Cognitive and affective characteristics of learning-disabled, severe behavior handicapped, and normal children and adolescents

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COGNITIVE AND AFFECTIVE CHARACTERISTICS
OF LEARNING DISABLED, SEVERE BEHAVIOR HANDICAPPED,
AND NORMAL CHILDREN AND ADOLESCENTS

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CHAPTER I
INTRODUCTION

The purpose of this chapter is to introduce the reader to the child and adolescent populations that are the focus of this research endeavor. Various conceptualizations and/or definitions of learning disabilities and severe behavioral handicaps will be explored and critiqued. The problems inherent in attempting to separate these two groups, both conceptually and diagnostically, will be discussed. Finally, the specific research questions to be addressed by this investigation will be outlined.

With the advent of Public Law 94-142, the federal government mandated that all states create and operationalize a means to identify and educate all children with handicapping conditions in a manner that protects their civil rights and guarantees that their education will be conducted in the least restrictive environment possible. Although there are thousands of children who evidence a myriad of handicapping conditions throughout the nation, two groups of exceptional children and adolescents, learning disabled and severely behaviorally handicapped, comprise a large number of the exceptional learners that continue to puzzle and challenge educators and psychologists. The prevalence of both disorders range between 4-10% of all school age children and adolescents depending upon the source of the estimate (APA, 1987; Kazdin, 1987).
Defining and Identifying LD and SBH groups

There are two primary sources that offer guidelines for the identification of learning disabled and severe behavior handicapped individuals (from here on to be referred to as LD and SBH) - The Ohio Department of Education's "Rules for the Education of Handicapped Children" and the American Psychiatric Association's Diagnostic and Statistics Manual of Mental Disorders (Third Edition - Revised) (APA, 1987). The State of Ohio definition of a learning disability proposes a disorder in one or more of the basic psychological processes involved in understanding or using written or spoken language which may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations. Excluded are a wide range of conditions including impairments of vision and hearing, motoric handicaps, mental retardation, emotional disturbance, and cultural or environmental disadvantage. This definition results in identification being based primarily on a significant discrepancy, judged to be 2 z-scores or more, between the individual's achievement and ability levels. Although the formula used to derive the ability/achievement discrepancy varies from state to state, Ohio's 2 z-score discrepancy was used as a criterion for purposes of this study.

The DSM-III-R system of classification suggests that learning disabilities are a subclass of disorders characterized by inadequate development of specific, academic, language, speech, and motor skills that are not due to physical or neurological disorders, pervasive developmental disorders, mental retardation, or deficient educational opportunities. Like
the Ohio guidelines, identification of these disorders is based upon standardized, individually administered measures of achievement that are markedly below what would be expected given the person's schooling and intellectual capacity. However, no explanation of "markedly below the expected level" is offered. Although the DSM-III-R offers lists of associated features, neither system offers hypotheses or assertions regarding causal explanations for this category of disorders.

According to the Ohio guidelines, a severe behavior handicapped individual exhibits one or more of the following characteristics: an inability to learn, an inability to build or maintain satisfactory interpersonal relationships, inappropriate behavior or feelings under normal circumstances, or a tendency to develop physical symptoms or fears associated with personal or school problems. Furthermore, this definition does not include children who are socially maladjusted, unless it is determined that they are severe behavior handicapped. This latter qualification appears to contradict a portion of the inclusionary criteria.

The DSM-III-R system does not have a classification labeled severe behavior handicapped. The parallel to the SBH classification is the DSM-III-R category which consists of the disruptive behavior disorders. This cluster includes attention-deficit hyperactivity disorder, oppositional-defiant disorder, and conduct disorder. Portions of the oppositional defiant disorder, which involves patterns of negativistic, hostile, and defiant behaviors, and the conduct disorder, which is characterized by behavior patterns in which the rights of others and age appropriate societal norms are violated, have considerable overlap with the SBH constellation of
behaviors (APA, 1987). In addition, DSM-III-R suggests that attention-
deficit hyperactivity disorder is commonly associated with both the
oppositional and conduct disorder syndromes.

When reviewing the literature on behavior disordered individuals one
is confronted with numerous labels that may or may not denote
homogeneous populations. Terms such as anti-social behavior, conduct
disordered, delinquent, and behaviorally handicapped are used seemingly
interchangeably. It is important then, before launching into this body of
literature, to clarify what characteristics each of these labels encompass.

The behaviorally handicapped individual is often referred to as one
who exhibits anti-social behavior (Kazdin, 1987). The essence of anti-
social behavior is that it violates major social rules and reflects actions
against other persons and/or property. Conduct disorders are characterized
as patterns of anti-social behavior that result in significant impairment in
school functioning and are regarded as unmanageable by significant others.
Delinquency, on the other hand, is a legal designation based on official
court contact. Delinquents may commit crimes, but not be regarded as
impaired, emotionally disturbed, or functioning poorly within the context of
everyday life. Conduct disordered persons may or may not engage in
delinquent behavior or have a history of court contact (Kazdin, 1987). Thus,
it appears that the conduct disorder classification may come closest to the
capturing the the flavor of the SBH criteria as it has been put forth by the
State of Ohio Department of Education. The ensuing review and discussion
encompasses delinquent, conduct-disordered, and persons who exhibit
patterns of anti-social behavior.
Conceptualization of LD and SBH populations

Kazdin (1985, 1987) has outlined numerous problems experienced by SBH populations. These populations are thought to exhibit hyperactive-inattentive-impulsive behavior (Whitehall, De Myer-Gapin & Scott, 1976), achievement deficiencies, particularly in the area of reading (Ledingham & Schwartzman, 1984; Sturge, 1982), interpersonal conduct or problem-solving (social skills) deficiencies (Behar & Stewart, 1982; Carlson, Lahey & Nepper, 1984; Panella & Hengeller, 1986), cognitive problem-solving deficiencies (Kendall & Braswell, 1985; Camp, 1977), attributional biases (Dodge, 1980; Dodge & Frame, 1982; Dodge, 1985), difficult temperament (Plomin, 1983; Earls, 1981), IQ deficits (Hirschi & Hindelang, 1977; Wilson & Hernstein, 1985), delayed moral reasoning development (Arbuthnot & Gordon, 1986; Jennings, Kilkenny & Kohlberg, 1983; Jurkovic & Prentice, 1977), and a superficial or ineffective empathy for others or perspective taking ability (Ellis, 1982; Gibbs, 1987). In addition, some researchers have suggested neurochemical deficiencies that impact the reward and inhibition of impulses circuitry of the central nervous system which results in reward seeking, uninhibited, and impulsive behavior (Rogeness et al., 1984; Gray, 1982; Quay, 1986).

Although the list is not quite as long, it has been speculated that LD children suffer from attention-deficits and impulsivity (Keogh & Margolis, 1976; Hallahan, 1975), memory deficits (Rabinowitz & Chi, 1987; Bauer, 1977; Torgeson, 1977), cognitive inefficiencies (Das, Kirby & Jarman, 1979; Douglas & Peters, 1979; Lupart & Mulcahy, 1984), metacognitive deficiencies (Borkowski, Johnston & Reid, 1987; Brown, 1978),
motivational problems (Licht, 1983; Torgeson & Licht, 1983; Dweck & Licht, 1980), affective disorders (Goldstein & Dundon, 1987; Goldstein et al., 1985), social-behavioral difficulties (Rourke, 1988; Bryan, 1974; McConaughty & Ritter, 1986), and perhaps deficits in social perceptual ability and social knowledge (Pearl, 1987).

There appears to be a great deal of overlap between the conceptualizations of the SBH and LD populations. The purpose of this review is not, however, to explore every hypothesized facet of LD and SBH populations. In broad terms, the cognitive (attention, metacognition, information processing) and affective (anxiety and depression) dimensions, as well as their functional relationship, are the foci of the remainder of this chapter.

Cognitive Characteristics of LD and SBH populations

Attention

The rubric of attention encompasses numerous constructs and descriptors such as arousal, vigilance, selectivity, focus, impulsivity, span, and distractibility to name but a few. Learning disabled individuals have been characterized as underaroused (Rosenthal and Allen, 1978), hypo-vigilant (Anderson, Halcomb & Doyle, 1973), and unable to selectively attend to task relevant information (Keogh & Margolis, 1976). Thus, they are likely to exhibit insufficient sustenance of their cognitive efforts and have a tendency to trade off relevant (central) information for that which is irrelevant (incidental) or counterproductive to successful problem solution (Ross, 1976).
The cognitive model of attention proposes that attention involves plan-matching and schema testing (Hochberg, 1978). According to Gibson and Rader (1979), with maturation the child becomes progressively more adept at understanding the correspondence between the information his/her perceptual processes are engaged in and its utility for performance in service of current demands and/or needs. Similarly, Douglas and Peters (1979) suggest that, with development, normal attentional functioning involves the individual's ability to utilize prior knowledge to guide perceptions and cognitions of present events, as well as an ability to impose voluntary, conscious, intentional, and deliberate control over these perceptions and cognitions. This conceptualization of attention can be closely linked to metacognitive skills such as predicting, checking, monitoring, and reality testing that characterize efficient thought processes (Brown, 1978).

Based upon the aforementioned attentional framework, Lupart and Mulcahy (1984) have suggested that the cognitive and academic difficulties encountered by LD children result, in part, from an inability to spontaneously impose self-regulatory attentional strategies on school related tasks. They exhibit a failure to adopt effort maximizing attentional strategies. A reading disabled person, for example, is affected by an inability to optimize his/her attention in that he/she does not use visual scanning and selective attention processes in order to grasp the highly relevant and ignore irrelevant features of the text. Thus, in Lupart and Mulcahy's model reading LD children fail to utilize self-regulative attentional strategies and executive plans to impose intent and purpose.
onto the reading activity and tend to view it merely as a decoding exercise for which they are often ill prepared.

Although the bulk of the evidence is equivocal at best, SBH groups have also been characterized by inattentiveness, impulsivity, and an inability to sustain attention (Arbuthnot, Gordon & Jurkovic, 1987). It has been hypothesized that the SBH individual's need for stimulation, coupled with an inability to delay gratification are directly related to deficits in sustained attention (Quay, 1977). In addition, it has been noted that undersocialized (conduct-disordered) individuals have a diminished capacity to inhibit their responding and verbally self-regulate behavior when confronted with cognitive tasks (Camp, 1977). Although studies investigating specific linkages between cognitive functions and academic deficiencies for SBH individuals are few in number, those that have examined this relationship have found that academic difficulties are significantly, and inversely, correlated with ratings of attention and concentration (McGee, Williams & Silva, 1985; Quay & Peterson, 1983).

Conclusions based on these conceptualizations would suggest that both LD and SBH groups exhibit a majority of symptoms which comprise the attention-deficit syndrome. Furthermore, it is hypothesized that both group's academic difficulties are attributable, to some degree, to attentional deficiencies. Presumably then, the construct of attention may be of little utility in terms of differential diagnostic procedures. These conclusions are tempered, however, by the fact that no single study has compared both groups across theoretically and psychometrically sound measures of attention. The questions surrounding similarities and/or
differences between LD and SBH groups in relation to attentional processes remain largely unanswered.

**Metacognitive and Information Processing Functions**

Conceptually, metacognition and information processing appear to be domains of considerable overlap between SBH and LD groups. Many researchers have asserted that a core feature of learning disabilities is the inability to utilize metacognitive functions to orient and focus attention and produce organized and efficient plans or strategies for solving academic tasks (Das, Kirby & Jarman, 1979; Douglas & Peters, 1979; Lupart & Mulcahy, 1984). Metacognition refers to one's knowledge concerning one's own cognitive processes and products. It is the active monitoring and consequent regulation and orchestration of these processes in relation to the cognitive objectives or information that is used to attain a concrete goal or objective (Flavell, 1977).

Strategies are goal oriented processes that are intentionally invoked (Brown et al., 1983). Ineffective use of organized goal-directed strategies such as labeling, verbal rehearsal, clustering, and categorization have been associated with LD children's poor performance on a variety of short-term memory tasks (Bauer, 1977; Torgeson, 1977; Torgeson & Houck, 1980).

Das, Kirby and Jarman (1979) have postulated that, whereas mental retardation is exemplified by both coding and planning deficiencies, learning disabilities may be subtyped according to specific difficulties in arousal, coding, or planning, or a combination of these processes. Das et al. (1979) suggest that some LD children may indeed have difficulty with
encoding, storage, and retrieval of information, whereas others may be underaroused, exhibiting both behavioral overactivity that hinders concentration and focus and an inability to generate plans for problem solution. They are unable to contemplate sensory information, distinguish relevant from irrelevant information, and formulate self-directed plans for goal attainment while inhibiting interfering impulsive tendencies (Douglas & Peters, 1979).

Concurring with Das et al. and Douglas and Peters, Lupart and Mulcahy (1984) suggest that LD children lack purpose and intention. They fail to understand themselves as goal-oriented beings and do not utilize their knowledge base and metacognitive abilities to strategize and plan efficient problem-solving maneuvers. Hallahan and Kauffman (1982) refer to LD children as passive learners who lack the necessary strategies and skills to systematically approach and conquer academic problems. Interestingly, Masson (1982) suggests that LD children have an additional unique metacognitive deficit in that they appear to be insensitive to their own failures to comprehend and perform adequately. Consequently, they are not likely to reevaluate and check their performance against original intentions and task demands.

SBH individuals have also been characterized as having poor foresight and planning ability with concomitant propensities towards behavioral and cognitive impulsivity (Quay, 1987). However, whereas cognitive and metacognitive deficiencies have been primarily related to academic failure for the LD child, deficient cognitive problem-solving skills in SBH individuals is typically associated with interpersonal and social
difficulties (Kazdin, 1987). The relationship between cognitive and metacognitive processes and social behavioral adjustment has been studied extensively by Spivack and Shure (1982). According to Spivack, Platt, and Shure (1976), the cognitive processes and problem-solving skills that underlie social behavior include: a) alternative solution thinking - the ability to generate different options for solving interpersonal problems (strategies), b) means-end thinking - an awareness of intermediate steps required to achieve a particular goal (planning), c) consequential thinking - the ability to identify what might happen as a direct result of implementing any given plan of action (foresight), d) causal thinking - the ability to relate one event to another over time and understand why one event lead to a particular outcome, and e) sensitivity to interpersonal problems - the ability to perceive a problem when it exists and identify one's part in its potential emergence.

In terms of interpersonal problem solving, SBH and other disturbed children tend to generate fewer alternative solutions, focus on the ends rather than carefully planning the progression of intermediate steps, fail to comprehend the consequences of their behavior, do not recognize the causes of other's behavior, and are insensitive to their role in interpersonal conflict (Spivack et al., 1976). This absence of strategy generation, failure to plan, lack of systematic approach to problem solving, and insensitivity to failure to perform adequately is strikingly similar to the constellation of cognitive deficits that are associated with LD children's academic deficiencies. Thus, although manifested in different realms, both LD and
SBH groups demonstrate cognitive inefficiencies and an inability to utilize metacognitive (strategic) abilities to solve problems.

Again, the clinician is confronted with a major assessment variable that presumably will not aid the differential diagnostic process. However, it is clear that LD and SBH groups have not been evaluated on similar cognitive and metacognitive measures. Questions related to intrapersonal cognitive functions (as opposed to socio-cognitive) and group similarities or differences cannot be adequately addressed until objective measures of cognitive processing are applied to appropriately matched groups of LD and SBH individuals. As long as psychologists lack the diagnostic tools necessary to make discriminations between the cognitive competencies of LD and SBH individuals, meaningful differential diagnosis and treatment is unlikely to become a reality.

Naglieri and Das (1988) have recently presented a battery of cognitive processing measures that represent a major advance in the assessment of cognitive functions. The PASS (Planning, Attention, Simultaneous, and Successive) model of cognitive processing (Naglieri & Das, 1988) is based on the neuropsychological work of Luria (1966, 1973, 1980). According to Luria (1966, 1973, 1980), human cognitive processing involves three functionally related systems which work in concert to perform all types of mental activity. The first unit regulates cortical tone and the maintenance of attention; the second unit receives, processes, and stores information using simultaneous and successive modes of information encoding; the third unit programs, regulates, directs, and monitors mental activity. The comprehensive nature of the PASS model
is timely in that it has the potential to be sensitive to and illuminate the
cognitive characteristics of exceptional groups of individuals such as LD
and SBH. Perhaps more importantly, the operationalization of objective and
psychometrically acceptable measures of attention, planning, and
information processing is likely to facilitate the much needed advances in
differential diagnostic procedures.

The Relationship between Affect and Cognition

Attention and capacity are fundamental interactive components of
efficient information processing. Kahneman (1973) suggests that
attention, the basic process by which individuals receive and process
information, has both selective and intensive aspects. Selectivity allows
the individual to consume limited amounts of available information,
intensity regulates the effort needed to perform cognitive operations on
that information and complete the processing task. Capacity refers to a
limited pool of energy available to individuals for the performance of
mental or cognitive operations (Kahneman, 1973). This model assumes that
there is an upper limit on the perceiver's capacity to process information
and that this limited capacity can be flexibly allocated among numerous
concurrent activities and environmental stimuli (Moray, 1969). Capacity is
not fixed, but varies as a function of individual characteristics and task
demands. Human cognitive performance is a function of the stimuli
selected for input, the amount of effort demanded by the task, and the
available cognitive capacity and energy (Kahneman, 1973).
Kahneman (1973) and Luria (1966) assert that there is an optimal level of arousal that corresponds to the nature and difficulty of any given cognitive task. The relationship between arousal and capacity is presumed to be curvilinear with some optimal level of arousal yielding maximum capacity (Kahneman, 1973). Because optimal arousal yields maximum capacity, emotional variables that result in underarousal or overarousal reduce an individual's capacity to process information (Weingartner, Cohen, Murphy, Martello & Gerdt, 1981). Affective variables may also excite irrelevant, interfering cognitions that would drain available capacity and result in deficient cognitive processing (Bower, 1981).

Goldstein and Dundon (1987) have brought to the forefront the possibility that mild and subtle forms of emotional distress, such as anxiety and depression, may play a key role in the origin and maintenance of learning problems. While many suggest that emotional problems are the result of learning disabilities and contribute to further learning problems, Goldstein and Dundon (1987) offer the possibility that emotional problems are the underlying cause of some children's academic failures. The relationship between affect and cognition for exceptional children is an empirical question worthy of further exploration.

**Affect and Cognition in LD and SBH groups**

Licht (1983) notes that motivational problems are among the most consistently reported characteristics of LD children. It is suggested that motivational problems originate in early school failure and initiate a sequence of cognitive and affective processes that continue to undermine
the learning process (Douglas & Peters, 1979; Licht, 1983; Torgeson, 1980).

Licht (1983) proposes that when LD children experience academic failure this evokes an intense doubt in their intellectual abilities and the effectiveness of any strategic efforts they can muster to overcome their difficulties. Hence, the anxiety associated with their perceived lack of ability and effectiveness promotes reduced efforts or avoidance behavior when they are confronted with difficult cognitive tasks. This avoidant tendency and reduction in effort leads to decreased social and academic knowledge and a deficient strategic repertoire. This closely resembles a "learned helplessness" syndrome (often associated with depressive features) which is strengthened by repeated failure. LD children come to view themselves as inept in a variety of academic settings (Dweck & Licht, 1980; Seligman, Maier & Greer, 1968). When confronted with difficult tasks these children demonstrate a deterioration in their effortful deployment of problem-solving strategies, resulting in a level of performance below their capabilities (Borkowski, Johnston & Reid, 1987).

