DIFFERENTIAL DIAGNOSIS OF DISRUPTIVE BEHAVIOR DISORDERS WITH ACADEMIC ACHIEVEMENT MOTIVATION, BEHAVIORAL ASSESSMENT SYSTEM FOR CHILDREN - TEACHER RATING SCALE AND BEHAVIORAL ASSESSMENT SYSTEM FOR CHILDREN-SELF REPORT OF PERSONALITY

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TABLE OF CONTENTS

TABLE OF CONTENTS

Chapter Page

LIST OF TABLES

Table Page

CHAPTER I

INTRODUCTION

Antisocial behavior and conduct problems in children and adolescents constitute a constellation of externalizing behaviors, ranging from severe (e.g., stealing, firesetting, destruction of personal property, cruelty to animals and assault) to relatively minor (e.g., yelling, whining, swearing, lying, and temper tantrums). Among youth, these behaviors contribute to the highest rates of referral for mental health services and may be one the most serious public health challenges in American society (Earls, 1989; Prinz & Miller, 1991). Typically, behaviors of this nature do not occur in isolation but cluster together and form a syndrome differentiating it from other problems of childhood and from typical childhood behaviors (Kazdin, 1987). Hinshaw and Anderson (1996) proposed that when these behaviors are presented as clusters they can be referred to as oppositional, antisocial, and conduct-disordered. Regardless of the label attached to children exhibiting these behaviors, the nature, onset, prevalence, and prognosis of the syndrome need careful study. Developing and evaluating effective methods and approaches for the assessment and classification of children with these problems is important (McMahon & Estes, 1997). The *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM-IV; American Psychiatric Association, 1994) groups children with this type of psychopathology under the category of Disruptive Behavior Disorders.

The DSM-IV classification of disruptive behavior disorders (DBDs) of childhood represents the largest group of clinical referrals and includes, attention-deficit hyperactivity disorder (ADHD), conduct disorder (CD), and oppositional defiant disorder (ODD). One of the most difficult tasks facing clinicians is the differential diagnosis of the DBDs. Among school-aged children, prevalence estimates range from 2% to 9% for CD (Kazdin, 1987; McMahon & Estes, 1997; Rutter, Tizard, Yule, Graham, & Whitmore, 1976). In various nonclinical samples, estimates for ODD range from 6% to 10% (Costello, 1990). In clinical samples, research on comorbidity among disruptive disorders yielded estimates on co-occurrence of ODD and CD among children with ADHD ranging from 20% (Barkley, 1990) to 60% (Biederman, Munir, & Knee, 1987). In this context, comorbidity refers to a greater than chance association between two or more independent disorders. According to the U.S. Congressional report compiled in 1986, it was estimated that "between 12% and 15% of children and youth suffer from emotional or other problems that warrant mental health treatment" (U.S. Congress, Office of Technology Assessment, 1986). However, because of serious methodological flaws in pre-1986 studies, the U.S. Congressional report may have underestimated the prevalence of children's psychiatric disorders by as much as fifty percent (Brandenberg, Friedman, & Silver, 1990; Costello, 1989; Offord, Boyle, Fleming, Blum, & Grant, 1989; Offord et al., 1987; Velez, Johnson, and Cohen, 1989).

The essential feature of CD is "a repetitive and persistent pattern of behavior in which the basic rights of others or major age-appropriate societal norms or rules are violated" (American Psychiatric Association, 1994, p. 85). Additionally, at least 3 of the 15 behaviors falling into the four groups listed below must have been present in the past

12 months, with at least one of the behaviors present in the last 6 months. The behaviors typically exhibited by these children have been categorized into four groups: aggressiveness to people and animals; property destruction; deceptiveness or theft; and serious rule violation. The category is further distinguished into two subtypes and are differentiated on the basis of the child's age at the appearance of the first symptom of CD, childhood-onset type and adolescent-onset type, respectively.

In the DSM-IV, the essential feature of ODD is "a recurrent pattern of negativistic, defiant, disobedient, and hostile behavior toward authority figures" (American Psychiatric Association, 1994, p. 91). Moreover, the pattern of behavior must have a duration of at least 6 months, and at least four of the following eight behaviors must be present: losing temper, arguing with grownups, actively defying or not complying with grownups' rules or requests, deliberately doing things that annoy other people, blaming others for own mistakes, being touchy or easily becoming annoyed by others, exhibiting anger and resentment, and showing spite or vindictiveness. The behaviors aforementioned must have a higher frequency than is generally seen in other children of similar developmental level and age. Also, the behaviors must lead to impairment in academic and social functioning. These disorders have received a considerable attention from researchers interested in comorbidity and differential diagnosis.

Research to determine whether CD and ODD are distinct disorders has been inconclusive (Achenbach, Edelbrock, & Howell, 1987; Ferguson & Rapoport, 1984; Loeber & Lahey, 1989; Rey & Morris-Yates, 1993). Additionally, researchers have had difficulty differentially diagnosing ADHD from CD and ODD as well. There is a need for further examination of this problem. Evidence supports two views: (a) that ODD and CD

are the same disorder and there is a developmental progression from ODD to CD, and (b) that they are distinct, independent diagnostic entities. Although there are data to support both of these ideas, the numerous changes in criteria from the third edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-III) to the *Diagnostic and Statistical Manual of Mental Disorders, Third Edition Revised* (DSM-III-R) to DSM-IV have resulted in the diagnostic categories for these childhood disorders remaining in flux (Achenbach & McConaughy, 1996). The explicit diagnostic criteria for the disorders CD and ODD were first introduced in the DSM-III. One of the changes that occurred during the revision of the DSM-III was that the thresholds for both ODD and CD were raised by eliminating the milder symptoms and increasing the number of symptoms required for each diagnosis. Additionally, the subtyping scheme for CD was simplified from four subcategories to three subtypes, which were further collapsed into one polythetic category with a single exclusionary criterion.

Statement of the Problem

Although there is comorbidity among the symptoms of the DBDs, assessment for the purposes of diagnosis, intervention, and treatment has relied extensively and often exclusively on the *Diagnostic and Statistical Manual of Mental Disorders* (DSM) which is a categorical approach. This paradigm is medically based and includes techniques like structured diagnostic interviews in the diagnostic classification of children and adolescents. This has lead to inefficient differential diagnosis and poor educational and therapeutic planning. In contrast, the dimensional paradigm is psychometrically based and includes self-report measures and rating scales. Because teacher ratings scales have

proven to be empirically sound assessment devices and useful in the diagnostic process for many forms of child psychopathology, one might consider their reliability and validity in the differential diagnosis of disruptive behavior disorders. However, there is almost no literature supporting the distinction of disorders using rating scale measures of academic achievement motivation, school problems, adaptive skills, or personal adjustment. Despite the promise dimensional methods may have to yield valuable information in the diagnostic process, the DSM categorical approach for diagnosis of disruptive behavior disorders continues to dictate agendas for clinical research, services, training, and funding (Achenbach, 1995). The problem is that even though dimensional methods are readily available for use in the diagnostic process, researchers have not examined the utility of these instruments in distinguishing disruptive behavior disorders in children and adolescents. Dimensions on rating scales can give an excellent qualitative and quantitative estimate of a child's functioning, which can be multifaceted, rather than the binary symptom-present or symptom-absent method of categorical diagnosis.

Theoretical Rationale for Instrument Selection

The development of diagnostic classifications for disruptive behaviors in children and adolescents has used two major approaches, categorical diagnoses and dimensional measurements (for review see Hinshaw, 1987; Loeber et al., 1991; Quay, 1986a; Werry et al., 1987). One of the most prolific dimensional methods used is teacher rating scales. Teacher rating scales have proven to be of considerable value in the evaluation and diagnostic processes for many forms of child psychopathology, especially externalizing disorders, which are often most salient in the classroom setting (Bauermeister, 1992;

Pelham, Evans, Gnagy, & Greensdale, 1992). In contrast to the categorical model, scale dimensions lends to the use of powerful and tractable methods of analysis (Caron & Rutter, 1991; Fergusson & Horwood, 1995).

Research (Achenbach et al., 1989; Fergusson et al., 1994; Hinshaw, 1987; Loeber et al., 1991; Rey & Morris-Yates, 1993) has repeatedly identified a number of correlated domains of disruptive behavior disorders, which constitutes a broad range of behaviors. The recognition of behavioral patterns specific to a disorder can help to expand our view of the broader scope of the phenomenology of various conduct and attentional disorders. A significant body of factor analytic research has investigated the validity of the distinction between ODD and CD made in the DSM-III-R. For example, Quay and Pedersen (1982) factor analyzed parent ratings on the Revised Problem Behavior Checklist and extracted two factors. One factor was comprised of primarily ODD symptoms and included the CD symptoms of starting fights and bullying. The second factor was composed of several CD symptoms and the questions related to having delinquent companions and substance use was found. Comprehensive reviews of factor analytic studies of teacher-reported symptoms have yielded a dimension composed of problematic behavior resembling ODD symptoms and aggressive behavior (fighting, attacking, bullying, cruel to others) and a second dimension composed of CD symptoms, having delinquent companions, and substance use (Loeber & Schmaling, 1985; Quay, 1986a). Although both of these reviews found evidence for an underlying two-factor model Loeber and Schmaling conceptualized these two factors as two poles of the same dimension rather than as two independent dimensions.

However, it should be noted that all factor analytic studies have not found that a two-factor solution can distinguish the disruptive behaviors of CD and ODD (Edelbrock & Achenbach, 1984; Neeper, Lahey, & Frick, 1990; Werry, Spague, & Cohen, 1975). These studies found that a single factor composed of ODD symptoms and several symptoms (fighting, lying, and stealing) to be more parsimonious. Investigation of the factors that influenced the extraction of a second factor included (1) a small number of items referring to CD in the pool, and (2) the large number of CD symptoms dropped because of low frequency in the sample. These latter studies illustrate the concern of whether dimensional instruments can differentiate ODD and CD.

Most adherents of the dimensional approach would argue that although many instruments have been used in this process, the measurement of attention deficit, oppositional defiant, and conduct disorders requires additional research. The focus of this research needs to determine which instruments' scales enhance the clinicians ability to make better diagnostic decisions and offer the optimal level of specificity needed to construct a strong assessment model for disruptive behavior disorders. Consequently, a dilemma exists for the practitioner. The research consistently supports the efficacy of rating scales in the identification of problem behaviors, but there almost no literature supporting the distinction of disorders based on dimensional measures.

Little is known about the ability of the Behavior Assessment System for Children (BASC) to differentiate ADHD, CD, or ODD (Adams & Drabman, 1994; Doyle, Ostander, Skare, Crosby, & August, 1997; Ostander, Weinfurt, Yarnold, & August, 1998). Ostander et al. (1998) examined the usefulness of the BASC and Child Behavior Checklist (CBCL) parent scales to differentiate students with ADHD from non-ADHD

students and discriminating between the predominantly inattentive-type and combined-type ADHD-afflicted students via the optimal discriminant classification tree analysis model. Using the mean scale scores of the BASC (Aggression, Anxiety, Attention Problems, Conduct Problems, Depression, Hyperactivity, Somatization, and Withdrawal) for 309 children of both genders, the investigators found that several scales provide significant discrimination. Specifically, all the scales discriminated non-ADHD from both of the ADHD groups and the Aggression, Conduct Problems, Depression, and Hyperactivity scales were significant discriminators of ADHD-combined and ADHD-Inattentive groups. These results demonstrate the diagnostic utility of the scales and further suggests that the BASC should be able to predict ADHD.

The following scales of the BASC-TRS were selected for this study as indicators of maladaptive behavior patterns Aggression, Attention Problems, Conduct Problems, Hyperactivity, and Learning Problems. These scales were selected on the basis of their ability to discriminate between clinical groups, as well as a control group of nonreferred children. Research by (Loeber et al., 1991) found that "symptoms of disruptive child consistently aggregated into two groupings, one composed of all ODD symptoms and some physical aggression (especially fighting and bullying) and another factor composed only of covert (nonaggressive) CD symptoms" (p. 380). In a similar manner, the following scales from the BASC-SRP were also used as indicators of maladjustment Locus of Control and Social Stress. Additionally, Self-Reliance and Interpersonal Relations were selected for this study as indicators of personal adjustment and to estimate the child's use of positive outlets for their problems. These scales were selected based on the literature that supports children who are diagnosed with ADHD symptomology and

CD have lower scores on ratings of self-perception than those with ADHD symptomology and ODD (Kuhn et al., 1997).

An equally important construct that should be considered in the differentiation of DBDs is academic achievement motivation. The multidimensional social-psychological construct of academic achievement motivation refers to the tendency to strive to accomplish tasks in the academic arena (Stinnett & Oehler-Stinnett, 1990). Over the past two decades, the measurement of children's academic achievement motivation has primarily been assessed through self-report inventories with low reliability and validity (Naccarato, 1988). Because children's self-reports of academic motivation have been plagued with psychometric limitations, as well as being contingent on the child's reading level, their ability to understand the directions and follow the format of the test, and their level of cooperation, teachers' ratings of this domain have been adopted. As with the identification of behavioral problems, teacher judgments of social and academic behaviors of students provide a more comprehensive sampling of those domains than most psychometric instruments and are excellent sources of content validity (Gresham, Reschly, & Carey, 1987). Teacher ratings have also discriminated reliably among clinical and exceptional education groups (Gresham et al., 1987; Hoge, 1983; Stinnett, Oehler-Stinnett, & Stout, 1989).

