the speed factor or "personal tempo," as Thurstone and Mellinger (1953) called it. Thurstone (1944) found that fast readers (subjects were 46 college freshmen) were significantly faster at color naming ($p < .05$) than were slow readers. And Jensen and Rohwer, Jr. (1966, p. 52) state that "Despite the significant improvement in color naming with practice, individual differences in color naming speed show remarkably little interaction with practice; Ss maintain pretty much the same rank order at every stage."

Five major neurological factors are most frequently cited as possible causes of learning disabilities: (a) structural damage; (b) physiological dysfunction; (c) abnormal cerebral lateralization; (d) maturational lag; and (e) environmental deprivation (Kolb & Whishaw, 1980). One view of the physiological or brain dysfunction hypothesis holds that the dysfunction results from defective "arousal mechanisms." Since the neocortex is normally activated by subcortical structures, it is argued that if the subcortical input were missing or abnormal, than a specific cortical region would dysfunction. This conclusion has been deduced from two principal sources. Firstly, Douglas and her colleagues (e.g., Douglas, 1976; Firestone & Douglas, 1975) have found that learning-disabled children have difficulty on continuous-performance tests which require them to react to particular stimuli while ignoring others (e.g., Stroop Color-Word Interference Test; Cohen, Weiss, and Minde, 1972). In a similar fashion, reaction-time studies show the children to have slower mean reaction times to signals (see Campbell et al., 1971). On tasks which involve visual searching, where the child is asked to search among several alternatives for a picture identical to a standard picture (e.g., Matching Familiar Figures Test; Kagan et al., 1964), learning disabled children choose impulsively and quickly, making many more errors than do normal children, who perform more slowly. Douglas (1976) concludes that the deficits on these types of tasks result from some form of inadequate cerebral activation. Douglas and several of her doctoral students have indeed found that performance on these forementioned tests is improved with cerebral stimulants such as amphetamine and caffeine (see Cohen et al., 1971). Jensen and Rohwer, Jr. (1966, p. 66) had reported earlier that "In general, stimulant drugs improve performance on all Stroop cards and decrease interference measures, while depressants and psychotomimetics (viz. LSD) have the opposite effect." Recall that, in general, the visual-evoked responses (VER) of MBD/SLD children have been reported as immature, demonstrating longer latencies and larger amplitudes, resembling the responses of younger normal children. Given that latencies presumably reflect the speed of mental processing, and given that latencies decrease with age, longer latencies represent immature responses (Accardo, 1980).

In any case, perhaps the significant difference between the LD and NLD groups on a task such as Color Naming, which taps speed of mental processing or "personal tempo" (Thurstone & Mellinger, 1953), should indicate to teachers of LD children that such children legitimately require extra time to both process information and to react to it.

Supplementary Interpretations Regarding Pre-, and Post-Measures.

Interesting differences on the pre-, post-measures were noted when a comparison was made of "all helpless LD versus NLD subjects", and "all mastery-oriented LD versus NLD subjects." The all helpless LD and NLD children differed significantly on only two of the pre-measures, Free Recall 1 (LD = 34.18; NLD = 39.15; F (1,22) = 4.52, $p < .04$), and Serial Recall 1 (LD = 28.73; NLD = 35.85; F (1,22) = 6.32, $p < .02$) and on none of the post-measures.

The all mastery-oriented LD and NLD children, however, differed significantly on all six pre-measures (immediately following) and on three post-measures (see Table 6.1): Raven 1 (LD = 10.31; NLD = 11.18; F (1, 28) = 5.72, $p < .02$); Free Recall 1 (LD = 36.08; NLD = 40.12; F (1, 28) = 9.94, $p < .01$); Serial Recall 1 (LD = 31.85; NLD = 37.24; F (1, 28) = 12.46, $p < .01$); Color Naming 1 (LD = 33.31; NLD = 28.47; F (1, 28) = 4.79, $p < .04$); Ideational Fluency 1 (LD = 5.38; NLD = 9.29; F (1, 28) = 5.83, $p < .02$); Aim 1 (LD = 10.31; NLD = 15.76; F (1, 28) = 16.17, $p < .01$). The all mastery-oriented LD and NLD children also differed on three post-measures (see Table 6.1).

Table 6.1. Means and Standard Deviations of "All Mastery-Oriented LD versus NLD Children" on Three Post-Measures.

Color Naming 2

	Mastery LD	Mastery NLD
Easy Condition	32.00 (5.57)	27.00 (6.23)
Difficult Condition	31.60 (6.11)	26.40 (3.47)

Main effect for Group, F (1, 20) = 5.06, p < .04.

Ideational Fluency 2

	Mastery LD	Mastery NLD
Easy Condition	4.00 (5.29)	10.17 (5.04)
Difficult Condition	3.60 (2.41)	8.50 (5.15)

Main effect for Group, F (1, 20) = 6.89, p < .02.

Aim 2

	Mastery LD	Mastery NLD
Easy Condition	16.00 (1.73)	12.83 (3.76)
Difficult Condition	9.60 (3.21)	18.80 (2.10)

Main effect for Group, F (1, 20) = 5.77, p < .03.

Group x Condition interaction, F (1, 20) = 24.25, p < .01

From this data, it appears that children who have a "helpless" orientation are differentiated only on those two tasks requiring sequencing or successive processing.

When comparing all "mastery-oriented" LD and NLD children, significant differences were found on all of the six pre-measures, and on three of the post-measures. The three post-measures involved speed of mental processing (all three tasks), verbal fluency (Ideational Fluency 2), and visual motor dexterity (Aim 2).

In analyzing data from LD subjects only, who are divided into helpless (n = 11) versus mastery-oriented (n = 13) categories, no differences arose on the pre-, or post-measures. However, when analyzing data from NLD subjects only, divided into helpless (n = 13) versus mastery-oriented (n = 17) categories, differences were noted on the pre-measure, Aim 1 (helpless NLD = 11.15; mastery-oriented NLD = 15.76; F (1, 28) = 14.39, p < .01), and on the post-measures Color Naming 2 (helpless NLD = 30.08; mastery-oriented NLD = 26.59; F (1, 28) = 4.47, p < .04) and Aim 2 (helpless NLD = 12.92; mastery-oriented NLD = 16.24; F (1, 28) = 5.05, p < .03). It would appear that speed of mental processing or "reaction time" is affected by a helpless orientation for NLD subjects.

In general, analyses and interpretations according to "helplessness orientation" versus "mastery orientation" are beyond the scope of this dissertation, which deals more specifically with comparisons between LD and NLD students in attributional style. However, these few forementioned results may inspire future research in the area of helplessness versus mastery-orientation.

Bannatyne's Recategorization of WISC-R Scores

For LD subjects, Bannatyne's hypothesized pattern of Spatial>Conceptual>Sequential was upheld in this study. This pattern is consistent with Bannatyne's (1971) description of genetic dyslexia. Moreover, the LD subjects in this study also fit Ryckman's and Elrod's (1983) subgroup of "genetic dyslexia," which required that Spatial be greater than Conceptual and that Sequential be 10 or more lower than Spatial. [The Ryckman and Elrod (1983) study demonstrated five subgroups of LD children within Bannatyne's recategorization paradigm. They (Ryckman & Elrod, 1983) felt that recognition of such intragroup variation would help clarify issues of diagnosis and remediation.]

The LD and NLD groups in this study were significantly differentiated on the Conceptual, Sequential, and Acquired categories (NLD scores were higher for all categories), but were not differentiated by the Spatial category. Remember, though, that the LD and NLD groups were initially matched on WISC-R performance scale IQ, and that the Spatial category is composed of three performance scale subtests - Picture Completion, Block Design, and Object Assembly. [Indeed, before matching, with a subject sample of 98 subjects (44 LD; 54 NLD), the two groups were significantly differentiated on all categories, including the Spatial category beyond the alpha = .01 level.]

Expectancies for Self

There were no differences between LD and NLD boys in "expectancy for self," pre-task. However, group differences were revealed in post-task self-expectancy ratings. The LD children, across conditions, expected to do better. In addition, on the post-task rating scale, both LD and NLD children gave higher self-expectancy ratings in the "easy" condition, and lower self-expectancy ratings in the "difficult" condition. Such typical shifts in expectancy, i.e., increments in expectancy after success and decrements after failure, have been found to result from attribution or ascription of an outcome to stable factors (Weiner et al., 1976). These stable factors may be perceived ability or perceived easiness or difficulty of the task (in skill- rather than luck-determined settings). Success ascribed to high ability or to the ease of the task has been found to lead to greater increments in the subjective expectancy of future success at that task than does success ascribed to good luck (McMahan, 1973). As well, failure ascribed to low ability or to the difficulty of the task decreases the expectancy of future goal attainment more than does failure ascribed to bad luck or to a lack of effort (Valle & Frieze, 1976).

Overall, the LD youngsters expected to do better than did the NLD youngsters. Both groups displayed typical shifts in self-expectancy, i.e., increments after success, and decrements after failure.

Expectancies for Other

On the "expectancy for other," pre-task, there was a trend for the LD children, compared to the NLD children, to expect better performance for "another boy." And, for "expectancy for other," post-task, regardless of condition, the LD children gave higher expectancy of success ratings for "other" than did the NLD children.

Both LD and NLD children had a higher post-task "expectancy for other" in the easy experimental condition.

Child Behavior Correlates

Examination of the Child Behavior Checklist (CBCL) results lead to the conclusion that the LD and NLD boys are indeed significantly different in a number of competency areas and on a number of behavior problem scales.

Achenbach and Edelbrock (1981) reported that among the social competence items, the open-ended item requesting parents to report school problems showed the largest effects of clinical status, with other items tapping school functioning and social behavior also showing large effects of clinical status. However, the total scores for behavior problems and for social competence showed larger effects than any of their individual component items. In this study, there were significant differences between LD and NLD boys on all the forementioned scores. There were group differences at the alpha = .01 level for Social Competence School, and Social Competence Total Score; and a group difference at the alpha = .02 level for the Social Competence Social scale. (There was no significant difference, however, between the LD and NLD boys on the Social Competence Activities scale.) The reader should nevertheless also keep in mind the fact that the LD boys' scores on both the competency scales and the behavior problem scales were also significantly different from those of Achenbach's clinic population (at alpha = .01 level). The LD children had significantly greater competence for Social Competence Activities, Social Competence Social, and on the Social Competence Total Score. However, the LD children were significantly lower on the Social Competence School scale, having been chosen _a priori_ for low reading ability. On the behavior problem scales, the clinic sample scored significantly higher (worse) than the LD group (alpha = .01 level).

Regarding the behavior problem scales, Achenbach and Edelbrock (1981) have reported that the largest main effects of clinical status across age/gender groups were the items "Unhappy, sad, or depressed," and "Poor school work." The item "Unhappy, sad, or depressed," #103, contributes to two behavior scales, the Depressed scale, and the Uncommunicative scale, and the second-order Internalizing scale, while the item "Poor school work," #61, contributes to the Hyperactive behavior scale, and the second-order Externalizing scale. The LD boys in this study differed significantly from the NLD boys on all of the forementioned scales, Depressed, Hyperactive, Internalizing, and Externalizing, at the alpha = .01 level. Achenbach and Edelbrock (1981) suggest that the fact that "Unhappy, sad, or depressed" was most strongly associated with referral status lends justification to the current upsurge in concern for childhood depression (e.g., Schulterbrandt & Raskin, 1977).

In addition to the Depressed, Hyperactive, Internalizing, and Externalizing scales, the LD and NLD boys differed significantly on the Total Behavior Problem Score (alpha = .01), and on the Obsessive/Compulsive, Aggressive, and Delinquent scales (alpha = .05 or less).

Again, it is important to keep in mind the fact that while LD boys' scores are significantly higher when compared with NLD boys', their scores are significantly lower when compared to a clinically referred population (alpha = .01 on all behavior problem scales). It should also be mentioned that the NLD boys in this study were comparable to the nonreferred boys used in Achenbach's norm group. There were no significant differences between NLD and non-clinic groups on any of the behavior scales, and no significant differences on all but one of the social competency scales. Understandably, the NLD children, who were selected as subjects by the criterion of a reading percentile score $\geq$ 50, had significantly higher scores on the Social Competence School scale.

It should be mentioned here that McConaughy and Ritter (1985) have recently published data on social competence and behavioral problems for 123 learning disabled boys aged 6 - 11. However, their subjects were those who had been referred for a psychoeducational assessment at the Center for Disorders of Communication at the University of Vermont, while the subjects in this study were "school-identified" learning disabled youngsters. In the McConaughy and Ritter (1985) study, LD boys were significantly lower than the normative samples in their participation in activities (unlike this dissertation's sample), and in their social involvement and school performance (corresponding to this study's LD sample). As well, on the behavior problem scales, the LD boys had significantly higher scores for both "externalizing" and "internalizing" types of problems, including those related to depression, uncommunicativeness, obsessive-compulsive behaviors, social withdrawal, hyperactivity, aggressiveness and delinquency. These results correspond to those of this study except that the McConaughy and Ritter (1985) results demonstrated significant differences on the two additional behavior scales, "social withdrawal" ($p < .07$ in this dissertation), and "uncommunicativeness" ($p < .11$ in this dissertation). In addition, the total number of behavior problems was within what is considered the clinical range for children referred to mental health clinics, suggesting significant behavior disturbance, in the McConaughy and Ritter (1985) study. The total number of behavior problems reported in this dissertation, however, while significantly higher than the total for the NLD control group, was also significantly lower than the total for a clinic group. The "school-identified" LD boys from this study seem less disturbed, overall, than the "clinic-referred" LD boys of the McConaughy and Ritter (1985) study.

It would appear that LD children, as a whole, in relation to NLD children, are at a somewhat greater risk for psychopathology. Educators and other professionals dealing with LD children should be aware of this, and should attempt to evaluate LD children in psychological and behavioral areas as well as in educational ones. For example, several of the behaviors outlined by Colbert et al. (1982) as indicative of childhood depression (e.g., dysphoria; sadness; aggressive behavior; restlessness) are behaviors which differentiate LD and NLD children.

At the same time, it has to be recognized that for any specific LD child, personality or behavioral factors may or may not be particularly relevant to in-school or out-of-school performance. A review of the literature regarding depression, for example, points to the substantial contribution of genetic factors in the etiology of major depressive disorder. Recall that Welner (1978), in reviewing childhood depression, concluded that while it is not unusual to find depressive symptoms as well as low self-esteem in children with learning disorders and/or hyperactivity, such children, based upon follow-up and family studies of hyperactive children (Mendelson, Johnson, & Stewart, 1971; Menkes, Rowe, & Menkes, 1967), are not at a high risk to develop primary affective disorder. Organismic as well as environmental factors play a role in the development of psychiatric disorder.

It may be the case that another variable, together with social competency and behavioral factors, may provide a better means of understanding a child's motivation and subsequent performance. For example, if the LD and NLD groups are subdivided into mastery-oriented versus helpless categories and "all mastery-oriented LD and NLD children" are compared, there are significant group differences only for Social Competence

School (LD = 3.00; NLD = 5.18; F (1, 28) = 46.38, $p < .01$), Total Social Competence (LD = 17.50; NLD = 21.17, F (1, 28) = 11.05, $p < .01$), and Hyperactive (LD = 5.69; NLD = 3.06; F (1, 28) = 4.11 $p < .05$) scales. However, when "all helpless LD and NLD children" are compared, there are significant group differences on Social Competence School (LD = 3.16; NLD = 5.06; F (1, 22) = 51.65, $p < .01$), Total Social Competence (LD = 17.58; NLD = 20.47; F (1, 22) = 4.65, $p < .04$), Schizoid (LD = 2.36; NLD = 1.00; F (1, 22) = 6.01, $p < .02$), Obsessive/Compulsive (LD = 5.45; NLD = 2.00; F (1, 22) = 7.72, $p < .01$), Somatic Complaints (LD = 1.54; NLD = .54; F (1, 22) = 6.66, $p < .02$), Hyperactive (LD = 7.09; NLD = 2.23; F (1, 22) = 8.92, $p < .01$), and Internalizing (LD = 14.82; NLD = 7.54; F (1, 22) = 4.31 $p < .05$) scales, as well as on T score for Internalizing (LD = 59.27; NLD = 50.38; F (1, 22) = 5.40, $p < .03$), and T score for Externalizing (LD = 58.27; NLD = 48.69; F (1, 22) = 4.21, $p < .05$).

Interestingly, the "all mastery-oriented LD and NLD children" differed significantly on the I^+ scale of the Intellectual Achievement Responsibility Scale ($p < .03$), on the Total I scale ($p < .02$), and on the Dweck mastery/helplessness score ($p < .05$), with NLD children having higher scores on all of these measures. But the mastery-oriented LD and NLD children did not differ in ascription of responsibility for negative events, the I^- scale. Recall that a mastery-oriented child, by definition (Diener & Dweck, 1978; 1980), is one who accepts personal responsibility for negative events. He is the child who ascribes failure to his own lack of effort and who persists in the face of difficulty. Attribution retraining (see Dweck, 1975; Diener & Dweck, 1978; 1980; Licht, 1983), which involves either indirect or direct instruction in attributing failures to a "lack of effort," thus appears quite justified.

There were no group differences on the IAR scales or on the Dweck measure, however, for the "all helpless LD and NLD children."

Overall, learning disabled children appear especially reticent about accepting responsibility or credit for positive events, even those LD children who are mastery-oriented! It was outlined beforehand how LD children, more than NLD children, attribute success (on a questionnaire) to external factors such as luck and ease of the task. Perhaps attribution retraining for LD children should include <u>both</u> teaching them to attribute failure to a "lack of effort," <u>and</u> teaching them to attribute success to their "good effort" and "ability."

<u>Affect and Enjoyment of the Task</u>

There were no differences in reported affect or mood between the LD and NLD boys either before or after the experimental task. Affect scores were not influenced by either group membership or experimental condition. In addition, there were no significant differences between LD and NLD children randomly assigned to the difficult condition on the "last affect" measure, taken after debriefing and subsequent completion of the easy experimental task. All subjects, both LD and NLD, seemed to thoroughly enjoy their participation in the study. Many expressed disappointment when the three testing sessions were finished.