When compared to the LD literature, the relationship between affect and cognition in SBH individuals has received far less critical analysis and empirical attention. Unlike LD groups, for which the hypothetical linkage between affective states and cognitive and academic deficiencies has been clearly articulated, it is generally presumed that SBH individuals, as a group, experience school failure for a variety of reasons (poor school attendance, lack of motivation for test taking, biased grading by teachers, and lack of parental interest in school performance) that are only obliquely related to their affective status (Quay, 1986).
Although anxiety and depression are not attributes typically associated with SBH-type populations, Arbuthnot, Gordon, and Jurkovic (1987) have noted that, in comparison to non-delinquents, delinquent males tend to have a more negative self-concept that is characterized by little liking, valuing, or respect for themselves. In addition, delinquents experience significantly more difficulty coping with external pressures, frustration, and stress, and report considerable feelings of tension, dissonance, and discomfort. That delinquents or SBH groups do experience anxiety is a possibility that requires additional empirical attention.

This brief overview generates numerous conceptual and diagnostic questions. For instance, are there differences between the cognitive processing competencies of LD and SBH groups? Do these exceptional groups differ from normally achieving students in terms of processing variables? Are there differences between the affective states of LD and SBH groups? Do these exceptional groups differ from normally achieving students in terms of the degree of anxiety and depression that they experience? If so, what is the relationship between affective states such as anxiety or depression and cognitive processing efficiencies or deficiencies?

Overall, it would appear that assessment of underarousal or overarousal (depression or anxiety) may provide important information relative to differential diagnosis of LD and SBH groups. Exploring the relationship between affective states and cognitive processing competency may lend further insight into the nature of each disorder. To adequately address the questions regarding group differences and similarities
(differential diagnosis) it is important to conduct research in which matched groups of LD and SBH individuals can be compared to each other and non-identified (regular education) individuals across psychometrically sound measures of affect and cognition.
CHAPTER II
REVIEW OF THE LITERATURE

The intent of this chapter is to provide a summary of the empirical and theoretical literature pertinent to LD and SBH populations. Because the research questions presented in chapter one surround assessment issues, and are essentially diagnostic in nature, the ensuing review encompasses areas of assessment that have been explored for both LD and SBH groups. Specifically, the domains of intelligence (IQ), socioemotional/behavioral status, self-concept/self-esteem, and attention/impulsivity will be examined. In addition, a more comprehensive examination of the PASS model and its significance for addressing the proposed research questions will be undertaken.

Intelligence: The search for the LD Profile

The IQ controversy and the search for the "LD profile" continues to be a popular contemporary issue. The authors of two recent meta-analytic reviews of the WISC-R and LD children argue cogently that the search for unique and diagnostically meaningful LD profiles is likely to be a fruitless endeavor (Kavale & Forness, 1984; Mueller, Dennis & Short, 1986).

Following their meta-analysis of 94 LD and normal Wechsler protocols, Kavale and Forness (1984) concluded that no recategorization,
factor cluster, or pattern analysis of the WISC-R yielded a unique LD profile that would aid in differential diagnosis of LD groups. In global terms, their data presents evidence that LD children's IQ scores (Verbal, Performance, and Full Scale) fall within the "average range." Furthermore, V-P discrepancies, usually in the P > V direction, were neither significant nor unique for the LD group, and thus provide minimal aid in the diagnostic procedure.

According to Kavale and Forness (1984), LD children performed more poorly than normals on verbal subtests. This, of course, would be expected on subtests such as Information and Arithmetic which have a considerable academic achievement component and thus tap the very areas in which LD children encounter significant difficulty. In contrast, LD children performed significantly better than normals on four nonverbal subtests (PC, PA, BD, OA), while their performance on the Coding and Mazes subtests was considerably poorer relative to their average performance on measures of nonverbal ability. Finally, Kavale and Forness found that the protocols of LD children yielded "subtest scatter", Verbal, Performance, and Full Scale IQs that exhibited less variability than normals and thus are of minimal, if any, diagnostic utility.

Recategorization of the WISC-R data, based on models such as that proposed by Bannatyne (1974), showed LD children to perform most poorly in areas requiring memory and attention. Their performance was strongest in the areas of perceptual organization, verbal comprehension, synthesis, and reasoning. The authors note, however, that the deviations in such an analysis did not reach the +3 suggested for the .05 level of significance.
(Kavale & Forness, 1984). The authors also dismiss the notion that LD persons are characterized by the ACID profile, or consistent weaknesses on the Arithmetic, Coding, Information, and Digit Span subtests of the Wechsler scales (Ackerman, Dykman & Peters, 1976). Their data reveal that the greatest suppression in these areas was 1.5 scaled scores, clearly not enough to interpret as significant.

Kavale and Forness (1984) found that LD protocols consistently yielded significantly higher VC and PO factor scores as compared to FD scores. This reaffirms the hypothesis that LD children experience a great deal of difficulty on tasks which require attention and concentration. Unfortunately, when converted into the three IQ scores (VC-PO-FD), differences were not significantly different (statistically significant) from normals and still fell within the average range, thus, once again providing limited diagnostic utility. They conclude that LD profiles do not differ from normals in a reliable and systematic manner and that the regrouping of Wechsler subtests does not aid in clinical diagnosis. Pattern analysis and the search for LD profiles appears to be unwarranted (Kavale & Forness, 1984).

In Mueller, Dennis, and Short's (1986) review of 119 samples of normal and exceptional children's WISC-R protocols they found that recategorization of WISC-R profiles did not appear to differentiate psychoeducational diagnostic groups from other groups with similar global intellect. In fact, WISC-R profiles have failed to be predictive of psychoeducational diagnosis, educational placement, and SES (Hale & Landino, 1981; Hale & Raymond, 1981, Vance, Fuller & Ellis, 1983). Hale
and Saxe (1983), however, report findings indicative of four specific WISC-R profiles that may characterize subgroups of clinic-referred children. They have not, however, related these findings to psychoeducational diagnoses or behavioral and learning patterns, nor have they demonstrated that modal profiles of referred children differ significantly from those of normal children (Mueller, Dennis & Short, 1986). The assumption that "normals" have flat profiles and will provide a benchmark to which exceptional groups can be compared and diagnostically differentiated is not only unverified, but highly untenable given the typical amount of fluctuation and subtest scatter inherent in the profiles of the WISC-R standardization sample (Sattler, 1988).

Mueller, Dennis, and Short's (1986) profile analysis provided a three cluster solution that appears to be associated with the mean Full Scale IQ rather than to the diagnostic composition of each group. The group whose FSIQ ranged between 100-140 was comprised of 65 percent unimpaired individuals, 9 percent clinic referred, 3 percent LD, and the remaining 23 percent were gifted individuals. The FSIQ range of 78-101 contained 100 percent of the behaviorally disordered individuals, 100 percent "other impaired", 93 percent of the LD children, 92 percent of the emotionally disturbed individuals, 67 percent clinic referred, and the remaining 35 percent of the unimpaired group. The FSIQ range of 51-82 contained 100 percent of the mentally handicapped individuals, 24 percent of the clinic referred, 8 percent of the emotionally disturbed, and the remaining 3 percent of the LD children.
In terms of the three factors of the WISC-R (VC = Verbal Comprehension, PO = Perceptual Organization, and FD = Freedom from Distractibility), 42 percent of the FSIQ = 100-140 group demonstrated VC > PO > FD. Another 42 percent evidenced PO > VC > FD. In contrast, 75 percent of the FSIQ = 78-101 group demonstrated PO > VC > FD. Finally, 56 percent of the FSIQ = 51-82 group demonstrated PO > FD > VC patterns. It appears that the VC category shifts in ranking from highest to lowest as the overall level of intellect decreases. Thus, while distinct WISC-R profiles do exist, they are most strongly associated with the global intellectual level, not specific disabilities (Mueller, Dennis & Short, 1986). In concurrence with Berk's (1983) earlier assertion that the search for diagnostically characteristic WISC-R profiles should be abandoned as a relatively useless enterprise, Mueller, Dennis, and Short conclude that the use of WISC-R profile analysis for differential diagnostic purposes is unwarranted.

Intelligence: The SBH Profile

The bulk of the literature exploring differences in intelligence for SBH-type populations has involved delinquent samples. For years it has presumed and documented that delinquents generally have lower mean IQs (X = 92) than the normal population (Hirschi & Hindelang, 1977). A few authors have gone so far as to conclude that IQ is generally more predictive of offending behavior than is social class or cultural background. That is, IQ is as important in predicting official delinquency as social class or race even when SES is controlled (Hirschi & Hindelang, 1977; Wilson & Herrnstein, 1985). In the case of conduct disordered groups, however, there
Is little reason to believe that general intelligence as measured by IQ tests is significantly lower than SES comparable groups with and without other disorders (Belitchman, Patterson, Gelfand & Minty, 1982).

For both delinquent and conduct disordered groups there has been considerable interest in verbal and performance discrepancies. Ollendick's (1979) comparison of V-P discrepancies for male delinquents with Kaufman's (1976) group of children whose parents who were unskilled laborers evidenced a sample mean PIQ of 90.2 and a mean VIQ of 81.7. Approximately 21 percent of the sample had discrepancies of 15 points or greater, all of which were in the PIQ > VIQ direction. Ollendick concluded that, compared to normals, delinquents were characterized by a greater frequency of PIQ > VIQ discrepancies and the absence of VIQ > PIQ differences.

Similarly, Hubble and Groff (1981) compared the distribution of PIQ > VIQ discrepancies between white male delinquents and Kaufman's (1976) report on the discrepancies in the WISC-R standardization sample. Although the magnitude of the discrepancies did not differ significantly, the direction of the discrepancies was significantly different for delinquents. Verbal elevations were observed for only 9 percent of the delinquent, as compared to 19 percent in the normal sample. Significant performance elevations were documented for 43 percent of the delinquents as compared to 24 percent in the normal group.

Most studies involving delinquents have shown VIQ means anywhere from 8-19 points lower than the population mean (average 10-12 points). Thus, indicating a disadvantage in the verbal area, but not global
intelligence (Quay, 1987). Given the findings of Mueller, Dennis, and Short (1986), which found the group with the highest frequency of P > V to be comprised of a substantial percentage of LD, emotionally disturbed, and "other impaired" individuals as well as behaviorally disordered, it is unlikely that the PIQ > VIQ pattern is unique to delinquent or conduct disordered groups. Recognizing that subscale differences of a considerable magnitude (12-15 points) occur in a high percentage of the standardization sample of ostensibly normal children provides additional evidence that the PIQ > VIQ for delinquents adds little information to the diagnostic process (Kaufman, 1976).

As was the case for LD samples, the search for a specific pattern of WISC-R subtest scatter for delinquents and conduct disordered individuals has proved to be fruitless (Quay, 1987). In his sample of delinquents, Ollendick (1979) found that mean ranges for individual subtest scale scores were not significantly different than normals, nor were the frequencies of individual subtest scores that deviated from each subject's mean performance. Similarly, Hale and Landino's (1981) attempt to use WISC-R subtest scores to differentiate among groups of conduct-disorder, anxious-withdrawn, mixed, and non-identified individuals failed to classify groups correctly at higher than chance rate. Additionally, the internal factor structure of the WISC-R does not appear to be significantly different for conduct-disordered groups as compared to normals (Hubble & Groff, 1981).

In conclusion, it appears that the traditional means of assessing intelligence (WISC-R and similar measures) have failed to provide useful information that might aid the differential diagnostic efforts of the
clinician (for LD and SBH groups). Not only does the verbal-nonverbal dichotomy not provide information pertinent to the differences between LD and SBH groups, it appears that measures such as the WISC-R cannot identify how LD and SBH individuals differ from normal individuals. Clearly, there is a need to broaden our concept of intelligence and seek to measure those aspects of cognition that will discriminate between normal and exceptional populations.

Socioemotional Status: Characterizing the LD Child

Professionals are becoming increasingly aware of the fact that LD children and adolescents suffer from a myriad of social and interpersonal difficulties. Although issues relative to the direction of causation (i.e. learning disabilities cause socioemotional problems vs. socioemotional problems cause learning disabilities) have not been adequately addressed in the empirical realm, recent research has begun to clarify the relationship between learning disabilities and socioemotional disturbances (Rourke, 1988).

The hypothesis that learning disabilities cause socioemotional disturbances has clinical appeal to many. It appears reasonable to hypothesize that learning disabled youngsters who encounter frequent, chronic, and pervasive learning difficulties throughout the elementary school years become unwilling recipients of criticism and negative evaluation by parents, teachers, and peers. These judgements render the learning disabled child more anxious and less self-assured in learning situations. Thus, a vicious cycle is initiated in which the academic
progress of the LD child is increasingly hampered by the progressively more debilitating degrees of anxiety and feelings of inferiority that are aroused (Rourke, 1988).

Investigations examining the characteristics of learning disabled children's parents (Goldman & Barclay, 1974), communication patterns within these families (Peck & Stackhouse, 1973), and the way in which LD children are perceived by parents (Stag, 1972), teachers (Bryan & Mc Grady, 1972), peers, (Bryan, 1976), and Independent observers (Bryan 1974) suggest that the LD child deals with an interpersonal environment that differs markedly from that of the normally achieving student. This literature suggests that, in contrast to normal students, learning disabled children a) are perceived as less pleasant and desirable by parents, teachers, and peers, b) are the recipients of more negative communications from parents, teachers, and peers, c) are ignored and rejected more often by teachers, d) are treated in a notably more punitive and derogatory manner by parents, and e) are likely to live in families that resemble those of emotionally disturbed children (Rourke, 1988).

Unfortunately, this body of literature suffers a variety of methodological flaws that temper its contribution considerably. Of primary importance is the fact that there has been no consistent criteria for identifying LD subjects. There have also been failures to replicate findings and inconsistencies that may be due, in part, to a lack of control for age or developmental considerations. In many studies, the dependent measures have been subjective ratings rather than reliable and valid psychometric instruments thus introducing ample opportunity for bias and
measurement error (Rourke, 1988). These flaws notwithstanding, there are some basic consistencies that are worthy of further consideration.

In contrast to the aforementioned hypothesis regarding the causal relationship between learning disabilities and socioemotional disturbances, Strang and Rourke (1985) argue that specific patterns of central processing abilities eventuate markedly different subtypes of learning disabilities and patterns of socioemotional functioning. Ozols and Rourke (1985) and Strang and Rourke (1985) have proposed two broad band LD classifications: verbal LD and nonverbal LD. It is presumed that each LD type will manifest different types of socioemotional patterns. A logical extension of this hypothesis has been the programmatic research of Rourke and his colleagues (Fisk, Fuerst & Rourke, 1988; Ozols & Rourke, 1985; Porter & Rourke, 1985; Rourke & Fisk, 1981; Strang & Rourke, 1985) which has sought to uncover specific intellectual profiles and socioemotional disturbances or personality patterns that characterize LD children. Their endeavors have verified the heterogeneity of the LD population and answered some of the previously unaddressed questions regarding the socioemotional status of LD individuals (Rourke, 1988).

Porter and Rourke (1985) investigated 100 LD children utilizing the PIC (Personality Inventory for Children, Wirt, Lachar, Klinedinst, & Seat, 1977) as an exploratory measure. Cluster analyses produced essentially four subtypes of LD groupings. Fifty percent of that sample showed no evidence of emotional disturbance and were rated as well adjusted in terms of socioemotional functioning. Twenty-five percent of the sample exhibited seriously disturbed internalized socioemotional functioning.
(anxiety, withdrawal, depression). An additional fifteen percent of that sample demonstrated elevations in areas comprised of hyperkinetic-aggressive features. Finally, a fourth group (approximately 10 percent) exhibited relatively normal socioemotional functioning that was accompanied by a variety of somatic complaints. Similar clusters and percentages were obtained by Speece, McKinney, and Appelbaum (1985) utilizing a different rating instrument.

In a more recent study, Fisk, Fuerst, and Rourke (1988) cluster analyzed PIC data that was obtained from 132 LD children between the ages of six and twelve. The subjects were divided into three equal groups based on their WISC profile. One group consisted of individuals with equal Verbal and Performance IQs (no more than a 3 point discrepancy); another was classified as the VIQ > PIQ (at least a 10 point discrepancy), and the third was labeled the PIQ > VIQ group (again, at least a 10 point discrepancy). The results yielded four interpretable clusters, three of which were strikingly similar to those identified by Porter and Rourke (1985). The clusters were characterized as normal, emotionally disturbed, hyperactive, and mildly anxious or depressed. It was noted that the VIQ > PIQ subjects constituted a major portion of the emotionally disturbed (46%) and hyperactive (63%) clusters. The normal and mild anxiety/depression clusters were drawn almost exclusively from the VIQ = PIQ and PIQ > VIQ groups. Rourke (1988) concludes that "nonverbal LD" children are more likely to be described as emotionally or behaviorally disturbed by their parents than are "verbal LD" children.
Rourke and his colleagues have arrived at several conclusions based upon their work with LD children. First, and perhaps most importantly, most LD children do not suffer from either mild or severe socioemotional disturbances. In addition, although distinct types of socioemotional and behavioral disturbances are displayed by LD individuals, there appears to be no unitary pattern of emotional disturbance or social incompetence that characterizes LD children as a group. Finally, one pattern (“nonverbal LD”) of central processing appears to lead to a specific configuration of achievement competencies and socioemotional disturbances (internalized psychopathology) (Rourke, 1988).

While the contributions made by Rourke and his colleagues are noteworthy, several empirical issues require further exploration and analysis. Rourke and his colleagues have not provided sufficient information nor justification for the division of LD children into “verbal and nonverbal” groups based on 10 point or greater (range is not specified) WISC V-P discrepancies. As was mentioned previously, 12-15 point discrepancies were obtained by approximately 25 percent of the standardization sample across all age groups (Sattler, 1988). Therefore, V-P discrepancies of this magnitude are neither characteristic or unique to LD groups, nor rare in prevalence for ostensibly normal groups of children.

In addition, while their instrument of choice (PIC) has adequate psychometric properties, their data represents parental perspectives only. Before drawing conclusions regarding socioemotional functioning or personality characteristics, it would seem prudent to validate these observations with ratings provided by teachers and the children.
themselves. This, of course, is not a critique of what has been done, but merely a plea for additional validation of Rourke et al.'s somewhat broad and general assertions. Finally, one conclusion regarding LD children is inconsistent with the evidence and potentially misleading. The assertion that the nonverbal LD pattern is likely to be associated with internalized types of pathology contradicts the finding that 63 percent of the hyperactive-aggressive group fell into this LD pattern. It appears that the nonverbal LD pattern is characteristic of both internalized and externalized manifestations of pathology. Such a conclusion is clearly more consistent with Rourke's (1988) argument that no unitary pattern of emotional disturbance or socioemotional incompetence is characteristic of LD populations.

Socioemotional Status: Characterizing the SBH Child

Delinquents and conduct-disordered persons have been characterized as individuals who are unable to take another's perspective and empathize with their circumstances and rarely see the value in conforming to behavioral expectations or rules aimed at preserving order. Furthermore, these individuals act as if property has no meaning beyond possession and friendship has no value beyond egocentric utility (Arbuthnot, Gordon & Jurkovic, 1987). Given this characterization, it is not surprising that these individuals experience significant social and interpersonal difficulty and dysfunction.
One correlate of anti-social behavior is poor interpersonal relations (Kazdin, 1987). These children tend to be overly aggressive, intrusive, and inconsiderate of other's needs and, consequently, are frequently rejected by their peers. Compared to well adjusted children, conduct-disordered children are less socially appropriate and show a lower degree of positive affect and social competence when interacting with both strangers and friends of their own age (Panella & Hengeller, 1986). These youth are also less likely to interact appropriately with adults or to defer to adult authority and be polite, and tend to respond in manner that is unlikely to promote further positive interactions (Gaffney & McFall, 1981). The resulting alienation from peers and adults serves to further stunt their social growth, thus they exhibit progressively poorer social skills and interactional patterns (Behar & Stewart, 1982; Carlson, Lahey & Neeper, 1984).