A survey of the literature indicates that academic achievement motivation is a multivariate construct (Gottfried, 1985; Harter, 1981; Maehr,1982). Gottfried (1990) described the structure of academic intrinsic motivation as the "enjoyment of school learning characterized by mastery orientation; curiosity; persistence; task endogeny; and the learning of challenging, difficult, and novel tasks" (p. 526). Harter (1978, 1981)

proposed another model of academic intrinsic motivation, based on White's (1959) effectance/competence motivation model, which is similar in definition to Gottfried's model. Harter (1978) describes this model as including curiosity, working toward one's own satisfaction, preference for challenging work, wanting to work independently, and using internal criteria for determination of success/failure.

Although both of these models reflect self-report measures of academic achievement motivation, they represent the central features of approach, mastery, persistence, curiosity, preference for challenging tasks, and independent/intrinsic functioning (Stinnett & Oehler-Stinnett, 1990). These features constitute the construct mastery/intrinsic motivation which was incorporated into the Teacher Rating of Academic Achievement Motivation (TRAAM) items. This construct has substantial validity and significance for children's effective school functioning (Gottfried, 1992). In generalizing the research across grade, gender, and ethnicity, children with higher levels of academic intrinsic motivation showed significantly higher school achievement, lower academic anxiety and more favorable perceptions of their academic competence (Gottfried, 1982, 1985).

During the development of the TRAAM, a skill versus performance model was incorporated to make the distinction between an academic skill deficit and an academic performance deficit, based on the theoretical and empirical work of Bandura (1977). An academic skill deficit contributes to school problems based on the assumptions that the behaviors required for success are not in the behavioral repertoire due to low ability and/or a lack of basic academic skills (Stinnett & Oehler-Stinnett, 1990). In contrast, performance deficits are those academic achievement problems that are conceptualized as

primarily motivational. That is, these deficits are often attributed to within-child variables (i.e., lack of effort, lack of persistence, low efficacy, poor self-esteem). Given that children have different reasons for learning, identification of these deficits becomes important for helping children develop positive feelings of competence as well as modifying their motivational orientation. Thus, teachers can learn how to foster adaptive motivational styles in children experiencing learning and/or behavioral difficulties and respond in ways in which these children think about themselves, the task, and their performance (Ames, 1986).

Despite the preponderance of findings illuminating the positive relationship between higher levels of academic motivation and higher school achievement, we should also be concerned with the measurement of maladaptive responses to experiencing failure in the academic realm. Even though children possess sufficient potential through the analysis of previous work samples and the general perceptions of the teacher, they may display the negative dimensions of academic achievement motivation, external motivation and/or failure avoidant/amotivation. Amotivation refers to a child's resistant and/or avoidant learning behaviors.

Past studies have not accessed measures of the constructs amotivation, mastery, and academic-cognitive skills within a sample of children diagnosed with the three DBDs as part of the diagnostic process. Farr and Stinnett (1993) conducted the only study that investigated the TRAAMs' ability to discriminate academic achievement between a sample of regular education students and students with severe behavior disorders. These researchers found that regular education students were rated to have higher levels of academic motivation. Additionally, a stepwise discriminant analysis demonstrated that

the Mastery and Cooperation factors formed a powerful discriminant function that discriminated the groups. These authors concluded that academic achievement motivation constructs warranted further research study, especially as they pertain to children with adjustment problems and psychopathology. The selection of the TRAAM was based on its measurement of the constructs that primarily tap Amotivation, Mastery, and Skill/Ability.

Purpose of the Study

The purpose of the current study is two-fold. First, it will evaluate the incremental predictive power of various behaviors generated from teacher ratings of academic achievement motivation and adaptive and problem behaviors in a school setting, and self-report of personality, in the differential diagnosis of oppositional defiant versus conduct disorder. Incremental predictive power refers to Second, it will evaluate the discriminating ability of the Teacher Rating of Academic Achievement Motivation (TRAAM), Behavioral Assessment System for Children - Teacher Rating Scales (BASC-TRS), and the Behavioral Assessment System for Children - Self Report of Personality (BASC-SRP) scales with respect to two of the three childhood disorders (CD and ODD).

Research Questions

The research study attempted to answer the following research questions:

1. Are Amotivation, Mastery, and Skill/Ability items of the TRAMM useful inclusionary and/or exclusionary markers for diagnosis of children who are labeled CD and ODD?

2. Are Aggression, Attention Problems, Conduct Problems, Hyperactivity, and Learning Problems items of the BASC-TRS useful inclusionary and/or exclusionary markers for diagnosis of children who are labeled CD and ODD?
3. Are Locus of Control, Social Stress, Self-Reliance, and Interpersonal Relations items of the BASC-SRP useful inclusionanry and/or exclusionary markers for diagnosis of children who are labeled CD and ODD?

Significance of the Study

The findings of this study will aid psychologists in identifying specific academic, behavioral adjustment, and self-concept profiles necessary to screen for CD and ODD. Based on this information better planning can be made with respect to classroom interventions for academic and emotional competence. The documentation of the factors associated with the onset and progression of the aforementioned disorders can be used to identify those correlates that are modifiable and/or amendable to intervention. Finally, the attainment of this information can be used to establish precedence for school mental health services in designing service delivery options that can adequately meet the diverse needs of students.

Hypotheses

1. Amotivation, Mastery, and Skills/Ability items of the TRAAM will function as inclusionary and/or exclusionary markers for diagnosis of children with CD and ODD.
2. The Aggression, Attention Problems, Conduct Problems, Hyeperactivity, and Learning Problem items of the BASC-TRS will function as inclusionary and/or exclusionary markers for diagnosis of children with CD and ODD.
3. The Locus of Control, Social Stress, Self-Reliance, and Interpersonal Relations items of the BASC-SRP will function as inclusionary and/or exclusionary markers for diagnosis of children with CD and ODD.

Assumptions

Given the greater precision and reliability of conditional probability analysis, it is expected that measures of academic achievement motivation and behavioral adjustment will effectively and accurately differentially diagnose children with CD and ODD based on their respective symptomologies. Further, with an increase in the accuracy of diagnosis, it is expected that a combination of the TRAAM, BASC-TRS, and BASC-SRP items will provide a sufficient amount of information to develop interventions that will support the educational and mental health needs of children with these disorders. Additionally, it is expected that the use of this methodology will add to the field the literature that exists on differential diagnosis of disruptive behavior disorders.

Limitations

Because the participants for this study are a subgroup of the clinical population, the results will only be generalizable to that population. Extreme base rates of some disorders will likely affect the maximum predictive value of Positive Predictive Power (PPP) and Negative Predictive Power (NPP). PPP is the proportion of individuals in a sample or population with the symptom who have the disorder and equals the conditional probability of having the disorder given the presence of the symptom. NPP is the proportion of individuals in a sample or population without the symptom who do not have the disorder. Thus the property of local base rates within the sample will be affected. The base rates will be affected because the high frequency of co-morbid symptoms, leading to a psychiatric diagnosis, exhibited in clinical subgroups similar to the current sample than a clinical sample. The result is that diagnostic accuracy declines markedly, increasing the number of false positives.

Definition of Terms

The following terms and definitions will be used throughout the study.

Affectivity - Reports of being worried.

Anhedonia - In ability to experience pleasure.

Attention Deficit Hyperactivity Disorder (ADHD) - A disorder characterized by a persistent pattern of inattention and/or hyperactivity-impulsivity that is more frequent and severe than typically observed in individuals at a comparable level of development.

Base Rate - refers to the prevalence of an event within a population.

Comorbidity - A greater than chance association between two or more independent disorders.

Conditional Probability (CP) - a probability that is based on only part of the population.

Conduct Disorder (CD) - A disorder characterized by a repetitive and persistent pattern of behavior in which the basic rights of others or major age-appropriate societal norms or rules are violated.

Diagnostic and Statistical Manual of Mental Disorders (DSM) - A manual designed to provide clear descriptions of diagnostic categories in order to enable clinicians and investigators to diagnose, communicate about, study and treat people with various mental disorders.

Negative Predictive Power (NPP) - The proportion of individuals in a sample or population without the symptom who do not have the disorder.

$$\frac{\text{n without the disorder who don't show the symptom}}{\text{n without symptom}}$$

Nosology - A taxonomy of diseases or clinical disorders.

Oppostional Defiant Disorder (ODD) - A disorder characterized by a recurrent pattern of negativistic, defiant, disobedient, and hostile behavior toward authority figures that persists for at least 6 months and is characterized by the frequent occurrence of at least four of the following behaviors: losing temper, arguing with adults, actively defying or refusing to comply with the requests or rules of adults, deliberately doing things that will annoy other people, blaming others for his or her own mistakes or misbehavior,

being touchy or easily annoyed by others, being angry and resentful, or being spiteful and vindictive.

Positive Predictive Power (PPP) - The proportion of individuals in a sample or population with the symptom who have the disorder and equals the conditional probability of having the disorder given the presence of the symptom.

$$\frac{\text{n with the disorder who show the symptom}}{\text{n with symptom}}$$

Sensitivity (SEN) - Indicates the proportion of subjects with the disorder who will be identified by the symptom.

$$\frac{\text{n with the disorder who show the symptom}}{\text{n with the disorder}}$$

Specificity (SPE) - Indicates the proportion of subjects without the disorder who will not have the symptom.

$$\frac{\text{n without the disorder who don't show the symptom}}{\text{n without disorder}}$$

Taxonomy - A hierarchical scientific classification system.

Organization of Study

Chapter I contains the introduction, research questions, significance of the study, assumptions, hypotheses, definition of terms, and limitations of the study. Chapter II, contains the review of literature, dealing with the history, benefits, and problems associated with different classification systems, comorbidity of disruptive behavior disorders, the constructs to be measured, the emphasis of the prototypic classification system, specific literature concerning the use of prototypic classification systems, and the

literature relevant to the clinical population to be used for the study. Chapter III contains the methodology, including the participants to be used in the study, the instruments that will be administered and the analysis of data. Chapter IV involves the research findings of the study. Chapter V contains the summary, conclusions and recommendations.

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CHAPTER II

REVIEW OF LITERATURE

Introduction

According to Zubin (1967), there are at least 50 different types of classification used throughout the world ranging from those which deny the existence of behavior disorders as entities to those which regard all behavioral disorders as manifestations of a singular underlying dimension. Yet, the predictive validity of different classification approaches used to differentiate the diagnostic categories of ADHD, ODD and CD as separate disorders remains unresolved. Most of the methods employed have adopted either a Kraepelinian or quantitative approach. Additionally, the association between psychopathology and academic underachievement has long been noted (Hinshaw, 1992; Moffitt, 1993). Current literature on CD and disruptive behavior also has been associated with school learning difficulties. However, to date, research has not been conducted on the use of academic achievement motivation, school problems, adaptive skills, or personal adjustment measures to differentiate children with ADHD, ODD or CD. In fact, the use of actuarial prediction, decision theory, and conditional probabilities (CP) has rarely been employed in diagnostic research, especially regarding academic factors.

Early studies in differentiating children with DBDs (e.g., Burke, 1988; Spitzer, Davies, & Barkley, 1990; Weistein, Stone, Noam, Grimes, & Schwab-Stone, 1989;

Widiger, Frances, Pincus, Davis, & First, 1991) relied extensively on DSM methods of diagnosis. The focus was to evaluate specific symptoms and set symptom cutoffs based on their predictive validity against clinician-generated diagnoses (McBurnett, 1996). Data generated evidence to support the notion that "these behavior and clinical domains are not redundant but rather have discriminant validity based on differential correlates" (Abikoff & Klein, 1992, p. 882). Specifically, ADHD was associated with lower IQ and lower academic performance and substantially lower rates of parental psychopathology (Lahey et al., 1988; McGee, Williams, & Silvia, 1984; Schachar, 1991; Werry et., 1987). Symptoms characteristic of CD included maternal rejection, poor parental supervision, and parental alcohol abuse (Reeves et al., 1987; Stewart, deBlois, & Cummings, 1980). ODD was associated with temper outbursts, defiance, and annoying behaviors (Taylor, 1986). Despite the distinguishing features associated with these disorders, categorical methods noted a number of behavioral patterns that co-occurred between ADHD and CD (Offord, Sullivan, Allen, & Abrams, 1979; Walker, Lahey, Hynd, & Frame, 1987), ODD and CD (Loeber et al., 1991; Loeber & LeBlanc, 1990), and ADHD and ODD (Popper, 1988; Werry, Reeves, & Elkind, 1987).