Children in both the easy and the difficult conditions were asked, after the experimental task, "How enjoyable did you find this game?" Their responses revealed a significant group by condition interaction. In the easy condition, the NLD children expressed greater enjoyment of the experimental task, while in the difficult condition, the LD children expressed greater enjoyment. Perhaps the LD children were less upset by a (contrived) failure experience because, in general, they have had more exposure to failure events. Or this result may simply reflect a motivational bias (Miller, 1976; Miller & Ross, 1975).

Affect was measured during this study to monitor the children's feeling states during the three testing sessions, especially during the third (experimental task) session.

Recent research has shown, for example, that positive affective states enhance learning, while negative states retard learning (Masters et al., 1979). Positive and negative expressed affective states were strongly associated with the overall rate and accuracy of children's learning, and negative states influenced the speed of cognitive processing (i.e., the rapidity with which a solution was reported). Masters and his colleagues (Masters & Furman, 1976; Masters et al., 1979) have demonstrated that young nursery school children have the potential for the cognitive self-control of their own affective states, and "the effects on learning indicate that even transient mood states may produce lasting changes in behavior (Masters et al., 1979, p. 380)."

> ...The influence of affective variables on persistence at effortful behavior may be mediated by reinforcement effects, if the variables are of positive or negative valence, such as favorable or unfavorable self-evaluation (Masters & Santrock, 1976) and if they are consequent to the effortful behavior. There is some evidence, however, that the impact of self-evaluations and their emotional concomitants may affect learning through incentive or other motivational mechanisms that are not consequent to learning but actually occur in anticipation of intellectual mastery (Masters, Furman, & Barden, 1977). Thus, mood states bearing no contingent relationship to performance may affect performance, learning, or mastery not through reinforcement processes but through motivational or arousal components (Masters, Barden, & Ford, 1979, pp. 380 - 381).

Weiner (1983) and colleagues are also in the process of examining the role of affect in achievement-related behavior (e.g., Weiner, Russell, & Lerman, 1978).

Implications

In recent years, it has been suggested (e.g., Black, 1974; Licht, 1983; Thomas, 1979) that LD children are caught in a chain of events wherein early school failure (for whatever reason or combination of factors) leads them to doubt their intellectual abilities, and, therefore, to doubt that anything they do will help them overcome their problems. They then lessen their achievement efforts, especially when dealing with difficult material, and this, in turn, increases the likelihood of continued failure which, again, strengthens the LD children's beliefs that they lack the ability to overcome their difficulties. As these beliefs become strengthened, they become generalized so that even easier academic experiences come to be interpreted in a maladaptive fashion.

Even if the child does experience some success (e.g., as a result of a specific remedial program or an individualized educational program) he or she may not acknowledge personal responsibility for it. Instead, he or she may attribute success to external factors, such as luck or ease of the task.

The implication of the foregoing analysis is that more than remediation of academic deficits is required if the LD child is to be disentangled from this cyclical pattern. The child's maladaptive beliefs or attributions must be dealt with as well.

Dweck and colleagues (Diener & Dweck, 1978; 1980; Dweck, 1975; Dweck & Reppucci, 1973) have outlined excellent strategies for optimizing adaptive patterns of attribution for elementary school-aged children. They have demonstrated that children who tend to hold beliefs which imply that their difficulties are surmountable through their own efforts will be most likely to engage in adaptive achievement-oriented behaviors. Dweck (1975) demonstrated that "attribution retraining" treatment, whereby children were taught to attribute the programmed failures they received to a lack of effort, was more successful than a "success only" treatment in altering children's responses to failure. The "attribution retraining" group showed a significantly greater tendency to emphasize effort over ability as a determinant of failure. In essence, helpless children who were taught to attribute their failures in the manner of mastery-oriented children began to cope with failure in a mastery-oriented style as well. They began to persist at difficult tasks and their performance improved. [Training materials should be arranged in such a way that the child's increased efforts will, indeed, result in improved task performance.]

In addition, Licht (1983; also see Torgesen and Licht, 1983) recommends attributing one's failures to "ineffective strategies." She reasons that if a child increases effort, and still fails, she or he may become even more discouraged than before efforts at "attribution retraining" had been initiated. There is a considerable body of literature, as well, that suggests that an important contributing factor to the poor performance of LD children is their failure to use planned, organized strategies that are within their level of ability (e.g., Douglas, 1976). "Perhaps, when children confront difficulty, the first alternative that they should consider is increasing their efforts. In the event that this does not succeed, changing to an alternative strategy might be considered (Licht, 1983, p. 487)."

Several researchers have attempted to match instructional methods to children's particular attributional style. For example, Pascarella and Pflaum (1981) and Pascarella, Pflaum, Bryan, and Pearl (1983) found that children with an external locus of control, i.e., those who do not believe that they are responsible for their successes and failures, learned more in a "teacher determination of errors" condition (task: using context cues in oral reading); while children with an internal locus of control (particularly effort) learned more in a "student determination of errors" condition. In an earlier study, Bugental, Whalen, and Henker (1977) also found an interaction between locus of control and most effective type of tutoring program used for hyperactive children. A "self-control" intervention produced significantly greater error reduction on the mazes (task: Porteus Mazes; Porteus, 1942) for children with (a) high perceived personal causality and (b) nonmedicated children; while a "social-reinforcement" intervention produced trends toward greater error reduction for (a) children with low perceived personal causality and (b) medicated children (Ritalin or methylphenidate).

From the findings of this study, one might recommend emphasis upon attribution retraining regarding "positive events or success." Learning disabled children especially should be encouraged to accept credit or responsibility for their successes. Ascriptions of causality to internal factors such as good effort and good ability should be encouraged. Special attention might be paid to those LD students who are "learned helpless" in orientation to failure.

Future Directions

The results of this study lead one to a number of suggestions. First and foremost, this study should be replicated with LD girls since it has been demonstrated in the literature (e.g., Dweck & Bush, 1976; Dweck, Davidson, Nelson, & Enna, 1978) that girls, when compared with boys, exhibit an attributional style that is more predictive of learned helplessness and, perhaps, even later depression (e.g., Dweck & Wortman, 1982; also see Radloff, 1975; Weissman & Klerman, 1977). The Dweck and Bush (1976) and the Dweck, Davidson, Nelson, and Enna (1978) studies used as subjects girls who were normal achievers. It would be instructive to see what results would be found with learning disabled girls.

The experimental task was chosen with great care so as not to differentially penalize the LD boys. But the experimental situation, overall, was a contrived one. Ecological validity would be enhanced by obtaining the children's attributions in their own classrooms, preferably immediately after a naturally-occurring event such as, for example, testing on the reading sections of the Stanford Achievement Tests (Gardner et al., 1973) or the Canadian Tests of Basic Skills (King et al., 1981). Most school districts administer these standardized tests at prescribed intervals, and it should not be too difficult to coordinate a field experiment within such a context.

This study demonstrated that LD boys differed from NLD boys in several competency and behavior problem areas of the Child Behavior Checklist (CBCL; Achenbach, 1981a). Why are there differences? Is there something intrinsic in the LD child's personality that causes these differences? Do these differences arise after several years of experiencing difficulty in school? Only longitudinal research will provide some acceptable explanations. Perhaps each school board could ask parents to complete a Child Behavior Checklist for each child entering kindergarten. With repeat CBCLs at intervals of, perhaps, every two or three years, it should be possible to answer some of the questions regarding competency and behavior problems for various subpopulations of school children.

Finally, a closer examination of that sub-population of learning disabled children who are "helpless" in orientation to learning tasks, rather than "mastery-oriented," may lead to even clearer remedial and ameliorative recommendations. Data from this study indicated differences on both performance measures and behavioral measures according to mastery versus helpless orientation for both LD and NLD boys.

Bibliography

Abramson, L.Y., Alloy, L.B., & Rosoff, R. (1981). Depression and the generation of complex hypotheses in the judgment of contingency. Behavior Research and Therapy, 19, 75-86.

Abramson, L.Y., Garber, J., Edwards, N.B., & Seligman, M.E.P. (1978). Expectancy changes in depression and schizophrenia. Journal of Abnormal Psychology, 87, 102-109.

Abramson, L.Y., Garber, J., & Seligman, M.E.P. (1980). Learned helplessness in humans: An attributional analysis. In J. Garber and M.E.P. Seligman (Eds.), Human helplessness: theory and applications. New York: Academic Press.

Abramson, L.Y., Seligman, M.E.P., & Teasdale, J.D. (1978). Learned helplessness in humans: Critique and reformulation. Journal of Abnormal Psychology. 87, 49-74.

Accardo, P.J. (1980). A neurodevelopmental perspective on specific learning disabilities. Baltimore, MD: University Park Press.

Achenbach, T.M. (1966). The classification of children's psychiatric symptoms: A factor analytic study. Psychological Monographs, 80, (7, Whole No. 615).

Achenbach, T.M. (1978). The child behavior profile: I. Boys aged 6-11. Journal of Consulting and Clinical Psychology, 46, 478-488.

Achenbach, T.M. (1979). The child behavior profile: An empirically based system for assessing children's behavioral problems and competencies. International Journal of Mental Health, 7, 24-42.

Achenbach, T.M. (1981a). Child behavior checklist for ages 4-16, University of Vermont, Burlington, VT, 05405.

Achenbach, T.M. (1981b, May 4). Workshop B: Child Behavior Checklist for Ages 4 - 16. Address and workshop presented at the conference entitled "Clinical Concerns in Child Development: A Focus on Cognition." Simon Fraser University, Burnaby, BC.

Achenbach, T.M., & Edelbrock, C.S. (1978). The classification of child psychopathology: A review and analysis of empirical efforts. Psychological Bulletin, 85, 1275-1301.

Achenbach, T.M., & Edelbrock, C.S. (1979). The child behavior profile: II. Boys aged 12-16 and girls aged 6-11 and 12-16. Journal of Consulting and Clinical Psychology, 47, 223-233.

Achenbach, T.M., & Edelbrock, C.S. (1981). Behavioral problems and competencies reported by parents of normal and disturbed children aged 4 through 16. Monographs of the Society for Research in Child Development, 46, (Serial No. 188).

Achenbach, T.M., & Edelbrock, C.S. (1983). Manual for the child behavior checklist and revised child behavior Profile, Queen City Printers Inc.

Ackerman, P.T., Dykman, R.A., & Peters, J.E. (1977a). Learning disabled boys as adolescents. Journal of the American Academy of Child Psychiatry, 16, 296-313.

Ackerman, P.T., Dykman, R.A., & Peters, J.E. (1977b). Teenage status of hyperactive and non-hyperactive learning disabled boys. American Journal of Orthopsychiatry, 47, 577-596.

Adelman, H.S. (1979a). Diagnostic classification of LD: A practical necessity and a procedural problem. Learning Disability Quarterly, 2, 56-62.

Adelman, H.S. (1979b). Diagnostic classification of LD: Research and ethical perspectives as related to practice. Learning Disability Quarterly, 2, 5-16.

Alden, L., & Cappe, R. (1981). Nonassertiveness: Skill deficit or selective self-evaluation? Behavior Therapy, 12, 107-114.

Alloy, L.B., Peterson, C., Abramson, L.Y., & Seligman, M.E.P. (1984). Attributional style and the generality of learned helplessness. Journal of Personality and Social Psychology, 46, 681-687.

American Psychiatric Association (1980). Diagnostic and statistical manual of mental disorders (3rd ed.). Washington, DC: Author.

Ames, C. (1978). Children's achievement attributions and self-reinforcement: Effects of self-concept and competitive reward structure. Journal of Educational Psychology, 70, 345-355.

Andrews, G.R., & Debus, R.L. (1978). Persistence and causal perception of failure: Modifying cognitive attributions. Journal of Educational Psychology, 70, 154-166.

Anthony, E.J., & Scott, P. (1960). Manic depressive psychosis in childhood. Journal of Child Psychology and Psychiatry, 1, 53-72.

Arajarvi, T., & Huttunen, M. (1972). Encopresis and enuresis as symptoms of depression. In A.L. Annell (Ed.): Depressive States in Childhood and Adolescence (pp. 212-217). Stockholm: Almquist & Wiksell.

Arkin, R.M., Appleman, A.J., & Burger, J.M. (1980). Social anxiety, self-presentation and the self-serving bias in causal attributions. Journal of Personality and Social Psychology, 38, 23-39.

The (U.S.) Association for Children and Adults with Learning Disabilities (1984). Answering the crisis in learning disabilities. Ottawa, ON: Canadian Association for Children and Adults with Learning Disabilities.

Atkinson, J.W. (1964). An introduction to motivation. Van Nostrand.

Atkinson, J.W., & Feather, N.T. (1966). A theory of achievement motivation. New York: Wiley.

Bakwin, H. (1972). Depression--a mood disorder in children and adolescents. Maryland State Medical Journal, 21, 55-61.

Bandura, A. (1977). Self efficacy: Toward a unifying theory of behavioral change. Psychological Review, 84, 191-215.

Bandura, A. (1981). Self-referent thought: A developmental analysis of self-efficacy. In J.H. Flavell & L. Ross (Eds.), Social cognitive development: Frontiers and possible futures. Cambridge, England: Cambridge University Press.

Bannatyne, A. (1968). Diagnosing learning disabilities and writing remedial prescriptions. Journal of Learning Disabilities, 7, 272-273.

Bannatyne, A. (1971). Language, reading and learning disabilities. Springfield, Il: Charles C. Thomas.

Bannatyne, A. (1974). Diagnosis: A note on recategorization of the WISC scaled scores. Journal of Learning Disabilities, 7, 272-273.

Barden, R.C., Garber, J., Duncan, S.W., & Masters, J.C. (1981). Cumulative effects of induced affective states in children: Accentuation, inoculation, and remediation. Journal of Personality and Social Psychology, 40, 750-760.

Barnett, M.A., Howard, J.A., Melton, E.M., & Dino, G.A. (1982). Effect of inducing sadness about self or other on helping behavior in high- and low-empathic children. Child Development, 53, 920-923.

Bar-Tal, D. (1975). Individual differences and attributional analysis of achievement-related behavior. Pittsburgh, PA: Learning Research and Development Center, University of Pittsburgh.

Bar-Tal, D. (1978). Attributional analysis of achievement-related behavior. Review of Educational Research, 48, 259-271.

Bar-Tal, D., & Darom, E. (1979). Pupil's attributions of success and failure. Child Development, 50, 264-267.

Bar-Tal,D., & Frieze, I. (1974). Achievement motivation and gender as determinants of attributions for success and failure. Unpublished manuscript, University of Pittsburgh, Pittsburgh, PA.

Bar-Tal, D., & Frieze, I.H. (1976). Attributions of success and failure for actors and observers. Journal of Research in Personality, 10, 256-265.

Bar-Tal, D., & Frieze, I.H. (1977). Achievement motivation for males and females as a determinant of attributions for success and failure. Sex Roles, 3, 301-313.

Barthe, D.G., & Hammen, C.L. (1981). The attributional model of depression: A naturalistic extension. Personality and Social Psychology Bulletin, 7, 53-58.

Battle, J. (1981). Culture-free self-esteem inventories for children and adults. Seattle: Special Child Publications.

Baumeister, R.F. (1982). A self-presentational view of social phenomena. Psychological Bulletin, 91, 3-26.

Beck, A. T. (1967). Depression: Clinical, experimental and theoretical aspects. New York: Harper & Row.

Beck, A.T. (1971). Cognition, affect, and psychopathology. Archives of General Psychiatry, 24, 495-500.

Beck, A. T. (1976). Cognitive therapy and emotional disorders. New York: International Universities Press.

Beck, A.T., & Beamesderfer, A. (1974). Assessment of depression: the depression inventory. In P. Pichot (Ed.) Psychological measurements in psychopharmacology. Modern Problems in Pharmacopsychiatry, 7. Karger, Basel, Switzerland.

Beery, K.E. (1967). Developmental Test of Visual-Motor Integration. Chicago: Follett Educational Corporation.

Belmont, L. (1980). Epidemiology. In H.E. Rie and E.D. Rie (Eds.), Handbook of minimal brain dysfunctions. New York: John Wiley & Sons.

Bem, D.J. (1967). Self-perception: an alternative interpretation of cognitive dissonance phenomena. Psychological Review, 74, 183-200.

Bemporad, J.R. (1982). Childhood depression from a developmental perspective. In L. Grinspoon (Ed.), Psychiatry 1982: Annual Review. Washington, DC: American Psychiatric Press, Inc.

Bender, L. (1938). A Visual Motor Gestalt Test and its clinical use. American Orthopsychiatric Association Research Monograph, No. 3.

Benson, J.S., & Kennelly, K.J. (1976). Learned helplessness: The result of uncontrollable reinforcements or uncontrollable aversive stimuli? Journal of Personality and Social Psychology, 34, 138-145.

Berger, M., Yule, W., & Rutter, M. (1975). Attainment and adjustment in two geographic areas. II. The prevalence of specific reading retardation. British Journal of Psychiatry., 126, 510-519.

Bibring, E. (1953). The mechanism of depression. In P. Greenacre (Ed.), Affective disorders. New York: International Universities Press.

Bingham, G. (1980). Self-esteem among boys with and without specific learning disabilities. Child Study Journal, 10, 41-47.

Birch, H.G., & Gussow, J.D. (1970). Disadvantaged children: Health, nutrition, and school failure. New York: Harcourt Brace Jovanovich.

Black, F.W. (1974). Self-concept as related to achievement and age in learning-disabled children. Child Development, 45, 1137-1140.

Blaney, P.H., Behar, V., & Head, R. (1980). Two measures of depressive cognitions: Their association with depression and with each other. Journal of Abnormal Psychology, 89, 678-682.

Blatt, S.J. (1974). Levels of object representation in anaclitic and introjective depression. Psychoanalytic Study of the Child, 29, 107-157.