Although there is a paucity of studies that have examined the socioemotional world of the SBH-type populations, existing studies suggest that it is not only the aggressive, disruptive, and noncompliant aspects of these individuals that hamper their social relationships, but also the lack of interpersonal sensitivity, responsiveness, and competence that renders them aversive to others, peers and adults alike (Quay, 1986). Whereas conduct-disordered features such as hyperactivity, aggressiveness, and disruptive and noncompliant behavior have been well documented, emotional attributes such as anxiety, withdrawal, and depression have not been the focus of any systematic investigations. To date, the evidence suggests that both LD and SBH-like groups encounter serious social and interpersonal
difficulties. Perhaps the exploration of intrapersonal/emotional differences might be more illuminating and useful in terms of distinguishing these groups diagnostically.

Attempts to identify specific clusters of socioemotional attributes that are characteristic of SBH-type populations have been compromised by the lack of correspondence between multiple observers and an inability to conceptualize the functional relationship between overt and subjective behavior (Kazdln, 1985). Although children can reliably identify their dysfunction, they tend to underestimate its presence and severity (Kazdln, French & Unis, 1983). Whereas children readily identify subjective symptoms (anxiety, depression, somatic complaints), parents tend to focus on overt behavioral symptoms while teachers present a wide range of behaviors not easily accessed by parents (Herjanic & Reich, 1982; Kazdln, 1985).

The results of several multiple rater studies have demonstrated a low correspondence between child, teacher, and parent reports of both subjective and overt behaviors (Achenbach, McConaughy & Howell, 1987; Forehand, Grist & Wells, 1979; Herjanic & Reich, 1982; Kazdln, French & Unis, 1983; Kazdln, Esveildt-Dawson, Unis & Rancurello, 1983). This marginal correspondence is a function of several variables including a) parental psychopathology and self-esteem, b) family characteristics (race, SES, welfare status), c) differing perspectives or biases (teacher, parent, child), d) the types of behaviors observed (overt vs. subjective) and, of course, situationally specific behavior on the child's part as well as the less than perfect psychometric properties of the rating devices (Achenbach,
McConaughy & Howell, 1987; Kazdin, French & Unis, 1983). Thus, comprehensive assessment procedures, the formulation of accurate diagnostic impressions, and the application of appropriate treatment modalities may be heavily reliant upon the child's perspective and emotional status as well as context specific observations by significant others.

The Self-Concept/Self-Esteem of the LD Child

For many LD children, academic failures represent only one of the many socio-psychological difficulties that they confront on a daily basis. According to Harris and King (1982), LD children's absence of academic success is often associated with their off-task behavioral responses to pervasive learning difficulties. The display of their chronically disruptive and norm violating behavior often results in reduced peer acceptability as well as teacher frustration and dissatisfaction. Thus, the earlier they are identified and separated from the mainstream the poorer their views of themselves become. They begin to see themselves as others see them: poorly equipped and organized to respond to the demands of peers, school, and home life, unable to interpret and utilized social cues meaningfully, and unable to verbally respond to the pressures that they feel (Kasik, Sabatino & Spoentgen, 1987).

The constellation of academic and behavioral attributes that often characterize LD children may place them at risk for socioemotional difficulties such as personality conflicts with teachers that render learning in the classroom very difficult and increased levels of stress and
strain associated with their exaggerated perceived demands of parents and teachers (Rourke, 1988). Given the severity and pervasive nature of their socio-psychological deficiencies, it would surprise no one if the self-concept and self-esteem of LD children suffered greatly in comparison to normally achieving students.

According to Rourke (1988), the relationship between learning disabilities and self-concept or self-esteem has been investigated in very few adequately controlled studies. To make matters worse, the findings that have been generated are inconsistent and not terribly contributory. For example, whereas Halechecko (1977) and Black (1974) found lower self-esteem among learning disabled youngsters as compared to normally achieving children, Silverman (1978), using the same instrument, found no between groups differences. In addition, although Ribner (1978) found that normally achieving children demonstrated greater self-esteem than as of yet undiagnosed LD children in regular classrooms, already identified LD children who were placed and functioning within a self-contained classroom could not be distinguished from normal achievers on the basis of self-esteem. Overall then, it does not appear that the self-esteem dimension has received adequate empirical attention, nor can it be considered a meaningful contributor to the diagnostic process for LD children.

The Self-Concept/Self-Esteem of the SBH Child

As was mentioned in a previous section, one of the more consistent findings of cross sectional research involving comparisons of delinquents
and non-delinquents on measures of self-concept (primarily the Tennessee Self-Concept Scale) is that delinquents have a more negative self-concept and express little liking, valuing, or respect for themselves. These features are also associated with an unclear and confusing picture of the self, an external locus of control or evaluation, difficulty coping with external pressures, frustration, and stress, and a considerable discrepancy between the self-view and beliefs about how they are seen by their parents and teachers (with the latter being generally more negative) (Arbuthnot, Gordon & Jurkovic, 1987).

Although there have been several models formulated to explain the relationship between self-concept and delinquency or conduct-disordered behavior, the predominant interpretation of this relationship is the “esteem enhancement” model proposed by Kaplan (1975). This model asserts that low self-esteem acts as a drive mechanism which propels individuals towards behavior choices that will recapture or enhance their regard for the self. Delinquent or conduct-disordered behavior can be interpreted as an adaptive or defensive response to self-devaluation (Kaplan, 1975). When conventional behavioral choices fail to foster or create positive self-regard, unconventional and deviant choices follow and result in a weakened attachment to, if not a hostility toward conventional activities and values.

While Fitts and Hammer’s (1969) review of several cross-cultural and cross-sectional studies would appear to support Kaplan’s model, the nature of the delinquency/self-concept relationship is undoubtedly more complex, fluctuating as a function of others variables such as SES, social and familial life, and educational level (Brynner, O’Malley & Bachman,
Brynner, O'Malley and Bachman (1981) report both a negative correlation between self-esteem and delinquency and a positive effect of delinquency on self-esteem. To expand upon this point (and complicate the picture even further), Kaplan (1980), in a summary of his own research findings, concluded that negative social experiences are related to lowered self-esteem, that self-derogation is associated with subsequent delinquency, and that such behavior is, in turn, related to increased self-esteem among previously self-derogating youth.

Later, Wells and Rankin (1983) applied path analytic procedures to a variety of cross sectional studies and reported that when the effects of prior causal factors (grades, social rejection, family relationships) were partialled out, there was no substantial effect of self-esteem on subsequent delinquency - even when various types of delinquency were analyzed or when separate analyses were done for high and low SES groups. Wells and Rankin did not reject Kaplan's model, however, but recommended the use of less global conceptions of self-esteem, and the consideration of critical periods throughout development.

In general, the relationship between self-esteem and delinquency or conduct-disordered behavior appears to be a complex one. Research in support of the esteem enhancement model is, at this point, inadequate. Until the construct of self-esteem is more thoroughly defined and narrowly measured across a variety of demographic variables, the potential impact of moderating variables such as family life, social life, educational level, SES, and race on the self-esteem/delinquency relationship is likely to compromise the utility of this personality dimension in terms of isolating
SBH specific features and making a significant contribution to the differentiation of LD and SBH diagnostic classifications.

Cognitive Processes: An examination of Attention and Planning

According to Levine (1987) dysfunctions of selective attention and selective intention (planning) may be among the most common sources of underachievement and school related maladaptation. Children predisposed to poor selectivity frequently concentrate on inappropriate stimuli and have a tendency to involve themselves in activities that lack purpose or a constructive end, thus creating the discrepancy between intellectual capacity and day-to-day performance.

Although many useful conceptualizations of selective attention exist, Hagen and Hale's (1973) perspective provides a meaningful background for understanding children with this type of attentional deficit. According to Hagen and Hale, the ability to attend selectively to critical stimulus features while simultaneously ignoring others is an integral part of the learning process. Because children are bombarded with sets of stimuli while in school, they must learn to select those that are most salient and likely to satisfy a purposeful need.

Hagen and Hale's (1973) steps in the selective attention process include alertness, awareness, focal activation, filtration, saliency determination, feedback, utilization, and end point establishment. At any point during this process children with learning problems might manifest their attentional deficits via erratic focus (unusual and inconsistent patterns of concentration), incidental learning (focus on nonsalient data,
detection of unimportant information), fatigued attention or inappropriate duration of effort (impersistance and/or failure to sustain attention and concentration, allocation of the wrong amount of time to tasks), distractibility (auditory, visual, social), and a reduced response to feedback (deficient self-monitoring, careless errors, lack of quality control). These characteristics have an obvious and negative impact on their ability to confront the demands and expectations of the traditional classroom.

Selective intention is a construct that is functionally related to selective attention and the generation of diverse products. Appropriate planning and consideration must occur before and during the production process (Levine, 1987). The intention process is conceptualized by Levine (1987) into ten component elements: needs assessment (determining need for goal or objective), methods review (scanning possible means of achieving objective), prediction of possible outcomes (forecasting desirable and undesirable outcomes of any chosen plan of action), method selection (determining most appropriate means of achieving objective), action inhibition (suppressing actions likely to fail, interfere, waste energy, or produce adverse consequences), persistence (sustaining the selected behavior for a sufficient length of time to achieve intended goal), monitoring (comparing actions with original intentions or plans and discerning unintended or undesirable deviations), mid-task regulation (modifying chosen actions), stop order (recognizing failure and the need to select new goal or alternative means of accomplishing existing goal), and review of outcome (determining success or failure and learning from experience).
Theoretically, the steps inherent in the intention process are critically relevant to children who suffer from selective attention deficits. Their dysfunction and lack of success may be due to a myriad of intentional difficulties such as unclear goals, use of the first method that comes to mind, failure to preview outcomes, no conscious method selection, irrelevant actions, impersistence, lack of self-monitoring, perseveration or premature task completion, and an overall failure to consider the process and learn from experience. These children might appear impulsive and exhibit an inability to select behaviors wisely. They encounter generalized difficulties due to their frenetic cognitive tempo and impulsive and poorly planned behavioral responses to academic activities and social interactions. Consequently, not only do these children experience academic failure, but they are often perceived as having aggressive, externalizing behavior disorders because their behavior is misinterpreted as emanating from anger and an intent to harm, rather than impulse control problems associated with a failure to consider behavioral consequences and impact on others. Thus, it is likely that both LD and SBH groups might be characterized as groups suffering from selective attention deficits and concomitant impulsive cognitive and behavioral patterns. The existing literature which examines the assessment of selective attention and impulsivity for both LD and SBH-type groups is, however, replete with contrasting interpretations, rendering meaningful conclusions equivocal at best.
LD Children: An examination of Attention and Impulsivity

Aylward and Whitehouse (1987) have noted that a great deal of research supports the notion that LD children, as a group, do differ significantly from normals on a variety of measures of attention. Several reviews (Keogh & Margolis, 1976; Routh, 1979; Samuels & Edwall, 1981) have documented evidence of LD-control differences on measures of vigilance, reaction time, distractibility, arousal, and impulsivity. Equally impressive, however, is the fact that the majority of investigators recognize that many LD children do not exhibit attention deficits and that many attention-deficit children do not evidence learning disabilities.

Examinations of LD vs. control children on measures of auditory and visual vigilance tasks, which require continuous sustained attention and monitoring in order to detect an infrequent stimulus, typically find that LD children make fewer correct detections and more false alarms than controls (Anderson, Halcomb & Doyle, 1973; Noland & Schultdt, 1971; Rugel & Rosenthal, 1974). Keogh and Margolis (1976), utilizing a somewhat more complex vigilance matching task in which subjects crossed out numbers in a booklet as they were read from a tape, found LD subjects to make more errors of omission and commission and have a greater response decrement over time than normal achievers. Although this response decrement has not been documented on simple auditory and visual vigilance tasks, it appears that LD children do exhibit poorer facility at sustaining attention when compared to control or normally achieving youngsters (Aylward & Whitehouse, 1987).
Early studies involving LD children and measures of selective attention or distractibility found that the degree of impairment in task performance depended upon the nature of the distractor. Those that are internally related to the central task (i.e. irrelevant written material presented on the same page as written material to be remembered and comprehended) have a more detrimental impact on performance than those stimuli that are external to the task (loud noises, flashing lights etc.) (Tarver & Hallahan, 1974). On visual tasks, distractors that are embedded within the stimuli have shown LD children to be more susceptible to distraction than normals (Sabatino & Ysseldyke, 1972; Willows, 1978). Others, however, have found no greater distractibility in LD children than in controls (Alwitt, 1966; Pelham, 1979).

One of the more frequently utilized indices of selective attention is Hagen's (1967) central-incidental recall paradigm. In this task subjects are presented information to which they are told to attend. This material is accompanied by incidental information that the subject is told to ignore. After presenting the material the subjects are asked to recall both sets of information. LD children are thought to be deficient in selective-attention due to their propensity to trade off relevant (central) information for irrelevant (incidental) information (Ross, 1976). The majority of studies employing this technique find that LD children have poorer performance on the central recall task than do controls (Hallahan, Kauffman & Ball, 1973; Pelham & Ross, 1977; Tarver, Hallahan, Kauffman & Ball, 1976). However, no one has systematically investigated the possibility that the LD children's poorer performance may be due to other cognitive deficiencies.
(memory, impulsivity etc.) and not merely attentional deficits. In addition, it is unfortunate that the hypothesis that the LD child's selective attention deficit causes them to attend to and be more distracted by incidental information has not been clearly supported by the data related to incidental task performance. Although Deikel and Friedman (1976) and Pelham and Ross (1977) found greater incidental recall among LDs as compared to controls, Hallahan et al. (1973), Pelham (1979), and Vrana and Pihl (1980) found no differences between LDs and controls on the incidental recall portion of the task.

Based on their review of the literature, Aylward and Whitehouse (1987) conclude that, although the results of studies involving external and internally embedded distracting stimuli are not totally consistent, they do suggest that LD children are more susceptible to related or embedded versus unrelated or external types of distraction. Questions regarding selective-attention deficits for LD groups require further empirical investigation and validation.

In contrast to Aylward and Whitehouse' summation, McNellis (1987) argues cogently that the research involving LD children and non-physiological measures of attention, particularly selective-attention, does not provide support for the hypothesized attentional deficit as a core syndrome of learning disabilities. McNellis (1987) argues that the construct of selective-attention involves concepts such as distractibility, focusing, discriminability, and stimulus selection, all of which have been poorly conceptualized and inadequately measured by cognitive and developmental psychologists.
Although she does not take issue with a large body of literature that has consistently yielded significant LD/non-LD differences on measures of sustained attention or vigilance, McNeillis raises questions regarding factors other than attention (interest, motivation, desire to conform) which might have a substantial impact on a child's performance on vigilance tasks. While these tasks do measure behavior patterns that are related to academic success, it is reasonable to assume that a significant proportion of what is being measured may be related to features other than attention (McNeillis, 1987).

With regard to selective-attention deficits, McNeillis (1987) questions the assumption that the diversity of selective-attention measures employed (Stroop tasks, Bender Gestalt, Embedded Figures, the Central-Incidental Information paradigm) are measuring the same unitary construct, factor, or ability. These measures, she argues, may require strategy formation, prior knowledge, and memory, all of which affect the child's performance on such tasks and are not necessarily related to selective-attention deficiencies.

McNeillis (1987) asserts that, as a whole, investigations utilizing measures of selective-attention such as Hagen's Central-Incidental paradigm (Copeland & Wisnelwski, 1980; Pelham, 1979; Quay & Weld, 1980; Hallahan, Kauffman & Ball, 1973; Pelham & Ross, 1977; Tarver, Hallahan, Kauffman & Ball, 1976), the Bender Gestalt BIP (Sabatino & Ysseldyke; 1972; Fabian & Jacobs, 1981), or any version of the Stroop task (Santostefano, Rutledge & Randall, 1965; Alwitt, 1966; Campbell, 1969) have yielded inconsistent findings and have been unsuccessful at
documenting that LD children suffer from selective-attention deficits. While the evidence suggesting that central and relevant distractors do disrupt the performance of LD children more so than non-LD children, methodological flaws (no control for age of subjects, failure to assess base rate differences on timed reading or naming tasks, and the use of other groups such as hyperactive, cerebral dysfunction, and minimally brain damaged as LD subjects) temper the conclusions to be drawn considerably (McNeillis, 1987).

If selective-attention deficits do exist in LD groups, well controlled research should be able to demonstrate a certain degree of convergence across multiple measures designed to access selective-attention. Two studies have found no significant LD/non-LD differences, no convergence and little to no correlation between several measures of selective-attention (McNeillis, 1984; Pelham, 1979). Aylward and Whitehouse (1987) point out, however, that Pelham (1979) and McNeillis’s (1984) efforts, the latter of which is unpublished, are the only studies among numerous investigations that have not found LD-control differences using the central-incidental paradigm as a measure of selective-attention or distractibility. The absence of significant between measures correlations is puzzling, yet inadequately addressed in a systematic manner by either Aylward and Whitehouse or McNeillis.

Overall, the questions regarding selective-attention deficits and learning disabled children remain largely unanswered. The potential relationship between attention-deficits and impulsivity, or deficiencies in selective-intention (planning) have not been addressed as of yet. It would
appear that alternative methods of measuring selective-attention and planning are needed in order to shed light on this issue and answer the question - can learning disabled children truly be characterized by selective attention and intention deficits as was asserted by Levine (1987)?

**SBH Children: An examination of Attention and Impulsivity**

In contrast to LD populations, for which the construct of attention has been a primary empirical focus in terms of cognitive processes, researchers utilizing delinquent and conduct-disordered samples have typically been more interested in the construct of impulsivity. For behavior disordered individuals impulsivity is hypothesized to be functionally related to an inability to delay gratification and a propensity towards sensation seeking behavior (Arbuthnot, Gordon & Jurkovic, 1987; Quay, 1986).

Undersocialized conduct-disordered and delinquent subjects have been shown to perform poorly on measures of impulsivity such as Kagan's (1966) Matching Familiar Figures Test (MFFT) (Paulsen, 1978), the Q-Score of the Porteus Maze Test (Doctor & Winder, 1954; Roberts & Erickson, 1968), and measures of persistence (Kendall, Zupan & Braswell, 1981). In comparison to anxious and control groups, undersocialized conduct-disordered individuals have also demonstrated a more rapid decrement in sustained attention and a tendency to engage in stimulus seeking behavior (DeMyer-Gapin & Scott, 1977).
The research is not unanimous in support of the impulsivity/behavior disordered phenomena. For example, the findings of Saunders, Repucci & Sarata (1973), who compared male delinquents to high school students (matched on the basis of age, SES, and ethnicity) on self-report measures of impulsivity and the MFFT, not only found that the MFFT did not correlate appreciably with either self-report measure, but also found the student sample to report more impulsive type behaviors. Similarly, Hurt (1988), who compared delinquents and non-delinquents across several measures of cognitive processing, found significant between groups differences on measures of selective-attention, and not planning, which theoretically would be closely related to the construct of impulsivity.