Dimensional methods, based on rating scales, have produced several findings that agree substantially with categorical classifications, but suggest modifications in the diagnostic nomenclature (Achenbach, Conners, Quay, Verhulst, & Howell, 1989; Quay, 1986b; Werry et al., 1987). The earliest efforts involved in using statistical methods to identify syndromes was completed by correlating item scores from case histories in combination with clinical judgment (Hewitt & Jenkins, 1946; Jenkins & Glickman, 1946). A review of factor-analytic studies by Quay (1986a) supported the distinction of

CD and ODD but labeled the conduct problem factors associated with these two disorders as Delinquent and Aggressive, respectively. The final factor, Attentional-Immaturity denoted the DSM-III category Attention Deficit Disorder. Although factor-analytic studies have produced consistent results across conduct and attention problems, conclusions should not neglect factors such as age of the child or items not endorsed by the rater because of limited opportunities to observe covert behaviors (Loeber et al., 1991).

Not surprising, efforts have been made to use a combination of these approaches in the diagnostic process (Biederman et al., 1993; Eiraldi, Power, & Nezu, 1997; Kuhne, Schacar, & Tannock, 1997). Yet, the investigators of these studies suggest that the results must be interpreted in the context of methodological limitations. Consequently, a promising methodological approach, conditional probability, has been receiving support from researchers and clinicians (Doyle, Ostander, Skare, Crosby, & August, 1997; Elwood, 1993; Landau, Milich, & Thomas, 1991; Lonigan, Anthony, & Shannon, 1998).

The following review outlines two of the main paradigms that have been used to differentiate childhood disorders, namely Kraepelinian and empirical approaches. After discussing the strengths and weaknesses of these approaches, issues pertaining to comorbidity among these childhood disorders will be covered. The review concludes with an introduction of conditional probability and item statistics, which will be employed for this study, and a summary and critique of the existing literature related to this method of analysis.

History of the Kraepelinian Approach

During the 1800s, German psychiatrist Emil Kraepelin began working on the development of the major categories of psychopathology, at least those accepted by contemporary authorities. As a result, Kraepelin published a series of textbooks in the area of abnormal psychology, and his organization of mental disorders in these textbooks brought about the modern classification of mental disorders, more commonly known as the Kraepelinian system. There are three points that are noteworthy about Kraepelin's approach to classification. His initial intent was not to create a classification system. As an author, he focused on writing textbooks that were organized in accordance with the major dimensions of psychopathology. The classification system that evolved from his writing were based upon tables of contents to the various editions of his books (Blashfield, 1984).

Secondly, his orientation towards psychopathology was much more psychological than his medically oriented contemporaries. He believed that most mental disorders had an associated organic etiology, but he advocated a careful behavioral analysis of patients in order to understand their clinical picture. Lastly, the major difference between Kraepelin's classification system and the currently accepted psychiatric classification primarily occurred at the subcategory level. The categories of "psychopathic conditions" (constitutional despondency, compulsive psychosis, impulsive psychosis, and contrary sexual instincts), for example, referred to a collection of concepts that are not obviously related to the contemporary subdivision of "personality trait disorders" (Blashfield,

1984). On the other hand, some of his other subdivisions (e.g., dementia praecox, manic-depressive insanity, alcoholism, and organic dementia) are generally recognizable.

The influence of Kraepelin's sixth-edition classification brought about the American Psychiatric Association adopting a new system, including 19 major categories from the Kraepelin system, as part of the *Standard Classified Nomenclature of Diseases* (American Psychiatric Association, 1933). However, this new classification system failed to gain popular acceptance in American psychiatry. In response to its poor acceptance, the American Psychiatric Association (APA) formed a task force to develop a system that would become the standard for the United States. The product of the task force was the first edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-I, 1952). Much to the dismay of the APA's task force, DSM-I and II were haunted with poor psychometric qualities and mixed professional acceptance which led to major overhaul in the engineering of DSM-III (APA, 1980). Prior to the revamping of the DSM-II a new category of child disorders was added, "Behavior Disorders of Childhoold and Adolescence," which listed seven subcategories of disorder. Among the categories listed, the first description of ADHD was included.

In 1980, the publication of the DSM-III reflected the concerns of members of the neo-Kraepelin movement: (1) diagnostic reliability; (2) advocacy of psychiatry as a viable branch of scientific medicine; and (3) belief that description is an important step in the process of understanding psychopathology (Blashfield, 1984). The changes that were implemented into this revision of the DSM made it radically different from its predecessors. These four changes attempted to improve upon the classification of childhood disorders which were absent in earlier versions of the DSM including: (1) the

use of diagnostic criteria; (2) a multiaxial approach to patient evaluation; (3) expanded descriptive information about the categories; and (4) a reorganization of the diagnostic categories, including symptom lists (McBurnett, 1996).

This edition of the DSM was the landmark publication that introduced the first operational criteria for CD. The criteria outlined included both severe overt and covert manifestation of antisocial behavior. Patterson (1982) posited that different developmental processes define the emergence of overt compared to covert antisocial behavior patterns. If these two processes, covert and overt antisocial behaviors, represent developmentally distinct patterns, then greater knowledge of these patterns would provide increased rates of accurate prediction, prevention, and treatment of later delinquency. Because the DSM system is based on a Kraepelinian framework in which distinct disorders are held to be present versus absent and to be distinct from other diagnoses (Achenbach, 1993), it retains a categorical method for classifying disorders and must account for the "discontinuities in the underlying distributions of the constituent behavior patterns if they are to be viable" (Mash & Barkley, 1997, p. 117). Thus, the DSM-III was criticized for its diagnosis of CD because of problems associated with sub-categorization and the introduction of a separate category, a milder variant of CD, oppositional disorder.

The purpose behind the use of the term oppositional disorder in the DSM-III was to capture early manifestations of aggressive, antisocial behavior that are exhibited in early to middle childhood. If it is conceptualized as a developmental predecessor to CD, then the ubiquity of the behavioral features and the marginal reliabilities in the empirical investigations casts considerable doubt on the viability of this category (Rey et al., 1988). Some investigators who studied preschool children using factor analytic methods have

found a one dimensional construct composed of oppositional and mildly aggressive behaviors (e.g., Achenbach, Edelbrock, and Howell, 1989; Fowler & Parke, 1979; Kuhn, 1979; McDermott, 1983; O'Donnell & Van Tuinan, 1979). As a consequence of these criticisms, the diagnostic criteria for OD underwent a series of changes.

Regarding the division of CD into four subcategories, socialized versus undersocialized and aggressive versus nonaggressive dimensions, the reliability of classifying these categories into subtypes was at best poor. Hinshaw and Anderson (1997) claimed that the use of these categories was unreliable due to the confounding of two components (e.g., low rates of undersocialized, nonaggressive youngsters). In his review of 61 studies spanning four decades, Quay (1986a) found that CD is a ubiquitous pattern found throughout the multivariate literature. Similarly, Werry, Methven, Fitzgerald, and Dixon (1983) found that using the DSM-III, in diagnosing CD, was moderately unreliable (kappa = .53) based on admissions to a child psychiatric unit in which children were diagnosed by two to four clinicians.

This edition was also the first time that the APA recognized the distinction between attention deficit disorder (ADD) with and without hyperactivity. The subtype, ADD without hyperactivity (ADD-H) was characterized as a combination of the inattention and impulsivity behaviors, and an absence of hyperactivity behaviors. Alternatively, attention deficit disorder with hyperactivity (ADD+H) reflects the a combination of the behaviors impulsivity, inattentivity, and hyperactivity.

Between 1980 and 1987, the DSM system had undergone another revision, DSM-III-R. Five general changes occurred between DSM-III and DSM-III-R: (1) revisions of concepts underlying the 5 axes of the multiaxial system, (2) a shift from

classical categories toward prototypes, (3) a decrease in the hierarchical nature of the diagnostic system, (4) some of the revisions in diagnostic criteria, and (5) revisions made in the textual descriptions of disorders. However, the bulk of changes in DSM-III and DSM-III-R were not fixed by empirical methods, "but were by necessity, the result of expert group consensus subject to the limitations of group process" (Frances, Widiger, & Pincus, 1989, p. 374). In fact, Campbell (1990) and Shaffer et al. (1989) noted that in the DSM-III-R, the age-appropriateness of the symptoms for CD and ODD were clearly inappropriate and, the DSM-III-R lacked a strong empirical basis for justifying diagnostic labels under the age of 5.

Summarizing the research carried out in the categorization of CD and ODD from DSM-III to DSM-III-R only complicates the issues of diagnostic thresholds and symptomology necessary for diagnosis. The DSM-III-R also changed OD to ODD and identified nine behavioral symptoms, five of which were necessary for diagnosis. Moreover, some researchers observed that raising the diagnostic threshold for CD to three (from a list of 13), with each needing to be displayed for six months, was questionable because one or two CD symptoms in childhood predicted adverse adult outcomes (Robins & Price, 1991). Thus, the simple lack of continuity in the definitions from the one publication to the next makes differential diagnosis more difficult, and has resulted in a decrease in the prevalence of the two disorders (Lahey et al., 1990).

The distinction between ADD+H and ADD-H was also met with a lack of consensus among DSM committee members, because they were not convinced that there was enough evidence to justify the distinction of the ADD subtypes (Barkley, 1990). Therefore, a category designated undifferentiated attention deficit disorder (U-ADD) was

adopted to include children with ADD-H, but this diagnostic entity lacked clinical and research utility and was vaguely defined (Power & DuPaul, 1996).

The goals of the latest edition of the DSM series, DSM-IV, according to the task force that was appointed by the APA, was to minimize reliance on expert opinion and to "maximize the impact of research on the deliberations of the workgroups and to document the empirical support for any revisions that are implemented" (Widiger, Frances, Pincus, Davis, & First, 1991, p. 282). In many ways the refinement and expansion that went into the DSM-IV fit conceptualizations of construct validation and are analogous to scale development and validation (McBurnett, 1996).

The introduction of the DSM-IV also brought about more change in the subcategorization of CD. The criteria included subtypes defined by age of onset, childhood-onset versus adolescent-onset. Moreover, the modification of six DSM-III criteria to include indexes of severity and categorizing of criteria into four main groupings was also noted in DSM-IV (Atkins, McKay, Talbott, & Arvanitis, 1996). The criteria for ODD in the DSM-IV when compared to the DSM-III-R was also modified. The DSM-IV criteria does not distinguish between mild, moderate, and severe classifications, but require "clinically significant impairment" (p. 94). Finally, changes in DSM-IV criteria for ODD included dropping the use of obscene language and swearing from the list of behavioral criteria, as well as the addition of a second major criterion. The additional criterion required evidence of "significant impairment in social, academic, or occupational functioning" to improve the conceptualization of the disorder (Mesco, Rao, Amaya-Jackson, & Cantwell, 1995). In light of the changes in perspective and nomenclature for the DBDs associated with the publication of the DSM-IV, additional

research makes it worthwhile to appraise the question again and examine the utility of their distinction (Loeber et al., 1991). Several concerns have been raised in response to the few guidelines that exist to facilitate this important, albeit difficult, differential diagnostic decision (Milich, Thomas, & Landau, 1987), including the revision of the diagnostic thresholds and criteria required for each diagnosis, and selection of the most adequate classification approach.

With this revision, ADHD was redefined and recognized three subtypes of the disorder: ADHD, predominantly inattentive (ADHD/I); ADHD, predominantly hyperactive-impulsive (AHDH/HI); and ADHD, combined (ADHD/COM). This distinction of the disorder identified two clusters of symptoms (i.e., inattentive and hyperactive-impulsive), and identified nine behaviors for each of the clusters.

Due to the lack of satisfactory diagnostic criteria for making differential diagnosis of ADHD, CD, and ODD classifications in children and adolescents, researchers have been required to consider several factors. Factors that were necessary for consideration included the model of behavioral classification employed, the assessment strategies used, and the diagnostic utility of the disorders in the development of methods that discriminate DBDs. Investigators have used different versions of research diagnostic criteria (RDC) to discriminate between disorders for research on etiology and response to treatment; however, the use of different sets of RDC have not yielded a high degree of agreement in their classification of individuals (Overall & Holister, 1979). The original intent behind the introduction of RDCs was to improve the reliability of diagnostic classifications for research purposes. One general model of RDC that has been utilized by many researchers is illustrated in the DSM-III, and it has been beneficial in facilitating research and

treatment efforts by increasing the precision with which it can group individuals according to descriptive similarities found in other individuals. However, there are very few RDC for use with child and adolescent disorders with adequate reliability.

Advantages of DSM-IV Usage

The use of systems like the DSM-IV to assess and categorize disruptive behavior disorders is not without its shortcomings. However, the DSM-IV remains the most widely used categorical method. It purports the ability to yield valid and reliable descriptions of children's behavior, and offers several strengths in doing so. One such strength is that it provides guidelines for assessing behavioral and emotional problems that may assist clinicians in understanding the needs of children exhibiting problems requiring remediation in the school setting (Power & DuPaul, 1996b). In fact, the DSM-IV lists patterns of behavior that signal a propensity for future problems. For example, the emergence of oppositional patterns of behavior in the early school years often indicates that a child is at risk for more serious antisocial behavior later in childhood (American Psychiatric Association, 1994; Patterson, Reid, & Dishion, 1992). The DSM-IV also provides multiple explanations to account for a set of behavioral symptoms and suggests factors that need to be considered to test clinical hypotheses (Power and DuPaul, 1996b). Understanding these distinctions will help psychologists assess the needs of children with pervasive problems and provide links to interventions with clinic-based professionals.