Blatt, S.J., Quinlan, D.M., Chevron, E.S., McDonald, C.,& Zuroff,D. (1982). Dependency and self-criticism: Psychological dimensions of depression. Journal of Consulting and Clinical Psychology, 50, 113-124.

Blishen, B.R., & McRoberts, H.A. (1976). A revised socioeconomic index for occupations in Canada. The Canadian Review of Sociology and Anthropology, 13, 71-79.

Bloom, B.S. (1976). Human characteristics and school learning. New York: McGraw Hill.

Boersma, F.J., & Chapman, J.W. (1978). Self-perceptions of ability, expectations and locus of control in elementary learning disabled children. University of Alberta.

Boersma, F.J., & Chapman, J.W. (1981). Academic self-concept, achievement expectations, and locus of control in elementary learning disabled children. Canadian Journal of Behavioural Science, 13, 349-358.

Bortner, M., & Birch, H.G. (1969). Patterns of intellectual ability in emotionally disturbed and brain damaged children. Journal of Special Education, 3, 351-369.

Broman, S.H. (1977, March). Early development and family characteristics of low achievers. Paper presented at the 14th International Conference of the Association for Children with Learning Disabilities, Washington, DC.

Brown, G., Chadwick, O.P.D., Shaffer, D., Rutter, M., & Traub, M. (1981). A prospective study of children with head injuries: III. Psychiatric sequelae. Psychological Medicine, 11, 63-78.

Brumback, R.A., & Staton, D.R. (1983). Learning disability and childhood depression. American Journal of Orthopsychiatry, 53, 264-281.

Brumback, R.A., Staton, D., & Wilson, H. (1980). Neuropsychological study of children during and after remission of endogenous depressive episodes. Perceptual and Motor Skills, 50, 1163-1167.

Bruner, J.S. (1964). The course of cognitive growth. American Psychologist, 19, 1-15.

Brunswik, E. (1955). Representative design probabilistic theory. Psychological Review, 62, 193-217.

Bryan, T.H., & Bryan, J.H. (1980). Learning disorders. In H.E. Rie and E.D. Rie (Eds.), Handbook of minimal brain dysfunctions. New York: John Wiley & Sons, 456-482.

Bryan, T., & Pearl, R. (1979). Self concepts and locus of control of learning disabled children. Journal of Clinical and Child Psychology, 8, 223-226.

Buchwald, A.M. (1977). Depressive mood and estimates of reinforcement frequency. Journal of Abnormal Psychology, 86, 443-446.

Bugental, D.B., Whalen, C., & Henker, B. (1977). Causal attributions of hyperactive children and motivational assumptions of two behavior change approaches: Evidence for an interactionist position. Child Development, 48, 874-884.

Butkowsky, I.S., & Willows, D.M. (1980). Cognitive-motivational characterstics of children varying in reading ability: Evidence for learned helplessness in poor readers. Journal of Educational Psychology, 72, 408-422.

Cairns, R.B., & Valsiner, J. (1984). Child psychology. Annual Review of Psychology, 35, 553-578.

Campbell, D.T., & Stanley, J.C. (1963).Experimental and quasi-experimental designs for research on teaching. In N.L. Gage (Ed.), Handbook of research on teaching. Chicago: Rand McNally. [Also published as Experimental and quasi-experimental designs for research (1966). Chicago: Rand McNally.]

Campbell, S.B., Douglas, V.I., & Morgenstern, G. (1971). Cognitive styles in hyperactive children and the effect of methyphenidate. Journal of Child Psychology and Psychiatry, 12, 55-67.

Carroll, J.B. (1976). Psychometric tests as cognitive tasks: A new structure of intellect. In L. Resnick (Ed.), The nature of intelligence. Hillsdale, NJ: Erlbaum.

Cattell, R.B. (1963). Theory of fluid and crystallized intelligence: A critical experiment. Journal of Educational Psychology, 54, 1-23.

Cattell, R.B. (1971). Abilities: Their structure, growth and action. Boston: Houghton-Mifflin.

Chadwick, O.P.D., Rutter, M., Brown, G., Shaffer, D., & Traub, M. (1981). A prospective study of children with head injuries: II. Cognitive sequelae. Psychological Medicine, 11, 49-61.

Chandler, M., & Boyes, M. (1982). Social-cognitive development. In B. Wolman (Ed.), Handbook of developmental psychology. Englewood Cliffs, NJ: Prentice Hall.

Chapin, M., & Dyck, D.G. (1976). Persistence in children's reading behavior as a function of N length and attribution retraining. Journal of Abnormal Psychology, 85, 511-515.

Chapman, J.W., & Boersma, F.J. (1979a). Academic self-concept in elementary learning disabled children: A study with the Student's Perception of Ability Scale. Psychology in the Schools, 16, 201-206.

Chapman, J.W., & Boersma, F.J. (1979b). Learning disabilities, locus of control, and mother attitudes. Journal of Educational Psychology, 71, 250-258.

Chess, S., & Thomas, A. (1972). Differences in outcome with early intervention in children with behavior disorders. In M.F. Roff, L.N. Robins, & M. Pollack (Eds.), Life history research in psychopathology. Minneapolis, MN: University of Minnesota Press.

Clarizio, H., & Bernard, R. (1981). Recategorized WISC-R scores of learning disabled children and differential diagnosis. Psychology in the Schools, 18, 5-12.

Clements, S.D. (Project director) (1966). National project on minimal brain dysfunction in children - Terminology and identification (Phase one of a three phase project; monograph No. 3; Public Health Service Publication No. 1415, Superintendent of Documents, Government Printing Office, Washington, DC).

Cohen, N.J., Douglas, V.I., & Morgenstern, G. (1971). The effect of methylphenidate on attentive behavior and autonomic activity in hyperactive children. Psychopharmacologia, 22, 282-294.

Cohen, N.J., Weiss, G., & Minde, K. (1972). Cognitive styles in adolescents previously diagnosed as hyperactive. Journal of Child Psychology and Psychiatry, 13, 203-209.

Colbert, P., Newman, B., Ney, P., & Young, J. (1982). Learning disabilities as a symptom of depression in children. Journal of Learning Disabilities, 15, 333-336.

Colonna, A., & Faglioni, P. (1966). The performance of hemispheric damaged patients on spatial intelligence tests. Cortex, 2, 293-307.

Connell, H.M. (1972). Depression in childhood. Child Psychiatry and Human Development, 4, 71-85.

Coopersmith, S. (1967). The antecedents of self-esteem, San Francisco: Freeman.

Costa, L.D., Vaughan, H.G., Jr., Horowitz, M., & Ritter, W. (1969). Patterns of behavioral deficit associated with visual spatial neglect. Cortex, 5, 242-263.

Costello, C.G. (1980). Childhood depression: Three basic but questionable assumptions in the Lefkowitz and Burton critique. Psychological Bulletin, 87, 185-190.

Covington, M.V., & Beery, R.G. (1976). Self-worth and school learning. New York: Holt, Rinehart and Winston.

Coyne, J.C. (1976). Depressions and the response of others. Journal of Abnormal Psychology, 85, 186-193.

Coyne, J.C., & Gotlib, I.H. (1983). The role of cognition in depression: A critical appraisal. Psychological Bulletin, 94, 472-505.

Crandall, V.C., Katkovsky, W., & Crandall, V.J. (1965). Children's belief in their own control of reinforcements in intellectual achievement situations. Child Development, 36, 91-109.

Crichton, J., Catterson, J., Kendall, D., & Dunn, H. (1981). Learning disabilities: A practical office manual. 2nd Ed., Victoria, BC: Morriss Printing Co. Ltd.

Critchley, M. (1962). Developmental dyslexia: A constitutional dysymbolia. In A.W. Franklin (Ed.), Word-blindness or specific developmental dyslexia (pp. 45-48). London: Pitman Medical Publishers.

Crittenden, K.S., & Wiley, M.G. (1980). Causal attribution and behavioral response to failure. Social Psychology Quarterly, 43, 353-358.

Cytryn, L., & McKnew, D.H. (1972). Proposed classification of childhood depressions. American Journal of Psychiatry, 129, 149-155.

Cytryn, L., & McKnew, D.H. (1974). Factors influencing the changing clinical expression of the depressive process in children. American Journal of Psychiatry, 131, 879-881.

Cytryn, L., McKnew, D.H., & Bunney, W.E. (1980). Factors influencing the changing clinical expression of the depressive process in children. American Journal of Psychiatry, 137, 22-25.

Dahl, V. (1972). A follow-up study of a child psychiatric clientele, with special regard to manic-depressive psychosis. In A.L. Annell (Ed.), Depressive states in childhood and adolescence (pp. 534-541). Stockholm, Sweden: Amquist and Wiksell.

Darley, J.M., & Goethels, G.R. (1980). People's analyses of the causes of ability-linked performances. In Leonard Berkowitz (Ed.), Advances in experimental social psychology (Vol. 13). New York: Academic Press.

Das, J.P. (1980). Planning: Theoretical considerations and empirical evidence. Psychological Research, 41, 141-151.

Das, J.P., Kirby, J., & Jarman, R.F. (1975). Simultaneous and successive syntheses: An alternative model for cognitive abilities. Psychological Bulletin, 82, 87-103.

Das, J.P., Kirby, J.R., & Jarman, R.F. (1979). Simultaneous and successive cognitive processes. NY: Academic Press.

Das, J.P., Leong, C.K., & Williams, N.H. (1978). The relationship between learning disability and simultaneous-successive processing. Journal of Learning Disabilities, 11, 618-625.

Das, J.P., & Malloy, G.N. (1975). Varieties of simultaneous and successive processing in children. Journal of Educational Psychology, 67, 213-230.

Das, J.P., & Malloy, G. (1981). Of brain divisions and functions. Academic Therapy, 16, 349-358.

Das, J.P., Mulcahy, R., & Wall, A.E. (Eds.) (1980). Theory and research in learning disabilities. New York: Plenum Press.

Davison, G.C., & Neale, J.M. (1982). Abnormal psychology (3rd Ed.). New York: John Wiley & Sons.

Deaux, K. (1976). Sex: A perspective on the attribution process. In J.H. Harvey, W.J. Ickes, and R.F. Kidd (Eds.), New directions in attribution research (Vol. 1, pp. 335-352). Hillsdale, NJ: Lawrence Erlbaum Associates.

de Charms, R. (1968). Personal causation. New York: Academic Press.

de Charms, R. (1972). Personal causation training in the schools. Journal of Applied Social Psychology, 2, 95-113.

de Charms, R. (1976). Enhancing motivation: A change in the classroom. New York: Irvington, Halstead-Wiley.

Deci, E.L. (1975). Intrinsic motivation. New York: Plenum Press.

de Hirsch, K., Jansky, J.J., & Langford, W.S. (1966). Predicting reading failure: A preliminary study. New York: Harper & Row.

De Renzi, E., & Faglioni, P. (1965). The comparative efficiency of intelligence and vigilance tests in detecting hemispheric cerebral damage. Cortex, 1, 410-433.

Diener, C.I., & Dweck, C.A. (1978). An analysis of learned helplessness: Continuous changes in performance, strategy, and achievement cognitions following failure. Journal of Personality and Social Psychology, 36, 451-462.

Diener, C.I., & Dweck, C.A. (1980). An analysis of learned helplessness: II. The processing of success. Journal of Personality and Social Psychology, 39, 940-952.

Dixon, W.J. (Chief Editor) (1981). BMDP Statistical Software 1981. Berkeley, CA: University of California Press.

Dominion Bureau of Statistics, 1961, Census of Canada, Bulletin 3.1-9, Ottawa, ON: Queen's Printer, 1963.

Douglas, V.I. (1976). Perceptual and cognitive factors as determinants of learning disabilities: A review chapter with special emphasis on attentional factors. In R.M. Knights and D.J. Bakker (Eds.), The neuropsychology of learning disorders. Baltimore, MD: University Park Press.

Douglas, V.I. (1980a). Higher mental processes in hyperactive children: Implications for training. In R.M. Knights and D.J. Bakker (Eds.). Rehabilitation, treatment and management of learning disorders. Baltimore: University Park Press.

Douglas, V.I. (1980b). Treatment and training approaches to hyperactivity: Establishing internal or external control. In C.K. Whalen and B. Henker, Hyperactive children: The social ecology of identification and treatment. New York: Academic Press.

Douglas, V. (1981, May 5). Workshop A: A cognitive training approach for the impulsive child. Clinical Concerns in Child Development: A Focus on Cognition Conference, Simon Fraser University, Burnaby, BC.

Douglas, D., & Anisman, H. (1975). Helplessness or expectation incongruency: Effects of aversive stimulation on subsequent performance. Journal of Experimental Psychology: Human Perception and Performance, 1, 411-417.

Duffy, F.H., Denckla, M.B., Bartels, P.H., Sandini, G., & Kiessling, L.S. (1980a). Dyslexia: Regional differences in brain electrical activity by topographic mapping. Annals of Neurology, 7, 412-420.

Duffy, F.H., Denckla, M.B., Bartels, P.H., Sandini, G., & Kiessling L.S. (1980b). Dyslexia: automated diagnosis by computerized classification of brain electrical activity. Annals of Neurology, 7, 421-428.

Duncan, O.D. (1961). A socioeconomic index for all occupations. In A.J. Reiss, Jr. (Ed.), Occupations and social status. New York: Free Press.

Dunn, H.G. (in preparation). Sequelae of Low Birth Weight: Vancouver Study. New York: Heinemann.

Dweck, C.S. (1975). The role of expectations and attributions in the alleviation of learned helplessness. Journal of Personality and Social Psychology, 31, 674-685.

Dweck, C.S., & Bush, E.S. (1976). Sex differences in learned helplessness: I. Differential debilitation with peer and adult evaluators. Developmental Psychology, 12, 147-156.

Dweck, C.S., Davidson, W., Nelson, S., & Enna, B. (1978). Sex differences in learned helplessness: II. The contingencies of evaluative feedback in the classroom and III. An experimental analysis. Developmental Psychology, 14, 268-276.

Dweck, C.S., & Gilliard, D. (1975). Expectancy statements as determinants of reactions to failure: Sex differences in persistence and expectancy change. Journal of Personality and Social Psychology, 32, 1077-1084.

Dweck, C.S., & Goetz, T.E. (1978). Attributions and learned helplessness. In J.H. Harvey, W.J. Ickes, and R.F. Kidd (Eds.), New directions in attribution research. (Vol. 2, pp. 157-179). Hillsdale, NJ: Lawrence Erlbaum Associates.

Dweck, C.S., Goetz, T.E., & Strauss, N.L.(1980). Sex differences in learned helplessness: IV. An experimental and naturalistic study of failure generalization and its mediators. Journal of Personality and Social Psychology, 38, 441-452.

Dweck, C.S., & Licht, B.G. (1980). Learned helplessness and intellectual achievement. In J. Garber & M.E.P. Seligman Human Helplessness: Theory and applications (pp. 197-221). New York: Academic Press.

Dweck, C.S., & Reppucci, N.D. (1973). Learned helplessness and reinforcement responsibility in children. Journal of Personality and Social Psychology, 25, 109-116.

Dweck, C.S., & Wortman, C.B. (1982). Learned helplessness, anxiety, and achievement motivation. In H.W. Krohne and L. Laux (Eds.), Achievement, stress, and anxiety. New York: Hemisphere Pub. Corp.

Eaves, L.C. (1983). Some predictive antecedents of poor school achievement. Unpublished doctoral dissertation, Simon Fraser University, Burnaby, BC.

Eaves, L.C., & Crichton, J.U. (1974-75). A five-year follow-up of children with minimal brain dysfunction. Academic Therapy, 10, 173-180.

Eisenberger, R., Park, D.C., & Frank, M. (1976). Learned industriousness and social reinforcement. Journal of Personality and Social Psychology, 33, 227-232.

Elkind, D., (1969). Piagetian and psychometric conceptions of intelligence. Harvard Educational Review, 39, 319-337.

Elkind, D. (1974). Children and adolescents: Interpretive essays on Jean Piaget. London: Oxford University Press.

Estes, W.K. (1974). Learning theory and intelligence. American Psychologist, 29, 740-749.

Feather, N.T. (1967). Valence of outcome and expectation of success in relation to task difficulty and perceived locus of control. Journal of Personality and Social Psychology, 7, 372-386.

Feather, N.T. (1969). Attribution of responsibility and valence of success and failure in relation to initial confidence and task performance. Journal of Personality and Social Psychology, 13, 129-144.

Feather, N.T., & Simon, J.G. (1971a). Attribution of responsibility and valence of outcome in relation to initial confidence and success and failure of self and other. Journal of Personality and Social Psychology, 18, 173-188.

Feather, N.T., & Simon, J.G. (1971b). Causal attributions for success and failure in relation to expectations of success based upon selective or manipulative control. Journal of Personality, 39, 527-554.

Feighner, J., Robins, E., Guze, S., et al.(1972). Diagnostic criteria for use in psychiatric research. Archives of General Psychiatry, 26, 57-63.

Finucci, J.M., Guthrie, T.T., Childs, A.L., Abbey, H., & Childs, B. (1976). The genetics of specific reading disability. Annals of Human Genetics, 40, 1-23.

Firestone, P., & Douglas, V.I. (1975). The effects of reward and punishment on reaction times and autonomic activity in hyperactive and normal children. Journal of Abnormal Child Psychology, 3, 201-215.

Fitch, G. (1970). Effects of self-esteem, perceived performance, and choice on causal attributions, Journal of Personality and Social Psychology, 16, 311-315.

Fontaine, G. (1974). Social comparison and some determinants of expected personal control and expected performance in a novel situation. Journal of Personality and Social Psychology, 29, 487-496.

Forness, S.R., & Cantwell, D.P. (1982). DSM III psychiatric diagnoses and special education categories. The Journal of Special Education, 16, 49-63.

Freud, S. (1957). Mourning & melancholia. In J. Strachey (Ed. and trans.), Standard edition of the complete psychological works of Sigmund Freud, Vol. 14. London: Hogarth Press, 1957 (Originally published, 1917).