The validity of the two most frequently employed measures of impulsivity, the MFFT and Porteus Maze Test, has been challenged by many authors (Block, Block & Herrington, 1974; O'Keefe, 1975; Reynolds & Stark, 1986). Block, Block, and Herrington assert that the MFFT as a measure of impulsivity-reflectivity places a great deal of weight on accuracy rather than response latency. O'Keefe suggests that it may be erroneous to interpret the lifting of the pencil during the Porteus Maze Test (which counts against subjects according to the scoring system) as indicative of impulsivity; an equally compelling interpretation is that this reflects a response inhibition which permits the further surveyance of the stimulus complex and planning for future action to complete the task.
In sum, although there are inconsistencies within the impulsivity literature, the research with behavior disordered groups is more consistent than inconsistent. This, of course, does not detract from the fact that there is an absence of convergent validity for various types of impulsivity measures and that, overall, serious assessment problems continue to hinder the evaluation of cognitive styles for exceptional groups of children. Added to these critical assessment issues is the fact that there is a considerable degree of overlap among problems of underachievement, learning disabilities, hyperactivity, attention-deficit disorders, delinquency, anti-social behavior, and conduct-disorders (Kazdin, 1985). It is this diagnostic complexity and confusion that has prompted notable authorities to assert that psychologists must develop objective, standardized, and appropriately normed measures of cognitive processes in order to make clinically relevant distinctions between disorders such as LD, CD, and ADHD and facilitate the process of differential diagnosis (Arbuthnot, Gordon & Jurkovic, 1987; Hinshaw, 1987; Quay, 1986). One model of human psychological processes that appears particularly relevant to this scientific endeavor is that which was originally formulated, proposed, and researched by Aleksandr Luria (1966, 1973).

**Luria's Model of Human Cognitive Processes**

Luria (1966, 1973) has theorized that there are three principal functional units of the brain: a unit for regulating cortical tone and waking, a unit responsible for obtaining, processing and storing
information, and a unit for programming, regulating and verifying mental activity. Mental processes and conscious activity are dependent upon the participation of all three functional units.

Organized goal-directed activity requires the maintenance of an optimal level of cortical tone. Only under optimal waking conditions and excitation can an individual receive and analyze information using selective systems of cortical connections. Lowered cortical tone disturbs the relationship between excitation and inhibition and mental activity cannot pursue its normal course (Luria, 1973). Luria (1966, 1973) suggests that the structures related to the first functional unit (block 1), which maintain and regulate cortical tone, lie in the subcortex and brain stem, particularly the ascending and descending reticular formation system.

The second functional unit (block 2), which receives, analyzes, and stores information, is located primarily in the lateral regions of the neocortex on the convex surface of the hemispheres. It occupies the posterior regions of the visual (occipital), auditory (temporal), and general sensory (parietal) sections of the brain (Luria, 1973 p.67). It is within this functional unit that the two basic forms of integrative activity (simultaneous and successive processing) of the cerebral cortex take place. Simultaneous processing is primarily spatial organization and synthesis of separate elements into simultaneous groups. According to Luria (1966), to grasp any system of relationships, whether grammatical-language or arithmetical concepts, is impossible without arranging the elements into a simultaneously surveyable scheme.
Successive processing is based primarily on consecutively, temporally organized series of elements which are not all surveyable at once. Each link is integrated into a series and evokes meaning only in a particular chain of successive links which follow each other in serial order (Luria, 1966).

The third functional unit (block 3) in Luria’s model is responsible for programming, regulating, verifying, and organizing conscious activity. This unit is located primarily in the anterior regions of the hemispheres. More precisely, the prefrontal divisions of the frontal lobes. These portions of the brain play a decisive role in the formation of intentions and programs and the regulation and verification of the most complex forms of human behavior. Individuals not only create intentions and plans for their behavior, but also regulate this behavior so that it conforms to these plans. Individuals verify their conscious activity by comparing the effects of their actions with the original intentions and then modify their mistakes (Luria, 1973). A distinguishing feature of the prefrontal region of the brain is that it has a very rich system of connections with lower levels of the brain (thalamus, reticular formation) and virtually all other regions of the cortex. Destruction of the prefrontal cortex is associated with a profound disturbance in complex behavioral activities and a marked disinhibition of immediate responses to irrelevant stimuli (Luria, 1966, 1973).

Any organized human activity possesses some degree of directivity and selectivity. Of the many stimuli which reach our senses
we respond only to those which are important, strong, or correspond to our immediate interests, intentions and goals. Directivity and selectivity of mental processes are the factors responsible for identifying the essential elements of mental activity. Moruzzi and Magoun (1949) Lindsley et al. (1949) and Jasper (1954) have revealed that the reticular formation, which is essential for the transition from sleep to waking, must also be regarded as one of the most important systems ensuring the most generalized and elementary forms of attention. Luria (1973) states that any complex form of attention, voluntary or involuntary, requires the possibility of selective recognition of a particular stimulus and inhibition of responses to irrelevant stimuli.

Disturbances in the superior part of the brain stem or limbic system may disrupt the primary basis of attention. Disturbances in the attentional processes which involve the brain stem or limbic system may be aided or mediated by verbal instructions. The frontal lobes also play a role in raising levels of vigilance, inhibiting responses to irrelevant stimuli, and preserving goal-directed behavior (Konorski & Lawicka, 1964; Brutkowski, 1964, 1966). Lesions to the frontal lobes lead to an inability to concentrate on instructions and inhibit responses to irrelevant stimuli. This increased distractibility often leads to profound disturbances in goal-directed behavior. Theoretically there is a critical relationship between the attentional resources of the individual and his/her ability to program and regulate behavior (planning). Disrupted behavioral regulation that is associated with
frontal lobe damage has not been successfully mediated by verbal instructions.

According to Luria (1973), thinking begins with the discovery of a task and the restraining of impulsive responses to that task. The individual investigates the conditions of the problem, analyzes its components, and recognizes the most essential features and their relationship to one another. One must select from a number of possible alternatives and create a general plan (scheme) for performing the task. A most essential component of this process is deciding which alternatives are most likely to succeed and rejecting all inadequate alternatives. This is often equated with forming a strategy. The individual must then choose the appropriate methods and consider which operations will be adequate for putting the general scheme of the solution into effect (tactics). The solution of a problem must be followed by a comparison of the results obtained with the original conditions of the task. Again, we see a functional link between the allocation of attention, inhibition of impulsive responding, and the planning and evaluative procedures that are involved in complex cognitive activities.

The PASS Model of Cognitive Processes: Operationalizing Luria's Model

The Planning, Attention, Simultaneous, and Successive (PASS) processing model proposed by Das (1972), Das, Kirby and Jarman (1979) and recently re-stated by Naglieri and Das (1988) is a model of human cognitive functioning derived from the neuropsychological work of Luria
(1966, 1973, 1980). Whereas Luria's (1966, 1973, 1980) research provided evidence that human cognitive processes are related to identifiable neurological areas and physical changes within the brain, the work of Das and his colleagues has been aimed primarily at developing, operationalizing, and demonstrating construct validity for a variety of tasks which measure planning, attention, simultaneous and successive processes.

Das, and others, have found simultaneous and successive factors and evidence of developmental differences by chronological and mental age using tests such as progressive matrices, memory for designs, and figure copying (simultaneous) and digit span forward, sound blending, and sentence repetition (successive) (Das, 1972; Das, Kirby, & Jarman, 1979). These studies have involved samples of elementary and middle school aged students (Das, 1972; Garafolo, 1986; Kirby & Das, 1978; Naglieri & Das, 1988), high school aged samples (Naglieri & Das, 1988), and college aged students (Das & Heemsbergen, 1983; Merritt & McCallum, 1983; Ashman, 1982).

The validity of these cognitive processing tasks has also been established with various samples of normal and exceptional children. Researchers have identified simultaneous and successive factors for normal (Das & Dash, 1983; Naglieri & Das, 1988), mentally retarded (Ashman, 1982; Das, 1972; Das, Cummins, Kirby, & Jarman, 1979; Jarman, 1978; Leong, 1980), learning disabled (Das, Leong, & Williams, 1978; Kirby & Robinson, 1987), and gifted (Karnes & McCallum, 1983; Snart, O'Grady, & Das, 1982) children and adults.
In more recent investigations, operationalized measures of planning have provided evidence for planning as a factor which is separate and distinct from simultaneous and successive encoding processes (Das & Heemsbergen, 1983). Such tasks range in complexity from simple trail-making like tasks to more complex activities such as writing a story or playing a strategic game. Results of factor analytic studies have found simple tasks such as trail making and visual search to load with complex measures of planning such as those involving story compositions (Das & Heemsbergen, 1983), solving syllogistic reasoning items (Das & Heemsbergen, 1983), the Wisconsin Card Sorting task (Garafolo, 1986), and a pictorial category task (Schofield & Ashman, 1986). Two recently developed tasks involving identification of two out of six identical multiple digit numbers in a row (Matching Numbers) and the completion of a page of symbol/letter pairs (Planned Codes) have also loaded with visual search and trail making tasks in studies by Naglieri and Das (1988), Naglieri, Prewett, and Bardos (1989), and Stutzman (1986).

The most recently investigated tasks are those which have been operationalized to measure the attention component, or first functional unit of the model. This research has found measures of selective attention such as those developed by Posner and Boies (1971) and Stroop (1935) to be useful in the assessment of attention (Das, 1987; Naglieri, Prewett, and Bardos, 1989; Naglieri, Das, Stevens, & Ledbetter, 1989). Additional evidence for the validity of these attention measures was demonstrated by Reardon (1988) who found significant differences
between attention-deficit and normal subjects on composite measures of the attention, planning, and successive processing components of the PASS model battery.

Chapter Summary

The intent of this chapter was to examine the characterological and diagnostic issues that are particularly relevant to LD and SBH-type populations. Literature pertinent to the domains of intelligence (IQ), socioemotional/behavioral status, self-concept/self-esteem, and attention/impulsivity was examined. The review of the IQ and self-concept/self-esteem domains suggests that these characteristics have little to offer in terms of discriminating between LD and SBH-type disorders.

In contrast, research examining the emotional and cognitive characteristics of LD and SBH-type groups provides evidence, albeit tentative and imperfect, that the development and implementation of theoretically sound, objective, and appropriately standardized measures of affect and cognition may illuminate characterological differences between LD and SBH-type groups. Accurate assessment of these domains may enhance our understanding and appreciation for these groups and facilitate the differential diagnostic efforts of researchers and clinicians.

Although it is clear that a substantial proportion of LD youngsters suffer from diagnosable emotional disorders and manifest behavior that is classified as problematic, our knowledge regarding the
role of emotional factors in learning disabilities is limited (Walker, 1987). We know even less about the contributory role of emotional factors for delinquent, conduct-disordered, or anti-social (SBH-type) individuals. Perhaps Walker (1987) is correct to assert that the reason the issue of emotional problems in LD children is such a complex one is that we have little understanding of the interactional relationship between emotion and cognition and therefore exhibit a tendency to conceptualize them as orthogonal domains of functioning. The aim of the present investigation is to begin to uncover the cognitive differences, if any, that exist between LD and SBH groups and to make an initial attempt at understanding how affective states (anxiety and depression) relate to and influence various components of human cognitive functioning.
Design The study utilized Campbell and Stanley's (1963) static-group comparison design. The research involved the comparison of three groups of students distinguished by their handicapping conditions (or lack thereof) as described by the Ohio Department of Education guidelines for the identification of children with special needs. Specifically, the groups were comprised of normal (regular education), learning disabled, and severe behavioral handicapped students that had been identified by educational teams in a suburban school district in central Ohio.

Subjects The sample included 90 male subjects whose ages range from seven to fifteen. Each group (normal, LD, and SBH) was comprised of 30 subjects, half of whom were drawn from an elementary school, the other half being drawn from a middle school. The LD and SBH subjects were identified according to the Ohio Rules for the Education of Handicapped Children by school district personnel (See Appendices A and B). The LD subjects had a 2 z-score discrepancy in at least one of the seven academic areas. The SBH students met the eligibility criteria for SBH programming set forth by the Ohio Department of Education. All subjects were matched on the basis of age.
Instruments

PASS Model Tasks Twelve PASS model tasks (Das & Naglieri, 1988) will be utilized in the study. Adequate reliability, validity, and factorial support for the operationalized measures has been documented (Naglieri & Das, 1987; Naglieri & Das, 1988; Naglieri, 1989). The PASS battery will include three measures of all four components of the processing model (planning, attention, simultaneous and successive processing). The PASS tasks will be administered in the following order to all subjects: Visual Search, Planned Connections, Planned Codes, Figure Memory, Simultaneous Verbal, Matrices, Expressive Attention, Number Finding, Receptive Attention (Pictures & Letters), Word Series, Sentence Repetition, and Sentence Questions. A description of each PASS task and its scoring criteria are presented below.

Measures of Planning

Visual Search: The child is instructed to point to a picture, number, or letter in an array of stimuli that matches a target figure which is located in a box in the center of the page. Each item includes two such searches, one on the top and one on the bottom half of each page. The items are timed from the point of exposure until the second match is identified.

Planned Connections: This paper and pencil task requires the child to connect in their proper numerical sequence a series of numbers (1 to 2, 2 to 3 etc.) which are arranged in various configurations on a page. The second type of item requires the child to alternately connect a number and letter in their proper sequence (1 to A, A to 2, 2 to B, B to 3 and so on). The task is scored for total time as well as the number of errors committed.
**Planned Codes:** The child's task is to code a series of boxes marked with the letters A, B, C, or D using a designated sequence of X's and O's (i.e., the code for A = OX, the code for B = XX, etc.). This task consists of two items (pages), each with different codes and different arrangements of response locations. The task is scored for total time as well as the number of errors committed.

**Measures of Simultaneous Processing**

**Figure Memory:** The child's task is to locate and outline a geometric figure (square, triangle), after having surveyed the figure for five seconds, when it is embedded within a more complex geometric design. All lines must be indicated without any additions or omissions. The child's score is the total number of designs correctly traced.

**Simultaneous Verbal:** The child's task is to choose one of six pictures that correctly answers a question read by the examiner. Each question involves various logical-grammatical relationships between the objects or persons depicted in all six pictures on a page. The child's score is the total number of items answered correctly.

**Matrices:** This task is similar to Naglieri's (1985) progressive matrix type task in which the child is to analyze nonverbal analogies and then chooses one of six options that best completes a visual analogy. The largest matrix is presented in a 3 x 3 format. The child's score is the total number of analogies completed correctly.
Measures of Attention

Expressive Attention: This task is similar to the Stroop Color Word Test (Stroop, 1935) and consists of three conditions. In condition one the child reads rows of color words (green, blue, red, and yellow) as fast as he/she can. In condition two the child identifies rows of colored blocks as fast as he/she can. Condition three is an interference task in that it contains color words that are printed in an incongruent color ink (i.e. the word RED may be printed in blue ink). The child is requested to read the colors the words are printed in as fast as he/she can. Each condition is scored for the amount of time needed to complete the page as well as the number of incorrect responses.

Number Finding: The child’s task is to find and underline specific target numbers which are randomly arranged within rows of numbers containing both target and distractor numbers. The task is scored for the amount of time needed to complete the page as well as the number of incorrect responses.

Receptive Attention (Pictures & Letters): The format of this task is identical for both pictures and letters. The child’s task is to find and underline pairs of pictures or letters that are the same on the basis of a physical (first item) or category/name (second item) match. Both tasks are scored for time and the number of correct identifications. In addition, these tasks can be scored for the number of omissions (pairs not identified) and commissions (pairs incorrectly identified) errors produced.
Measures of Successive Processing

**Word Series:** This task consists of nine single syllable words which are presented in series ranging in length from two to seven words. The child's score is the total number of series recalled correctly.

**Sentence Repetition:** This task consists of orally presented sentences which use color words in the place of nouns (e.g., the blue is graying). The child is required to repeat the sentences exactly as presented (including word endings, omissions, and reversals). The child's score is the sum of the number of sentences repeated correctly.

**Sentence Questions:** This task requires the child to answer a question about the sentences presented in the Sentence Repetition task (e.g., The blue is graying. Who is graying?). The child's score is the sum of the number of questions answered correctly.

*The Children's Depression Inventory* (CDI; Kovacs, 1981).

The CDI is a research instrument that was developed to assess the severity of depressive symptoms in children. It is adapted from the widely used Beck Depression Inventory for adults and consists of 27 questions that deal with issues such as feelings of sadness, self-hatred, sleep disturbances, experiencing happiness and fun, school performance, and so on. Each item is read to the child and he/she indicates which one of three statements best describes him/herself within the past two to three weeks. Items are scored either 0, 1, or 2, depending on the severity of the statement endorsed (i.e., I have plenty of friends = 0, I have some friends but I wish I had more = 1, or I do not have any friends = 2).
The CDI has demonstrated relatively high internal consistency reliability (coefficients ranging from .86 to .90) (Reynolds, Anderson, & Bartell, 1984), and adequate test-retest reliability (r=.72) (Kovacs, 1981). Moderate correlations between the CDI and clinicians’ global ratings of depression (Kovacs, 1981), and children's responses to the Bellevue Index of Depression (Kazdin, French, & Unis, 1983) have also been documented.

The Revised Children’s Manifest Anxiety Scale (RCMAS, Reynolds & Richmond, 1985). The RCMAS is a 37 item self-report questionnaire that is designed to measure the degree to which children experience anxiety. Each item is read to the child and he/she indicates (YES/NO) whether or not that particular statement is true or untrue regarding the way they feel about themselves (i.e. I worry a lot of the time YES / NO).

The RCMAS Total Anxiety Score has demonstrated internal consistency reliability coefficients ranging from .75 and .87 for white and black males across all age groups (Reynolds & Richmond, 1985). Test-retest reliability studies utilizing a short re-test interval (3 weeks) have demonstrated extremely high reliability estimates (.98 for a combined group of 99 male and female children) (Pela & Reynolds, 1982). Reynolds and Richmond (1979) and Reynolds and Paget (1981) have conducted factor analytic studies which support the construct validity of the scale and its division into four primary factors or subscales (Physiological anxiety, Worry/Oversensitivity, Social Concerns/Concentration, and a Lie scale).
Procedures

Due to small class sizes, the LD and SBH subjects will be tested by entire classrooms. Thus, a letter informing the parents of the nature and purpose of the study will be sent prior to commencing the data collection. All information will remain confidential and no data will be utilized to make decisions regarding the student’s educational programming. Because the normal subjects will not be tested as entire classrooms, a letter of consent will be sent to the parents. This letter is to be returned to the respective schools before involving any regular education student in the research project.

After receiving the necessary consent and permission forms, each child will be individually administered the 12 PASS tasks, and the CDI and RCMAS scales. The tests will be administered according to test manual guidelines by one of two male doctoral students in Child Clinical and School Psychology. Items on the CDI and RCMAS scales will be read to each subject. Total test time will be approximately one and a half hours for each subject. The testing will be completed in one or two sessions depending upon daily schedules and space availability. For any child who endorses the extreme response to the suicidal ideation item on the CDI, his/her name will be given to the district’s supervisor of psychological services, who will, in turn, inform that building’s psychologist and ensure that a follow-up investigation is conducted.
**Hypotheses**

Hypotheses 1-4 (stated in the null form) will examine cognitive processing differences between the two exceptional groups, LD and SBH, utilizing the operationalized measures of processing that comprise the PASS model battery. Specific cognitive profiles that are characteristic of either or both groups will be investigated.

**Hypothesis #1:** It is hypothesized that there will be no statistically significant differences between the performance of LD and SBH subjects on the PASS model composite measure of Planning.

**Hypothesis #2:** It is hypothesized that there will be no statistically significant differences between the performance of LD and SBH subjects on the PASS model composite measure of Attention.