A further strength of the DSM is that it might provide information useful to behavioral assessors beyond traditional approaches to target behavior selection since behaviors can be clustered according to topographical co-variations (Kazdin, 1983).

According to Kratochwill and McGivern (1996), acquiring knowledge about the diagnostic problem solving process will help the clinician examine a problem as it relates to the referral concern or priority for treatment.

A final advantage that the DSM system offers is that it facilitates a forum for communication among professionals outside the school setting. Knowledge of the manual and diagnostic criteria is essential for effective communication with physicians and other community professionals. Moreover, the classification schema provides a time-effective mode for communicating with another professional regarding the behavioral and emotional difficulties a specific student is exhibiting (Power & DuPaul, 1996b).

Shortcomings of DSM-IV Usage

Recognition and examination of the shortcomings that pertain to the use of the DSM system is also imperative for discussing the classification of disruptive behavior disorders. Although the DSM specifies the behaviors associated with each psychiatric disorder, it fails to provide the necessary information needed to determine whether the child exhibits each criterion. Specifically, the DSM does not provide guidelines about optimal informants for assessing each disorder, recommended contexts for assessment, preferred methods for data collection, and optimal methods for determining symptom severity, such as by normative comparison (McConaughy & Achenbach, 1990).

Gresham and Gansle (1992) claimed that the DSM-III-R rests on a medical model conception of behavior. Given that a majority of the members assigned to the task forces of the DSM system were physicians, it should not be surprising that it reflects a medical model conceptualization. The diagnostic categories are discussed in terms of

"symptoms," "syndromes," and "disorders," with the implication that somehow these phenomena are caused by some disease process. However, the authors of the DSM system contends that it is "atheoretical" and "descriptive" because the etiologies of mental disorders are unknown (APA, 1987).

Achenbach & McConaughy (1996) expressed the concern that the DSM system specifies the same criterial behaviors and the same number of behaviors that must be present to qualify for diagnosis, regardless of the child's age or gender. Because the DSM does not offer cutoff scores that distinguishes the prevalence of disorders based on each gender, different ages, or different informants, important variations within gender and age groups are likely to be overlooked. The only valuable information that the DSM can offer in this domain is prevalence rates.

Although the DSM III-R has a considerable amount of shortcomings, it is the most comprehensive system available for the classification of mental and behavioral disorders (Reynolds, 1992). Yet, there is no system that offers a method to assess and classify children's behavior and personality which is perfectly accurate, reliable and provides comprehensive data.

History of Empirical Approach

Given the problems of Kraepelinian systems a more empirical alternative was developed. Historically, the use of empirically based approaches was prompted by the lack of differentiation provided for childhood disorders in early psychiatric nosologies, and the categorization of children's problems according to diagnostic criteria or service distinctions failed to capture the multifaceted nature of the problems (Achenbach &

McConaughy, 1996; McConaughy & Achenbach, 1989). Moreover, the lack of nosological categories for childhood disorders spurred early efforts to identify sets of co-occurring problems (Achenbach, 1996). As early as the 1940s researchers began using combinations of bivariate statistics and clinical judgment to identify patterns of problems scored as present versus absent from case histories of children seen for mental health services (Jenkins & Glickman, 1946). The availability of computers, using multivariate methods, such as factor analysis and principal components analyses, made it possible to identify patterns of co-occurring problems in children from large samples of data (e.g., Achenbach, 1966; Conners, 1969; Miller, 1967; Quay, 1964).

Although the procedures for assessing children were becoming more standardized compared to those typically used in applying psychiatric nosologies, the individual studies varied with respect to the assessment procedures, the children who were assessed, the sources of data, and the methodology for analyzing the data (Achenbach, 1996; Achenbach & McConaughy, 1996). In spite of the methodological diversity, differences in the assessment instruments, informants, and samples, reviews of these studies revealed important consistencies within the patterns of the behavioral/emotional problems found in childhood (Achenbach & Edelbrock, 1978; Quay, 1979). Altogether, the approach advanced by these studies can be described as "empirically based," in that it statistically analyzes sets of co-occurring problems obtained on samples of children.

Empirically-based assessment also refers to procedures that are based on observations and experiences and can be verified or disproved by observation or experiment (Achenbach, 1985; McConaughy, 1992). They employ a psychometric model; its intent is to measure the degree to which particular children manifest particular

problems. Behavior rating scales are a form of empirically based assessment for obtaining data on children's problems from multiple sources designed to tap domains such as personality, maladjustment, problem behavior, psychopathology, and social and emotional functioning. Additionally, during the past decade, considerable attention has been given to the development of definitions, screening criteria, and instruments that would yield information for providing clear distinctions between the comorbid conditions evidenced in disorders such as depressive, attention deficit, conduct and oppositional defiant disorders. In particular, instruments such as the Child Behavior Checklist (CBCL; Achenbach, 1978; Achenbach & Edelbrock, 1979), the Behavior Problem Checklist (Quay & Pederson, 1983), and the Conners Teacher Rating Scales (CTRS-48; Conners, 1969; Goyette, Conners, & Ulrich, 1978; Loney & Milich, 1982) have been used with the identification of characteristics associated with attention deficit and conduct disorders

Multiaxial Empirically Based Assessment

During the same time period that these instruments were being utilized for the identification of characteristics associated with childhood disruptive disorders, McConaughy and Achenbach proposed a model called multiaxial empirically based assessment (MEBA) to account for the multifaceted nature of children's problems (Achenbach, 1985; Achenbach & McConaughy, 1987; McConaughy & Achenbach, 1989). MEBA emphasizes the use of standardized procedures to identify strengths and weaknesses in multiple areas based on data from multiple sources. Because children exhibit diverse forms of misbehavior from one social context and interaction partner to another, the goal of this model is to use what each procedure reveals about needs for help

in different contexts. The model is described in terms of five assessment axes applicable from preschool through high school, which represents different sources and different kinds of data relevant to the comprehensive assessment of most children (Achenbach, 1993).

Included under Axis I, parent reports, is the Child Behavior Checklist for ages 2-3 (CBCL/2-3; Achenbach, 1992; Achenbach, Edelbrock, & Howell, 1987) and the Child Behavior Checklist for ages 4-18 (CBCL/4-18; Achenbach, 1991b), as well as historical records and parent interviews. Axis II, teacher reports, contains the Teacher's Report Form (TRF; Achenbach, 1991c), teacher interviews and school records. Axis III, cognitive assessment, employs the use of standardized measures conducted by school psychologists and other professionals for evaluating the cognitive ability, perceptual-motor skills, language functioning, and academic achievement of children. Axis IV, physical assessment, provides measures of height, weight, and physical development through medical and neurological exams. Axis V, direct assessment of the child, incorporates direct observation of the child, self-reports, clinical interviews, self-concept measures, and personality tests. The instruments included in Axis V are the Youth Self Report (YSR; Achenbach, 1991d), the Direct Observation Form (DOF; see Achenbach, 1991b; McConaughy, Achenbach, & Gent, 1988), and the Semi-structured Clinical Interview for Children (SCIC; McConaughy & Achenbach, 1990).

Others researchers continue to embrace the use of dimensional measures and rely on DSM-III-R diagnoses obtained from parent and child interviews, or on research diagnostic criteria that integrate clinical information from interview schedules and scale scores to identify deviant children in nonreferred samples (Abikoff & Klein, 1992).

Although these instruments have adequate psychometric properties and applicability across a wide range of behaviors, they inherently have shortcomings for use in diagnosis. Moreover, the ability to provide valid empirical evidence to distinguish these between narrow-band syndromes on the continuum of internalizing and externalizing behaviors continues to remain unclear (Hinshaw, 1987).

Equally important are the features that are shared by behavioral rating scales. McConaughy (1992) outlined these psychometric features which include: (a) use of standard instructions and response formats, (b) contain multiple items for sampling competencies and/or problems, (c) summing of scores to construct quantitative indices of functioning in target areas, (d) standard scores are derived from normative samples, and (e) scale scores are tested for reliability and validity. Some researchers (e.g., Achenbach, 1995; 1991a; Comers, 1990; Quay, 1983) have used statistical procedures such as principal components and factor analysis to aggregate multiple items on rating scales into empirically derived syndromes. Syndromes in this approach denote a group of problems that tend to co-occur or covary with each other.

Advantages of Usage

The movement toward the use of empirically based approaches for developing a classification system for childhood behavior disorders has revealed important inconsistencies in certain patterns of childhood behavior/emotional problems (Achenbach & Edelbrock, 1978; Quay, 1979). Because this approach can use statistical procedures such as principal components and factor analysis to aggregate multiple items on rating scales into empirically derived syndromes, it offers several advantages over a priori

diagnostic classification systems that are based on predefined descriptive criteria and expert opinions. McConaughy (1992, 1993) outlined these advantages with an emphasis placed on using empirically based rating scales for assessing children's problems and adaptive functioning. First, quantitative scores typically yield more objective and reliable estimates of children's functioning than do subjective judgments or projective measures. The benefit of quantifying assessment data relative to the profiles of empirically based syndromes is that clinicians avoid the need for forced choices between the present versus absent diagnoses and between one disorder versus another (Achenbach & McConaughy, 1996). Second, using norm-based standard scores can provide a basis for judging distributions of scores on standardized measures and facilitate judgments of deviance in a child's reported behavior versus normative samples. Provided an instrument has well-established reliability and validity estimates, standard scores can discriminate between referred and nonreferred for judging clinical deviance and may be sensitive in evaluating treatment effectiveness. Third, multiple items offer analysis of a broad range of potentially relevant problems that may provide information that extends beyond the referral complaints. Fourth, aggregation of items into empirically derived scales facilitates assessment of syndromes of problems that tend to co-occur. Lastly, rating scales are an efficient and economical means for collecting data on children's functioning. Additionally, because school psychologists have increased their use of behavioral ratings (Hutton, Dubes, & Muir, 1992), they can invest more of their time gathering other important information and expanding their role through the provision of more direct services (e.g., interviewing prospective informants, direct intervention, indirect consultation, individual counseling, linking assessment to intervention).

Shortcomings of Usage

Although the use of behavior rating scales has proliferated during the past ten years, there are limitations or disadvantages of which both researchers and practitioners should be cognizant. McConaughy (1992, 1993) and Mesco, Rao, Amaya-Jackson, & Cantwell (1995) described some of the short-comings which are troublesome for empirically-based assessment. Scores on rating scales do not dictate choices for interventions, and responses to treatment can only be reflected by measurable changes in the same dimensional scores. Similar to other assessment procedures, "rating scales measure current functioning, but they do not provide information on the causes or etiology of problems" (McConaughy, 1993, p. 287). Moreover, because informants differ in terms of the behavior they are qualified to rate, information must be obtained on other variables to determine which factors precipitate and sustain identified problems. Achenbach (1995) proposed that empirically based systems should be used as "a stepping stone toward more closely focused and replicable research on etiology, course treatment and outcome" (p. 271). A related limitation is that the categorical grouping of behavior derived by statistical procedures may not be clinically or theoretically meaningful, and therefore do not provide objective measures of children's problems. Edelbrock (1983) contended that the items which make-up the scale can be construed as meaningless and trivial to some informants, and are often subject to diverse interpretations. Moreover, rating scales involve perceptions of problems, and these perceptions vary from one informant to the next and can be influenced by a variety of factors. One such factor, known as the halo effect, influences the informant is such a way that he/she may over or

underrate a child because of their positive or negative impressions or by pretest information. Achenbach, McConaughy, and Howell (1987) suggested that there is neither a royal road nor a gold standard for measuring phenomena that are not inherently affected by assessment procedures and other situational variables. Therefore, the process used in assessing their practical utility and efficiency must be multifaceted. Additional resources are reviews that critique the psychometric properties of various rating scales (e.g., Martin, Hooper, & Snow, 1986; McConaughy, 1992; Witt, Heffer, & Pfeiffer, 1990).

Replication of DSM Categories

Studies which have incorporated factor analytic methods with more differentiated and thorough item pools have consistently found supportive evidence regarding the distinctiveness of the scale/factor measuring inattention from hyperactivity or conduct problems (Edelbrock & Achenbach, 1984; McGee, Williams, & Sylvia, 1985; Quay, 1983; Ullmann, Sleator, & Sprague, 1984). Thus, based on the robust findings that these studies have exhibited, investigators should use confirmatory over exploratory factor analyses in the area of child psychopathology to test hypotheses about the number and nature of factors that are yielded from given samples and scales (Skinner, 1981).