Frieze, I. (1980). Beliefs about success and failure in the classroom. In J.H. McMillan (Ed.), The social psychology of school learning (pp. 39-78). New York: Academic Press.

Frieze, I.H., Fisher, J., Hanusa, B., McHugh, M.C., & Valle, V.A. (1978). Attributions of the causes of success and failure as internal and external barriers to achievement in women. In J.A. Sherman and F.L. Denmark (Eds.), The Psychology of Women: Future directions in research. New York: Psychological Dimensions, Inc.

Frommer, E. (1968). Depressive illness in childhood. British Journal of Psychiatry, 2, 117-123.

Garber, J., & Seligman, M.E.P. (Eds.) (1980). Human helplessness: Theory and applications. New York: Academic Press.

Gardner, E.F., Rudman, H.C., Karlsen, B., & Merwin, J.C. (1973). Stanford Achievement Test: 7th edition. San Antonio, TX: The Psychological Corporation.

Gilmor, T.M., & Minton, H.L. (1974). Internal versus external attributions of task performance as a function of locus of control, initial confidence and success-failure outcome. Journal of Personality, 42, 159-174.

Glaser, K. (1967). Masked depression in children & adolescents. American Journal of Psychotherapy, 21, 565-574.

Goetz, T.E., & Dweck, C.S. (1980). Learned helplessness in social situations. Journal of Personality and Social Psychology, 39, 246-255.

Goldstein, D., & Dundon, W.D. (1985-1986). Affect and cognition in learning disabilities. In S. J. Ceci (Ed.), Handbook of cognitive, social, and neuropsychological aspects of learning disabilities (2 vols. in one, Vols. 1 and 2). New York: Lawrence Erlbaum Associates.

Golin, S., Sweeney, P.D., & Schaeffer, D.E. (1981). The causality of causal attributions in depression: A cross-lagged panel correlational analysis. Journal of Abnormal Psychology, 90, 14-22.

Gotlib, I.H. (1981). Self-reinforcement and recall: Differential deficits in depressed and nondepressed psychiatric inpatients on chance and skilled tasks. Journal of Abnormal Psychology, 90, 521-530.

Gotlib, I.H., & Olson, J.M. (1983). Depression, psychopathology, and self-serving attributions. British Journal of Clinical Psychology, 22, 309-310.

Gotlib, I.H., & Robinson, L.A. (1982). Responses to depressed individuals: Discrepancies between self-report and observer- rated behavior. Journal of Abnormal Psychology, 91, 231-240.

Graham, P., Rutter, M., & George, S. (1973). Temperamental characteristics as predictors of behavior disorders in children. American Journal of Orthopsychiatry, 43, 328-339.

Grimes, L. (1981). Learned helplessness and attribution theory: Redefining children's learning problems. Learning Disability Quarterly, 4, 91-100.

Guilford, J.P. (1967). The nature of human intelligence. New York: McGraw-Hill.

Guilford, J.P., & Hoepfner, R. (1971). The analysis of intelligence. New York: McGraw-Hill.

Hakstian, A.R., & Bennet, R.W. (1977). Validity studies using the Comprehensive Ability Battery (CAB): I. Academic achievement criteria. Educational and Psychological Measurement, 37, 425-437.

Hakstian, A.R., & Cattell, R.B. (1974). The checking of primary ability structure on a broader basis of performances. British Journal of Educational Psychology, 44, 140-154.

Hakstian, A.R., & Cattell, R.B. (1976). Manual for the Comprehensive Ability Battery (CAB), 1976 Edition. Champaign, IL: Institute for Personality and Ability Testing.

Hamachek, D.E. (1978). Encounters with the self. New York: Holt, Rinehart & Winston.

Hamilton, M. (1960). A rating scale for depression. Journal of Neurology, Neurosurgery and Psychiatry, 23, 56-61.

Hammen, C.L., & deMayo, R. (1982). Cognitive correlates of teacher stress and depressive symptoms: Implications for attributional models of depression. Journal of Abnormal Psychology, 91, 96-101.

Hanusa, B.H., & Schulz, R. (1977). Attributional mediators of learned helplessness. Journal of Personality and Social Psychology, 35, 602-611.

Haqq, D.M. (1979). Temporal perspective in actor-observer attribution. Unpublished master's thesis, University of British Columbia, Vancouver, BC.

Harber, J. (1981). Learning disability research: How far have we progressed? Learning Disability Quarterly, 4, 372-381.

Hartzell, H.E., & Compton, C. (1984). Learning disability: 10-year follow-up. Pediatrics, 74, 1058-1064.

Harvey, J.H., Ickes, W.J., & Kidd, R.F. (Eds.) (1976). New directions in attribution research (Vol. 1). Hillsdale, NJ: Lawrence Erlbaum Associates.

Harvey, J.H., Ickes, W.J., & Kidd, R.F. (Eds.) (1978). New directions in attribution research (Vol. 2). Hillsdale, NJ: Lawrence Erlbaum Associates.

Harvey, J.H., Ickes, W.J., & Kidd, R.F. (Eds.) (1981). New directions in attribution research. (Vol. 3). Hillsdale, NJ: Lawrence Erlbaum Associates.

Hastorf, A., Schneider, D., & Polefka, J. (1970). Person perception. Reading, MA: Addison-Wesley.

Heider, F. (1958). The psychology of interpersonal relations. New York: Wiley.

Helper, M.M. (1980). Follow-up of children with minimal brain dysfunctions: Outcomes & predictors. In H.E. Rie and E.D. Rie (Eds.) Handbook of minimal brain dysfunctions (pp. 75-114). New York: John Wiley & Sons.

Higgins, C., & Wertman, H. (1968). Visual closure assessment. Albany, NY: Authors.

Hiroto, D.S. (1974). Locus of control and learned helplessness. Journal of Experimental Psychology, 102, 187-193.

Hiroto, D.S., & Seligman, M.E.P. (1975). Generality of learned helplessness in man. Journal of Personality and Social Psychology, 31, 311-327.

Hollingshead, A.B. (1957). Two-factor index of social position. Unpublished manuscript, Yale University.

Holroyd, K.A., Westbrook, T., Wolf, M., & Badhorn, E. (1978). Performance, cognition, and physiological responding in test anxiety. Journal of Abnormal Psychology, 87, 442-451.

Hughes, J.R. (1978). Electroencephalographic and neurophysiological studies in dyslexia. In A.L. Benton & D. Pearl (Eds.), Dyslexia: An appraisal of current knowledge (pp. 205-240). New York: Oxford University Press.

Hunt, E. (1971). What kind of computer is man? Cognitive Psychology, 2, 57-98.

Hunt, E. (1973). The memory we must have. In R. Shank and K. Colby (Eds.), Computer models of thought and language. San Francisco: Freeman.

Hunt, E., & Lansman, M. (1975). Cognitive theory applied to individual differences. In W.K. Estes (Ed.), Handbook of learning and cognitive processes (Vol. 1). Hillsdale, NJ: Erlbaum.

Hunt, E., Lunneborg, C., & Lewis, J. (1975). What does it mean to be high verbal? Cognitive Psychology, 7, 194-227.

Ickes, W.J., & Layden, M.A. (1978). Attributional styles. In J.H. Harvey, W.J. Ickes, and R.F. Kidd (Eds.), New directions in attribution research (vol. 2). Hillsdale, NJ: Erlbaum.

Illingworth, R.S. (1980). Developmental variation in relation to minimal brain dysfunction. In H.E. Rie and E.D. Rie (Eds.), Handbook of minimal brain dysfunctions (pp. 522-565). New York: John Wiley & Sons.

Ingram, T.T.S. (1960). Pediatric aspects of specific developmental dysphasia, dyslexia and dysgraphia. Cerebral Palsy Bulletin, 2, 254-277.

Janoff-Bulman, R. (1979). Characterological versus behavioral self-blame: Inquiries into depression and rape. Journal of Personality and Social Psychology, 37, 1798-1809.

Jensen, A.R., & Rohwer, Jr., W.D. (1966). The Stroop color-word test: A review. Acta Psychologica, 25, 36-93.

Johnson, D.S. (1981). Naturally acquired learned helplessness: The relationship of school failure to achievement behavior, attributions, and self-concept. Journal of Educational Psychology, 73, 174-180.

Jones, E.E., & Davis, K.E. (1965). From acts to dispositions: The attributional process in person perception. Advances in Experimental Social Psychology, 2, 219-266.

Jones, E.E., Davis, K.E., & Gergen, K.J. (1961). Role playing variations and their informational value for person perception. Journal of Abnormal Social Psychology, 63, 302-310.

Jones, E.E., Kanouse, D.E., Kelley, H.H., Nisbett, R.E., Valins, S., Weiner, B. (Eds.) (1972). Attribution: Perceiving the causes of behavior. Morristown, NJ: General Learning Press.

Jones, E.E., & Nisbett, R.E. (1972). The actor and the observer: Divergent perceptions of the causes of behavior. In E.E. Jones et al. (Eds.) Attribution: Perceiving the causes of behavior. Morristown, NJ: General Learning Press.

Jones, S.L., Nation, J.R., & Massad, P. (1977). Immunization against learned helplessness in man. Journal of Abnormal Psychology, 86, 75-83.

Jones, E.E., & Wortman, C. (1973). Ingratiation: An attributional approach. Morristown, NJ: General Learning Press.

Kagan, J., Moss, H.A., & Sigel, I.E. (1963). Psychological significance of styles of conceptualization. In J.C. Wright and J. Kagan (Eds.), Basic cognitive processes in children. Monograph of the Society for Research in Child Development, Serial No. 86.

Kagan, J., Rosman, B.L., Day D., Albert, J., & Phillips, W. (1964). Information processing in the child: Significance of analytic and reflective attitudes. Psychological Monographs: General and Applied, 78, (1, Whole No. 578).

Karoly, P. (1977). Behavioral self-management in children: Concepts, methods, issues, and directions. In M. Hersen, R.M. Eisler, & P.M. Miller (Eds.), Progress in behavior modification. New York: Academic Press, 5, 197-262.

Kashani, J.H. (1982). Epidemiology of childhood depression. In L. Grinspoon (Ed.), Psychiatry 1982: Annual Review. Washington, DC: American Psychiatric Press, Inc.

Kaufman, A.S. (1975). Factor analysis of the WISC-R at eleven age levels between 6.5 and 16.5 years. Journal of Consulting and Clinical Psychology, 43, 135-147.

Kaufman, A.S. (1979a). Intelligent testing with the WISC-R. New York: John Wiley & Sons.

Kaufman, A.S. (1979b). WISC-R research: Implications for interpretation. School Psychology Digest, 8, 5-26.

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

Kavale, K., & Nye, C. (1981). Identification criteria for learning disabilities: A survey of the research literature. Learning Disability Quarterly, 4, 383-388.

Kelley, H.H. (1967). Attribution theory in social psychology. In D. Levine (Ed.), Nebraska symposium on motivation. Lincoln, NE: University of Nebraska Press.

Kelley, H.H., & Michela, J.L. (1980). Attribution theory and research. In Rosenzweig & Porter (Eds.), Annual review of psychology, (Vol.31, pp. 457-501).

King, E.M. and others (1981). Canadian test of basic skills: Teacher's guide [original test by E.F. Lindquist, A.N. Hieronymus, and others]. Scarborough, ON: Thomas Nelson & Sons (Canada) Limited.

Klee, S., & Meyer, R.G. (1979). Prevention of learned helplessness in humans. Journal of Consulting and Clinical Psychology, 47, 411-412.

Klein, D.C., & Seligman, M.E.P. (1976). Reversal of performance deficits and perceptual deficits in learned helplessness and depression. Journal of Abnormal Psychology, 85, 11-26.

Klein, D.C., Fencil-Morse, E., & Seligman, M.E.P. (1976). Learned helplessness, depression, and attribution of failure. Journal of Personality and Social Psychology, 33, 508-516.

Kolb, B., & Whishaw, I.Q. (1980). Fundamentals of human neuropsychology. San Francisco: W.H. Freeman and Co.

Koller, P.S., & Kaplan, R.M. (1978). A two-process theory of learned helplessness. Journal of Personality and Social Psychology, 36, 1177-1183.

Kovacs, M. (1978). Children's depression inventory (CDI). Unpublished Manuscript, University of Pittsburgh.

Kovacs, M. (1980/81). Rating scales to assess depression in school-aged children. Acta paedopsychiatrica, 46, 305-315.

Kovacs, M., & Beck, A.T. (1977). An empirical-clinical approach toward a definition of childhood depression. In J.G. Schulterbrandt and A. Raskin (Eds.), Depression in childhood: Diagnosis, treatment, & conceptual models. New York: Raven Press.

Kovacs, M., & Beck, A.T. (1978). Maladaptive cognitive structures in depression. American Journal of Psychiatry, 135, 525-533.

Krakowski, A.J. (1970). Depressive reactions of childhood and adolescence. Psychosomatics, 11, 429-433.

Kuhn, B., & Kuhn, R. (1972). Drug therapy for depression in children. In A.L. Annell (Ed.), Depressive states in childhood and adolescence (pp. 163-203). New York: John Wiley and Sons.

Kuiper, N.A. (1978). Depression and causal attributions for success and failure. Journal of Personality and Social Psychology, 36, 236-246.

Kukla, A. (1972). Attributional determinants of achievement-related behavior. Journal of Personality and Social Psychology, 21, 166-174.

Lambert, N.M., Sandoval, J., & Sassone, D. (1978).Multiple prevalence estimates of hyperactivity in school children and the rate of occurrence of treatment regimens. American Journal of Orthopsychiatry, 48, 446-463.

Lang, M., & Tisher, M. (1978). Children's Depression Scale. Australian Journal of Psychology, 13, 293.

Langer, E.J. (1978). Rethinking the role of thought in social interaction. In J. Harvey, W. Ickes, & R.F. Kidd (Eds.), New directions in attribution research (vol. 2). Hillsdale, NJ: Erlbaum.

Lansdell, H. (1980). Theories of brain mechanisms in minimal brain dysfunctions. In H.E. Rie & E.D. Rie (Eds.), Handbook of minimal brain dysfunctions (pp. 117-151). New York: John Wiley & Sons.

Lapouse, R. (1966). The epidemiology of behavior disorders in children. American Journal of Diseases of Children, 111, 594- 599.

Lefkowitz, M.M. (1980). Childhood depression: A reply to Costello. Psychological Bulletin, 87, 191-194.

Lefkowitz, M.M., & Burton, N. (1978). Childhood depression: A critique of the concept. Psychological Bulletin, 85, 716-726.

Lefkowitz, M.M., & Tesiny, E.P. (1980). Assessment of childhood depression. Journal of Consulting and Clinical Psychology, 48, 43-50.

Leong, C.K. (1974). An investigation of spatial-temporal information processing in children with specific reading disability. Unpublished doctoral dissertation, Department of Educational Psychology, University of Alberta, Edmonton, Canada. Discussed in Das et al., 1979.

Leong, C.K. (1982). Promising areas of research into learning disabilities with emphasis on reading disabilities. In J.P. Das, R.F. Mulcahy, and A.E. Wall (Eds.), Theory and research in learning disabilities (pp. 3-26). New York: Plenum Press.

Lesse, S. (1974). Depression masked by acting-out behavior patterns. American Journal of Psychotherapy, 28, 352-361.

Lewin, K. (1938). The conceptual representation and the measurement of psychological forces. Durham, NC: Duke University Press.

Lewin, K. (1951). Field theory in social science. New York: Harper.

Lewinsohn, P.M., Steinmetz, J.L., Larsen, D.W., & Franklin, J. (1981). Depression-related cognitions: Antecedent or consequence? Journal of Abnormal Psychology, 90, 213-219.

Licht, B.G. (1983). Cognitive-motivational factors that contribute to the achievement of learning-disabled children. _Journal of Learning Disabilities_, _16_, 483-490.

Licht, B.G., & Dweck, C.S. (1984). Determinants of academic achievement: The interaction of children's achievement orientations with skill area. _Developmental Psychology_, _20_, 628-636.

Licht, B.G., Kistner, J.A., Ozkaragoz, T., Shapiro,S., & Clausen, L. (1985). Causal attributions of learning disabled children: Individual differences and their implications for persistence. _Journal of Educational Psychology_, _77_, 208-216.

Ling, W., Oftedal, G., & Weinberg, W. (1970). Depressive illness in childhood presented as severe headache. _American Journal of Diseases of Children_, _120_, 122-124.

Lovitt, T.C., & Jenkins, J.R. (1979). Learning disabilities research: Defining populations. _Learning Disability Quarterly_, _2_, 46-50.

Luria, A.R. (1966). _Higher cortical functions in man_. New York: Basic Books. (a).

Luria, A.R. (1966). _Human brain and psychological processes_. New York: Harper & Row, (b).

Luria, A.R. (1973). _The working brain_. Harmondsworth, England: Penguin.

MacFarlane, J.W., Allen, L., & Honzik, M.P. (1954). A developmental study of the behavior problems of normal children between 21 months and 14 years. Berkeley, CA: University of California Press.

Maier, S.F., & Seligman, M.E.P. (1976). Learned helplessness: Theory and evidence. Journal of Experimental Psychology: General, 105, 3-46.

Malmquist, C.P. (1972). Depressive phenomena in children. In B.B. Wolman (Ed.), Manual of Child Psychopathology (pp. 497-540). New York: McGraw-Hill.

Manly, P.C., McMahon, R.J., Bradley, C.F., & Davidson, P.O. (1982). Depressive attributional style and depression following childbirth. Journal of Abnormal Psychology, 91, 245-254.

Maslow, A.H. (1971). The farther reaches of human nature. New York: Viking Press.

Masters, J.C., Barden, R.C., & Ford, M.E. (1979). Affective states, expressive behavior, and learning in children. Journal of Personality and Social Psychology, 37, 380-390.

Masters, J.C., & Furman, W. (1976). Effects of affective states on noncontingent outcome expectancies and beliefs in internal or external control. Developmental Psychology, 12, 481-482.