**Hypothesis #3:** It is hypothesized that there will be no statistically significant differences between the performance of LD and SBH subjects on the PASS model composite measure of Simultaneous processing.

**Hypothesis #4:** It is hypothesized that there will be no statistically significant differences between the performance of LD and SBH subjects on the PASS model composite measure of Successive processing.

Hypotheses 5-8 will examine cognitive processing differences between LD and normally achieving groups of children and adolescents. Again, the operationalized measures of processing that comprise the PASS model battery will be utilized.
Hypothsis *5: It is hypothesized that there will be statistically significant differences between the performance of normals and LD subjects (with normals demonstrating significantly more efficient processing) on the PASS model composite measure of Planning.

Hypothsis *6: It is hypothesized that there will be statistically significant differences between the performance of normal and LD subjects (with normals demonstrating significantly more efficient processing) on the PASS model composite measure of Attention.

Hypothsis *7: It is hypothesized that there will be statistically significant differences between the performance of normal and LD subjects (with normals demonstrating significantly more efficient processing) on the PASS model composite measure of Simultaneous processing.

Hypothsis *8: It is hypothesized that there will be statistically significant differences between the performance of normal and LD subjects (with normals demonstrating significantly more efficient processing) on the PASS model composite measure of Successive processing.

Hypotheses 9-12 will examine cognitive processing differences between SBH and normally achieving groups of children and adolescents. Again, the operationalized measures of processing that comprise the PASS model battery will be utilized.

Hypothsis *9: It is hypothesized that there will be statistically significant differences between the performance of normals and SBH subjects (with normals demonstrating significantly more efficient processing) on the PASS model composite measure of Planning.
Hypothesis *10: It is hypothesized that there will be statistically significant differences between the performance of normal and SBH subjects (with normals demonstrating significantly more efficient processing) on the PASS model composite measure of Attention.

Hypothesis *11: It is hypothesized that there will be statistically significant differences between the performance of normal and SBH subjects (with normals demonstrating significantly more efficient processing) on the PASS model composite measure of Simultaneous processing.

Hypothesis *12: It is hypothesized that there will be statistically significant differences between the performance of normal and SBH subjects (with normals demonstrating significantly more efficient processing) on the PASS model composite measure of Successive processing.

Hypotheses 13-15 will examine differences in the levels of anxiety experienced by all three groups of subjects. Specifically, the two exceptional groups (LD and SBH) will be compared to one another, and each will also be compared to normally achieving students. The The Revised Children's Manifest Anxiety Scale (RCMAS) will be used as an index of anxiety levels.

Hypothesis *13: It is hypothesized that there will be no statistically significant differences between LD and SBH subjects' self-reports of anxiety as measured by the RCMAS.
**Hypothesis #14:** It is hypothesized that LD subjects will report statistically significant higher levels of anxiety as compared to normally achieving, regular education students.

**Hypothesis #15:** It is hypothesized that SBH subjects will report statistically significant higher levels of anxiety as compared to normally achieving, regular education students.

Hypotheses 16-18 will examine differences in depressive symptoms experienced by all three groups of subjects. Specifically, the two exceptional groups (LD and SBH) will be compared to one another, and each will also be compared to normally achieving students. The Children's Depression Inventory (CDI) will be used as an index of depression or depressive symptomatology.

**Hypothesis #16:** It is hypothesized that there will be no statistically significant differences between LD and SBH subjects' self-reports of depression as measured by the CDI.

**Hypothesis #17:** It is hypothesized that LD subjects will report statistically significant higher levels of depression as compared to normally achieving, regular education students.

**Hypothesis #18:** It is hypothesized that SBH subjects will report statistically significant higher levels of depression as compared to normally achieving, regular education students.

Hypotheses 19 and 20 will examine the relationship between depression, anxiety, and cognitive processing competency as demonstrated
by all three groups of subjects. Specifically, analyses will be performed which investigate the relationship between depression and cognitive processing competency and the relationship between anxiety and cognitive processing competency irrespective of educational group membership.

**Hypothesis 19:** It is hypothesized that those subjects or groups that report elevated levels of depression will have significantly lower scores across all composite measures of the PASS model. There will be a statistically significant, inverse relationship between these variables.

**Hypothesis 20:** It is hypothesized that those subjects or groups that report elevated levels of anxiety will have significantly lower scores across all composite measures of the PASS model, but particularly in the areas of attention, planning, and successive processing. Again, there will be a statistically significant, inverse relationship between these variables (particularly these four variables).

**Data Analysis**

Descriptive statistics will be calculated and presented for each PASS subtest, the four PASS composite areas, and the CDI and RCMAS scales across all three groups of subjects.

To test significance between groups on all six primary dependent measures (Planning, Attention, Simultaneous, and Successive Composites, CDI, and RCMAS), two separate MANOVA procedures will be performed (one across the four cognitive processing composites, the other across the measures of anxiety and depression). If significant differences exist, univariate ANOVA's will be conducted to test the significance of each
difference using either a bonferroni correction procedure or Scheffe's protected F statistic to maintain the familywise error rate at $p < .05$.

Hypotheses 1-18 can be tested utilizing these statistical methods. In order to investigate hypotheses 19 and 20, a discriminant function analysis of all six dependent measures will be performed.
CHAPTER IV
RESULTS

This chapter presents a comparative analysis of the performance of the three subject groups (regular education, learning disabled, and severe behavior handicapped) across the 12 PASS model tasks, four cognitive processing composites (Planning, Attention, Simultaneous and Successive processing), and self-report measures of anxiety and depression. Sample characteristics, descriptive statistics, and task intercorrelational analyses will be presented and discussed prior to examining multivariate and discriminant function analyses.

Sample Characteristics

All three groups were comprised of 30 male subjects between the ages of seven and fifteen. Table 1 provides the mean age, Full Scale IQ, PPVT-R, and WRAT-R standard scores for each group, and the percentage of black and white subjects in all three samples. Minor differences in group composition exist in that, whereas the entire normal and LD groups were Caucasian, three of the thirty SBH subjects were black. Non-significant differences between the LD and SBH groups were obtained from their most current index of general intellectual functioning (WISC-R Full Scale IQ; t(1,58) = 1.95, p > .05). Similarly, non-significant differences between all three groups were obtained on a measure of receptive vocabulary

69
Table 1
Sample Characteristics (Age, IQ, PPVT-R, WRAT-R (Reading), % White, % Black).

<table>
<thead>
<tr>
<th></th>
<th>NORMALS (N = 30)</th>
<th>LD (N = 30)</th>
<th>SBH (N = 30)</th>
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<tr>
<td>% Black</td>
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Note: All subjects are males. Age is reported in months.
Although these differences were not statistically significant, the normal group demonstrated the most developed receptive vocabulary and the LD group's performance deviated most significantly from the average range of functioning. Significant between groups differences were noted on a measure of reading decoding skills (WRAT-R; $E(2, 87) = 19.07$, $p < .01$). Although both the LD and SBH groups demonstrated significantly lower performances on the WRAT-R as compared to the normal group, once again the LD group demonstrated the greatest deficiency in this academic area. This, of course, is consistent with the identification process and the presumed differences in the nature of the handicapping conditions that exist between LD and SBH groups. That is, it is expected that the LD group's performance to be significantly lower than that of both the SBH and normal groups given the fact that many LD children are identified based on significant discrepancies between ability and achievement in areas such as reading decoding. Finally, non-significant differences in chronological age were obtained across all three groups ($E(2, 87) = .009$, $p > .05$).

Table 2 presents raw score means and standard deviations for each group across the 12 PASS tasks. The values listed for the Visual Search (VS), Planned Connections (PC), and Expressive Attention (EA) tasks represent the total time (in seconds) required for the subject to complete all items in that particular task. In contrast, the values listed for the remaining measures: Planned Codes, Number Finding, Receptive Attention, Figure Memory, Simultaneous Verbal, Matrices, Word Series, Sentence Repetition, and Sentence Questions, are representative of the total number
Table 2
PASS Raw Score Means and Standard deviations

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**Note:**
- PCODES = PLANNED CODES
- NF = NUMBER FINDING
- R. ATT. = RECEPTIVE ATTENTION
- FIG. MEM. = FIGURE MEMORY
- SIM. VERBAL = SIMULTANEOUS VERBAL
- WORD SER. = WORD SERIES
- SENT. REP. = SENTENCE REPETITION
- SENT. Q. = SENTENCE QUESTIONS
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<td>SD</td>
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<td>2.6</td>
<td>2.6</td>
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</tbody>
</table>

Note: * CDI scores are raw scores derived from the entire 27 item inventory.
** RCMAS scores are T-scores and scaled scores derived from the factor scores as presented in the RCMAS manual.
of questions answered correctly or target stimuli identified by the subject within a standard time period.

Table 3 consists of the scores obtained for each group on the Children's Depression Inventory (CDI) (which yields raw scores only) and the Revised Children's Manifest Anxiety Scale (RCMAS) (which provides two different forms of standard scores). The figures listed for the CDI represent the total point values obtained from the subject's endorsement of depressive symptomatology (each item of the inventory is scored on a 0-2 scale with higher numbers being indicative of more intense and significant levels of depressive thoughts and feelings). In contrast, whereas the Total Anxiety score on the RCMAS is a T-score (Mean of 50, Standard deviation of 10), the metric for each individual subscale is a scaled score which has a mean of ten and a standard deviation of three.

**Conversion of PASS Raw Scores to Standard Scores**

In order to make the interpretation of between groups differences on the 12 PASS model tasks more concise, the raw scores for each task were converted into a common metric of standard or T-scores (mean of 50, standard deviation of 10) using the means and standard deviations of the 30 regular education subjects. The following formula was used to compute standard score for those tasks in which the subject's performance was based on the total number of correct responses generated or stimuli identified by the subject (Planned codes, Number Finding, Receptive Attention, Figure Memory, Simultaneous Verbal, Matrices, Word Series, Sentence Repetition, Sentence Question):
The three measures (Visual Search, Planned Connections, Expressive Attention) that were scored for the total time required to successfully complete the task were also converted into standard scores. Because lower scores on these measures reflect processing proficiency, meaningful and uniform derived standard scores (higher scores reflecting increased proficiency) were obtained utilizing the following formula:

\[
\frac{(\text{Obtained Raw Score} - \text{Mean of Regular Ed. Group})}{\text{Standard Deviation of Regular Ed. Group}} \times 10 + 50
\]

This formula manipulates the distribution so that lower total time scores are represented as higher standard scores and are indicative of better performance.

A separate metric was utilized in order to obtain standard scores for the four processing composites (Planning, Attention, Simultaneous and Successive processing). The composites are essentially a combination of the three tasks utilized which best define that processing component. In order to differentiate composite measures from individual task performance and make meaningful comparisons to traditional measures of general intellectual functioning, the following formula was used to obtain the four composite standard scores:

\[
\frac{(\text{Sum of all T-Scores from each Processing Area})}{\text{Total Number of Tasks in each Processing Composite}} \times 15 + 100
\]
Thus, the composite measures are essentially an average of the subject's performance on the tasks which comprise each individual component of the processing model. The metric for the composites have a mean of 100 and a standard deviation of 15.

Table 4
PASS Standard Score Means and Standard deviations

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<tr>
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<th>NORMALS</th>
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<td>SD</td>
<td>X</td>
<td>SD</td>
<td>X</td>
<td>SD</td>
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<td>39.4</td>
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** These values reflect a partial Attention Composite based upon each groups' performance on the Expressive Attention and Number Finding tasks only. See text and Tables 10 and 11 for further explanation.
PASS model Inter-task Correlational Analyses

Prior to conducting the multivariate analyses, the pattern of intercorrelations among the 12 PASS model tasks was examined. Because the majority of the PASS tasks demonstrated a significant correlation with chronological age, both obtained and partialled correlation matrices are provided for each group separately. Tables 5 through 8 demonstrate the significant and pervasive impact of the age effect across all variables. When the age effect is extracted from the task intercorrelations the pattern of relationships become more consistent with the underlying theory regarding the constructs or processing variable that each task purportedly measures.

Although the task intercorrelations obtained for both the LD and SBH groups adhere more closely to the underlying theoretical model (see Tables 6 and 7), the extent to which the planning and attention measures correlate with one another was notable across all three groups. It must be noted that the relatively small sample size inherent in the individual groups consists of a larger amount of error variance than does the total sample. Therefore, the intercorrelational matrix was further examined entering the standard scores for the entire sample (N=90) into the correlational equation. The results of these analyses are presented in obtained and partialled form in Table 8.
Table 5
Normal Group PASS Obtained and Partialled Intercorrelations (N = 30)

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Note: Obtained correlations are presented below the diagonal; partialled correlations above the diagonal.
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LD Group PASS Obtained and Partialed Intercorrelations (N = 30)

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Note: Obtained correlations are presented below the diagonal; partialled correlations above the diagonal.
Table 7
SBH Group PASS Obtained and Partialled Intercorrelations (N = 30)

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Note: Obtained correlations are presented below the diagonal; partialled correlations above the diagonal.

Table 8 clearly illuminate the fact that, by utilizing the larger sample size and thereby eliminating a portion of error variance, the task intercorrelations function more in accordance with the underlying theoretical hypotheses regarding the interrelatedness of each processing component. For example, the measures of planning correlate most highly with one another, yet moderately with measures of attention as would be
predicted based on Luria's theoretical postulations. A factor analysis of the total sample standard score data was conducted in order to assess the degree to which each task was functioning in its intended manner (i.e. loading on the processing factor which it was purported to measure).

Table 8
Total Sample PASS Obtained and Partialled Intercorrelations (N = 90)

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Note: Obtained correlations are presented below the diagonal; partialled correlations above the diagonal.
The results of the Varimax oblique four factor solution are presented in Table 9. With the exception of two tasks, Expressive and Receptive Attention, the processing measures demonstrated one primary loading on a factor defined by the cluster of tasks which were intended to measure one specific and unique component of the PASS model. Whereas the Expressive Attention task demonstrated a split loading on what were determined to be the Attention and Planning factors, the Receptive Attention task yielded moderately significant loadings across all four PASS model components. Due to the unanticipated nature of the results of the Receptive Attention measure, further exploration of the two items which comprise the task was conducted. Item 5 of the Receptive Attention task consists of a selective and sustained effort to identify physically matched pairs of letters from an array of letter combinations (i.e. AA, bb, etc.). In contrast, item 6 requires that the subject identify lexically or nominally matched pairs of letters from a similar array of letter pairs (i.e. Aa, bB, etc.). Both items are scored for total time needed to complete the task and total number of correctly identified letter pairs.

Originally, only Receptive Attention Item 6 was used in the attention composite. The rationale being that the degree of complexity and the demands it placed on attentional employment exceeded that of 5 and thus would make finer discriminations between individuals and groups. The results of the factor analysis, however, suggested a need for further examination of both items that comprise this measure.
An indepth analysis of the Receptive Attention measure began with an examination of item 5 which was not used in the original attention composite. Initially, the partialled intercorrelations between the Receptive Attention 5 total time and number correct scores and the 12 PASS tasks was examined. Table 10 contains a summary of this analysis. The results demonstrate that, while the total time data correlates similarly with both planning and attention measures, the number
correct data correlates most significantly with the planning measures (to a greater extent than did the number correct data obtained for Item 6). Thus, it is unlikely that merely replacing Item 6 with either the total time or number correct portions of Item 5 would yield a purer measure of attention. Thus, alternative means of item scoring were evaluated.

Table 10
Partialled Intercorrelations between Receptive Attention Item #5 and 12 PASS tasks.

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<td>.29</td>
<td>.26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WS</td>
<td>.07</td>
<td>.15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SR</td>
<td>.11</td>
<td>.15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SQ</td>
<td>.11</td>
<td>.25</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The second phase of evaluating the Receptive Attention task involved a combined scoring system in which the total time score was divided by the number correct score. This ratio yields an index of overall planning proficiency. The intercorrelations between items 5 and 6 and the remaining PASS tasks are presented in Table 11. The results are
remarkably similar to those presented in Table 10 in that both Item 5 and 6 are correlated most highly with measures of planning and secondarily with the other two measures of attention. More importantly, it was noted that neither Item demonstrated a significant correlation with the Number Finding task which essentially defined the Attention factor in the previously presented factor analysis.

The final analysis of the Receptive Attention task consisted of a combined scoring system in which both Items (5 and 6) total time scores were summed and then divided by the sum of the number correct scores on both trials. The resulting correlations between the combined Receptive Attention measure and the remaining PASS tasks are presented in Table 11. As was the case in the preceding two analyses, the Receptive Attention measure was most highly correlated with measures of planning and demonstrated a secondarily significant relationship with the Expressive Attention measure. Once again, a non-significant statistical relationship was obtained between the combined Receptive Attention task and the most pure measure of attention (Number Finding).

Overall, the results of the factor analysis and subsequent investigations of multiple methods of scoring the Receptive Attention measure suggest that, for this sample, the Receptive Attention task correlated with other measures attention and planning. The aforementioned analyses provide ample statistical evidence to justify the elimination of the Receptive Attention measure from the Attention Composite in order to obtain the most pure composite measure of the Attention construct. Therefore, in all subsequent multivariate group analyses - those which are
presented in Tables 12 through 19 - the Attention Composite is comprised of the best two measures of attention (Expressive Attention and Number Finding).

Table 11
Partialled Intercorrelations between Receptive Attention (RA) Items #5 and #6 and a Combination of Receptive Attention Items #5 and #6 and 12 PASS tasks (Total Time scores/Number Correct scores).

<table>
<thead>
<tr>
<th></th>
<th>RA#5 TT/NC</th>
<th>RA#6 TT/NC</th>
<th>RA#5 &amp;#6 TT/NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>VS</td>
<td>.63</td>
<td>.48</td>
<td>.63</td>
</tr>
<tr>
<td>PC</td>
<td>.53</td>
<td>.33</td>
<td>.48</td>
</tr>
<tr>
<td>PCO</td>
<td>.46</td>
<td>.33</td>
<td>.42</td>
</tr>
<tr>
<td>EA</td>
<td>.40</td>
<td>.40</td>
<td>.45</td>
</tr>
<tr>
<td>NF</td>
<td>.25</td>
<td>.15</td>
<td>.22</td>
</tr>
<tr>
<td>RA#5 T/NC</td>
<td></td>
<td></td>
<td>.58</td>
</tr>
<tr>
<td>RA#6 T/NC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FM</td>
<td>.28</td>
<td>.23</td>
<td>.29</td>
</tr>
<tr>
<td>SV</td>
<td>.22</td>
<td>.13</td>
<td>.20</td>
</tr>
<tr>
<td>MAT</td>
<td>.28</td>
<td>.22</td>
<td>.27</td>
</tr>
<tr>
<td>WS</td>
<td>.11</td>
<td>.06</td>
<td>.13</td>
</tr>
<tr>
<td>SR</td>
<td>.13</td>
<td>.14</td>
<td>.15</td>
</tr>
<tr>
<td>SQ</td>
<td>.20</td>
<td>.22</td>
<td>.24</td>
</tr>
</tbody>
</table>

Group Differences across Measures of Cognitive Processing

A 3 (Groups) X 6 (Assessment Devices) MANOVA was performed on all six major dependent variables (four PASS composites, CDI, and RCMAS scales). The results yielded a significant main effect for group ($F(2, 87) = 5.098, p < .01$) as well as a significant interaction between groups and the various dependent measures ($F(10, 435) = 2.93, p < .01$).
Table 12
Univariate F-Values for Between Groups comparisons on PASS Composites, CDI, and RCMAS scales.