Achenbach, Verhulst, Baron, and Althaus (1987) subjected the ratings of parents and parent-surrogates of 1,863 clinically referred American and Dutch boys aged 6-11 and 12-16, using the Child Behavior Checklist (CBCL; Achenbach & Edelbrock, 1983) as part of the intake process for mental health services, to principal components analysis. Frequency distributions were calculated for each the 118 behavioral/emotional problem items on the CBCL for the four samples (Americans ages 6-11 and 12-16; Dutch ages

6-11 and 12-16). The criteria for computing the syndrome scales for each age group involved retaining only those rotated factors with at least 6 items that displayed loadings greater than or equal to .30.

The preliminary results of the factor analyses of the CBCL for the clinically referred Dutch boys produced 7 syndrome scales for both age groups that showed correlations ranging from .80 to .98 with the same scales derived from the American sample. Moreover, in both age groups, the Aggressive syndrome exhibited the greatest similarity (.98). In a similar manner, the 2 versions of the Delinquent syndrome also exhibited high correlations for both age groups, .97 and .95 respectively. However, in comparison to the Aggressive scale, the number of items common to the Dutch and American versions was smaller. The correlations on the Hyperactive syndromes between the American and Dutch samples were also moderate to high, .86 for ages 6-11 and .93 for ages 12-16. Further analyses revealed that the commonality for the core syndrome between the two countries reflected more attentional problems than activity level. Overall the results indicated that the high degree of significant relationships that exists between the normative samples of American and Dutch boys in scale scores and in the percentiles above the 98th percentile cut-off on these syndromes support the use of the same syndrome scales by clinicians and researchers in the Netherlands and the United States. Furthermore, the replication of these syndromes in a non-clinical sample supports the notion that these behavioral/emotional problems are represented in both clinical and normal samples of children and adolescents. In comparison with Krapelinean classifications of behavioral problems in children, the syndromes found in this study,

Hyperactive and Inattentive, Aggressive, and Conduct Problems are reflective of those found in ADHD, ODD, and CD, respectively.

Achenbach, Conners, Quay, Verhulst, and Howell (1989) attempted to confirm the empirical identification of child and adolescent syndromes through principal components analyses on four sets of parents' ratings of 8,194 six to sixteen year olds referred for mental health services. The instruments used to collect the parents' ratings were the American Child Behavior Checklist for ages 4-16 (CBCL; Achenbach & Edelbrock, 1983), the Dutch translation of the CBCL (Verhulst, Akkerhuis, and Althaus, 1983), and the Achenbach, Conners, Quay (ACQ) Behavior Checklist (Achenbach, Conners, & Quay, 1983). Before any analyses were performed, the items for each sex/age group within each sample were checked to determine if they were reported in less than 5% of the group. Only 13 items fell below the 5% criterion in any group and these items were omitted from the principal components analysis. Analyses were also performed on all the items reported for greater than 5% of each sex/age group on the CBCL, Dutch CBCL, and ACQ, as well as the subset of ACQ items that had counterparts on the CBCL. The syndromes were operationally defined based on the item loadings above a particular cutoff on factors in the varimax rotation retained for a particular group. The cutoffs on an index of symptoms for diagnostic criteria are consistent with the polythetic format adopted by the DSM-III-R for some child/adolescent disorders. The diagnostic criteria encompassed in the DSM-III-R's polythetic format consists of "an index of symptoms of which a certain number but no single one is required to make the diagnosis" (American Psychiatric Association, 1987, p. xxiv).

Results indicated that the following six syndromes replicated strongly across all four sex/age groups: Aggressive, Anxious/Depressed, Attention Problems, Delinquent, Somatic Complaints, and Withdrawn. The study also sought to determine whether the syndromes derived from this study were commensurate with reviews of syndromes derived in other studies that compared the descriptive content of syndromes. The findings suggest that there is strong support for syndromes having many of the items found on the following eore syndromes in the present study: Aggressive, Anxious/Depressed, Attention Problems, Delinquent, Schizoid, and Withdrawn.

In comparison with the DSM-III-R categories, many of the items found to co-occur in the empirically derived syndromes, Aggressive and Delinquent, are complements to those in the DSM-III-R Conduct Disorder category. However, the results did not support a syndrome that corresponded to the DSM's Oppositional Defiant Disorder. Quay (1986a) noted that several of the problems delineating this classification in the DSM have been found in most empirically derived versions of the syndrome identified as Aggressive. Additionally, the results support a syndrome that includes both problems of attention and overactivity that are consistent with Attention-Deficit Hyperactivity Disorder. A majority of the items comprised in this syndrome involve inattention and problems with activity. In summary, the replicated syndromes provide preliminary support for the notion that parental reports should be a component in the taxonomy of child/adolescent disorders. Moreover, because these syndromes could be operationally defined in terms of specific assessment methods and cutoff scores based on large normative and clinical samples, they may be helpful in the construction of RDC for child/adolescent disorders (Achenbach et al., 1989). Taken together, empirical approaches

provide an efficient and cost-effective way of obtaining objective and reliable information regarding child behavior. Additionally, when used as a component in multimethod assessment they can improve the educational and mental health services rendered to children.

These traditional diagnostic studies have been aimed at identifying those symptoms that significantly differentiate referred and nonreferred children (Hodges, Kline, Stern, Cytryn, & McKnew, 1982) or between different groups of referred children (Costello, Edelbrock, & Costello, 1985; Herjanic & Campbell, 1977). As discussed earlier, studying childhood behavior disorders using clinic populations versus nonreferred cases may be problematic to the extent that referral bias makes such populations unrepresentative of the general population of disordered children (Carlson, Tamm, & Guab, 1997). Equally important is that the use of clinical populations to examine co-occurrence among disruptive behavior disorders may skew findings, as referred populations are atypical in their overrepresentation of subjects with more than one diagnosis (Berkson, 1946).

Comorbidity of Disruptive Behavior Disorders

Even though the conditions of ADHD, ODD, and CD represent the largest group of clinical referrals, comorbidity within disruptive behavior disorders is not uncommon. Collectively several researchers have denoted several conditions that are needed to establish the presence of the existence of a comorbid condition (Biederman, Kennan, & Faraone, 1991; Caron & Rutter, 1991). Because comorbidity can take place by chance, it is essential to determine whether comorbidity exceeds chance levels and by what

magnitude. Thus, the initial step is to establish whether or not two disorders co-occur at a rate better than chance, and then "calculate how much the risk of one disorder is altered when it co-occurs with another disorder" (Loeber & Kennan, 1994, p. 498). Next, it must be determined whether the course of one disorder is affected by the occurrence of another disorder. At this stage, Loeber and Le Blanc (1990) recommend that we distinguish between different temporal processes of conduct problems, including onset, escalation, persistence, de-escalation, desistance or cessation. Finally, the focus must be turned to the extent to which the relation between co-occurring disorders is symmetrical or not.

Therefore, the assessment issues that can affect conclusions regarding comorbidity, treatment efficacy and long-term outcome, need to be considered, as they are an essential components in the diagnostic, decision making process. Among these assessment issues are the informant (parent, child, or teacher) who provides the clinical interview data (Loeber, Green, Lahey, & Stouthamer-Loeber, 1989; Mannuzza & Gittleman, 1986), the algorithm or procedure used to combine information to arrive at a final diagnosis (Cohen, Velez, Kohn, Schwab-Stone, & Johnson, 1987; Kline, 1988; Reich & Earls, 1987), and situational or pervasive criteria that are used for diagnostic purposes (Klein & Mannuzza, 1989; Loeber, 1991).

If comorbidity patterns represent true co-occurrence, then the group represents a sizable subgroup of children with disruptive behavior disorders. When this is the case, the overlap between the two disorders indicates that they share the same risk factor or factors. This finding is particularly true in that many psychiatric disorders are mutifactorial in origin and many of the causal factors are not diagnostic specific (Caron & Rutter, 1991).

The subgroups "hyperactive" and "aggressive" defined by different instruments do not emerge as distinct disorders in that 30% to 90% of the children in one category were also classified in the other (Biederman, Newcorn, & Sprich, 1991). Moreover, there is a tendency for the overlap to be asymmetrical: conduct disordered/aggressive children have a higher probability of being hyperactive then vise versa (Hinshaw, 1987). This kind of overlap is especially evident in clinical samples, where pure ADHD children are identified easily (Reeves, Werry, Elkind, & Zametkin, 1987). Additionally, the overlap can also be attributed to the child-referred nature of the samples used. Children who are clinically referred do not represent the same population of deviant children. The distinction between nonreferred and referred cases varies on the severity of behavioral disturbance (Griest, Forehand, Wells, & McMahon, 1980), as well as the nature of parent-child interactions (Rogers, Forehand, Griest, 1981). In the case of cluster analytically defined subgroups, relatively little validation work has been done using multivariate techniques. Although this is a very promising technique, more research needs to be conducted in order add to the current literature in order to validate its future use.

However, different patterns of comorbidity can be produced artificially through sampling bias, referred to as Berksonian in epidemiology (Lilienfeld & Lilienfeld, 1980). The Berkson (1946) effect explains that for statistical reasons separate from referral biases, the comorbidity rate in clinic samples will always be greater than that in the general population whenever only a small portion of the conditions making up the comorbidity pattern are referred to clinics.

However, despite the existence of comorbidity between these disorders, there is a large variation between studies in the strength of the association observed. The absence of

the diagnostic efficiency property in the measures used in these studies to differentially separate the symptoms associated with these disorders may be related to the samples used. The existence of comorbid conditions in psychiatric and disruptive disorders have been established by two review studies (Biederman, Newborn, & Sprich, 1991; Loeber & Kennan, 1994).

When Loeber & Kennan (1994) reviewed the literature on disruptive behavior disorders, they identified that studies on CD have not sufficiently emphasized that youth diagnosed with the disorder are prone to exhibit one or more comorbid conditions. The most well-known of these conditions is ADHD. Because ADHD is one of the earliest appearing disorders in childhood, it is one of the earliest conditions to emerge with comorbidity with CD, with the motor hyperactivity component being the first noticeable behavior (Loeber et al., 1991). Other studies have shown that in a proportion of ADD cases, CD does not develop until late childhood or adolescence, indicating that some hyperactive youngsters, even when not displaying oppositional/conduct problems in elementary school, developed conduct problems later (Gittelman et al., 1985; Szatmari, Boyle, & Offord, 1989; Velez et al., 1989). Thus, even though the co-occurrence of ADD and CD may be quite early, some ADD youth do not develop comorbid disruptive disorders until adolescence.

With this review, the focus was placed upon large, epidemiological samples so that the results were representative of the population parameters. The degree of co-occurrence in epidemiological surveys have shown that the prevalence of ADHD decreases with age for both sexes (Gittelman et al., 1985; Szatmari, Boyle, & Offord, 1989; Velez et al., 1989). However, the prevalence of CD tends to increase from

childhood to adolescence, irrespective of whether DSM-III or DSM-III-R diagnostic standards are used (Gittelman et al., 1985; Velez et al., 1989). Szatmari et al. (1989) found that through the an analysis of a community sample of children between the ages of 4 to 11 years old, prevalence of pure ADD was about twice that of pure CD. The prevalence of pure CD was twice as large as that of pure ADD for children between the ages of 12 and 16. This trend alludes to the fact that the co-occurrence of ADD and CD peak during middle childhood, a period in which the overlap in prevalence would be at its highest.

The relative degree of comorbity between ADHD and CD may partly be more of a reflection of the impulsive behaviors that are characteristic of both of these disorders. Equally of concern is research on the developmental course of ADD suggests that children and adolescents may continue to manifest problems with inattention, even though the symptoms of hyperactivity and impulsivity tend to wane and decrease in adolescence (Hart et al., 1993). In addressing the developmental process, Milich and Loney (1979) found that "there is considerable evidence that, although the primary symptomology of hyperactivity may decrease with increasing age, many secondary problems develop or worsen during adolescence" (p. 99).

Although the distinguishing features associated with the disorders ADHD and CD seem to reflect sensitivity to a host of empirical evidence, there are far more features associated with their comorbidity. The features that are commonly associated with the comorbidity between CD and ADHD include greater symptom severity (Offord, Sullivan, Allen, & Abrams, 1979; Walker, Lahey, Hynd, & Frame, 1987), increased risk for later antisocial behaviors (Farrington, Loebor, & Van Kammen, 1990; Schacher, Rutter, &

Smith, 1981), greater levels of parental psychopathology and psycho-social adversity (Lahey et al., 1988; Schacher & Wachsmuth, 1990), more peer rejection (Johnston & Pelham, 1986; Milich & Dodge, 1984; Pelham & Bender, 1982), deficient processing of social information (Milich & Dodge, 1984).