Masters, J.C., Furman, W., & Barden, R.C. (1977). Effects of achievement standards, tangible rewards, and self-dispensed achievement evaluation on children's task matters. Child Development, 48, 217-224.

Masters, J.C., & Santrock, J.W. (1976). Studies in the self-regulation of behavior: Effects of contingent cognitive and affective events. Developmental Psychology, 12, 334-348.

Mattis, W., French, J.H., & Rapin, I. (1975). Dyslexia in children and young adults: Three independent neuropsychological syndromes. Developmental Medicine and Child Neurology, 17, 150-163.

McConaughy, S.H., & Ritter, D.R. (1985). Social competence and behavioral problems of learning disabled boys aged 6-11. Journal of Learning Disabilities, 18, 547-553.

McConville, B.J., Boag, L.C., & Purohit, A.P. (1973). Three types of depression. Canadian Psychiatric Association Journal, 18, 133-138.

McMahan, I. (1973). Relationships between causal attributions and expectancy of success. Journal of Personality and Social Psychology, 28, 108-114.

Meichenbaum, D. (1975). Self-instructional methods. In F.H. Kanfer and A.P. Goldstein (Eds.), Helping people change (pp. 357-391). New York: Pergamon.

Meichenbaum, D. (1980). Cognitive behavior modification with exceptional children: A promise yet unfulfilled. Exceptional Education Quarterly, 1, 83-88.

Meichenbaum, D., & Goodman, J. (1971). Training impulsive children to talk to themselves: A means of developing self-control. Journal of Abnormal Psychology, 77, 115-126.

Mendelson, W., Johnson, N., & Stewart, M.A. (1971). Hyperactive children as teenagers: A follow-up study. Journal of Nervous and Mental Diseases, 153, 273-279.

Menkes, M.J., Rowe, J.S., & Menkes, J.H. (1967). A twenty-five year follow-up study on the hyperkinetic child with minimal brain dysfunction. Pediatrics, 39, 393-399.

Metalsky, G.I., Abramson, L.Y., Seligman, M.E.P., Semmel, A., & Peterson, C. (1982). Attributional styles and life events in the classroom: Vulnerability and invulnerability to depressive mood reactions. Journal of Personality and Social Psychology, 43, 612-617.

Meyer, J.P. (1980). Causal attribution for success and failure: A multivariate investigation of dimensionality, formation, and consequences. Journal of Personality and Social Psychology, 38, 704-718.

Miller, D.T. (1976). Ego involvement and attributions for success and failure. Journal of Personality and Social Psychology, 34., 901-906.

Miller, D.T., & Ross, M. (1975). Self-serving biases in the attribution of causality: Fact or fiction? Psychological Bulletin, 82, 213-225.

Miller, I., & Norman, J. (1979). Learned helplessness in humans: A review and attribution theory model. Psychological Bulletin, 86, 93-118.

Miller, I.W., Klee, S.H., & Norman, W.H. (1982). Depressed and nondepressed inpatients' cognitions of hypothetical events, experimental tasks, and stressful life events. Journal of Abnormal Psychology, 91, 78-81.

Miller, L.C. (1967). Louisville behaviour checklist for males, 6- 12 year of age. Psychological Reports, 21, 885-896.

Mischel, T. (1971). Piaget: Cognitive conflict and the motivation of thought. In T. Mischel (Ed.), _Cognitive development and epistemology_ (pp. 311-355). New York: Academic Press.

Mischel, W. (1973). Toward a cognitive social learning reconceptualization of personality. _Psychological Review_, _80_, 252-283.

Mowrer, O.H. (1960). _Learning theory and behavior_. New York: Wiley.

Mueller, C.W., & Parcel, T.L. (1981). Measures of socioeconomic status: Alternatives and recommendations. _Child Development_, _52_, 13-30.

Myklebust, H., & Boshes, B. (1969, June). _Minimal brain damage in children_. Final report, U.S. Public Health Service Contract 108-65-142. U.S. Department of Health, Education, & Welfare. Evanston, IL: Northwestern University Publication.

Nicholls, J.G. (1979). Development of perception of own attainment and causal attributions for success and failure in reading. _Journal of Educational Psychology_, _71_, 94-99.

Nisbett, R.E., & Wilson, T. (1977). Telling more than we can know: Verbal reports on mental processes. _Psychological Review_, _84_, 231-259.

Olson, J.L., & Mealor, D.J. (1981). Learning disabilities identification: Do researchers have the answer? _Learning Disability Quarterly_, _4_, 389-400.

Orton, S.T. (1928). Specific reading disability - strephosymbolia. _Journal of the American Medical Association_, _90_, 1095-1099.

Overmier, J.B., & Seligman, M.E.P. (1967). Effects of inescapable shock upon subsequent escape and avoidance learning. _Journal of Comparative and Physiological Psychology_, _63_, 28-33.

Pascarella, E., & Pflaum, S.W. (1981). The interaction of children's attribution and level of control over error corrections in reading instruction. _Journal of Educational Psychology_, _73_, 533-540.

Pascarella, E.T., Pflaum, S.W., Bryan, T.H., & Pearl, R.A. (1983). Interaction of internal attribution for effort and teacher response mode in reading instruction: A replication note. _American Educational Research Journal_, _20_, 269-276.

Patten, M.D. (1983). Relationships between self-esteem, anxiety, and achievement in young learning disabled students. Journal of Learning Disabilities, 16, 43-45.

Pearce, J. (1977). Depressive disorders in childhood. Journal of Child Psychology and Psychiatry, 18, 79-83.

Pearce, J.B. (1978). The recognition of depressive disorder in children. Journal of the Royal Society of Medicine, 71, 494-500.

Pearl, R. (1982). LD children's attributions for success and failure: A replication with a labeled LD sample. Learning Disabilities Quarterly, 5, 173-176.

Pearl, R., & Bryan, T., & Donahue, M. (1980). Learning disabled children's attributions for success and failure. Learning Disability Quarterly,3, 3-9.

Peterson, C., Semmel, A., von Baeyer, C., Abramson, L.Y., Metalsky, G.I., & Seligman, M.E.P. (1982). The Attributional Style Questionnaire. Cognitive Therapy and Research, 6, 287-299.

Peterson, C., & Seligman, M.E.P. (1984). Causal explanations as a risk factor for depression: Theory and evidence. Psychological Review, 91, 347-374.

Peterson, D.R. (1961). Behavior problems of middle children. Journal of Consulting Psychology, 25, 205-209.

Petti, T.A. (1978). Depression in hospitalized child psychiatry patients. Journal of the American Academy of Child Psychiatry, 17, 49-59.

Phares, E.J. (1957). Expectancy changes in skill and chance situations. Journal of Abnormal Social Psychology, 54, 339-342.

Phares, E.J. (1973). Locus of control: A personality determinant of behavior. Morristown, NJ: General Learning Press.

Piaget, J. (1926). The language and thought of the child. New York: Harcourt, Brace.

Piercy, M.F., & Smyth, V. (1962). Right hemisphere dominance for certain non-verbal intellectual skills. Brain, 85, 775-790.

Porter, R.B., & Cattell, R.B. (1979). Handbook for the Children's Personality Questionnaire. Champaign,IL: Institute for Personality and Ability Testing, Incorporated.

Porteus, S.E. (1942). Qualitative performance in the maze test. Vineland, NJ: Smith.

Poznanski, E.O. (1982). The clinical characteristics of childhood depression. In L. Grinspoon (Ed.), Psychiatry 1982. Annual Review. Washington, DC: American Psychiatric Press. Poznanski, E.O., Cook, S.C., & Carroll, B.J. (1979). A depression rating scale for children. Pediatrics, 64, 442-450.

Poznanski, E.O., Cook, S.C., & Carroll, B.J. (1979). A depression rating scale for children. Pediatrics, 64, 442-450.

Poznanski, E., & Zrull, J.P. (1970). Childhood depression: Clinical characteristics of overtly depressed children. Archives of General Psychiatry, 23, 8-15.

Preston, R.C., & Yarington, D.J. (1967). Status of fifty retarded readers eight years after reading clinic diagnosis. Journal of Reading, 11, 122-129.

Pribram, K.H., & Luria, A.R. (1973). Psychophysiology of the frontal lobes. New York: Academic Press.

Prkachin, K.M., Craig, K.D., Papageorgis, D., & Reith, G. (1977). Nonverbal communication deficits and response to performance feedback in depression. Journal of Abnormal Psychology, 86, 224-234.

Puig-Antich, J., Blau, S., Marx, N., Greenhill, L.L., & Chambers, W. (1978). Prepubertal major depressive disorder; Pilot study. Journal of the American Academy of Child Psychiatry, 17, 695-707.

Quay, H.C. (1979). Residential treatment. In H.C. Quay & J. Werry (Eds.), Psychopathological disorders of childhood (2nd ed.). New York: Wiley.

Rabinovitch, R.D., Drew, A.L., De Jong, R., Ingram, W., & Withey, L. (1954). A research approach to reading retardation. In R. McIntosh & C.C. Hare, (Eds.) Neurology and psychiatry in childhood (pp. 363-395). Baltimore, MD: Williams and Wilkins.

Radloff, L. (1975). Sex differences in depression. The effects of occupation and marital status. Sex Roles, 1, 249-265.

Ransohoff, D.F., & Feinstein, A.R. (1978). Problems of spectrum and bias in evaluating the efficacy of diagnostic tests. New England Journal of Medicine, 299, 926-930.

Rapoport, J.L., Quinn, P.O., Bradbard, G., Riddle, K.D., & Brooks, E. (1974). Imipramine and methylphenidate treatments of hyperactive boys. Archives of General Psychiatry, 30, 789-793.

Raven, J.C. (1956,1962). Coloured Progressive Matrices. London: H.K. Lewis & Co., Ltd.

Raven, J.C. (1965). Guide to using the Coloured Progressive Matrices. London: H.K. Lewis & Co., Ltd.

Rawson, M.B. (1968). Developmental language disability: Adult accomplishments of dyslexic boys. Baltimore: Johns Hopkins University Press.

Renshaw, D.C. (1974). Suicide and depression in children. Journal of School Health, 44, 487-489.

Rholes, W.S., Blackwell, J., Jordan, C., & Walters, C. (1980). A developmental study of learned helplessness. Developmental Psychology, 16, 616-624.

Richman, N. (1977). Short term outcome of behavior problems in three year old children. In P.J. Graham (Ed.), Epidemiological approaches in child psychiatry. New York: Academic Press.

Riddle, K.D., & Rapoport, J.L. (1976). A 2-year follow-up of 72 hyperactive boys. The Journal of Nervous and Mental Disease, 162, 126-134.

Rie, H.E., & Rie, E.D. (1980). Handbook of minimal brain dysfunctions. New York: John Wiley & Sons.

Rizley, R.C. (1978). Depression and distortion in the attribution of causality. Journal of Abnormal Psychology, 87, 32-48.

Robins, E., & Guze, S. (1970). Establishment of diagnostic validity in psychiatric illness: Its application to schizophrenia. American Journal of Psychiatry, 126, 983-987.

Robins, L.N. (1966). Deviant children grown up. Baltimore: Williams & Wilkins.

Robins, L.N. (1979). Follow-up studies. In H.C. Quay and J.S. Werry (Eds.), Psychopathological disorders of childhood (pp. 483-513). New York: John Wiley & Sons.

Robinson, H.M., & Smith, H.K. (1962). Reading clinic clients - ten years after. The Elementary School Journal, 63, 22-28.

Rogers, C.R. (1959). A theory of therapy, personality, and interpersonal relationships, as developed in the client-centered framework. In S. Koch (Ed.), Psychology: A study of a science (Vol. 3). New York: McGraw-Hill.

Ross, L., Lepper, M.R., & Hubbard, M. (1975). Perseverance in self-perception and social perception: Biased attributional processes in the debriefing paradigm. Journal of Personality and Social Psychology, 32, 880-892.

Roth, S., & Kubal, L. (1975). Effects of noncontingent reinforcement on tasks of differing importance: Facilitation and learned helplessness. Journal of Personality and Social Psychology, 32, 680-691.

Rotter, J.B. (1966). Generalized expectancies for internal versus external control of reinforcement. Psychological Monographs, 80, (1, Whole No. 609).

Rotter, J.C., Chance, J.E., & Phares, E.J. (1972). Applications of a social learning theory of personality. New York: Holt, Rinehart & Winston.

Royce, J.R., Yeudall, L.T., & Bock, C. (1976). Factor analytic studies of human brain damage: I. First and second-order factors and their brain correlates. Multivariate Behavioral Research, 4, 381-418.

Ruble, D.N., & Rholes, W.S. (1981). The development of children's perceptions and attributions about their social world. In J.H. Harvey, W. Ickes, & R.F. Kidd (Eds.), New directions in attribution research (Vol. 3, pp. 3-36). Hillsdale, NJ: Lawrence Erlbaum.

Rugel, R.P. (1974). WISC subtest scores of disabled readers: A review with respect to Bannatyne's recategorization. Journal of Learning Disabilities, 7, 48-55.

Rusch, R.R. (1970). Reliability of the Higgins-Wertman Test of Visual Closure. Perceptual and Motor Skills, 30, 879-885.

Rusch, R.R. (1971). Note on the validity of the claim that final closure is related to reading achievement. Perceptual and Motor Skills, 32, 394.

Rutter, M. (1972). Relationship between child and adult psychiatric disorders. Acta Psychiatrica Scandinavica, 48, 3- 21.

Rutter, M. (1977). Brain damage syndromes in childhood: Concepts and findings. Journal of Child Psychology and Psychiatry, 16, 181-197.

Rutter, M. (1978). Early sources of security and competence. In J.S. Bruner & A. Garton (Eds.), Human growth and development. Oxford: Clarendon Press.

Rutter, M. (1980). Raised lead levels and impaired cognitive/behavioral functioning: A review of the evidence. Supplement to Developmental Medicine and Child Neurology, Vol.22, No. 1. Supplement No. 42. Spastics International Medical Publications in association with Wm. Heinemann Medical Books Ltd., Tadworth, Surrey; J.B. Lippincott Co., East Washington Square, Philadelphia, PA., 19105. London: 1980. (b)

Rutter, M., & Chadwick, O. (1980). Neurobehavioral associations and syndromes of "minimal brain dysfunction." In F.C. Rose (Ed.), Clinical neuro-epidemiology. Tunbridge Wells: Pitman Medical.

Rutter, M., Chadwick, O., & Schachar, R. (1980). Hyperactivity and minimal brain dysfunction: Epidemiological perspectives on questions of cause and classification. Presented at Symposium on Minimal Brain Dysfunction and Hyperkinetic Behavior in Children, April 25, 1980, Omaha, Nebraska.

Rutter, M., Chadwick, O., Shaffer, D., & Brown, G. (1980). A prospective study of children with head injuries: I. Design and methods. Psychological Medicine, 10, 633-645.

Rutter, M., Graham, P., & Yule, W. (1970a). A neuropsychiatric study in childhood. London: Spastics International Medical Publications.

Rutter, M., Tizard, J., & Whitmore, K. (Eds.) (1970b). Education, health and behavior. The Isle of Wight Study. London: Longmans.

Rutter, M., & Yule, W. (1975). The concept of specific reading retardation. Journal of Child Psychology and Psychiatry, 16, 181-197.

Ryan, T.A., Jr., Joiner, B.L., & Ryan, B.F.(1981). MINITAB Reference Manual. University Park, PA: Pennsylvania State University. A companion to MINITAB Student Handbook. Boston, MA: Duxbury Press.

Ryckman, D.B., & Elrod, G.F. (1983). Once is not enough. Journal of Learning Disabilities, 16, 87-89.

Santostefano, S. (1978). A biodevelopmental approach to clinical psychology. New York: John Wiley & Sons, Inc.

Satterfield, J.H., Cantwell, D.P., & Satterfield, B.T. (1979). Multimodality treatment. Archives of General Psychiatry, 36, 965-974.

Sattler, J.M. (1982). Assessment of children's intelligence and special abilities. 2nd edition. Boston: Allyn and Bacon, Inc.

Satz, P. & Friel, J. (1973). Some prediction antecedents of specific learning disability: A preliminary one year follow-up. In P. Satz and J. Ross (Ed.s), The disabled learner: Early detection and treatment (pp. 79-98). Rotterdam University Press.

Schachter, S. (1964). The interaction of cognitive and physiological determinants of emotional state. Advances in Experimental Social Psychology, 1, 49-80.

Schain, R.J. (1977). Neurology of childhood learning disorders. (2nd ed.). Baltimore: The Williams & Wilkins Co.

Schulterbrandt, J.G., & Raskin, A. (1977). Depression in childhood: Diagnosis, treatment, and conceptual models. New York: Raven Press.

Schunk, D.H. (1981). Modeling and attributional effects on children's achievement: A self-efficacy analysis. Journal of Educational Psychology, 73, 93-105.

Seidel, V.P., Chadwick. O.F.D., & Rutter, M. (1975). Psychological disorders in crippled children. A comparative study of children with and without brain damage. Developmental Medicine and Child Neurology, 17, 563-573.

Seligman, M.E.P. (1974). Depression and learned helplessness. In R.J. Friedman & M.M. Katz (Eds.), The psychology of depression: Contemporary theory and research. Washington: V.H. Winston.

Seligman, M.E.P. (1975). Helplessness: On depression, development, and death. San Francisco: W.H. Freeman.
Seligman, M.E.P., Abramson, L.Y., Semmel, A., & von Baeyer, C. (1979). Depressive attributional style. Journal of Abnormal Psychology, 88, 242-247.

Seligman, M.E.P., Abramson, L.Y., Semmel, A., & von Baeyer, C. (1979). Depressive attributional style. Journal of Abnormal Psychology, 88, 242-247.

Seligman, M.E.P., & Maier, S.F. (1967). Failure to escape traumatic shock. Journal of Experimental Psychology, 74, 1-9.

Seligman, M.E.P., Maier, S.F., & Geer, J. (1968). The alleviation of learned helplessness in the dog. Journal of Abnormal Psychology, 73, 256-262.