<table>
<thead>
<tr>
<th></th>
<th>F</th>
<th>NORMAL vs. LD</th>
<th>NORMAL vs. SBH</th>
<th>LD vs. SBH</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLANNING COMPOSITE</td>
<td>3.57</td>
<td>N &gt; LD</td>
<td>ns</td>
<td>ns</td>
</tr>
<tr>
<td>ATTENTION COMPOSITE</td>
<td>4.51*</td>
<td>N &gt; LD</td>
<td>ns</td>
<td>ns</td>
</tr>
<tr>
<td>SIMULTANEOUS COMPOSITE</td>
<td>6.99*</td>
<td>N &gt; LD</td>
<td>N &gt; SBH</td>
<td>ns</td>
</tr>
<tr>
<td>SUCCESSIVE COMPOSITE</td>
<td>4.17</td>
<td>N &gt; LD</td>
<td>ns</td>
<td>ns</td>
</tr>
<tr>
<td>CDI</td>
<td>.82</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
</tr>
<tr>
<td>RCMAS</td>
<td>.87</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
</tr>
</tbody>
</table>

Note: * p < .05

Bonferroni procedures were used to control the experimentwise error rate for the resulting univariate F statistics computed for the four PASS processing composites (Bray & Maxwell, 1982). This involves dividing the .05 alpha level by the number of processing variables analyzed in the MANOVA. In this case, the alpha level is designated to be p < .013. The results of univariate F-tests - presented in Table 12 - reveal statistically significant between groups differences on the Attention and Simultaneous processing scales of the PASS model cognitive measures. Within groups differences across the PASS processing composites were non-significant for both the LD (F (3, 87) = 1.29, p > .10) and SBH groups (F (3, 87) = 0.32, p > .10).

Twelve pairwise comparisons were performed using a Scheffe protected F-test which maintained the error rate at p < .05. These
analyses demonstrate that, whereas the regular education (normal) students demonstrated significantly higher performances than LD students across all four PASS composites (Planning Composite \( E(1,58) = 3.15, p. < .05 \); Attention Composite \( E(1,58) = 4.06, p. < .05 \); Simultaneous Composite \( E(1,58) = 5.84, p. < .05 \); Successive Composite \( E(1,58) = 3.24, p. < .05 \)), their performance was superior to the SBH group on measures of Simultaneous processing only (Normal vs. SBH Planning Composite \( E(1,58) = 2.09, p. > .10 \); Attention Composite \( E(1,58) = 2.52, p. > .10 \); Simultaneous Composite \( E(1,58) = 4.56, p. < .05 \); Successive Composite \( E(1,58) = 3.01, p. > .05 \)) Simultaneous Composite). The differences obtained between the LD and SBH groups across all cognitive processing composites were non-significant (Planning Composite \( E(1,58) = 0.11, p. > .10 \); Attention Composite \( E(1,58) = 0.18, p. > .10 \); Simultaneous Composite \( E(1,58) = 0.08, p. > .10 \); Successive Composite \( E(1,58) = 0.004, p. > .10 \)). The PASS composite scores for each group are presented in pictorial form in Figure 1.
In summary, the data suggest that null hypotheses 1-4, which propose that there will be no significant differences between the LD and SBH groups on each of the four PASS model processing composites, cannot be rejected based on the current findings. Likewise, hypotheses 9, 10, and 12, which propose that there will be significant differences between the normal and SBH groups on composite measures of Planning, Attention, and Successive processing, respectively, are not supported by this data. Only hypothesis 11, which proposes normal/SBH differences in the area of Simultaneous processing, receives support from the existing data.

Hypotheses 5-8, which propose that there will be significant differences between the normal and LD groups (favoring the normal group) on each of the four PASS model processing composites, are supported by
the data. The data confirm statistically significant normal/LD differences across all four processing composites in favor of the normal sample.

A more detailed analysis of the PASS model tasks is presented in Table 13. The one-way MANOVA performed on this data reveals a significant main effect for the group factor ($F(2, 87) = 7.25, p < .01$) as well as statistically significant univariate $F$ values for five of the twelve processing measures. No interaction between groups and measures was demonstrated ($F(22, 957) = 0.89, p > .10$) for the twelve individual measures of cognitive processing.

Table 13
Univariate $F$-Values for Between Groups Comparisons of Individual PASS Model Cognitive Processing Measures.

<table>
<thead>
<tr>
<th></th>
<th>$F$</th>
<th>$p$-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PLANNING</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visual Search</td>
<td>2.27</td>
<td>&gt;.10</td>
</tr>
<tr>
<td>Planned Connections</td>
<td>5.42*</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Planned Codes</td>
<td>1.49</td>
<td>&gt;.10</td>
</tr>
<tr>
<td><strong>ATTENTION</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expressive Attention</td>
<td>2.90</td>
<td>&gt;.01</td>
</tr>
<tr>
<td>Number Finding</td>
<td>4.89*</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Receptive Attention</td>
<td>3.14</td>
<td>&gt;.01</td>
</tr>
<tr>
<td><strong>SIMULTANEOUS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Figure Memory</td>
<td>6.49*</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Simultaneous Verbal</td>
<td>4.75*</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Matrices</td>
<td>3.91</td>
<td>&gt;.01</td>
</tr>
<tr>
<td><strong>SUCCESSIVE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Word Series</td>
<td>1.62</td>
<td>&gt;.10</td>
</tr>
<tr>
<td>Sentence Repetition</td>
<td>3.35</td>
<td>&gt;.01</td>
</tr>
<tr>
<td>Sentence Questions</td>
<td>6.04*</td>
<td>&lt;.01</td>
</tr>
</tbody>
</table>
Group Differences on measures of Depression and Anxiety

The three groups' self-reports of depressive symptomatology and generalized anxiety did not differ significantly. The resulting $F$ values yielded from the one-way MANOVA were non-significant for both the CDI ($F(2, 87) = 0.82, p. > .10$) and the RCMAS ($F(2, 87) = 0.87, p. > .10$) scales. A finer grained analysis of the four subscales of the RCMAS demonstrated statistically significant differences on the Lie scale only ($F(2, 87) = 4.37, p. < .05$). In this case, the SBH group demonstrated less of a propensity than normal and LD students to endorse socially acceptable, yet unrealistic responses. It should be noted, however, that none of the groups' means on the RCMAS scales deviated significantly from the mean of the standardization group, nor would any of the groups' endorsements be considered clinically elevated. Between groups analyses of the Physiological Anxiety ($F(2, 87) = 1.67, p. > .10$), Worry/Oversensitivity ($F(2, 87) = 1.10, p. > .10$), and Social Concerns/Concentration ($F(2, 87) = 0.42, p. > .10$) subscales of the RCMAS yielded non-significant results.

In summary, null hypotheses number 13 and 16, which propose that there will be no significant differences between the LD and SBH groups on the CDI and RCMAS scales cannot be rejected based on the current data. Directional hypotheses, those proposing that both the LD and SBH groups will report significantly higher levels of depression and anxiety as measures by the CDI and RCMAS scales (hypotheses number 14, 15, 17, and 18), can be rejected on the basis of the data obtained from the normal, LD, and SBH groups utilized in this study.
Examining the Relationship between Depression, Anxiety, and Cognitive Processing Competence

Prior to conducting statistical analyses of the six primary dependent measures, the distribution of extreme scores (those that fell 2 standard deviations or more above the normal group mean) on the CDI and RCMAS scales were examined. Of the total sample (N=90), 17 subjects (18.8%) demonstrated extreme scores on either or both measures of affective status. Whereas 14 subjects (15.5%) reported extreme symptomatology on the CDI, only 7 subjects (7.7%) reported extreme levels of anxiety on the RCMAS. 4 of the 17 subjects (4.4%) reported significantly elevated levels of both depression and anxiety.

A more detailed breakdown of extreme scores demonstrated that 4 of the 14 extreme CDI protocols were obtained from regular education subjects (28.6%), 4 were obtained from LD subjects (28.6%), and 6 were obtained from SBH subjects (42.8%). Similarly, 1 of the 7 extreme RCMAS protocols was obtained from a regular education subject (14.3%), 2 were obtained from LD subjects (28.6%), and 4 were obtained from SBH subjects (57.1%). Of the four subjects who endorsed extreme levels of both depression and anxiety, 1 was a regular education subject and 3 were SBH students.

Preliminary correlational analyses of the relationship between CDI and RCMAS scores and the four PASS processing composites suggest little to no degree of relationship. Table 14 presents a correlational matrix in which the effect of age has been partialed out of the obtained correlations between the six primary dependent variables. An examination of this table
clearly demonstrates that, although the measures of depression and anxiety are significantly related to one another, they are not appreciably related to the groups' performance on the four components of cognitive processing.

Table 14
Total Group Partialed Intercorrelations between PASS Composites and CDI and RCMAS scales.

<table>
<thead>
<tr>
<th></th>
<th>CDI</th>
<th>RCMAS</th>
<th>PLAN</th>
<th>ATT</th>
<th>SIM</th>
<th>SUCC</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCMAS</td>
<td>.64</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLANNING</td>
<td>.02</td>
<td>.10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ATTENTION</td>
<td>.04</td>
<td>.02</td>
<td>.45</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIMULTANEOUS</td>
<td>.05</td>
<td>.09</td>
<td>.40</td>
<td>.31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUCCESSIVE</td>
<td>.00</td>
<td>.10</td>
<td>.21</td>
<td>.10</td>
<td>.57</td>
<td></td>
</tr>
</tbody>
</table>
only two percent of the variance in CDI scores can be accounted for by the the PASS cognitive measures collectively.

Similarly, Table 16 demonstrates that the six predictor variables accounted for 46% of the variance in RCMAS scores. In this case, the majority of this variance can be attributed to the scores on the CDI scale (42%). In addition, a small proportion of variance is also attributable to performance on measures of planning (4%). Again, the analysis reveals little predictive utility between the PASS composite measures of cognitive processing and this measure of affective status.

In summary, the most powerful predictor of CDI scale scores is the total score derived from the RCMAS scale. Similarly, the most powerful predictor of RCMAS scale scores is the total score derived from the CDI scale. The PASS measures of cognitive processing, on the other hand, consistently added little to the regression equation in terms of accounting for variance in either the CDI or RCMAS total scale scores.

### Table 15
Summary of Regression Procedure for Predicting CDI scale scores.

<table>
<thead>
<tr>
<th>Step</th>
<th>Variable</th>
<th>df</th>
<th>F*</th>
<th>p</th>
<th>B</th>
<th>R</th>
<th>R2</th>
<th>% Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RCMAS</td>
<td>1,88</td>
<td>63.96</td>
<td>&lt;.001</td>
<td>.45</td>
<td>.65</td>
<td>.42</td>
<td>42</td>
</tr>
<tr>
<td>2</td>
<td>PLAN.</td>
<td>2,87</td>
<td>32.29</td>
<td>&lt;.001</td>
<td>.00</td>
<td>.65</td>
<td>.43</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>ATT.</td>
<td>3,86</td>
<td>22.05</td>
<td>&lt;.001</td>
<td>-.05</td>
<td>.66</td>
<td>.44</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>SIM.</td>
<td>4,85</td>
<td>16.62</td>
<td>&lt;.001</td>
<td>-.08</td>
<td>.66</td>
<td>.44</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>SUCC.</td>
<td>5,84</td>
<td>13.15</td>
<td>&lt;.001</td>
<td>.01</td>
<td>.66</td>
<td>.44</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>AGE</td>
<td>6,83</td>
<td>10.99</td>
<td>&lt;.001</td>
<td>.02</td>
<td>.67</td>
<td>.44</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: * F values are presented for the total regression model.
Discriminating between groups on the basis of measures of Cognitive Processing, Depression, and Anxiety

Hypotheses 19 and 20 address not only the functional relationship between affect and cognition, but the extent to which multiple assessment devices provide discriminatory power between the three presumably qualitatively different groups utilized in the study. In order to ascertain the discriminability of the six dependent measures, a discriminant function analysis was performed.

Discriminant function analysis provides weighted combinations of variables that assist in discriminating between various groups. The weights reflect the variables influence or importance to the ultimate classification of an observation (Amick & Walberg, 1975). In theory, values for weighted combinations of scores should produce a greater differentiation between groups than does any singular variable. The root discriminant function performed in this analysis provides an uncorrelated linear combination of the original variables that achieves maximum group differentiation. The higher the coefficient, the more importance that
variable has in discriminating between groups. Variables with negative coefficients indicate that the higher an individual's score on that variable, the less likely he or she is to belong to the group associated with that discriminant function. Variables with near zero coefficients are not good discriminators (Amick & Walberg, 1975). Each root discriminant function is associated with the group having the highest mean score for that function and the group having the lowest mean score for that function. As Table 17 clearly demonstrates, root function number one, which accounts for 92% of the variance in the selected variables, would be the most effective in terms of group differentiation. Standardized weighted coefficients are presented for each variable.

The coefficients yielded in discriminant function number one indicate that the weighted scores for these variables do not provide a clear cut means by which to classify observations (i.e. the magnitude of most weights is only marginally significant). This function is associated with the normal (high scores) and LD (low scores) groups. Examination of the coefficients suggests that the most important variables to accurate classification are the Simultaneous processing and Attention composites. That is, whereas an individual who scores high on these composites is likely to belong to the regular education group, an individual who scores low on these composites is likely to be an LD student. Conversely, the negative coefficients for the CDI and RCMAS variables suggest that an individual scoring high on these scales is not likely to be a regular education student, and more likely to belong to one of the remaining groups.
It should be noted, however, that the magnitude of the CDI and RCMAS weights make them relatively poor discriminators in general.

Table 17  
Summary Results of Discriminant Function Analysis of PASS Processing Composites, CDI, and RCMAS scales.

Root Number 1 = 0.2182  
Percentage of Variance Accounted for = 92.71

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>STANDARDIZED WEIGHT</th>
<th>GROUP</th>
<th>DISCRIMINANT MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDI</td>
<td>-0.138</td>
<td>NORMAL</td>
<td>8.73</td>
</tr>
<tr>
<td>RCMAS</td>
<td>-0.211</td>
<td>LD</td>
<td>7.73</td>
</tr>
<tr>
<td>PLANNING</td>
<td>0.061</td>
<td>SBH</td>
<td>7.79</td>
</tr>
<tr>
<td>ATTENTION</td>
<td>0.406</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIMULTANEOUS</td>
<td>0.517</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUCCESSIVE</td>
<td>0.257</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Root Number 2 = 0.0171  
Percentage of Variance Accounted for = 7.29

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>STANDARDIZED WEIGHT</th>
<th>GROUP</th>
<th>DISCRIMINANT MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDI</td>
<td>-0.350</td>
<td>NORMAL</td>
<td>5.89</td>
</tr>
<tr>
<td>RCMAS</td>
<td>1.150</td>
<td>LD</td>
<td>5.75</td>
</tr>
<tr>
<td>PLANNING</td>
<td>-0.207</td>
<td>SBH</td>
<td>6.06</td>
</tr>
<tr>
<td>ATTENTION</td>
<td>0.307</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIMULTANEOUS</td>
<td>0.076</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUCCESSIVE</td>
<td>-0.101</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Root discriminant function number two, which accounts for only 7.29 percent of the overall variance, is associated with the SBH (high scores) and LD (low scores) groups. In this function the RCMAS scale is clearly the most powerful predictor of diagnostic group. That is, subjects with high
scores on the RCMAS are more likely to be from the SBH group than the remaining groups. The CDI and Attention composite are also marginally effective predictors in this function. The negative coefficient for the CDI indicates that an individual scoring high on these scales is not likely to be an SBH student, and more likely to belong to one of the remaining groups. It must be recognized, however, that due to the meager portion of variance accounted for by this root, this discriminant function is not likely to assist differential diagnostic procedures to any significant extent.

Because the CDI and RCMAS scales demonstrated no discriminant power for the samples used in this study, additional discriminant function analyses were conducted using only the PASS measures of cognitive processing as criterion variables. Table 18 presents the discriminant weights for the cognitive measures across the three groups. As was the case in the original discriminant analysis, the function is associated with the normal (high scores) and LD (low scores) groups. Although the discriminant power of the Successive processing variable is enhanced, the coefficients suggest that the most important variables to accurate classification are the Simultaneous processing and Attention composites.
Table 16
Summary Results of Discriminant Function Analysis of PASS Processing Composites only.

Root Number 1 = 0.1987
Percentage of Variance Accounted for = 99.07

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>STANDARDIZED WEIGHT</th>
<th>GROUP</th>
<th>DISCRIMINANT MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLANNING</td>
<td>-0.050</td>
<td>NORMAL</td>
<td>10.32</td>
</tr>
<tr>
<td>ATTENTION</td>
<td>0.456</td>
<td>LD</td>
<td>9.34</td>
</tr>
<tr>
<td>SIMULTANEOUS</td>
<td>0.559</td>
<td>SBH</td>
<td>9.46</td>
</tr>
<tr>
<td>SUCCESSIVE</td>
<td>0.289</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Because the MANOVA and ANOVA procedures suggest that the greatest cognitive processing differences exist between the regular education and LD groups, a final discriminant function analysis was performed to assess the degree to which the PASS model variables might assist differentiating between these two student groups. The results - displayed in Table 19 - demonstrate that, although all processing variables may make a contribution to group separation, the best discriminators appear to be the measures of attention and successive processing. It should be noted, however, that the magnitude of all coefficients is marginal. That is, although significant between groups differences exist, none of the processing variables produce clear distinctions between the regular education and LD groups.
Table 19
Summary Results of Discriminant Function Analysis of PASS Processing Composites for Regular Education and LD groups only.

Root Number 1 = 0.2618
Percentage of Variance Accounted for = 100.00

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>STANDARDIZED WEIGHT</th>
<th>GROUP</th>
<th>DISCRIMINANT MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLANNING</td>
<td>0.201</td>
<td>NORMAL</td>
<td>9.91</td>
</tr>
<tr>
<td>ATTENTION</td>
<td>0.406</td>
<td>LD</td>
<td>8.91</td>
</tr>
<tr>
<td>SIMULTANEOUS</td>
<td>0.299</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUCCESSIVE</td>
<td>0.393</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In conclusion, the correlational, multiple regression, and discriminant function analyses performed on the existing data do not support the tenets of hypotheses 19 and 20 which suggest that there will be a reliable and predictable relationship between subjects’ performance on measures of cognitive processing and their current emotional status. Not only do the results suggest non-significant relationships between these measures of affect and cognition, but it appears that, for this particular sample, the combination of assessment devices utilized makes only a marginal contribution to differentiating between these ostensibly different student groups.

Additional Data Analyses

Additional correlational and multiple regression analyses were performed to examine the relationship between the PASS processing measures and measures of achievement (PPVT-R, WRAT-R Reading) for the entire sample and each educational group separately. Tables 20 and 21
present partialled correlations between the six measures and the extent to
which each variable correlated with age.

Table 20
Total Sample and Normal Group Partialled Intercorrelations between PASS Composites and PPVT-
R and WRAT-R measures.