The literature associated with CD and ODD, converges on two viewpoints. The first is that children who are diagnosed with disruptive, aggressive and rule breaking symptoms suffer from a single condition with different levels of severity. From a developmental perspective, researchers have identified the age of onset for ODD is earlier than CD, and there are certain age trends in the comorbidity of CD and other disorders that have been postulated (Gittelman, Mannuzza, Shenker, & Bonagura, 1985; Velez, Johnson, and Cohen, 1989). The starting point that the prevalence of CD increases is during early adolescence. If another disorder decreases in prevalence with age during the same time period, we would expect that the comorbidity of that disorder with CD to decrease with age. Thus conceptualizing ODD and CD according to the correlates they share, lower socioeconomic status, inadequate parenting, and parental antisocial behavior, suggests that ODD may indeed be perceived as a less mature and less severe manifestation of CD or that there is a hierarchical relationship between ODD and CD (Lahey et al., 1992). This assumption is clearly articulated in the DSM-III-R, (p. 57): "In Conduct Disorder all of the features of Oppositional Defiant Disorder are likely to be present: for that reason, Conduct Disorder preempts the diagnosis of Oppositional Defiant Disorder." Using this methodology reflects an assumption that ODD and CD are similar enough that combining them into one group still gives us the ability to draw meaningful conclusions from this single category (Lahey et al., 1992). Moreover, Walker et al. (1991)

reported that 96% of clinically referred boys aged 7-12 years who met DSM-III-R criteria for CD also met full criteria for ODD. Data collected from the field trials of the DSM-III-R noted that 84% of clinically referred youths with CD also met criteria for ODD (Spitzer et al., 1991). Consequently, the viewpoint that clinic-referred youths with CD exhibit the same symptoms as youth with ODD and differ only by also exhibiting more serious antisocial behaviors can be supported. Although this relationship exists, it should be demonstrated that youth diagnosed with CD are more likely to exhibit ODD than children with other disorders. Frick, O'Brein, Wootton, and McBurnett (1994), and Loeber, Lahey, and Thomas (1991) indicated these studies all failed to distinguish between behavioral covariation and etiological factors; thus, their conclusions are suspect.

The second viewpoint acknowledges that ODD and CD are discrete disorders. Loeber et al. (1991) introduced three reasons why ODD and CD appear to be distinct enough to be considered separate disorders. One factor suggests that there is sufficient evidence to prove that many children and adolescents with ODD do not go on to meet the criteria for CD (Lahey, Loeber, Quay, Frick, & Grimm, 1992; Loeber, et al., 1991; Loeber et al., 1993; Russo, Loeber, Lahey, & Kennan, 1994). The second claim is that although many children who develop CD during childhood have already developed ODD, a substantial number of youths who develop CD for the first time during adolescents have not previously exhibited ODD (Lahey, Loeber, Quay, Frick, & Grimm, 1992; Loeber et al., 1991). The developmental progression that begins in adolescence rather than early childhood has been referred to as the late-starter (Patterson et al., 1991), adolescent-onset (Hinshaw et al., 1993), adolescence-limited (Moffitt, 1993), or nonaggressive antisocial pathway (Loeber, 1988). This illustrates that studies that use longitudinal research designs

can distinguish groups of individuals with different developmental histories who appear similar in their behavioral presentation at a single assessment. Furthermore, Moffitt, Caspi, Dickson, Slivia, & Stanton (1996) found that in contrast to boys with early development of conduct problems, the late-starter boys showed no evidence of verbal IQ deficits, reading difficulties, preexisting family adversity, or temperamental difficulties. The final factor maintains that symptoms of ODD and CD are largely distinct disorders with partially related etiologies (one or more etiological factors in common). On a practical level, this conceptualization was addressed by empirical support on factors such as behavioral covariation, age of onset, the developmental course, correlates and risk factors, stability and predictability, seriousness ratings, and treatment implications. In their reviews of over 60 factor analytic studies (Loeber & Lahey, 1989; Quay, 1986a), and the factor analysis by Achenbach et al. (1989) supported the distinction between CD and ODD, and identified a two dimensional construct composed primarily of more serious and less serious conduct problems. However, the findings can also be interpreted as implying that the concept of ODD should be expanded to include at least some aggressive behaviors.

Biederman, Newcorn, and Sprich (1991) conducted a systematic search of the psychiatric and psychological literature for empirical studies dealing with the comorbidity of attention deficit hyperactivity disorder with other disorders. Definitions from the DSM-III-R for attention deficit hyperactivity disorder and related disorders anchor this review; however, some of the studies used other means of classification, including DSM-II, DSM-III attention deficit disorder, and dimensional descriptions of clinical syndromes.

In discussing the relationship between attention deficit hyperactivity disorder and conduct disorder, two central positions can be identified: attention deficit hyperactivity and conduct disorders are indistinguishable, or they are either partially or completely independent. The positions that supports that these two disorders are indistinguishable suggests that given the measurement and/or diagnosis of either attention hyperactivity disorder or conduct disorder, the identification of the other yields no additional information. Proponents of this position point to the similarities between children with attention hyperactivity disorder and those with conduct disorder has frequently been denoted in studies of correlates, outcome, and treatment responses (Barkley, McMurray, Edelbrock, 1989; Quay, Routh, & Shapiro, 1987). In a similar manner, investigators have pointed out the intercorrelations between symptoms of these two disorders that has been reported in factor-analytic studies of children with behavioral disorders (Campbell & Werry, 1986; Quay, 1986b). Finally, proponents of this position acknowledge that there is a lack of substantial differences in psychosocial, neurodevelopmental, and prenatal factors between children with ADHD and children with CD (Sandberg, Wieselberg, & Shaffer, 1980).

Those proponents who view ADHD and CD as partially or completely independent have found support in studies that compare patterns of familial aggregation, cognitive performance, and outcome of children with ADHD with those of children with ADHD plus conduct disorder. Loney, Kramer, and Milich (1981) found that the symptoms of hyperactivity and aggression were not highly correlated and showed different patterns of concurrent and predictive validity, which suggests they are separate disorders. Specifically, the presence of conduct disorder in childhood, whether associated

with attention deficit hyperactivity disorder or not, was significantly correlated with aggressive behavior and delinquency in adolescence, but childhood attention deficit hyperactivity disorder without conduct disorder was correlated with cognitive and academic deficits (Szatmari et al., 1989; Milich & Loney, 1979; Stewart, deBlois, Cummings, 1980). Similar findings emerged from a follow-up study in a nonclinical sample (McGee, Williams, Silvia, 1984a; McGee, Williams, Silvia, 1984b). If one were to consider subgrouping based on the comorbidity with CD, there may be potential value in determining which children with ADHD have a more serious prognosis and different family-genetic risk factors and require specialized comprehensive therapeutic interventions.

The debate as to whether ADHD and CD are distinct disorders is still unresolved, but there is a considerable amount of evidence that indicates that they are at least partially independent dimensions and/or categories. They do differ not only in their defining clinical features but also in external variables such as outcome (cognitive dysfunction for ADHD versus aggression, antisocial behaviors, substance abuse, and delinquency for CD), etiological factors (familial aggregation), and psychosocial and developmental correlates.

In the research investigating the comorbidity of ADHD and ODD, only a few studies have generated data on these two groups and the status remains unclear (Popper, 1988; Werry, Reeves, & Elkind, 1987). With respect to subgrouping, some researchers have grouped ADHD and ODD into a single antisocial behavioral category, making it difficult to draw conclusions about oppositional defiant disorder itself. The studies that have date on these two disorders report an overlap of at least 35% between ADHD and

ODD, either alone or combined with CD in both epidemiologic (Anderson, Williams, & McGee, 1987; Bird, Canino, & Rubio-Stipec, 1988) and clinical (Biederman, Faraone, Kennan, 1990; Faraone et al., 1991) studies of children and adolescents.

These large bodies of research have been successful at identifying a number of correlated domains of disruptive behavior including oppositional defiant behavior, attention deficit hyperactive behavior, and conduct disorders (Achenbach et al., 1989; Fergesson et al., 1994; Rey & Morris-Yates, 1993). However, many of the studies that examine comorbidity use clinical samples and this complicates generalizability, as referred groups of patients by definition will contain a disproportionately large percentage of persons who show comorbidity (Berkson, 1946; Caron & Rutter, 1991). Thus, in order to unravel this seemingly unresolvable issue, one possible alternative is to use a different form of categorization that is frequently called the prototype view.

Model of Analysis

Critiques of the psychiatric diagnostic system have focused on three primary problems: (a) lack of reliability of diagnostic judgments (Eysenck, 1952; Mehlman, 1952; Scott, 1958), (b) heterogeneity among similarly diagnosed patients (Blum, 1978; King, 1954; Rutter, 1954; Wittenborn & Bailey, 1952), and (c) failures to demonstrate predictive utility (Hunt, 1951; Hunt, Wittson, & Barton, 1950). In providing an explanation of this model, the assumptions surrounding it must be clarified. The critical assumption that defines this system is that the features need only be correlated with category membership; they need not be necessary and sufficient. The assumption of correlated features does not require categories to have defining features. Thus, the

assumption allows for borderline cases because the case may fail to have many of the correlated features of the prototype. It also permits extensive heterogeneity of category instances. Thus, one instance may contain most of the correlated features of the prototype and another may contain hardly any. A second assumption is that of categorization. Given the idea of prototypes as representations of categories, a natural way of determining that an instance belongs to a category is to compute the overlap in features between instance and category prototype. Thus, the immediate consequence of this prototype-matching process is that typical instances will be categorized more efficiently than atypical ones, of diagnostic efficiency in terms of their true positive hit rates (Cantor, Smith, French, & Mezzich, 1980). This model provides a method for which the diagnostic efficiency of each of the features and each combination of features can be calculated. Therefore, it is possible to compare the various combinations of features to identify which combination of features may be more efficient in the diagnosis of a disorder.

One application of this classification system is by studying differential diagnosis of disorders through the use of conditional probability methods and Bayesian statistics (i.e., positive predictive power (PPP), negative predictive power (NPP), sensitivity (SEN), specificity (SPE), and base rates).

Conditional Probability

Widiger et al. (1984) present the term conditional probability as referring to a probability that is based on only part of the population (e.g., the probability of disorder "X" given that the individual comes from the subpopulation of subjects with symptom "Y"). Base rate refers to the prevalence of an event (e.g., a symptom or condition) within

a population. In addition to this basic statistic, there are four other indices that are becoming more popular and useful for examining the efficiency of symptoms in the diagnosis and differential diagnosis of a disorder: sensitivity, specificity, positive predictive power, and negative predictive power. Sensitivity and specificity are, in fact, Conditional probabilities (CP), but are rarely acknowledged as such. Sensitivity indicates the proportion of subjects with the disorder who will be identified by the symptom (i.e., true-positive rate) and provides information about a symptom's efficiency as an exclusion criterion because the symptom that is almost always present may rule out the disorder by its absence (Milich et al., 1987). For example, sensitivity indicates the probability that a child with the flu is likely to have a high temperature. Specificity indicates the proportion of subjects without the disorder who will not have the symptom (i.e., true-negative rate) and provides information about a symptom's efficiency as an inclusion criterion. (Milich et al., 1987). For example, in the case of cancer, specificity expresses the probability that a patient does not have lung cancer, and has a negative test for emphysema. Positive predictive power (PPP) is the proportion of individuals with the symptom who have the disorder and equals the conditional probability of having the disorder given the presence of the symptom. Complementary to PPP is NPP, which is the proportion of individuals without the symptom who do not have the disorder. For the purposes of this paper, symptom refers to the manifestation of a disorder.

Recognized earlier, the indices PPP and negative predictive power (NPP) have also been defined as representing the confidence one has in generalizing from a behavior to a disorder (i.e., inductive statistic). Alternatively, sensitivity and specificity represent the confidence one has in generalizing from a disorder to a behavior (i.e., a deductive

statistic). Landau et al. (1991) extended the relationship between these indices by demonstrating that PPP should be correlated with specificity and NPP correlated with sensitivity depending on the base rates of behaviors and disorders.

Benefits of Usage

Considering the use of (CP) and their counterparts, Bayesian probabilities, poses some immediate benefits to clinicians and researchers with direct implications to clinical discriminations in psychological assessment. Frick et al. (1994) noted that using CP not only provides information to clinicians on the empirical foundations of disruptive disorder criteria, but also gives information on the relationships that exist between symptoms and diagnoses for use in actual practice. They also called attention to the fact that the information that CP yield can be factored into diagnostic decision-making, which will in turn assist in defining the core features of the disorder. Additionally, Elwood (1993) asserted CP is more relevant to daily decisions than complex multivariate between group analyses. However, conditional probability methods can be viewed as a complex variation of item-total correlational analyses.

The use of base rate information typically involves contrasting it with some kind of individuating or diagnostic information, such as personality description or the true-positive-rate and a false-positive rate of a test. Research in this area demonstrates the base-rate fallacy, when decision makers are presented with base rate information and they defer to the individuating information even when it is irrelevant to the decision to be made (e.g., Borgida & Nisbett, 1977; Kahneman & Tversky, 1973). Additionally, base rates also give explicit recognition to the overall accuracy rate achieved by using

diagnostic signs and the frequency of false positive and negative errors. Because professionals are likely to make the same kinds of decision-making errors as nonprofessionals, neglecting or underusing base rates can lead to serious diagnostic decision making errors. So, why is that base rates are continually disregarded? One conclusion is that many clinicians are confident in their decision making ability and have limited awareness of the importance of base rate information for diagnostic accuracy (Kennedy, Willis, & Faust, 1997). Yet, Moldin, Gottesman, Rice, & Erlenmeyer-Kimling (1991) in their investigation of the predictive powers of the Minnesota Multiphasic Personality Inventory (MMPI), showed that this renowned clinical test is highly influenced by moderate base rates typically encountered in clinical practice. Therefore, being in possession of the base rate information of a particular sample puts clinicians in the position to calculate the overall accuracy rate achieved by using diagnostic signs and the frequency of false-negative and false positive errors (Kennedy et al., 1997). As a result, Kennedy et al (1997) acknowledges that clinicians can rely on strategies that optimize utility, irrespective of maximizing sensitivity or specificity, by shifting the ratio of false-negative and false positive errors in the desired direction. Consequently, base rate changes can alter the frequencies of certain kinds of errors (e.g., incorrectly diagnosing a condition as not present) reducing the issue to little or no importance.