Seligman, M.E.P., Peterson, C., Kaslow, N.J., Tanenbaum, R.L., Alloy, L.B., & Abramson, L.Y. (1984). Attributional style and depressive symptoms among children. Journal of Abnormal Psychology, 93, 235-238.

Shapiro, J. (1985, March 6). Letter to the editor. Vancouver Sun, p. A5.

Shaver, K.G. (1975). An introduction to attribution processes. Cambridge, MA: Winthrop Pub. Inc.

Shepherd, M., Oppenheim, B., & Mitchell, S. (1971). Childhood behavior and mental health. New York: Grune & Stratton.

Siegel, P.M. (1971). Prestige in the American occupational structure. Unpublished doctoral dissertation, University of Chicago.

Silver, A.A., & Hagin, R.A. (1964). Specific reading disability: follow-up studies. American Journal of Orthopsychiatry, 34, 95-102.

Simon, J.G., & Feather, N.T. (1973). Causal attributions for success and failure at university examinations. Journal of Educational Psychology, 64, 46-56.

Sladen, B.K. (1972). Some genetic aspects of dyslexia. Bulletin of the Orton Society, 22, 41-53.

Smith, M.D. (1979). Prediction of self-concept among learning disabled children. Journal of Learning Disabilities, 12, 664-669.

Smith, M.D., Coleman, J.M., Dokecki, P.R., & Davis, E.E. (1977). Recategorized WISC-R scores of learning disabled children. Journal of Learning Disabilities, 10, 437-443.

Smith, S.D., Kimberling, W.J., Pennington, B.F., & Lubs, H.A. (1983). Specific reading disability: Identification of an inherited form through linkage analysis. Science, 219, 1345- 1347.

Snow, R.E. (1980). Aptitude processes. In R.E. Snow, P.A. Federico, & W.E. Montague (Eds.), Aptitude, learning, and instruction. Vol. I: Cognitive process analyses of aptitude. Hillsdale, NJ: Lawrence Erlbaum Assoc., Pub.

Solomon, R.L., & Corbit, J.D. (1973). An opponent-process theory of motivation: II. Cigarette addiction. Journal of Abnormal Psychology, 81, 158-171.

Solyom, L., Beck, P., Solyom, C., & Hugal, R. (1974). Some etiological factors in phobic neurosis. Canadian Psychiatric Association Journal, 19, 69-78.

SPSS:^{x} (1983). User's Guide. New York: McGraw-Hill.

Statistics Canada, (1971) Canadian Classification and Dictionary of Occupations, Ottawa: Queen's Printer.

Statistics Canada, (1972). Dictionary of 1971 Census Terms. Ottawa: Queen's Printer.

Staton, R.D., Wilson, H., & Brumback, R. (1981). Cognitive improvement associated with tricyclic antidepressant treatment of childhood major depressive illness. Perceptual and Motor Skills, 53, 219-234.

Stevenson, D.T., & Romney, D.M. (1984). Depression in learning disabled children. Journal of Learning Disabilities, 17, 579-582.

Stewart, M.A. (1980). Genetic, perinatal, & constitutional factors in minimal brain dysfunctions. In H.E. Rie and E.D. Rie (Eds.), Handbook of minimal brain dysfunctions, New York: John Wiley & Sons, 155-168.

Stipek, D.J., & Weisz, J.R. (1981). Perceived personal control and academic achievement. Review of Educational Research, 51, 101-137.

Stroop, J.R. (1935). Studies of interference in serial verbal reactions. Journal of Experimental Psychology, 18, 643-661.

Taylor, S.E., & Fiske, S.T. (1978). Salience, attention, and attribution: Top of the head phenomena. In L. Berkowitz, (Ed.), Advances in experimental social psychology (vol. 11, pp. 249-288). New York: Academic Press.

Teasdale, J.D. (1978). Effects of real and recalled success or learned helplessness and depression. Journal of Abnormal Psychology, 87, 155-164.

Tennen, H., & Eller, S.J. (1977). Attributional components of learned helplessness and facilitation. Journal of Personality and Social Psychology, 35, 265-271.

Tennen, H., & Gillen, R. (1979). The effect of debriefing on laboratory induced helplessness: An attributional analysis. Journal of Personality, 47, 629-642.

Tetlock, P.E. (1981). The influence of self-presentational goals on attributional reports. Social Psychology Quarterly, 44, 300-311.

Thomas, A. (1979). Learned helplessness and expectancy factors: Implications for research in learning disabilities. Review of Education Research, 49, 208-221.

Thomas, A., & Pashley, B. (1982). Effects of classroom training on LD students' task persistence and attributions. Learning Disability Quarterly, 5, 133-144.

Thornton, J.W., & Jacobs, P.D. (1971). Learned helplessness in human subjects. Journal of Experimental Psychology, 87, 367-372.

Thurstone, L.L. (1938). Primary mental abilities. Psychometric Monographs. No. 1.

Thurstone, L.L. (1944). A factorial study of perception. Chicago: University of Chicago Press.

Thurstone, L.L., & Mellinger, J.J. (1953). The Stroop Test. Chapel Hill, NC: The Psychometric Laboratory, University of North Carolina, no. 3.

Thurstone, L.L., & Thurstone, T.G. (1962). SRA Primary Mental Abilities. Chicago: SRA.

Toolan, J.M. (1962). Depression in children & adolescents. American Journal of Orthopsychiatry, 32, 404-414.

Torgesen, J. (1975). Problems and prospects in the study of learning disabilities. In E. Mavis Hetherington (Ed.), Review of Child Development Research (vol. 5), Chicago: University of Chicago Press.

Torgesen, J. (1982). Use of rationally defined subgroups in research. In J.P. Das, R.F. Mulcahy, and A.E. Wall (Eds.), Theory and research in learning disabilities. New York: Plenum Press.

Torgesen, J., & Dice, C. (1980). Characteristics of research on learning disabilities. Journal of Learning Disabilities, 13, 531-535.

Torgesen, J.K., & Licht, B.G. (1983). The learning disabled child as an inactive learner: Retrospect and prospects. In J.D. McKinney & L. Feagans (Eds.), Current topics in learning disabilities (Vol. 1). Norwood, NJ: Ablex Publishing.

Towbin, A. (1971). Organic causes of minimal brain dysfunction: Perinatal origin of minimal cerebral lesions. Journal of the American Medical Association, 217, 1207-1214.

Towbin, A. (1978). Cerebral dysfunctions related to perinatal organic damage: Clinical-neuropathologic correlations. Journal of Abnormal Psychology, 87, 617-635.

Towbin, A. (1980). Neuropathologic factors in minimal brain dysfunction. In H.E. Rie & E.D. Rie (Eds.), Handbook of minimal brain dysfunctions (pp. 185-209). New York: John Wiley & Sons.

Trope, Y., & Brickman, P. (1975). Difficulty and diagnosticity as determinants of choice among tasks. Journal of Personality and Social Psychology, 31, 918-926.

Valle, V.A., & Frieze, I.H. (1976). Stability of causal attributions as a mediator in changing expectations for success. Journal of Personality and Social Psychology, 33, 579-587.

Weary, G. (1980). Examination of affect and egotism as mediators of bias in causal attributions. Journal of Personality and Social Psychology, 38, 348-357.

Wechsler, D. (1939). Wechsler-Bellevue I.

Wechsler, D. (1942). Wechsler-Bellevue II. Army Wechsler.

Wechsler, D. (1949). Manual for the Wechsler Intelligence Scale for Children. New York: Psychological Corporation.

Wechsler, D. (1974). Manual for the Wechsler Intelligence Scale for Children - Revised. New York: Psychological Corporation.

Weidl, K.H., & Carlson, J.S. (1976). The factorial structure of the Raven Colored Progressive Matrices Test. Educational and Psychological Measurement, 36, 409-413.

Weinberg, W.A., Rutmen, J., Sullivan, L., Penick, E.C., & Dietz, S.G. (1973). Depression in children referred to an educational diagnostic center: Diagnosis & treatment. Journal of Pediatrics, 83, 1065-1072.

Weiner, B. (1972). Theories of motivation: From mechanism to cognition. Chicago: Rand McNally.

Weiner, B. (1974). Achievement motivation and attribution theory. Morristown, NJ: General Learning Press.

Weiner, B. (1976). An attributional approach for educational psychology. In L. Shulman (Ed.), Review of research in education (vol. 4, pp. 179-209). Itasca, IL: F.E. Peacock. Weiner, B. (1979). A theory of motivation for some classroom experiences. Journal of Educational Psychology, 71, 3-25.

Weiner, B. (1979). A theory of motivation for some classroom experiences. Journal of Educational Psychology, 71, 3-25.

Weiner, B. (1980). Human motivation. New York: Holt, Rinehart, and Winston.

Weiner, B. (1983). Speculations regarding the role of affect in achievement-change programs guided by attributional principles. In J.M. Levine & M.C. Wang (Eds.), Teacher and student perceptions: Implications for learning (pp. 57-73). Hillsdale, NJ: Lawrence Erlbaum.

Weiner, B. (1984). Principles for a theory of student motivation and their application within an attributional framework. In R. Ames & C. Ames (Eds.), Research on motivation in education (Vol. 1, Student Motivation, pp. 15-38). New York: Academic Press.

Weiner, B., Frieze, I., Kukla, A., Reed, L., Rest, S., Rosenbaum, R.M. (1972). Perceiving the causes of success and failure. In E.E. Jones et al (Eds.), Attribution: Perceiving the causes of behavior (pp. 95-120). Morristown, NJ: General Learning Press.

Weiner, B., & Kukla, A. (1970). An attributional analysis of achievement motivation. Journal of Personality and Social Psychology, 15, 1-20.

Weiner, B., Nierenberg, R., & Goldstein, M. (1976). Social learning (locus of control) versus attributional (causal stability) interpretations of expectancy of success. Journal of Personality, 44, 52-68.

Weiner, B., Russell, D., & Lerman, D. (1978). The cognitive-emotion process in achievement-related contexts. Journal of Personality and Social Psychology, 37, 1211-1220.

Weiss, G., Minde, K., Werry, J. Douglas, V., & Nemeth, E. (1971). Studies on the hyperactive child, VIII. Five-year follow-up. Archives of General Psychiatry, 24, 409-414.

Weissman, M.M., & Klerman, G.L. (1977). Sex differences and the epidemiology of depression. Archives of General Psychiatry, 34, 98-111.

Welner, Z. (1978). Childhood depression: An overview. The Journal of Nervous and Mental Disease, 166, 588-593.

Welner, Z., Welner, A., McCrary, M.A., & Leonard, M.A. (1977). Psychopathology in children of inpatients with depression: A controlled study. Journal of Nervous and Mental Disease, 164, 408-413.

Welner, Z., Welner, A., Stewart, M., Palkes, H., & Wish, E. (1977). A controlled study of siblings of hyperactive children. Journal of Nervous and Mental Disease, 165, 110-117.

Werner, E.E. (1980). Environmental interaction in minimal brain dysfunctions. In H.E. Rie and E.D. Rie (Eds.), Handbook of minimal brain cysfunctions (pp. 210-231). New York: John Wiley & Sons.

Werner, E.E., & Smith, R.S. (1977). Kauai's children come of age. Honolulu: University Press of Hawaii.

Werry, J.S., & Quay, H.C. (1971). The prevalence of behavior symptoms in younger elementary school children. American Journal of Orthopsychiatry, 41, 136-143.

Wiener, G., Rider, R.V., Oppel, W.C., & Harper, P.A. (1968). Correlates of low birth weight. Psychological status at eight to ten years of age. Pediatric Research, 2, 110-118.

Witkin, H.A., Dyk, R.B., Faterson, H.G., Goodenough, D.R., & Karp, S.A. (1974). Psychological differentiation. Potomac, MD: Erlbaum.

Witkin, H.A., Moore, C.A., Goodenough, D.R., & Cox, P.W. (1977). Field-dependent and field-independent cognitive styles and their educational implications. Review of Educational Research, 47, 1-64.

Woodcock, R.W. (1977). Woodcock-Johnson Psycho-educational Battery: Technical Report. Boston: Teaching Resources.

Woodcock, R.W. (1978). Development and standardization of the Woodcock-Johnson Psycho-educational Battery. Hingham, MA: Teaching Resources Corporation.

Woodcock, R.W., & Johnson, M.B. (1977). Woodcock-Johnson Psycho-educational Battery. Hingham, MA: Teaching Resources Corporation.

Woodruff, R.A., Goodwin, D.W., & Guze, S.B. (1974). Psychiatric Diagnosis. New York: Oxford University Press.

Wortman, C.B., Panciera, L., Shusterman, L., & Hibscher, J. (1976). Attributions of causality & reactions to uncontrollable outcomes. Journal of Experimental Social Psychology, 12, 301-316.

Young, E., & Egeland, B. (1976). Repetition choice behavior as a function of chronological age, task difficulty and expectancy of success. Child Development, 47, 682-689.

Yule, W. (1973). Differential prognosis of reading backwardness and specific reading retardation. British Journal of Educational Psychology, 43, 244-248.

Zemore, R., & Johansen, L.S. (1980). Depression, helplessness and failure attributions. Canadian Journal of Behavioral Science, 12, 161-174.

Zerbin-Rudin, E. (1967). Congenital word blindness. Bulletin of the Orton Society, 17, 47-54.

Zuckerman, M., Larrance, D.T., Porac, J.F.A., & Blanck, P.D. (1980). Effects of fear of success on intrinsic motivation, causal attribution, and choice behavior. Journal of Personality and Social Psychology, 39, 503-513.

Zuroff, D.C. (1981). Depression and attribution: Some new data and a review of old data. <u>Cognitive Therapy and Research</u>, <u>5</u>, 273-281.

Appendix 1

THE UNIVERSITY OF BRITISH COLUMBIA
Faculty of Education
2125 Main Mall
University Campus
Vancouver, B.C., Canada
V6T 1Z5

January 17, 1984

Dear Principal and Teachers:

The ______________ School Board has given us permission to conduct research for a doctorate in Interdisciplinary Studies (Special Education; Clinical Psychology; Pediatrics) in the elementary schools. We are interested in children's motivation, especially children's attributions or explanations regarding performance on game-like tasks. Such interpretations of the causes of good or poor performance have been shown to be important predictors of future persistence on many kinds of tasks. It would be valuable for educators to know the attributional systems of both children who are doing well in school, and those who are having difficulty.

Although we will be administering the WISC-R in order to determine intelligence level, and the three reading subtests of the Woodcock-Johnson Psychoeducational Battery in order to determine achievement level in reading, we would be grateful if you could make an initial judgment regarding subject selection for us. Basically, we want to compare the attributions and performances of learning-disabled boys with those of normally achieving boys.

For experimental subjects, we are interested in boys only, between the ages of 9 years 0 months to 11 years 11 months, in Grades 4, 5, or 6, or in a specialized class placement for learning disabilities, whose IQs are at least 80 (on the Verbal, Performance, or Full Scale scores), and whose reading achievement is at the 20th percentile for their age or lower on a standardized reading test (such as on the Canadian Tests of Basic Skills that was given on a district-wide basis before the Christmas break). These youngsters must be native English speakers (i.e., not ESL) and must not be seriously handicapped physically, emotionally, or culturally. (Children with glasses, hearing aids, or other corrected sensory or minor deficits, for example, are acceptable.) These learning-disabled youngsters often have histories of school difficulties from Grade One; have uneven performance records, i.e., good in some subjects and poor in others; and have had an early diagnosis of LD (medical, psychological, or educational).

For control subjects we are interested in boys between the ages of 9 years 0 months and 11 years 11 months, in Grades 4, 5, or 6, preferably boys from the same classes (or at least the same school) as the experimental subjects. The best method is to choose the boy on the class list whose birthday comes closest to that of the experimental child. He must meet the same criteria - IQ $\geq$ 80, native language English, and be free from serious physical, emotional, or cultural handicap. But he must be within the normal range (expected grade level) in reading. It is best not to select "stars" as control subjects, as a close match is preferable, even regarding socioeconomic status (if, for example, family occupations are known).

Appendix 2

THE UNIVERSITY OF BRITISH COLUMBIA
Faculty of Education
2125 Main Mall
University Campus
Vancouver, B.C., Canada
V6T 1Z5

January 15, 1984

Dear Parent(s)/Guardian(s):

The ______________ School Board has given us permission to conduct research for a doctorate in Interdisciplinary Studies (Special Education; Clinical Psychology; Pediatrics) in the elementary schools. We are interested in children's motivation and how it affects school performance. It would be valuable for educators to know the motivational systems of both children who are doing well in school, and those who are having difficulty.

We would like to include your child in this study and would be grateful if you would allow him/her to participate in our research. There will be three individual testing sessions over a two-week period, each lasting approximately one hour. Testing will be done at your child's school at a time arranged with your child's classroom teacher. All testing will be done individually and privately. Results will remain strictly confidential; information will not be given to teachers or to school personnel.

The first session involves the administration of an individualized intelligence test and achievement tests commonly used in the schools. The second session involves the completion of two questionnaires that show what factors children feel are important in achievement situations, and completion of five short tasks. The third session involves further motivational survey questions and completion of five or six games or tasks. For some of the students one of the games will be made more difficult than for others. The final tasks for all children are simple ones to ensure that they leave the experimental situation with positive feelings of success. The purpose of the study will be explained to them; previous research has revealed that children find these tasks/games interesting and enjoyable.

Participation in the project is voluntary and withdrawal at any time is permissible. All identifying information will be coded to ensure anonymity, and access to the data collected will be restricted to the researchers (below) and members of the doctoral dissertation committee.

If you agree to allow your child's participation in this study, we would ask you to complete the enclosed Child Behavior Checklist (either parent or guardian may fill it out) and return it together with the attached consent form in the envelope provided.

If you have any questions regarding the research project, please feel free to telephone either of us at the numbers given below.

Thank you.