<table>
<thead>
<tr>
<th></th>
<th>AGE</th>
<th>PPVT</th>
<th>WRAT</th>
<th>PLAN</th>
<th>ATT</th>
<th>SIM</th>
<th>SUCCE</th>
<th>AGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPVT-R</td>
<td>.04</td>
<td>.47</td>
<td>-.03</td>
<td>-.07</td>
<td>.39</td>
<td>.35</td>
<td>.06</td>
<td></td>
</tr>
<tr>
<td>WRAT-R</td>
<td>.26</td>
<td>.54</td>
<td>.08</td>
<td>.00</td>
<td>.18</td>
<td>.19</td>
<td>.39</td>
<td></td>
</tr>
<tr>
<td>PLANNING</td>
<td>.69</td>
<td>.32</td>
<td>.44</td>
<td>.38</td>
<td>.15</td>
<td>.15</td>
<td>.72</td>
<td></td>
</tr>
<tr>
<td>ATTENTION</td>
<td>.48</td>
<td>-.01</td>
<td>.24</td>
<td>.45</td>
<td>.09</td>
<td>.06</td>
<td>.58</td>
<td></td>
</tr>
<tr>
<td>SIMULTANEOUS</td>
<td>.56</td>
<td>.43</td>
<td>.52</td>
<td>.40</td>
<td>.31</td>
<td>.36</td>
<td>.76</td>
<td></td>
</tr>
<tr>
<td>SUCCESSIVE</td>
<td>.36</td>
<td>.48</td>
<td>.46</td>
<td>.21</td>
<td>.10</td>
<td>.57</td>
<td>.59</td>
<td></td>
</tr>
</tbody>
</table>

Note: Total sample correlations are below the diagonal; Normal group coefficients are above the
diagonal.
Step-wise multiple regression analyses were conducted using the PPVT-R and WRAT-R measures as criterion variables. Chronological age and the PASS composite measures were used as predictor variables. Tables 22 through 29 present the results of the regression procedures.

Table 22 demonstrates that, for the entire sample, the five predictor variables accounted for 35% of the variance in PPVT-R scores. The majority of this variance is accounted for by measures of simultaneous (13%) and successive processing (8%), and planning (10%). A small amount of variance is also attributable to performance on measures of attention (4%). For the entire sample, chronological age was not significantly related to performance on the PPVT-R.

Similarly, Table 23 demonstrates that the five predictor variables accounted for 42% of the variance in WRAT-R scores. In this case, the

**Table 21**
LD and SBH Group Partialled Intercorrelations between PASS Composites and PPVT-R and WRAT-R measures.

<table>
<thead>
<tr>
<th></th>
<th>AGE</th>
<th>PPVT</th>
<th>WRAT</th>
<th>PLAN</th>
<th>ATT</th>
<th>SIM</th>
<th>SUCC</th>
<th>AGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPVT-R</td>
<td>-.06</td>
<td>.65</td>
<td>.48</td>
<td>-.14</td>
<td>.51</td>
<td>.63</td>
<td>.07</td>
<td></td>
</tr>
<tr>
<td>WRAT-R</td>
<td>.05</td>
<td>.23</td>
<td>.47</td>
<td>.15</td>
<td>.62</td>
<td>.45</td>
<td>.42</td>
<td></td>
</tr>
<tr>
<td>PLANNING</td>
<td>.78</td>
<td>-.18</td>
<td>.26</td>
<td>.23</td>
<td>.60</td>
<td>.30</td>
<td>.74</td>
<td></td>
</tr>
<tr>
<td>ATTENTION</td>
<td>.50</td>
<td>-.29</td>
<td>-.01</td>
<td>.56</td>
<td>.18</td>
<td>.02</td>
<td>.47</td>
<td></td>
</tr>
<tr>
<td>SIMULTANEOUS</td>
<td>.55</td>
<td>.09</td>
<td>.33</td>
<td>.44</td>
<td>.35</td>
<td>.67</td>
<td>.45</td>
<td></td>
</tr>
<tr>
<td>SUCCESSIVE</td>
<td>.30</td>
<td>.01</td>
<td>.46</td>
<td>-.06</td>
<td>-.06</td>
<td>.33</td>
<td>.23</td>
<td></td>
</tr>
</tbody>
</table>

Note: LD group correlations are below the diagonal; SBH group coefficients are above the diagonal.
majority of this variance can be attributed to the scores on measures of Planning (18%) and simultaneous processing (13%). In addition, a small proportion of variance is also attributable to age (7%) and performance on measures of successive processing (4%). The fact that measures of attention contributed nothing to the regression equation is a function of the fact that they are significantly correlated with measures of planning which were entered before them and accounted for a significant amount of the overall variance.

Table 22
Summary of Regression Procedure for Predicting PPVT-R scores (All Subjects, N =90).

<table>
<thead>
<tr>
<th>Step</th>
<th>Variable</th>
<th>df</th>
<th>F*</th>
<th>p</th>
<th>B</th>
<th>R</th>
<th>R^2</th>
<th>% Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AGE</td>
<td>1.88</td>
<td>0.14</td>
<td>&gt;.10</td>
<td>-.17</td>
<td>.04</td>
<td>.002</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>PLAN.</td>
<td>2.87</td>
<td>4.84</td>
<td>&lt;.01</td>
<td>.24</td>
<td>.32</td>
<td>.10</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>ATT.</td>
<td>3.86</td>
<td>4.63</td>
<td>&lt;.01</td>
<td>.23</td>
<td>.37</td>
<td>.14</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>SIM.</td>
<td>4.85</td>
<td>7.96</td>
<td>&lt;.01</td>
<td>.31</td>
<td>.52</td>
<td>.27</td>
<td>13</td>
</tr>
<tr>
<td>5</td>
<td>SUCC.</td>
<td>5.84</td>
<td>8.93</td>
<td>&lt;.01</td>
<td>.36</td>
<td>.59</td>
<td>.35</td>
<td>8</td>
</tr>
</tbody>
</table>

Note: * F values are presented for the total regression model.

Table 23
Summary of Regression Procedure for Predicting WRAT-R scores (All Subjects, N =90).

<table>
<thead>
<tr>
<th>Step</th>
<th>Variable</th>
<th>df</th>
<th>F*</th>
<th>p</th>
<th>B</th>
<th>R</th>
<th>R^2</th>
<th>% Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AGE</td>
<td>1.88</td>
<td>6.17</td>
<td>&lt;.01</td>
<td>-.16</td>
<td>.26</td>
<td>.07</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>PLAN.</td>
<td>2.87</td>
<td>14.08</td>
<td>&lt;.01</td>
<td>.29</td>
<td>.50</td>
<td>.25</td>
<td>18</td>
</tr>
<tr>
<td>3</td>
<td>ATT.</td>
<td>3.86</td>
<td>14.80</td>
<td>&lt;.01</td>
<td>.01</td>
<td>.50</td>
<td>.25</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>SIM.</td>
<td>4.85</td>
<td>12.87</td>
<td>&lt;.01</td>
<td>.47</td>
<td>.61</td>
<td>.38</td>
<td>13</td>
</tr>
<tr>
<td>5</td>
<td>SUCC.</td>
<td>5.84</td>
<td>12.10</td>
<td>&lt;.01</td>
<td>.34</td>
<td>.65</td>
<td>.42</td>
<td>4</td>
</tr>
</tbody>
</table>

Note: * F values are presented for the total regression model.
Table 24 demonstrates that, for the normal group, the five predictor variables accounted for only 22% of the variance in PPVT-R scores. Almost all of the variance was accounted for by measures of simultaneous (16%) and successive processing (5%). A small amount of variance is also attributable to performance on measures of attention (1%). Chronological age and measures of planning were not significantly related to performance on the PPVT-R.

Similarly, Table 25 demonstrates that the five predictor variables accounted for only 20% of the variance in WRAT-R scores. In this case, the majority of this variance can be attributed to age (15%), with small portions being contributed by measures of planning (1%), simultaneous (2%) and successive processing (2%).

<table>
<thead>
<tr>
<th>Step</th>
<th>Variable</th>
<th>df</th>
<th>F*</th>
<th>p</th>
<th>B</th>
<th>R</th>
<th>R²</th>
<th>% Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AGE</td>
<td>1,28</td>
<td>0.10</td>
<td>&gt; .10</td>
<td>-.15</td>
<td>.06</td>
<td>.004</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>PLAN.</td>
<td>2,27</td>
<td>0.06</td>
<td>&gt; .10</td>
<td>-.13</td>
<td>.07</td>
<td>.005</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>ATT.</td>
<td>3,26</td>
<td>0.07</td>
<td>&gt; .10</td>
<td>-.09</td>
<td>.09</td>
<td>.009</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>SIM.</td>
<td>4,25</td>
<td>1.25</td>
<td>&gt; .10</td>
<td>.48</td>
<td>.41</td>
<td>.17</td>
<td>16</td>
</tr>
<tr>
<td>5</td>
<td>SUCC.</td>
<td>5,24</td>
<td>1.36</td>
<td>&gt; .10</td>
<td>.30</td>
<td>.47</td>
<td>.22</td>
<td>5</td>
</tr>
</tbody>
</table>

Note: * F values are presented for the total regression model.
Table 25
Summary of Regression Procedure for Predicting WRAT-R scores (Normal Group, N = 30).

<table>
<thead>
<tr>
<th>Step</th>
<th>Variable</th>
<th>df</th>
<th>F*</th>
<th>p</th>
<th>B</th>
<th>R</th>
<th>R²</th>
<th>% Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AGE</td>
<td>1,28</td>
<td>5.00</td>
<td>&lt;.05</td>
<td>.06</td>
<td>.39</td>
<td>.15</td>
<td>15</td>
</tr>
<tr>
<td>2</td>
<td>PLAN.</td>
<td>2,27</td>
<td>2.51</td>
<td>&gt;.10</td>
<td>.08</td>
<td>.40</td>
<td>.16</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>ATT.</td>
<td>3,26</td>
<td>1.63</td>
<td>&gt;.10</td>
<td>.05</td>
<td>.40</td>
<td>.16</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>SIM.</td>
<td>4,25</td>
<td>1.40</td>
<td>&gt;.10</td>
<td>.19</td>
<td>.43</td>
<td>.18</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>SUCC.</td>
<td>5,24</td>
<td>1.18</td>
<td>&gt;.10</td>
<td>.15</td>
<td>.44</td>
<td>.20</td>
<td>2</td>
</tr>
</tbody>
</table>

Note: * F values are presented for the total regression model.

Table 26 demonstrates that, for the LD group, the five predictor variables accounted for only 13% of the variance in PPVT-R scores. All of this variance can be attributed to measures of attention (7%) and simultaneous processing (6%). Chronological age, and measures of planning and successive processing were not significantly related to the LD group's performance on the PPVT-R.

In contrast, Table 27 demonstrates that the five predictor variables account for 33% of the variance in the LD group’s WRAT-R scores. In this case, the most significant contribution was made by measures of successive processing (15%). Small portions are also accounted for by measures of planning (7%), attention (4%) and simultaneous processing (7%). Only chronological age was not significantly related to the LD group’s performance on the WRAT-R.
Table 26
Summary of Regression Procedure for Predicting PPVT-R scores (LD Group, N = 30).

<table>
<thead>
<tr>
<th>Step</th>
<th>Variable</th>
<th>df</th>
<th>F*</th>
<th>p</th>
<th>B</th>
<th>R</th>
<th>R2</th>
<th>% Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AGE</td>
<td>1,28</td>
<td>0.11</td>
<td>&gt;.10</td>
<td>-.03</td>
<td>.06</td>
<td>.004</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>PLAN.</td>
<td>2,27</td>
<td>0.06</td>
<td>&gt;.10</td>
<td>.03</td>
<td>.07</td>
<td>.004</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>ATT.</td>
<td>3,26</td>
<td>0.64</td>
<td>&gt;.10</td>
<td>.18</td>
<td>.26</td>
<td>.07</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>SIM.</td>
<td>4,25</td>
<td>0.90</td>
<td>&gt;.10</td>
<td>.35</td>
<td>.36</td>
<td>.13</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>SUCC.</td>
<td>5,24</td>
<td>0.73</td>
<td>&gt;.10</td>
<td>-.06</td>
<td>.36</td>
<td>.13</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: * F values are presented for the total regression model.

Table 27
Summary of Regression Procedure for Predicting WRAT-R scores (LD Group, N = 30).

<table>
<thead>
<tr>
<th>Step</th>
<th>Variable</th>
<th>df</th>
<th>F*</th>
<th>p</th>
<th>B</th>
<th>R</th>
<th>R2</th>
<th>% Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AGE</td>
<td>1,28</td>
<td>0.07</td>
<td>&gt;.10</td>
<td>-.21</td>
<td>.05</td>
<td>.003</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>PLAN.</td>
<td>2,27</td>
<td>1.04</td>
<td>&gt;.10</td>
<td>.33</td>
<td>.27</td>
<td>.07</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>ATT.</td>
<td>3,26</td>
<td>1.03</td>
<td>&gt;.10</td>
<td>-.18</td>
<td>.33</td>
<td>.11</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>SIM.</td>
<td>4,25</td>
<td>1.36</td>
<td>&gt;.10</td>
<td>.19</td>
<td>.42</td>
<td>.18</td>
<td>7</td>
</tr>
<tr>
<td>5</td>
<td>SUCC.</td>
<td>5,24</td>
<td>2.38</td>
<td>&gt;.10</td>
<td>.55</td>
<td>.56</td>
<td>.33</td>
<td>15</td>
</tr>
</tbody>
</table>

Note: * F values are presented for the total regression model.

Table 28 demonstrates that, for the SBH group, the five predictor variables accounted for 55% of the variance in PPVT-R scores. The majority of this variance can be attributed to measures of planning (24%) and successive processing (16%). Small amounts of variance are also accounted for by measures of simultaneous processing (9%) and attention (6%). Chronological age was not significantly related to the SBH group’s performance on the PPVT-R.
Similarly, Table 29 demonstrates that the five predictor variables account for 51% of the variance in the SBH group's WRAT-R scores. In this case, the most significant contribution was made by chronological age (18%), and measures of planning (18%) and simultaneous processing (14%). Measures of attention (0%) and successive processing (1%) contributed little to the regression equation. This is a function of the fact that they are significantly correlated with measures of planning and simultaneous processing, respectively, which were entered before them and accounted for a significant amount of the overall variance.

Table 28
Summary of Regression Procedure for Predicting PPVT-R scores (SBH Group, N =30).

<table>
<thead>
<tr>
<th>Step</th>
<th>Variable</th>
<th>df</th>
<th>F*</th>
<th>p</th>
<th>B</th>
<th>R</th>
<th>R²</th>
<th>% Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AGE</td>
<td>1.28</td>
<td>0.15</td>
<td>&gt;.10</td>
<td>-.21</td>
<td>.07</td>
<td>.005</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>PLAN.</td>
<td>2.27</td>
<td>4.18</td>
<td>&lt;.05</td>
<td>.41</td>
<td>.49</td>
<td>.24</td>
<td>24</td>
</tr>
<tr>
<td>3</td>
<td>ATT.</td>
<td>3.26</td>
<td>3.73</td>
<td>&lt;.05</td>
<td>-.25</td>
<td>.55</td>
<td>.30</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>SIM.</td>
<td>4.25</td>
<td>3.91</td>
<td>&lt;.05</td>
<td>-.17</td>
<td>.62</td>
<td>.39</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td>SUCC.</td>
<td>5.24</td>
<td>5.94</td>
<td>&lt;.01</td>
<td>.68</td>
<td>.74</td>
<td>.55</td>
<td>16</td>
</tr>
</tbody>
</table>

Note: * F values are presented for the total regression model.

Table 29
Summary of Regression Procedure for Predicting WRAT-R scores (SBH Group, N =30).

<table>
<thead>
<tr>
<th>Step</th>
<th>Variable</th>
<th>df</th>
<th>F*</th>
<th>p</th>
<th>B</th>
<th>R</th>
<th>R²</th>
<th>% Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AGE</td>
<td>1.28</td>
<td>6.08</td>
<td>&lt;.05</td>
<td>.01</td>
<td>.42</td>
<td>.18</td>
<td>18</td>
</tr>
<tr>
<td>2</td>
<td>PLAN.</td>
<td>2.27</td>
<td>7.49</td>
<td>&lt;.01</td>
<td>.14</td>
<td>.60</td>
<td>.36</td>
<td>18</td>
</tr>
<tr>
<td>3</td>
<td>ATT.</td>
<td>3.26</td>
<td>4.84</td>
<td>&lt;.01</td>
<td>.03</td>
<td>.60</td>
<td>.36</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>SIM.</td>
<td>4.25</td>
<td>6.35</td>
<td>&lt;.01</td>
<td>.85</td>
<td>.71</td>
<td>.50</td>
<td>14</td>
</tr>
<tr>
<td>5</td>
<td>SUCC.</td>
<td>5.24</td>
<td>4.96</td>
<td>&lt;.01</td>
<td>.10</td>
<td>.71</td>
<td>.51</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: * F values are presented for the total regression model.
In summary, the most powerful predictors of PPVT-R and WRAT-R performance varied as a function of group composition. The PASS cognitive measures accounted for a meager portion of the overall variance in PPVT-R and WRAT-R scores for the normal group. Although the PASS measures also accounted for very little variance in the LD group's performance on the PPVT-R, approximately a third of the variance in WRAT-R scores was accounted for by the four processing composites. In contrast, the PASS processing composites accounted for over half of the variance in PPVT-R and WRAT-R scores for the SBH group.
CHAPTER V
DISCUSSION

It has been asserted that both learning disabled (Rourke, 1988) and conduct disordered (SBH) (Kazdin, 1987) children and adolescents suffer from a myriad of cognitive, behavioral, academic, and social deficiencies or disturbances which ultimately render them socially and personally maladjusted. Both groups are characterized by inattentive and impulsive behavioral patterns (Whitehall, DeMyer-Gapin & Scott, 1976; Keogh & Margolis, 1976), academic skill deficiencies (Ledingham & Schwartzman, 1984), ineffective cognitive and metacognitive processes (Kendall & Braswell, 1985; Douglas & Peters, 1979; Borkowski, Johnston & Reid, 1987), and interpersonal conduct or social behavioral difficulties (Carlson, Lahey & Neeper, 1984; Rourke, 1988; McConaughy & Ritter, 1986).

Features such as delayed development in moral reasoning and perspective taking ability (Arbuthnot & Gordon, 1986) and superficial or ineffective empathy for others (Ellis, 1982; Gibbs, 1987) tend to be associated with conduct disordered individuals. In contrast, characteristics specific to learning disabled groups have included motivational problems (Licht, 1983), depression (Goldstein & Dundon, 1987), and deficits in social perceptual ability and social knowledge (Pearl, 1987). These differential characteristics
notwithstanding, there appears to be a great deal of conceptual overlap between LD and conduct disordered or SBH populations. A major area of overlap between these groups involves cognitive inefficiencies and difficulties utilizing metacognitive (strategic) abilities to solve problems. However, as the literature suggests, the extent to which within groups cognitive processing deficiencies are supported by scientific data varies as a function of the cognitive tasks examined and the reviewer's interpretation of the empirical evidence.

The purpose of this study was to investigate the similarities and differences between two educationally classified groups (LD and SBH) of children and adolescents across measures of cognitive processing and affective status (anxiety and depression). In addition, this study sought to examine the psychodiagnostic utility of a theoretically derived battery of cognitive processing measures as well as the relationship between affective status and cognitive competence. In general, the underlying purpose of the study was to examine the extent to which the two primary variables (affect and cognition) might assist differential classification (diagnosis) of two presumably qualitatively different student groups.

**An examination of between group differences on measures of Planning**

Overall, the results indicate non-significant differences between the three groups in the area of planning. Although the planning tasks did not produce a clear differentiation between all three groups, pairwise comparisons reveal that the LD group performed planning tasks with significantly less efficiency than the regular education students. The SBH
students' performance did not differ significantly from that of either the regular education or LD groups. This pattern of performance on the PASS planning measures is consistent with Bardos (1988) who found LD students earned lower scores than regular education students on similar tasks requiring the generation of strategies and impulse inhibition, and Hurt (1988) who found non-significant differences between delinquent and non-delinquent groups.