Thus far, the discussion has only presented the utility of CP and base rates without recognizing the limitations and influences that can attenuate the efficiency of these methodologies. Although SPE and SEN values do present information that is relevant to diagnostic decisions, they are often mistakenly interpreted to predict valid negatives when they actually express the inverse probabilities. As a result, the ability of tests to

discriminate individuals in typical clinical situations is greatly exaggerated (Landau et al., 1991; Milich et al., 1987). Another assumption claims that SEN and SPE are more preferable because their values, in principle, are independent of the base rates. However, Robin (1985) noted that sensitivity and specificity fail in their stability across settings causing fluctuations in PPP and NPP.

With respect to PPP and NPP, we must always remember that the PPP and NPP rates are always dependent in part upon the local base rates for the disorder being diagnosed. Because these indices are influenced by base rates, the effect is reciprocal in nature (Elwood, 1993). Specifically, PPP is vulnerable to a loss in specificity (i.e., an increase in false positives), whereas NPP is reduced by the loss of sensitivity (i.e., an increase in false negatives). When used in isolation base rates actually decrease the accuracy of diagnostic signs or indicators (Kennedy et al., 1997). Thus, it would be self-defeating to use any criteria in isolation or make decisions solely on their evidence. In isolation, they should be framed as an analysis of the kinds of errors one is willing to make (e.g., the consequences of overdiagnosing, i.e., false-positive error versus a false-negative error).

The current literature does not convincingly support the use of CP, but the research, in the context of their usefulness to the clinician tends to support their necessity for drawing accurate inferences regarding the relative diagnostic efficiency of the symptoms. However, Meehl and Rossen (1955) effectively demonstrated four decades ago that the probability of valid test positives are dependent upon the base rate, or prevalence, of the target disorder in the population being assessed and "the base rate

establishes the proportion of valid test positives that would result from chance alone" (p. 24).

Selected Research

The publication of the classic article by Meehl and Rosen (1955), showing the effects of base rates on the accuracy of clinical discriminations, continues to be largely ignored in the application of classification and evaluation of clinical tests despite the fact their findings are widely conceded. Elwood (1993) claimed that the concept of predictive power has also become increasing acknowledged in the psychiatric and psychological literature. Additionally, it has been applied to the diagnosis of mental disorders (Widiger, Hurt, Frances, Clarkin, & Gilmore, 1984). Recently this concept has been introduced as method validating psychological tests (Gerardi, Keene, & Penk, 1989; Moldin et al., 1991; Olin, Schneider, Eaton, Zemansky, & Pollock, 1992; Rarp, Paris, Walsh, & Wallace, 1988). Because diagnostic decisions have never been a matter of simply determining the probability of a diagnosis given the symptom, several studies have employed conditional probability methods to examine the efficiency of symptoms for (a) differential diagnosis of disorders using DSM symptoms (Landau, Milich, & Widiger, 1991; Laurent, Landau, & Stark, 1993; Milich, Widiger, & Landau, 1987; Pelham, Evans, Gnagy, & Greenslade, 1992; Waldman, & Lilienfeld, 1991; Widiger, Clarkin, Hurt, & Gilmore, 1984; Widiger, Hurt, Frances, Clarkin, & Gilmore, 1984), (b) judgments of children's social competence (Gresham, Noell, & Elliott, 1996), and (c) classification of children presented in case scenarios (Kennedy, Willis, & Faust, 1997). Although these

studies attempted to explore the diagnostic efficiency of this methodology, they have been criticized because they were confined to local, unrepresentative samples of subjects.

Differential Diagnosis

Pelham, Evans, Gnagy, and Greenslade (1992) examined the predictive efficiency of the individual DSM-III-R symptoms from the Disruptive Behavior Disorder Rating Scale (DBD) in defining the disruptive behavior disorders in special education. The DBD was composed of the 36 DSM-III-R criteria for ADHD, ODD, and CD, randomly ordered across diagnostic categories, and reflected the response format of the Conners Teacher Rating Scale (Conners, 1969). That is, each item was rated on a 4-point scale ranging from 0 ("not at all") to 3 ("very much"). In their sample, 364 ratings of boys between the ages of 5 and 19 and attending various part- or full-time special education classes for reasons other than Mental Retardation were found to be usable for this study.

After dividing the sample into age groups comparable to the normative data presented in Pelham, Gnagy, Greenslade, & Milich (1992), the proportion of the sample that exhibited the number of symptoms required for DSM-III-R diagnostic cutoffs (eight symptoms for ADHD, five symptoms for ODD, and three symptoms for CD) were calculated. Analysis of these rates indicated that ODD and CD were highest in the oldest age range; however, the rates for ADHD were variable but high across all ages. Comorbidity estimates showed that the overlap between ADHD, ODD, and CD, collapsed across age fell at 38% for those special education students that met the diagnostic criteria on the DBD for ADHD, versus 25% for ODD, and 9% for CD, with considerable overlap between the disorders. Overall, 43% of the sample met criteria for

one or more diagnoses, and this percentage is somewhat lower than what was reported by others (e.g., Mattison, Humphrey, Kales, Handford, Finkenbinder, & Hernit, 1986).

The hallmark symptom of ADHD, "easily distracted," had the lowest PPP rate, revealing that it performed poorly as an inclusionary item for the diagnosis of ADHD. However, the absence of the symptom did the best job of indicating the absence of the disorder (NPP = .88). Therefore, this symptom has more power as an exclusionary item. A similar pattern emerged for those symptoms reflecting inattention. In contrast, the symptom "interrupts or intrudes on others" did the best job of indicating the presence of the ADHD disorder (PPP = .91), but had a relatively low NPP rate (.71). This reverse pattern was also present for many of the symptoms reflecting impulsivity, further signifying that they function better as inclusionary than exclusionary items in this sample.

Relative to the disorder ODD, the PPP rates for the ODD items in predicting the diagnosis of ODD ranged from .68 to .98. The symptom "spiteful or vindictive" convincingly confirmed an ODD diagnosis (PPP = .98), however, it did not function as well as in indicating the absence of the diagnosis (NPP = .82). The NPP rates for the ODD items were uniformly high (.80 or greater). Overall, ODD symptoms did as good of a job predicting the presence of ADHD as did the ADHD symptoms. Conversely, NPP rates were relatively lower for the ODD items compared to the ADHD items that indicated the absence of ADHD. The ADHD symptoms were not useful in predicting ODD, PPP rates; however, the NPP rates for ADHD symptoms predicting ODD were relatively high (all NPPs > .78), indicating that the absence of the ADHD symptom predicted the absence of the ODD diagnosis.

The prominent limitation of this study was not the fact that a substantial proportion of the sample met criteria on the Disruptive Behavior Disorder (DBD) Rating Scale for diagnosis of the DSM-III-R disruptive behavior disorders, but that the information was limited because diagnosis was based solely on teacher report. The classification of children for special education is based on the decision of a multidisciplinary team as well as a combination of multiple informant reports regarding the child's academic, behavioral, and social functioning. Despite this limitation a great majority of the children, 136 of 155, met criteria for ADHD. This finding is consistent with the literature on disruptive behavior disorders, there is considerable overlap between children identified as ADHD, ODD, and CD (August, Realmuto, MacDonald, Nugent, & Crosby 1996; Hinshaw, 1987).

Related to the aforementioned limitation, teachers have little knowledge about the DSM-III-R symptomology of disruptive behavior disorders and/or are not able to observe the more serious symptoms (i.e., cruelty to animals, setting fires). This limits the utility of the DBD scale as the sole source of diagnostic information for CD or ODD. Moreover, based on teacher ratings, it appears that some of the symptomology in the special education population for oppositional and conduct disorder, have a high degree of covariation. Finally, these results provide some insight on the differences between the epidemiological indicators SEN and SPE versus PPP and NPP. For example, the distractibility symptom has a relatively high sensitivity (SEN = 0.87) for ADHD, and the likelihood that a child with ADHD being rated as distractible is relatively high. However, the sensitivity of "easily distracted" is nearly as high for diagnosis of ODD (0.84). This item demonstrates the same sensitivity rates for ODD diagnosis as it does for ADHD

diagnosis. On the other hand, a child rated as interrupting and intruding should have a higher probability of receiving the ADHD diagnosis (PPP = 0.91) but not likely to be diagnosed as ODD (PPP = .62). This illustrates that sensitivity and specificity indices provide information quite different from PPP and NPP rates. Therefore, reliance on SEN and SPE measures for diagnostic purposes can be misleading.

Diagnosis of Depression and Anxiety Disorders

Using a diagnostic interview format, a multistage selection procedure, and Bayesian item statistics, Laurent, Landau and Stark (1993) argued that it was possible to identify the most efficient diagnostic inclusion and exclusion criteria for childhood anxiety and depression. Additionally, they wanted to test the efficiency of symptoms in the diagnosis of childhood internalizing disorders by applying the NPP and PPP analyses. The first wave of participants consisted of 750 fourth through seventh graders from a suburban and rural school district. After being screened for evidence of depression, 115 fourth, fifth, sixth, and seventh graders remained for whom permission to participate was obtained. The final sample consisted of 85 girls and 30 boys. The majority of the participants (94%) were regular education students with the remaining 6% of the sample receiving special education support in a resource room setting.

The Childhood Depression Inventory (CDI; Kovacs, 1980/81) and Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds and Richmond, 1985) were used to determine the children's continued participation in the study. However, the children were assigned to group classification based on results of a clinical interview, the Schedule for Affective Disorders and Schizophrenia for School-Age Children (K-SADS; Puig-

Antich & Ryan, 1986). Using the results of the anxiety and mood disorders portion of the K-SADS interview, 34 students were identified as exhibiting a diagnosable depressive disorder using DSM-III-R criteria and 30 participants were identified as exhibiting a diagnosable anxiety disorder.

Following the K-SADS interview, interrater reliability was calculated on the K-SADS symptom ratings. A total of 28 audio tapes were randomly selected from a pool of 133 interviews with children who completed the second stage of screening. Independent raters listened to the audio tapes and evaluated the child on each K-SADS symptom. The percentage of agreement was calculated based on an exact match (i.e., agreement on each symptom) between the interviewer and rater. Each child was then given a diagnosis based on the judgment of two of the authors who reviewed the K-SADS interview protocols and used strict DSM-III-R diagnostic criteria. The interrater agreement 91% for depressive disorders and 93% for the anxiety disorders.

Of the original sample of 720 children, 35 youngsters were identified as presenting a depressive disorder, and 30 were identified as presenting an anxiety disorder. The results identified a number of symptoms, with PPP rates = 1.00, for individual depression symptoms, indicating that every child whom reported that symptom was diagnosed as having a depressive disorder. Unexpectedly, most of these symptoms appeared so infrequently that their utility for diagnostic purposes was questionable. The symptom "being loved" emerged as the most efficient symptom, predicting depression in all the cases that were self-reported (PPP = 1.00); however, its absence strongly predicted that depression was unlikely (NPP = 1.00). Therefore, the symptom "feeling loved" could be considered a two-way pathognomic for the disorder (i.e., it served as both an efficient

inclusionary and exclusionary criteria). The symptom "anhedonia" emerged as the second most efficient inclusion criteria for the disorder. Additionally, the symptoms "depressed mood" and "excessive guilt" were found to have sufficient utility for use in the diagnosis of depression (PPP values were .81 and .89, respectively). Children who denied these symptoms revealed that a diagnosis of depression would be unlikely (NPP rates of 0.81 and 0.75, respectively), making them strong exclusion criteria.

In the identification of the most efficient inclusion symptoms for anxiety, none of the depression symptoms showed a higher PPP rate for the diagnosis of anxiety than the depression diagnosis. Two of the symptoms "anorexia" and "suicidal ideation" displayed equal PPP rates for both of the disorders (0.60 and 0.80, respectively). Interpretation of these rates indicates that children who admitted either of these symptoms would have an equal probability of being diagnosed as having an anxiety disorder, making them unreliable for the differential diagnosis. Examination of the PPP and NPP rates in terms of their diagnostic efficiency as inclusion and exclusion criteria were assessed for the diagnosis of anxiety were also performed. The anxiety items obtained a mean PPP rate of 0.65 in identifying an anxiety disorder. In comparison to the mean PPP rate for depression, the anxiety symptoms operated less efficiently as inclusion criteria for their respective diagnosis. Examination of the mean PPP rates for anxiety symptoms in the diagnosis of depressive disorder revealed that on average the anxiety symptoms were more efficient predictors of a depression diagnosis than an anxiety diagnosis. Further analysis of the individual PPP rates of the anxiety symptoms proved that a majority of the anxiety symptoms were better predictors of depression than anxiety. This is clearly problematic for the differential diagnoses of these two disorders. Many of these

symptoms reflect of the physiological markers of the presence anxiety, while the other symptoms appear in the diagnostic criteria sets of both anxiety and depressive disorders in the DSM-III-R.