Yours truly,

Appendix 3

THE UNIVERSITY OF BRITISH COLUMBIA
Faculty of Education
2125 Main Mall
University Campus
Vancouver, B.C., Canada
V6T 1Z5

PARENT CONSENT FORM

Project Title: Attribution Patterns of School-Aged Children

Principal Investigator: Dr. Peggy R. Koopman

I consent to ____________________'s participation in the educational research project being conducted by the University of British Columbia. I am aware that this will involve three sessions of approximately one hour each, over a period of two weeks, conducted by a graduate student experimenter and a research assistant. I understand that the confidentiality of the test results will be maintained and that no individual scores will be released. I understand that participation in this project is voluntary and may be terminated at any time.

I hereby give my permission for my child to participate in the educational research being conducted by the University of British Columbia.

YES ________________________________
(signature)

________ I have completed the Child Behavior Checklist and am returning it in the envelope provided. (Please check.)

I would rather not have my child participate in this research project and am returning the unanswered Child Behavior

Checklist in the envelope provided.

NO ______________________________
(signature)

School: ______________________________

Appendix 3
(Parent consent for release of two tests' scores)

THE UNIVERSITY OF BRITISH COLUMBIA
Faculty of Education
2125 Main Mall
University Campus
Vancouver, B.C., Canada
V6T 1Z5

January 23, 1984

Dear Parent(s)/Guardian(s):

As you will note in the letter attached (dated January 15, 1984), the first session of my research project involves the administration of an individualized intelligence test - the WISC-R, or Wechsler Intelligence Scale for Children - Revised, and the administration of the three reading achievement subtests from the Woodcock-Johnson Psycho-educational Battery.

Your child's principal has expressed a desire to receive and retain the scores from these two tests only in order to best help your child at school.

Please indicate your consent by completing the form below.

If you wish your child to participate in the study, but do not wish any scores given to the school, please indicate this below and complete the consent form at the end of the letter attached.

Thank you.

Donna M. Haqq, M.A.

Appendix 4

STUDENT CONSENT FORM

By way of introduction to the study, and in order to obtain consent from the child subject, the following will be said or paraphrased to each child before Session I begins:

"I am interested in your ideas and opinions about some tasks. You will probably find some of these tasks easy and some of them hard. Children usually find all of these tasks very interesting though. I will ask you to explain how you think you did and why you think you did well or not well on some of the tasks. The important thing is that you do your best and answer all the questions as well as you can. The first task I'm going to give you,* for example, is meant for children between the ages of 6 and 16; so some of the questions will be easy and some of them will be hard - meant for older children. Just do the best that you can.

Later, when I ask for your opinion on some questions I will read the questions out loud while you follow along. If you don't understand a word or sentence, please ask about it.

All of your answers are private and confidential. No one except me and my teachers at U.B.C. will know about them, and, in fact, I will be coding everyone's papers so that no one's name will be on them - only an identifying number to keep track of them. (Coded questionnaires may then be shown to the child to show what is meant by "coded.")

Your parent(s) has/have given permission for you to take part in our project, but you have to agree to take part too. You have the right to discontinue or stop being in the project at any time without anyone saying anything about it. And you may ask for a break to rest or stretch if you like. We will meet at three times, for about 1 to 1 1/2 hours, though, so that, hopefully, you won't get tired and you will find everything quite interesting and enjoyable.

At the end of the last session we have together I will explain why I've asked the questions I will be asking, and why I have given you the tasks that I will be giving you. You will understand why we are doing this project when I explain it all to you then.

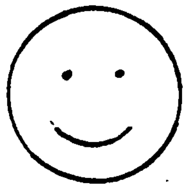
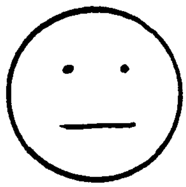
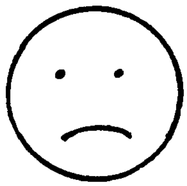
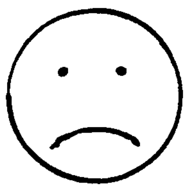
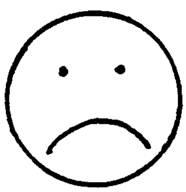
Do you have any questions before we begin?

* i.e., the Wechsler Intelligence Test for Children - Revised (WISC-R)

Appendix 5

MOOD MEASURE

Please put an "X" beside the face which best shows how you feel right now.

Very, very good		____________
Very good		____________
Good		____________
Don't know		____________
Bad		____________
Very bad		____________
Very, very bad		____________

Appendix 6

Attribution Rating Scale Training

I am interested in how you think or feel about some things. One way to show how you feel about something is to rate it on a scale. For example, if I ask you "How much do you like ice cream? Put an 'X' beside the words that best describe how much you like ice cream." Where would you put your 'X'?

My feelings about ice cream are that

_______ 1. I love it

_______ 2. I really like it

_______ 3. I like it

_______ 4. I don't care one way or the other

_______ 5. I don't like it

_______ 6. I really don't like it

_______ 7. I hate it

Now, put an 'X' beside the words that best describe how you feel about doing dishes. Where would you put your 'X'?

My feelings about doing the dishes are that

_______ 1. I love it

_______ 2. I really like it

_______ 3. I like it

_______ 4. I don't care one way or the other

_______ 5. I don't like it

_______ 6. I really don't like it

_______ 7. I hate it

Remember, there is <u>no right way</u> to answer these questions; <u>it</u>

all depends on your own feelings and opinions.

Now I'm going to tell you about a situation and I want you to tell me how much you think each thing is important. For example, pretend that you are on a baseball team, and your team wins.

1. How much do you think that your team won because the whole team was trying hard to win?

   _______ 1. very, very much

   _______ 2. very much

   _______ 3. much

   _______ 4. didn't matter

   _______ 5. somewhat

   _______ 6. a little bit

   _______ 7. not much at all

2. How much do you think that your team won because the whole team was lucky?

   _______ 1. very, very much

   _______ 2. very much

   _______ 3. much

   _______ 4. didn't matter

   _______ 5. somewhat

   _______ 6. a little bit

   _______ 7. not much at all

3. How much do you think that your team won because your teammates are good players - they have good ability?

   _______ 1. very, very much

   _______ 2. very much

   _______ 3. much

_______ 4. didn't matter

_______ 5. somewhat

_______ 6. a little bit

_______ 7. not much at all

4. How much do you think that your team won because the opposite team did not have good players - the game was easy?

_______ 1. very, very much

_______ 2. very much

_______ 3. much

_______ 4. didn't matter

_______ 5. somewhat

_______ 6. a little bit

_______ 7. not much at all

Now, pretend that your team lost the baseball game.

1. How much do you think that your team lost because the whole team wasn't trying hard to win?

_______ 1. very, very much

_______ 2. very much

_______ 3. much

_______ 4. didn't matter

_______ 5. somewhat

_______ 6. a little bit

_______ 7. not much at all

2. How much do you think that your team lost because the whole team was unlucky?

_______ 1. very, very much

_______ 2. very much

_______ 3. much

_______ 4. didn't matter

_______ 5. somewhat

_______ 6. a little bit

_______ 7. not much at all

3. How much do you think that your team lost because your team has poor players - they have <u>poor ability</u>?

_______ 1. very, very much

_______ 2. very much

_______ 3. much

_______ 4. didn't matter

_______ 5. somewhat

_______ 6. a little bit

_______ 7. not much at all

4. How much do you think that your team lost because the opposite team had good players - <u>the game was hard</u>?

_______ 1. very, very much

_______ 2. very much

_______ 3. much

_______ 4. didn't matter

_______ 5. somewhat

_______ 6. a little bit

_______ 7. not much at all

Appendix 7

Pre-experimental attribution questionnaire

Now, pretend that you are doing a test in school and you do very well on it; you get an 'A.'

1. How much do you think that you did well on the test because you tried hard?

   _______ 1. very, very much

   _______ 2. very much

   _______ 3. much

   _______ 4. didn't matter

   _______ 5. somewhat

   _______ 6. a little bit

   _______ 7. not much at all

2. How much do you think that you did well on the test because you were lucky?

   _______ 1. very, very much

   _______ 2. very much

   _______ 3. much

   _______ 4. didn't matter

   _______ 5. somewhat

   _______ 6. a little bit

   _______ 7. not much at all

3. How much do you think that you did well on the test because of your ability - you were smart?

   _______ 1. very, very much

   _______ 2. very much

   _______ 3. much

_______ 4. didn't matter

_______ 5. somewhat

_______ 6. a little bit

_______ 7. not much at all

4. How much do you think that you did well on the test because the test was <u>easy</u>?

_______ 1. very, very much

_______ 2. very much

_______ 3. much

_______ 4. didn't matter

_______ 5. somewhat

_______ 6. a little bit

_______ 7. not much at all

Now, pretend that you are doing a test in school and you do very badly on it; you get an 'F' or 'E.'

1. How much do you think that you did poorly on the test because you <u>didn't try hard</u> enough?

_______ 1. very, very much

_______ 2. very much

_______ 3. much

_______ 4. didn't matter

_______ 5. somewhat

_______ 6. a little bit

_______ 7. not much at all

2. How much do you think that you did poorly on the test because you were <u>unlucky</u>?

_______ 1. very, very much

_______ 2. very much

_______ 3. much

_______ 4. didn't matter

_______ 5. somewhat

_______ 6. a little bit

_______ 7. not much at all

3. How much do you think that you did poorly on the test because of your poor ability - you were dumb?

_______ 1. very, very much

_______ 2. very much

_______ 3. much

_______ 4. didn't matter

_______ 5. somewhat

_______ 6. a little bit

_______ 7. not much at all

4. How much do you think that you did poorly on the test because the test was hard?

_______ 1. very, very much

_______ 2. very much

_______ 3. much

_______ 4. didn't matter

_______ 5. somewhat

_______ 6. a little bit

_______ 7. not much at all

Appendix 8

Intellectual Achievement Responsibility Questionnaire

(Crandall, Katkovsky, and Crandall, 1965)

Directions:

This is a questionnaire to find out how you feel about some things that happen to you in your daily life. For each question put a check in front of the one choice that best describes what happens or how you feel. This is not a test. There are no right or wrong answers. Your answers will not be shown to anyone else in your school. Please be sure to answer all of the questions.

[Note: Item numbers preceded by + are those items which comprise the I^+ subscale. Those preceded by - comprise the I^- subscale. In addition, those items marked with an asterisk, *, are those used to classify subjects into helplessness and mastery-oriented categories (Diener & Dweck, 1978; 1980).]

1. If a teacher passes you to the next grade, would it probably be

_____ a. because she liked you, or

___+_ b. because of the work you did?

2. When you do well on a test in school, is it more likely to be

___+_ a. because you studied for it, or

_____ b. because the test was especially easy?

* 3. When you have trouble understanding something in school, is it usually

_____ a. because the teacher didn't explain it clearly, or

* __-_ b. because you didn't listen carefully?

*4. When you read a story and can't remember much of it, it is usually

_____ a. because the story wasn't well written, or

*___-_ b. because you weren't interested in the story?

5. Suppose your parents say you are doing well in school. Is this likely to happen

___+_ a. because your school work is good, or

_____ b. because they are in a good mood?

6. Suppose you did better than usual in a subject at school. Would it probably happen

___+_ a. because you tried harder, or

_____ b. because someone helped you?

7. When you lose at a game of cards or checkers, does it usually happen

_____ a. because the other player is good at the game, or

___-_ b. because you don't play well?

* 8. Suppose a person doesn't think you are very bright or clever.

* ___-_ a. Can you make him change his mind if you try to, or

_____ b. are there some people who will think you're not very bright no matter what you do?

9. If you solve a puzzle quickly, is it

_____ a. because it wasn't a very hard puzzle, or

___+_ b. because you worked on it carefully?

10. If a boy or girl tells you that you are dumb, is it more likely that they say that

_____ a. because they are mad at you, or

___-_ b. because what you did really wasn't very bright?

* 11. Suppose you study to become a teacher, scientist, or doctor and you fail. Do you think this would happen

* __-_ a. because you didn't work hard enough, or

_____ b. because you needed some help, and other people didn't give it to you?

12. When you learn something quickly in school, is it usually

___+_ a. because you paid close attention, or

______ b. because the teacher explained it clearly?

13. If a teacher says to you, "Your work is fine," is it

______ a. something teachers usually say to encourage pupils, or

___+_ b. because you did a good job?

* 14. When you find it hard to work arithmetic or math problems at school, is it

* ___-_ a. because you didn't study well enough before you tried them, or

______ b. because the teacher gave problems that were too hard?

* 15. When you forget something you heard in class, is it

______ a. because the teacher didn't explain it very well, or

* ___-_ b. because you didn't try very hard to remember?

16. Suppose you weren't sure about the answer to a question your teacher asked you, but your answer turned out to be right. Is it likely to happen

______ a. because she wasn't as particular as usual, or

__+_ b. because you gave the best answer you could think of?

17. When you read a story and remember most of it, is it usually

__+__ a. because you were interested in the story, or

_____ b. because the story was well written?

18. If your parents tell you you're acting silly and not thinking clearly, is it more likely to be

__-__ a. because of something you did, or

_____ b. because they happen to feel cranky?

* 19. When you don't do well on a test at school, is it

_____ a. because the test was especially hard, or

* ___-_ b. because you didn't study for it?

20. When you win at a game of cards or checkers, does it happen

__+__ a. because you play real well, or

_____ b. because the other person doesn't play well?

21. If people think you're bright or clever, is it

_____ a. because they happen to like you, or

___+_ b. because you usually act that way?

22. If a teacher didn't pass you to the next grade, would it probably be

_____ a. because she "had it in for you," or

___-_ b. because your school work wasn't good enough?

* 23. Suppose you don't do as well as usual in a subject at school. Would this probably happen

* __-__ a. because you weren't as careful as usual, or

_____ b. because somebody bothered you and kept you from working?

24. If a boy or girl tells you that you are bright, is it usually

__+__ a. because you thought up a good idea, or

_____ b. because they like you?

25. Suppose you became a famous teacher, scientist, or doctor. Do you think this would happen

_____ a. because other people helped you when you needed it, or

___+_ b. because you worked very hard?

26. Suppose your parents say you aren't doing well in your school work. Is this likely to happen more

___-_ a. because your work isn't very good, or

_____ b. because they are feeling cranky?

27. Suppose you are showing a friend how to play a game and he has trouble with it. Would that happen

_____ a. because he wasn't able to understand how to play, or

___-_ b. because you couldn't explain it well?

28. When you find it easy to work arithmetic or math problems at school, is it usually

_____ a. because the teacher gave you especially easy problems, or

__+__ b. because you studied your book well before you tried them?

29. When you remember something you heard in class, is it usually

__+__ a. because you tried hard to remember, or

______ b. because the teacher explained it well?

30. If you can't work a puzzle, is it more likely to happen

__-__ a. because you are not especially good at working puzzles, or

______ b. because the instructions weren't written clearly enough?

31. If your parents tell you that you are bright or clever, is it more likely

______ a. because they are feeling good, or

___+_ b. because of something you did?

32. Suppose you were explaining how to play a game to a friend and he learns quickly. Would that happen more often

__+__ a. because you explained it well, or

______ b. because he was able to understand it?

* 33. Suppose you're not sure about the answer to a question your teacher asks you and the answer you give turns out to be wrong. Is it likely to happen

______ a. because she was more particular than usual, or

* __-__ b. because you answered too quickly?

* 34. If a teacher says to you, "Try to do better," would it be

______ a. because this is something she might say to get pupils to try harder, or

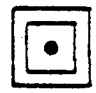
* ___-_ b. because your work wasn't as good as usual?

Appendix 9

Directions and Sample of the "Aim" Pre-, Post-Measure

CAB-A

: this test, you are to draw lines on a page full of figures just like this:



orking as *quickly* and *carefully* as you can

(1) draw a line freehand all the way around between the outer and inner squares, and then

(2) draw a circle around the dot.

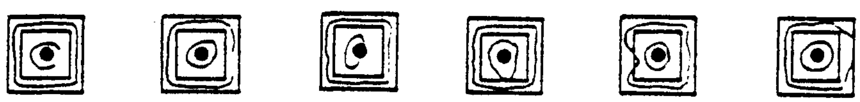
'AMPLES:

careful

(1) not to let your line touch either of the squares or the dot, and

(2) to make the lines complete; that is, go all the way around between the squares and around the dot.

e following would *not* get a point because the line either touched one of the squares or the dot, or was incomplete:

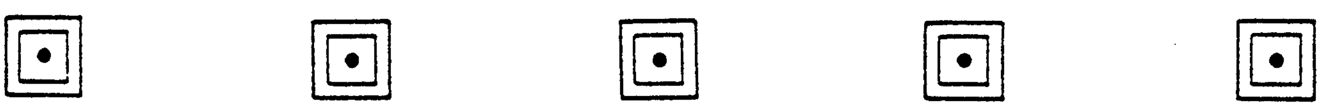


n't use a ruler to draw the lines. All pencil marks must be drawn freehand. *Finish each figure completely before going on he next one.*

ır score will be the number of figures with correctly drawn lines, so you should *go as fast as you can without making errors.*

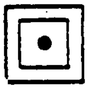
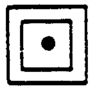
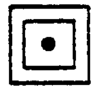
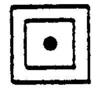
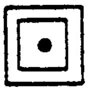
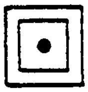
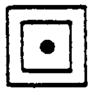
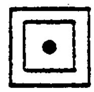
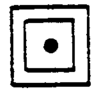
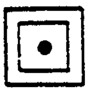
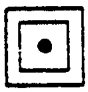
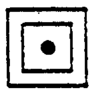
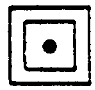
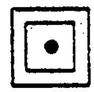
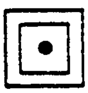
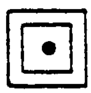
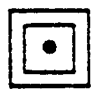
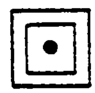
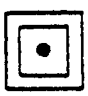
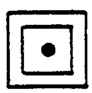
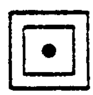
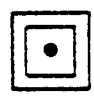
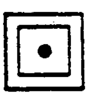
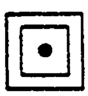
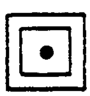
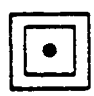
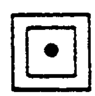
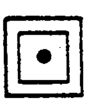
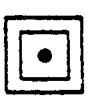
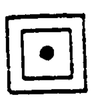
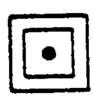
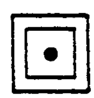
AMPLES:

practice, do the following examples as quickly and accurately as you can. You will have 30 seconds:



ke sure you have two sharp pencils ready. If not, sharpen two pencils in the space below, so that you will have a sharp cil for each of the two parts of this test. You will have *2½ minutes* for each of two pages of figures.