Of the three planning measures used, the greatest differences were observed on the planned connections task which is similar to trail making tasks used in other research (Das, 1984). This result is consistent with the findings of Reardon (1988) in which the planned connections task was the best discriminator between attention-deficit and regular education students.

In summary, the results indicate that SBH students do not exhibit significantly different planning processes as compared to regular education students. LD students on the other hand evidenced more difficulty when required to formulate and implement problem solving strategies.

**An examination of between group differences on measures of Attention**

The measures of attention which comprised the final Attention Composite were similar to the Stroop Color Word Test (Stroop, 1935) and an attention measure developed by Das and Naglieri requiring the simultaneous consideration of two salient aspects of a stimulus (Arabic numeral and type of print). The results produced statistically significant between groups differences on these two measures. As was the case for
measures of planning, the pattern of performance indicated that LD students performed significantly poorer than regular education students, but similarly to SBH students on the measures of attention. Likewise, the SBH groups' ability to employ and control attentional processes exceeded that of the LD group, but did not reach the level of proficiency demonstrated by the regular education students.

The results reveal that the LD group demonstrated significant differences in the areas of both planning and attention which, according to Luria's (1973) original theory, are proposed to be functionally interrelated. That is, the LD groups' difficulty in extracting or attending to relevant stimulus features and dividing their attention among multiple stimulus features may have impacted their ability to produce an efficient plan or strategy for attacking and completing unique cognitive problems. In contrast, the SBH group did not demonstrate inattentive or impulsive behavior, nor difficulty with planning as might have been predicted based upon evidence gathered by Whitehall, DeMyer-Gapin, and Scott (1976) and DeMyer-Gapin, and Scott (1977).

There are two plausible explanations for inconsistent findings pertinent to the measurement of attention and planning for behaviorally disordered samples. First, it is possible that the group utilized in this study (SBH) and others (Delinquent vs. Conduct-disordered vs. Impulsive) were chosen based on different criteria and thus represent qualitatively different groups. Furthermore, given that there is a great deal of diagnostic confusion and overlap between conduct-disordered and attention-deficit/hyperactive groups (Quay, 1986; Werry, Elkind, & Reeves,
1987), it is possible that significant findings are confounded, at least in part, by the inclusion of attention-deficit subjects in the samples of previous studies. Thus, the findings of Whitehall, DeMyer-Gapin & Scott (1976) and DeMyer-Gapin & Scott (1977), which showed a more rapid decrement in sustained attention to “boring slides” for undersocialized conduct-disordered (CD) as compared to anxious individuals, are tempered considerably by the fact that a portion of the CD subjects may have also been attention-deficit/hyperactive individuals (Quay, 1986).

Secondly, the variability in the nature and validity of the processing measures used in previous studies may account for the differential conclusions offered by various researchers. Measures such as Kagan’s (1966) Matching Familiar Figures Test (MFFT), Porteus Maze Test (Doctor & Winder, 1954) and tasks such as the Continuous Performance Test (CPT) (Rosvold, Mirsky, Sarason, Bransome, & Beck, 1956), and watching “boring slides”, (Whitehall, DeMyer-Gapin & Scott, 1997) have been used to document attentional deficiencies and impulse control difficulties in conduct-disordered and delinquent samples of children and adolescents. More recently, however, Werry, Elkind, and Reeves (1987) have shown that the MFFT and Continuous Performance Test (CPT), which is a measure of sustained attention and distractibility, failed to differentiate conduct-disordered individuals from attention-deficit, anxious, and control group subjects. Conduct-disordered individuals did not demonstrate an inability to plan and regulate behavior, nor difficulties maintaining an adequate level of sustained attention. This is consistent with research conducted by Hurt (1988) (who used the PASS processing measures) who found non-
significant differences between delinquents and non-delinquents on measures of planning. In Hurt's study delinquents did, however, earn significantly lower scores on the PASS measures of selective attention. Hurt asserted that delinquents may be characterized, not by impulsivity or planning deficiencies, but by the difficulties they experience when required to attend to critical stimulus features while ignoring other salient, yet irrelevant, aspects of a stimulus.

Unlike the PASS measures of planning and attention utilized in this study, measures such as the MFFT and Porteus Maze are neither theoretically derived, nor have they received consistent validation as measures of impulsivity and attention. In fact, O'Keefe (1975) has challenged the Porteus maze as a measure of impulsivity, citing the fact that lifting the pencil (which is against the rules and detracts from the total score) may be a sign of response inhibition that permits survey of the task and planning for future action, not impulsivity. Likewise, Block, Block, and Herrington (1974) have criticized the MFFT as a measure of impulsivity stating that too often differences in response accuracy, not latency, are reported as an indication of impulsive behavior. In contrast to these measures, the PASS measures of attention and planning have demonstrated adequate construct validity in numerous studies involving a variety of exceptional groups of children and adolescents (Naglieri, 1989). Therefore, the theory driven PASS tasks may offer a more defensible approach to the measurement of planning and attentional processes.
An examination of between group differences on measures of Simultaneous Processing

The study found significant processing differences in the area of simultaneous processing. The regular education subjects earned higher simultaneous processing scores than both the LD and SBH subjects. The LD and SBH groups did not differ significantly on measures of simultaneous information processing.

These results may be accounted for by the procedures used to place LD and SBH students. Among other factors, children are identified LD and SBH due to poor academic performance. Simultaneous processing measures have been shown to be related equally to reading comprehension, reading vocabulary, verbal IQ, and nonverbal IQ scores, and have correlated significantly with measures of both reading comprehension (Das & Cummins, 1982) and reading decoding (Cummins & Das, 1980; Das & Cummins, 1982). In addition, Das, Kirby, and Jarman (1979) have summarized studies revealing that high achievers are superior to low achievers on both measures of simultaneous and successive processing.

This creates a paradox in that, although the LD and SBH subjects used in this study are clearly poorly achieving students, the assessment data used to identify these groups has failed to isolate the processing characteristics that are related to their achievement deficiencies. In other words, assessment batteries containing measures such as the WISC-R (verbal and nonverbal IQs) and measures of simultaneous and successive processing are limited in terms of both predicting academic achievement and illuminating the cognitive deficiencies of these exceptional groups.
This is conveyed in several studies which have found that the WISC-R (Kavale & Forness, 1984; Mueller, Dennis & Short, 1986) and measures of simultaneous and successive processing alone are not especially useful in identifying cognitive weaknesses of learning disabled individuals (Bardos, 1988; Das & Cummins, 1982; Naglieri & Haddad, 1984).

The battery of simultaneous tasks used in this research is more diverse than previous studies and has demonstrated a significant relationship to basic measures of vocabulary and word decoding. It is important to note, however, that measures of planning and attention can account for as much, if not more, of the variance in achievement measures for the exceptional groups. This is particularly true for the SBH group used in this study. Thus, adding measures of planning and attention to the assessment battery may help define the relationship between cognitive processes and achievement for exceptional groups of students.

An examination of between group differences on measures of Successive Processing

Overall, the study demonstrated no significant between groups differences on the composite measure of successive processing. Although the successive tasks did not produce a clear differentiation between the three groups, pairwise comparisons reveal that the LD group performed successive processing tasks with significantly less efficiency than the regular education students. The pattern of performance across the three groups was identical to that evidenced on measures of planning and attention. That is, LD subjects demonstrated significantly poorer
performance than regular education subjects, but performed similarly to the SBH subjects whose performance did not deviate significantly from that of the regular education group. Based on the observed deficiencies on measures of attention, it is possible that LD group's performance on successive processing tasks, which require concentration on the order of stimulus input as well as an appreciation for relevant and irrelevant stimulus features, was compromised by their difficulty selectively attending to critical information inherent in the tasks.

The Sentence Questions task evidenced significant variability across all three groups. This is important because the task is more complex and requires not only certain memory functions, but also an understanding of sentence syntax and a significant degree of concentration upon the serial relation of one word to the next (Jarman, 1980). Thus, both language comprehension difficulties and momentary lapses in concentration or attention, characteristics shared by many LD students, are likely to have a negative impact on one's performance on such tasks.

An examination of between group differences on measures of Depression and Anxiety

The self-report inventories of depression and anxiety used in the study failed to yield any significant between groups differences. The differences between groups were negligible and none of the groups endorsed clinically significant levels of either depression or generalized anxiety.
The absence of between groups differences, particularly between SBH and regular education samples, is puzzling. Perhaps the selection process so heavily emphasizes overt behavioral criteria, that intrapersonal and emotional factors are frequently overlooked when assessing candidates for SBH programming. An alternative explanation can be found in the administration of these instruments. For the CDI and RCMAS the subject is requested to report if statements are generally accurate or inaccurate with regards to their feelings towards themselves (RCMAS), or to think about how they have felt in the past two weeks (CDI). Thus, the absence of clinically significant elevations for all groups may, in fact, reflect the fact that the majority of subjects were neither particularly anxious, nor feeling depressed at the time the testing took place. Their emotional status, therefore, would have had little impact, positive or negative, on their eventual performance on the cognitive measures. Whatever the reasons for these unexpected results, it is clear that this sample of SBH children and adolescents differs very little from both the regular education and LD samples in terms of cognitive competence and current affective status.

Examining the relationship between Affect and Cognitive Processes

Luria (1966, 1973) has proposed that any organized goal-directed human activity requires an optimal level of cortical tone or arousal. Insufficient or excessive levels of arousal disrupt the delicate balance between excitation and inhibition that allow humans to process information with a degree of both directivity and selectivity. Complex
thinking involves the discovery of task demands, selection of relevant information, inhibition of impulsive responding, and the creation and monitoring of alternative plans for performing an action. Thus, it was hypothesized that individuals or groups who reported extreme levels of depression (which could be related to an underaroused state), anxiety (which could be related to an overaroused state), or both depression and anxiety would evidence a decreased ability to employ both attentional and strategic planning skills. It was also thought that extreme levels of depression would have a pervasive and negative impact on all cognitive functions measured by the PASS model tasks.

The results of this research suggest little relationship between states of depression, anxiety, and the ability to utilize cognitive functions in an efficient manner. Not only did correlational analyses yield negligible relationships between affect and cognitive competence, but multiple regression procedures further demonstrated that the composite cognitive processing measures produced almost no predictive power in terms of accounting for variance in self-reports of depression and anxiety.

Can the PASS Cognitive measures, CDI, and RCMAS aid differential diagnostic procedures?

One aim of this study was to uncover possible combinations of assessment devices that might discriminate between the three educationally distinct groups utilized. It was hypothesized that regular education, LD, and SBH students would demonstrate markedly different patterns of cognitive efficiency and current emotional status and that their
profiles would facilitate a finer grained analysis of the attributes which characterize these qualitatively different groups. This goal was only partially realized.

The results suggest that four of the six primary assessment variables (PASS measures) provide a reasonable degree of discrimination between regular education and LD groups, but little to no differentiation between either regular education and SBH, or LD and SBH groups. For this sample, the cognitive measures of Attention and Simultaneous processing are the strongest discriminators between the regular education and LD children. Planning was not found to be an effective discriminator variable due to the significant correlation between planning and attention. The attention tasks proved to be such powerful discriminators that the additional discriminant power of the planning measures was statistically minimized.

Because LD and SBH groups functioned so similarly to one another across all components of cognitive processing and emotional status, it may be extremely difficult to make distinct classifications into one of these two exceptional groups based on the six measurements used in the study. The measures of depression and anxiety added little to the differential classification process. Overall, the lack of differentiation between LD and SBH groups on cognitive and affective measures is interesting in light of the fact that the "Ohio Department of Education Guidelines for the Identification of Students with Special Needs" goes to great lengths to insure that LD and SBH classifications produce two distinct disability groups with little to no degree of characterological overlap.
Two of the five characteristics listed in the Ohio Handbook for the Identification of Children with Severe Behavior Handicaps propose "inappropriate behavior or feelings under normal circumstances and a general pervasive mood of unhappiness or depression" as diagnostic features of the SBH child or adolescent. In light of this, what can be said for the fact that the SBH group did not differ significantly from either the "normal" or LD group on measures of emotional disturbance? It is possible that the measures used in the study (CDI and RCMAS) assess characteristics that are irrelevant to differential classification of the two educational groups. In addition, the study did not utilize behavior rating scales to corroborate the subjects' self-reports of emotional status. Perhaps the observations of other individuals (teachers and parents) regarding LD and SBH students' mood, interpersonal behavior, and cognitive competence would make finer discriminations between these groups.

There appears to be at least two plausible explanations for the absence of clear group differentiation. First, one might suspect that the measures used in the study possess inadequate validity and therefore failed to illuminate true between groups differences. This seems an unlikely conclusion, however, given the ample documentation of construct and concurrent validity that was presented for the PASS model measures, the CDI, and the RCMAS scales in chapters two and three of this document. As mentioned previously, the surprising failure of the CDI and RCMAS scales to discriminate between groups (especially normal and SBH groups) may be attributed to the fact that they ask the individual to report their feelings and thoughts in general, or over the past two weeks, and therefore may not
have yielded an accurate index of the subject's emotional status at the time of testing. If, for example, the subjects who reported high levels of distress were referencing their feelings in the past week, this might explain why such reports seemed to have no impact on their ability to attend to the cognitive stimulus materials, generate adequate plans for problem resolution, and process information either simultaneously or successively rather efficiently while in the testing context. More importantly, it is possible that the PASS measures are independent of, or not susceptible to, the compromising influences of depression and anxiety. This would be in contrast to Kaufman's (1979) suggestion that traditional measures of intelligence, such as the WISC-R, contain certain subtests (third factor) which can be hampered significantly by extreme levels of anxiety.

The second explanation for non-discriminatory patterns of cognitive and emotional functioning revolves around the identification and classification process used in the educational system. For whatever reasons, both LD and SBH students presumably evidence difficulty learning at a level consistent with their expected potential. This criteria must be demonstrated in the case of an LD student and may be demonstrated for an SBH classification. This emphasis on the ability/achievement discrepancy requires the use of intelligence tests, such as the WISC-R, which have failed to produce unique or specific profiles for learning disabled (Kavale & Forness, 1984), or attention-deficit, conduct-disordered, and anxious individuals (Hale & Landino, 1981). Thus, the two groups might be quite similar in terms of general level of intellectual functioning and academic
mastery to begin with. It is possible, therefore, that LD and SBH groups are not significantly different in terms of cognitive processing competence, but that, when compared to regular education students, the LD sample in this study is characterized by more severe processing deficiencies, particularly in the areas of planning and attention.

Chapter Summary

The results of this study reveal that, whereas LD subjects consistently scored lower than normal subjects on composite measures of Planning, Attention, Simultaneous and Successive processing, the performance of SBH subjects deviated significantly from the regular education group on measures of Simultaneous processing only. The overall comparisons of the cognitive components of the PASS model produced statistically significant between groups differences on the composite measures of Attention and Simultaneous processing. No significant differences in cognitive processing efficiency were demonstrated between the LD and SBH groups.

In contrast, self-report measures of depression and anxiety failed to demonstrate any significant variability between the three educational groups. All three groups produced mean scores on the depression and anxiety inventories that fall at subclinical levels, providing no evidence of significant pathology or dysfunction. Furthermore, the results suggest that there is no reliable relationship between reported depression or anxiety and an individual's ability to utilize the cognitive functions measures by the PASS model tasks. Therefore, it appears that the PASS measures and
affective inventories provide little in terms of aiding differential diagnostic/classification procedures for these three educational groups.

**Limitations of the Study**

Because the samples utilized in the study were comprised of all male, mostly white subjects, the generalizability of the results to females and individuals of differing races is limited. Furthermore, although the sample sizes were adequate and the groups were carefully matched in order to allow for confident and meaningful interpretations of the mean score comparisons, caution must be exercised when interpreting intragroup correlational statistics.

The measurement of the emotional status variable was limited to a significant degree by the measures chosen. No attempt was made to corroborate the subjects' reports with observations from significant others (teachers, parents, peers). It is possible that multi-informant data might have facilitated differential classification of the educational groups used in this study.

Socio-economic status and family history/composition are two potentially important variables that were not considered in this study. Although, whenever possible, the exceptional and regular education groups were obtained from the same schools (presumably comprised of similar levels of socio-economic status), these two variables may have contributed to differential classification of the educational groups.

Finally, it should also be noted that no attempt was made to distinguish or separate attention-deficit subjects from either learning
disabled or severe behavior handicapped individuals. Because the literature suggests that the attention-deficit syndrome is often a comorbid diagnosis for both LD and conduct-disordered individuals, perhaps ferreting out an additional group or groups would have provided interesting information regarding the differential characteristics of the exceptional groups. The results, therefore, provide little insight into the differences that may exist between LD, LD-ADHD, SBH, and SBH-ADHD children and adolescents.

**Implications for Future Research**

With the possible exception of overt behavioral repertoire, the differences between LD and SBH individuals (as classified by Ohio's guidelines) remain unclear. One of the major differences presented in the Identification criteria involves current socio-emotional status. Based on the current findings, three suggestions for future research are offered: a) research should be conducted comparing the same educational groups on different measures of emotional status (perhaps both self-report and interview formats), b) research should be conducted comparing the same educational groups across other individual's (teachers, parents, friends) perceptions or reports of their socio-emotional status - this data in conjunction with the previous suggestion obviously opens the door to correlational analysis of self and other's reports of social and emotional functioning, and c) similar research should be conducted in different school districts to assess whether or not the current findings are specific to the school district accessed for this study.
Future studies might attempt to examine finer distinctions between LD, LD-ADHD, SBH, and SBH-ADHD groups to assess the impact of attention-deficit symptoms on measures of planning, attention, simultaneous and successive processing. There is also a need to investigate the relationship between the PASS tasks and more comprehensive measures of achievement for normal and exceptional groups of children. These studies may illuminate the relationship between cognitive processes and achievement and provide insights into how processing deficiencies and proficiencies in the four composite areas might impact school performance for various groups of children and adolescents.
REFERENCES


APPENDIX A

The Ohio Department of Education's Definition of a Specific Learning Disability.

A specific learning disability means a disorder in one or more of the basic psychological processes involved in understanding or using language, spoken or written, which may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations. The term includes such conditions as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. The term does not include children who have learning problems which are primarily the result of visual, hearing and motor handicaps, of mental retardation, of emotional disturbance, or of environmental, cultural or economic disadvantage.

Criteria

A specific learning disabled child shall have a severe discrepancy (defined as 2 z-scores or standard deviations) between achievement and ability which adversely affects his or her educational performance to such a degree that special education and related services are required. The multifactored evaluation must produce evidence of a discrepancy score of two or greater than two between intellectual ability and achievement in one or more of the the following seven areas: a) oral expression, b) listening comprehension, c) written expression, d) basic reading skills, e) reading comprehension, f) mathematical calculation, or g) mathematics reasoning. Finally, the child's severe discrepancy between achievement and
ability cannot be primarily the result of: a) vision, hearing, or motor handicaps, b) mental retardation, c) emotional disturbance, or d) environmental, cultural or economic disadvantage.
APPENDIX B

The Ohio Department of Education's Definition of a Severe Behavior Handicap.

The term severe behavior handicap means a condition exhibiting one or more of the following characteristics over a long period of time and to a marked degree, which adversely affects educational performance: a) an inability to learn, which cannot be explained by intellectual, sensory or health factors, b) an inability to build or maintain satisfactory interpersonal relationships with peers and teachers, c) inappropriate types of behavior or feelings under normal circumstances, d) a general pervasive mood of unhappiness or depression, or e) a tendency to develop physical symptoms or fears associated with personal or school problems.

The term does not include children who are socially maladjusted, unless it is determined that they are severe behavior handicapped.