DO NOT TURN THIS PAGE UNTIL ASKED TO DO SO.

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

Appendix 10

Expectancy of Success Measure for Self, Pre Task

Before you play the game, I wonder if you could show me how well you think you will do on this game. Do you think you will be able to guess none of the picture cards? one of them? two of them? three of them? four of them? all of them? Put an 'X' beside the number on the page that shows how many of them you think you will be able to get right.

I think I will be able to guess correctly

1 picture card __________

2 picture cards __________

3 picture cards __________

4 picture cards __________

5 picture cards __________

6 picture cards __________

7 picture cards __________

8 picture cards __________

9 picture cards __________

10 picture cards __________

Expectancy of Success Measure for Other (Pre-Task)

If another boy from your class were given this same game, how many picture cards do you think he would get right? Put an 'X' beside the number on the page showing how many of them he would be able to get right.

I think another boy from my class would be able to guess correctly

1 picture card ___________

2 picture cards ___________

3 picture cards ___________

4 picture cards ___________

5 picture cards ___________

6 picture cards ___________

7 picture cards ___________

8 picture cards ___________

9 picture cards ___________

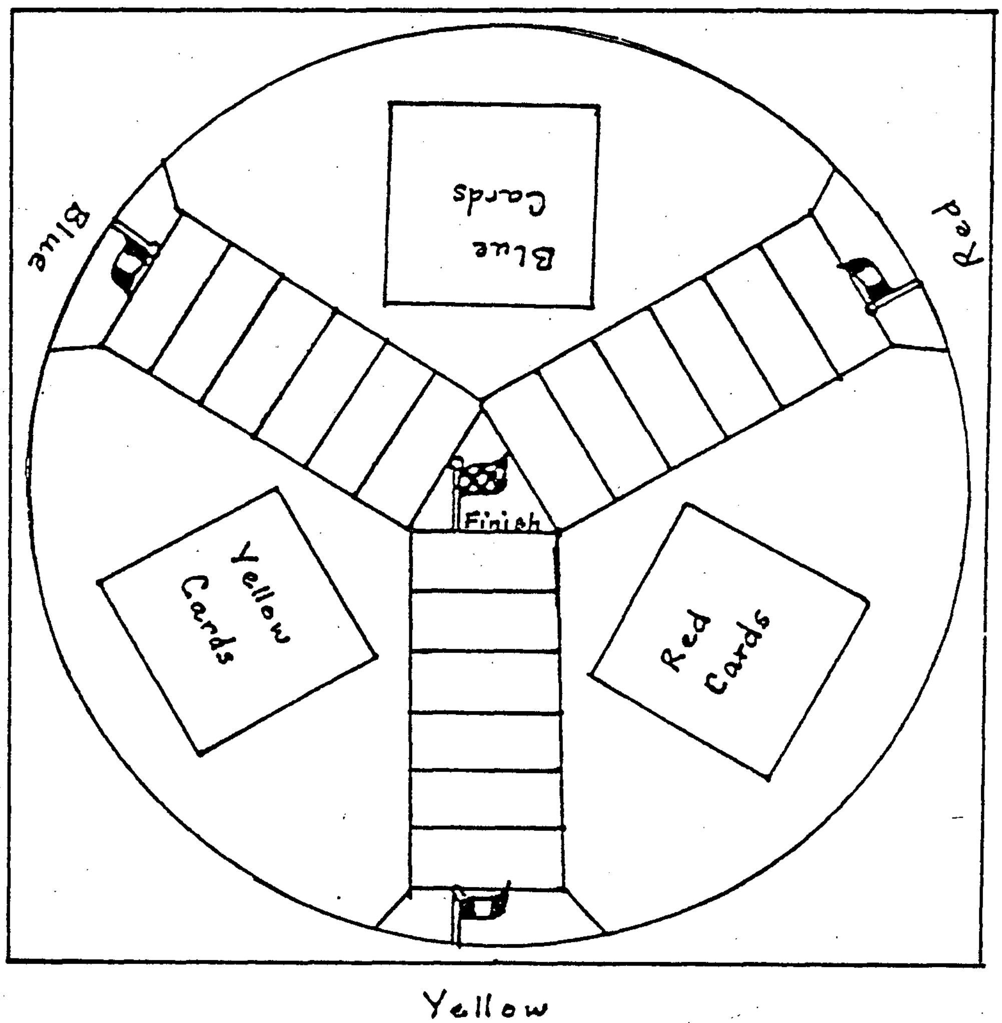
10 picture cards ___________

Appendix 11

Schematic Drawing of Board Game

"Round-Robin Racing"

(Experimental Manipulation Task for Easy and Difficult Conditions)



Scale = 4:1

Appendix 12

Post-experimental Task Attribution Questionnaire

Easy Condition

Good for you. You got your car to the winner's box.

1. How much was this because you tried hard?

_______ 1. very, very much

_______ 2. very much

_______ 3. much

_______ 4. didn't matter

_______ 5. somewhat

_______ 6. a little bit

_______ 7. not much at all

2. How much was this because you were lucky?

_______ 1. very, very much

_______ 2. very much

_______ 3. much

_______ 4. didn't matter

_______ 5. somewhat

_______ 6. a little bit

_______ 7. not much at all

3. How much was this because you are good at this kind of game - you have good ability?

_______ 1. very, very much

_______ 2. very much

_______ 3. much

_______ 4. didn't matter

_______ 5. somewhat

______ 6. a little bit

______ 7. not much at all

4. How much was this because the game was easy?

______ 1. very, very much

______ 2. very much

______ 3. much

______ 4. didn't matter

______ 5. somewhat

______ 6. a little bit

______ 7. not much at all

5. How enjoyable did you find this game?

______ 1. very, very enjoyable

______ 2. very enjoyable

______ 3. enjoyable

______ 4. can't decide

______ 5. somewhat enjoyable

______ 6. a little enjoyable

______ 7. not enjoyable at all

6. Do you have any suggestions about how this game can be improved?

Post-experimental Task Attribution Questionnaire

Difficult Condition

You were unable to get your car to the winner's box.

1. How much was this because you didn't try hard enough?

_______ 1. very, very much

_______ 2. very much

_______ 3. much

_______ 4. didn't matter

_______ 5. somewhat

_______ 6. a little bit

_______ 7. not much at all

2. How much was this because you were unlucky?

_______ 1. very, very much

_______ 2. very much

_______ 3. much

_______ 4. didn't matter

_______ 5. somewhat

_______ 6. a little bit

_______ 7. not much at all

3. How much was this because you are poor at this kind of game - you have poor ability?

_______ 1. very, very much

_______ 2. very much

_______ 3. much

_______ 4. didn't matter

_______ 5. somewhat

_______ 6. a little bit

_______ 7. not much at all

4. How much was this because the game was <u>hard</u>?

_______ 1. very, very much

_______ 2. very much

_______ 3. much

_______ 4. didn't matter

_______ 5. somewhat

_______ 6. a little bit

_______ 7. not much at all

5. How enjoyable did you find this game?

_______ 1. very, very enjoyable

_______ 2. very enjoyable

_______ 3. enjoyable

_______ 4. can't decide

_______ 5. somewhat enjoyable

_______ 6. a little enjoyable

_______ 7. not enjoyable at all

6. Do you have any suggestions about how this game can be improved?

Appendix 13

Expectancy of Future Success for Self

If you were give 10 more picture cards to do, how many of them do you think you would get right? Put an "X" beside the number showing how many picture cards you think you would be able to guess correctly.

1 picture card _______

2 picture cards _______

3 picture cards _______

4 picture cards _______

5 picture cards _______

6 picture cards _______

7 picture cards _______

8 picture cards _______

9 picture cards _______

10 picture cards _______

Expectancy of Future Success for Other

If another boy from your class were given 10 more picture cards to do, how many of them do you think he would get right? Put an "X" beside the number showing how many picture cards you think he would be able to guess correctly.

I think another boy from my class would be able to guess correctly

1 picture card ______

2 picture cards ______

3 picture cards ______

4 picture cards ______

5 picture cards ______

6 picture cards ______

7 picture cards ______

8 picture cards ______

9 picture cards ______

10 picture cards ______

Appendix 14

Means and Standard Deviations for Pre-Measures According to Group, Condition, and Order

Raven1

	LD Mean	LD S.D.	LD n		NLD Mean	NLD S.D.	NLD n
Easy Condition				Easy Condition			
Order 1	10.57	.98	(n=7)	Order 1	11.00	.89	(n=6)
Order 2	10.00	1.41	(n=5)	Order 2	10.83	1.17	(n=6)
Difficult Condition				Difficult Condition			
Order 1	10.00	.63	(n=6)	Order 1	10.78	.44	(n=9)
Order 2	9.00	.82	(n=4)	Order 2	11.14	1.07	(n=7)
No Task Condition				No Task Condition			
Order 1	11.25	.96	(n=4)	Order 1	11.00	1.00	(n=5)
Order 2	11.00	2.00	(n=4)	Order 2	11.20	.84	(n=5)

Free Recall 1

	LD Mean	LD S.D.	LD n		NLD Mean	NLD S.D.	NLD n
Easy Condition				Easy Condition			
Order 1	32.86	4.45	(n=7)	Order 1	35.67	4.46	(n=6)
Order 2	39.80	5.07	(n=5)	Order 2	40.83	2.71	(n=6)
Difficult Condition				Difficult Condition			
Order 1	35.17	4.07	(n=6)	Order 1	38.89	4.23	(n=9)
Order 2	33.25	7.09	(n=4)	Order 2	41.43	3.21	(n=7)
No Task Condition				No Task Condition			
Order 1	36.00	2.45	(n=4)	Order 1	41.20	2.77	(n=5)
Order 2	39.75	4.64	(n=4)	Order 2	42.40	1.14	(n=5)

Serial Recall 1

LD				NLD			
Easy Condition				Easy Condition			
Order 1	26.71	5.41	(n=7)	Order 1	30.50	3.94	(n=6)
Order 2	34.40	8.20	(n=5)	Order 2	38.17	2.32	(n=6)
Difficult Condition				Difficult Condition			
Order 1	31.33	6.92	(n=6)	Order 1	36.11	4.57	(n=9)
Order 2	28.25	6.65	(n=4)	Order 2	38.28	4.54	(n=7)
No Task Condition				No Task Condition			
Order 1	31.25	3.10	(n=4)	Order 1	36.80	3.83	(n=5)
Order 2	36.25	6.08	(n=4)	Order 2	39.60	1.14	(n=5)

Color Naming 1

LD				NLD			
Easy Condition				Easy Condition			
Order 1	39.14	12.03	(n=7)	Order 1	26.67	8.57	(n=6)
Order 2	30.60	4.83	(n=5)	Order 2	33.17	7.52	(n=6)
Difficult Condition				Difficult Condition			
Order 1	32.83	7.25	(n=6)	Order 1	30.00	6.08	(n=9)
Order 2	36.00	6.98	(n=4)	Order 2	30.14	5.58	(n=7)
No Task Condition				No Task Condition			
Order 1	33.25	6.18	(n=4)	Order 1	28.00	3.81	(n=5)
Order 2	31.25	3.59	(n=4)	Order 2	33.00	4.30	(n=5)

Ideational Fluency 1

	LD Mean	LD S.D.	LD n		NLD Mean	NLD S.D.	NLD n
Easy Condition				Easy Condition			
Order 1	6.00	4.00	(n=7)	Order 1	11.50	4.37	(n=6)
Order 2	6.20	1.64	(n=5)	Order 2	9.33	5.32	(n=6)
Difficult Condition				Difficult Condition			
Order 1	6.83	5.84	(n=6)	Order 1	7.67	4.47	(n=9)
Order 2	4.75	5.50	(n=4)	Order 2	6.86	4.30	(n=7)
No Task Condition				No Task Condition			
Order 1	7.50	5.32	(n=4)	Order 1	10.80	3.49	(n=5)
Order 2	5.00	3.74	(n=4)	Order 2	4.20	4.21	(n=5)

Aim 1

	LD				NLD		
Easy Condition				Easy Condition			
Order 1	11.14	7.15	(n=7)	Order 1	13.67	1.50	(n=6)
Order 2	15.80	3.42	(n=5)	Order 2	12.67	4.50	(n=6)
Difficult Condition				Difficult Condition			
Order 1	9.17	4.62	(n=6)	Order 1	13.11	4.62	(n=9)
Order 2	9.75	4.11	(n=4)	Order 2	15.43	4.24	(n=7)
No Task Condition				No Task Condition			
Order 1	10.00	1.41	(n=4)	Order 1	14.00	1.87	(n=5)
Order 2	9.00	2.45	(n=4)	Order 2	11.40	4.56	(n=5)

Appendix 15

Means and Standard Deviations for Post-Measures According to Group, Condition, and Order of Presentation

Raven 2

	LD Mean	LD S.D.	LD n		NLD Mean	NLD S.D.	NLD n
Easy Condition				Easy Condition			
Order 1	10.86	.90	(n=7)	Order 1	9.67	2.25	(n=6)
Order 2	10.60	.55	(n=5)	Order 2	11.17	.75	(n=6)
Difficult Condition				Difficult Condition			
Order 1	9.50	2.34	(n=6)	Order 1	11.33	.71	(n=9)
Order 2	11.25	1.50	(n=4)	Order 2	11.14	.90	(n=7)
No Task Condition				No Task Condition			
Order 1	10.50	1.29	(n=4)	Order 1	11.20	.84	(n=5)
Order 2	10.75	.96	(n=4)	Order 2	11.00	.71	(n=5)

Free Recall 2

	LD Mean	LD S.D.	LD n		NLD Mean	NLD S.D.	NLD n
Easy Condition				Easy Condition			
Order 1	37.00	5.03	(n=7)	Order 1	37.67	5.64	(n=6)
Order 2	36.80	4.32	(n=5)	Order 2	39.17	3.87	(n=6)
Difficult Condition				Difficult Condition			
Order 1	36.67	3.98	(n=6)	Order 1	40.44	2.13	(n=9)
Order 2	35.50	3.51	(n=4)	Order 2	39.00	3.65	(n=7)
No Task Condition				No Task Condition			
Order 1	38.00	4.69	(n=4)	Order 1	43.00	3.08	(n=5)
Order 2	39.00	2.00	(n=4)	Order 2	39.80	2.77	(n=5)

Serial Recall 2

	LD Mean	LD S.D.			NLD Mean	NLD S.D.	
Easy Condition				**Easy Condition**			
Order 1	32.00	7.39	(n=7)	Order 1	34.83	5.00	(n=6)
Order 2	32.20	7.33	(n=5)	Order 2	35.67	4.55	(n=6)
Difficult Condition				**Difficult Condition**			
Order 1	32.33	5.43	(n=6)	Order 1	37.33	3.54	(n=7)
Order 2	32.50	6.14	(n=4)	Order 2	36.14	4.10	(n=7)
No Task Condition				**No Task Condition**			
Order 1	35.00	5.66	(n=4)	Order 1	41.60	3.29	(n=5)
Order 2	33.25	3.59	(n=4)	Order 2	37.40	3.97	(n=5)

Color Naming 2

	LD				NLD		
Easy Condition				**Easy Condition**			
Order 1	37.14	7.82	(n=7)	Order 1	25.83	6.31	(n=6)
Order 2	29.80	4.60	(n=5)	Order 2	32.33	5.78	(n=6)
Difficult Condition				**Difficult Condition**			
Order 1	30.33	5.46	(n=6)	Order 1	28.44	4.30	(n=9)
Order 2	33.00	5.77	(n=4)	Order 2	27.28	4.11	(n=7)
No Task Condition				**No Task Condition**			
Order 1	33.50	5.92	(n=4)	Order 1	28.40	4.50	(n=5)
Order 2	36.00	9.34	(n=4)	Order 2	29.60	3.78	(n=5)

Ideational Fluency 2

	LD Mean	LD S.D.			NLD Mean	NLD S.D.	
Easy Condition				Easy Condition			
Order 1	4.43	3.91	(n=7)	Order 1	9.00	7.48	(n=6)
Order 2	6.20	1.30	(n=5)	Order 2	10.83	4.62	(n=6)
Difficult Condition				Difficult Condition			
Order 1	4.50	3.08	(n=6)	Order 1	4.89	2.93	(n=9)
Order 2	10.50	4.93	(n=4)	Order 2	10.28	5.99	(n=7)
No Task Condition				No Task Condition			
Order 1	4.25	4.99	(n=4)	Order 1	10.20	6.76	(n=5)
Order 2	9.25	4.27	(n=4)	Order 2	9.00	2.92	(n=5)

Aim 2

	LD				NLD		
Easy Condition				Easy Condition			
Order 1	12.57	5.35	(n=7)	Order 1	11.67	3.01	(n=6)
Order 2	14.20	1.64	(n=5)	Order 2	12.17	4.12	(n=6)
Difficult Condition				Difficult Condition			
Order 1	11.17	5.08	(n=6)	Order 1	15.67	4.24	(n=9)
Order 2	10.75	4.79	(n=4)	Order 2	18.57	3.78	(n=7)
No Task Condition				No Task Condition			
Order 1	10.25	1.89	(n=4)	Order 1	14.80	4.49	(n=5)
Order 2	8.50	3.70	(n=4)	Order 2	13.00	3.16	(n=5)