An additional set of anxiety symptoms containing the stem "worry about..." were the only symptoms that operated as expected in the diagnosis of anxiety disorders. They proved to be efficient as both inclusion and exclusion criteria, fitting the criteria as a two-way pathognomic. This set of symptoms had high PPP and NPP rates, revealing that if a child admitted to having these symptoms they were likely to be diagnosed as having an anxiety. Conversely, children who declined these symptoms were more likely to not be diagnosed as having an anxiety disorder. It was further noted that this set of symptoms were quite characteristic of anxious children. In summary, the base rates for these symptoms suggest that they present with sufficient frequency to be included in the diagnostic decision-making process.

The results of the present investigation reflects four points to be concerned by those interested in the diagnosis of anxiety and depressive disorders in children. First, the use of conditional probability analysis has merit in the study of symptomology related to the diagnosis of internalizing disorders and some the problems that may be inherent in the differential diagnosis of these disorder based on children's self-reports. One issue that is related difficulty experienced in the differential diagnosis of these two disorders is that they share many common symptoms making their distinction as separate disorders elusive (Brady & Kendall, 1992; Clark & Watson, 1991; Eason, Finch, Brasted, & Saylor, 1985; Finch, Lipovsky, Casat, 1989; Katon & Roy-Byrne, 1991). Second, the current findings revealed a significant degree of overlap (13 of the 22 depression symptoms and 25 of the

28 anxiety symptoms examined) showed comparable or higher PPP rates for the other disorder. This indicates a need for systematic set of guidelines to be developed for the diagnosis of these disorders given the frequent revisions to the psychiatric taxonomy (Laurent et al., 1993). Third, although these two disorders share common symptoms, this investigation identified some that appear to be unique to each disorder and that the same symptoms are not parallel between children and adult diagnoses for these disorders. The symptoms "feeling unloved," "anhedonia," "depressed mood," and "excessive guilt" were the best inclusion symptoms in the diagnosis of depression and consistent with the pattern found by Clark and Watson (1991). In addition, the denial of the symptoms "depressed mood" and "excessive guilt" was strongly indicative that a depression diagnosis was unlikely. Thus, the symptoms reflecting loss of pleasure or melancholia were consistent in what Clark and Watson reported for adults. Equally important is the fact that Clark and Watson (1991) reported that are unique to adult anxiety; however, the findings in this study indicated that physiological symptoms were the most efficient at differentiating children with an anxiety disorder from those with a depressive disorder. Finally, when considering the use of children's self-reports in the diagnosis of anxiety disorders, emphasis should be placed upon the presence of an anxious mood or affectivity. In consideration of the school-based population used in this investigation, interview questions about children's competence in different areas (i.e., athletics, academics, and peers) seem salient and perhaps the best forum for demonstrations of proficiency in these areas (Laurent et al., 1991). In contrast, questions soliciting information about heart palpitations or autonomic hyperactivity hardly seem appropriate or sensitive to the cognitive maturity or capabilities of children this age.

Judgment of Social Competence

The Social Skills Rating System (SSRS; Gresham & Elliott, 1990), Gresham, Noell, & Elliott, (1996) employed conditional probability methods to differentiate children judged by teachers as belonging to social competence (SC) or low social competence (LSC) groups using a large representative sample of children. Specifically, this study used item statistics to determine the presence or absence of social skills as being predictive of low social competence (PPP and NPP) and the presence or absence of social skills (SEN and SPE). A total of 1,021 students (500 males, 521 females) in kindergarten through sixth grades, stratified by ethnicity, geographic region, and community size were assigned group membership, SC and LSC, based on the total (SSRS) raw score from teacher ratings. Children with Social Skills Rating Scale - Teachers form (SSRS-T) raw scores that fell within the range of one standard deviation or greater below the mean were assigned to the LSC group. Conversely, children with SSRS-T raw scores that fell at or above the mean were assigned to the SC group.

For the sample of females, 12 of the 30 SSRS-T items proved to be accurate inclusionary criteria for identifying membership in the LSC group, with NPP values falling in the range of .85 to .91. There were 25 SSRS-T items with NPP values above .80, suggesting that all items are fairly accurate in excluding children as belonging to the LSC group. Twelve items were categorized as both inclusionary and exclusionary criteria (two-way pathognomics), good predictors of both inclusion into and exclusion from the LSC group. Additionally, the PPP values for males ranged from .32 to 1.00. As with

females, the SSRS-T items functioned better as exclusionary criteria as indicated by consistently high NPP values, ranging from .84 to .93.

SSRS-T showed poor SEN rates for both males and females. Specifically, if a male or female was identified as belonging to the LSC group, the SSRS-T functioned poorly at predicting the absence of a particular social skill. Thus, we can confidently state SSRS-T items for males were accurate predictors of true negatives (i.e., SC group membership). In this study, social skills, as measured by the SSRS-T, function more accurately as exclusionary criteria for identifying teacher judgments of LSC group membership (high NPP values) and identifying true negatives for LSC group membership (high SPE values) for both females and males.

The results of this study indicate that conditional probability methods can be used in the identification of specific behaviors that are related to teachers' global judgments of social competence. However, one of the criticisms that challenged this study was changing a continuous variable (SSRS-T total score) to one reflecting a dichotomy (LSC and HSC). Cohen (1983) argued that the "throwing away of variance" is often unjustified. Yet, support for this change has been demonstrated in several studies using various behavioral rating scales to index social skills for children with mild disabilities (Gresham & Elliott, 1990; Gresham, Elliott, & Black, 1987; LaGreca & Stone, 1990; Merrell, 1993; Merrell, Johnson, Merz, & Ring, 1992; Stumme, Gresham, & Scott, 1982; Swanson & Malone, 1992). A second criticism indicated that like Pelham et al. (1992) and Milich et al. (1987), the results were restricted to global teacher ratings/judgments.

Because conditional probability analyses were based on data obtained from the same source: teachers rating the absence or presence of social skills, it must be

recognized that reporting the absence of different social behaviors as measured by other methods may be predicting social incompetence. Further the investigators acknowledged that this is clearly the case due to the evidence that different raters agree at low to moderate levels (Achenbach, McConaughy, & Howell, 1987; Gresham & Elliott, 1990; McConaughy, 1993).

Classification of Children

Kennedy, Willis, and Faust (1997) mailed information packets that contained six different case scenarios to a sample of 300 psychologists, trainers and practitioner. The overall response rate was 45%, that is 134 respondents. Three kinds of information were provided in varying combinations with each packet that was sent to the participants. The section containing the case scenarios included (a) base-rate information, (b) irrelevant individuating information, and (c) relevant, diagnostic accuracy rate information. Every packet included base-rate information, specifically the percentage of boys diagnosed with a learning disability in a school (i.e., 10%). Of the packets that were sent to the participants two-thirds of packets contained irrelevant information, two-thirds of packets contained relevant accuracy-rate information which pertained to the procedures in diagnosing LD. Additionally, half of packets contained a statement designed to link the base-rate information with the diagnosis to be predicted.

The participants rated the probability that the child identified in the case scenario had a learning disability, then rated their confidence on their decision. The design of the study was to randomly assign each psychologist to one of six conditions. The first independent variable had three levels: (a) base rate plus irrelevant information,

(b) base-rate plus accuracy rate information, and (c) base rate information plus accuracy rate information plus individuating information. The other independent variable had two levels: (a) salient link between that base-rate data and the category to be predicted; no link provided between that base-rate data and the category. The dependent variables of the study were (a) diagnostic accuracy score and (b) confidence rating in the diagnosis.

Results showed that when provided with a salient link, participants did not differ significantly from those would receive a salient link. The participants were not more accurate in their probabilistic diagnostic decisions when they had a salient link provided between base-rate information and the category to be predicted. In might be hypothesized that salience may have been a potential avenue for reduction of base-rate fallacy. Those who received both the relevant accuracy-rate information as well as irrelevant information with base-rates did not differ significantly from those who received either the relevant accuracy-rate information with base-rates or those who received the irrelevant individuating information with base-rates. However, those who received irrelevant individuating information with base rates were more accurate than those who received the relevant accuracy-rate information with base rates were. Gnys et al. (1995) showed that psychologists' diagnostic decisions may be influenced adversely by an illusionary belief in an association between a particular psychometric result and the diagnosis of Learning Disabled. In the area of cognitive psychology, Lyon and Slovic (1976) documented that individuals often rely on the accuracy rates of a test and fail to incorporate other relevant information (e.g., base rates) when making probability judgments. They also suggested the most salient features of case specific evidence often determine probability estimates.

To date no investigation has been done to examine what the affects these two sources of information combined would have on diagnostic decision making.

Some of the explanations for differential levels of accuracy were the extremity of the accuracy rate information provided (when presented with this form of information often base their decisions on that information and neglect other pertinent information). A second assumption was the substantive nature of the individuating information provided (become more conservative in the absence of academic-achievement information). Finally it may be been that the participants assumption of additive effects of error was associated with these two sources of information.

A second study consisted of 20 school psychologists was conducted following the same procedures were followed and results yielded that all psychologists used the base rate information accurately when no other information was presented. Additionally, no difference was found between the reported and the optimal probability judgment.

Results also demonstrated that psychologists used base rate information appropriately in the absence of other clinical information. In the first study, salience of the link between base rate and diagnosis did not affect accuracy of probabilistic diagnostic decision making of school psychologists, therefore, in the second study the two levels of this variable were collapsed. This allowed for a four-way comparison among the levels of diagnostic information. Results indicated that when receiving base-rate information only, psychologists were far more accurate than all other psychologists were. This was an important finding that documents "when base-rate information is presented in combination with either irrelevant information, diagnostic information, or irrelevant and diagnostic information, compared to base-rate alone, their diagnostic accuracy can be

expected to decline markedly" (Kennedy, Willis, & Faust, p. 303). This further demonstrates that psychologists are likely to neglect, or to underuse, base rates in probabilistic decision tasks when either irrelevant individuating information or relevant diagnostic information is present.

Base rates rarely appear alone and even may be obfuscated by poorly operationalized or poorly validated diagnostic criteria. In many judgment tasks there is more nonpredictive than predictive information, and base rate information may not be available to the clinician. School psychologists have a limited awareness of the importance of base-rate information for diagnostic accuracy.

Summary of Studies

The examination of the literature on the utility and efficiency of conditional probability methods for differential diagnosis of childhood disorders reveals a few substantial findings. First, any criteria used to improve the diagnostic accuracy of a method or procedure (e.g., indices such as SPE and SEN) should not be used in isolation to make decisions. Instead clinicians should apply the properties of a decision-making framework that emphasizes the incorporation of base rates, costs of errors, goals, and other important information (Meehl & Rosen, 1955). Simply stated, the consequences of overdiagnosing can be detrimental to the individual receiving the diagnosis as well as embarrassing to the clinician that made the diagnosis. Research in this area has demonstrated the base-rate fallacy, when decision makers are presented with base rate information and they defer to the individuating information even when it is irrelevant to the decision to be made (e.g., Borgida & Nisbett, 1977; Kahneman & Tversky, 1973).

Furthermore, it confirms the fact that we are likely to neglect, or to underuse, base rates in probabilistic decision tasks when either individuating information (i.e., nondiagnostic or irrelevant) or relevant diagnostic information is present. However, this problem is amendable if clinicians make an effort to compute PPP and NPP statistics based on representative, local samples. This puts them in the position to make more accurate and less biased decisions regarding the future likelihood that a child who presents with a specific symptom has a disorder.

Given the considerable overlap that exists between ADHD, ODD, and CD (Abikoff & Klein, 1992; Biederman, Newborn, & Sprich, 1991; Hinshaw, 1987; Loeber & Kennan, 1994), future investigations that employ the use of conditional probability method should not only consider the collection of diagnostic information from multiple sources, but also incorporate multiple instruments to gain reliable estimates of functioning across settings. Although we can acknowledge that different raters agree at low to moderate levels (Achenbach, McConaughy, & Howell, 1987; Gresham & Elliott, 1990; McConaughy, 1993), the decision making process traditionally uses a multidisciplinary team approach in order to determine eligibility for special education services. Thus, an investigation of the relationships that exist between multiple informant and independently derived diagnoses may reflect a change in the probability rates. These types of studies will also provide a method of validating the symptoms against criteria such as treatment response, biological markers, course and outcome. Therefore, the construction of diagnostic criteria consisting of symptoms with high NPPs and high PPPs can assist in examining the predictive efficiency of symptoms for diagnosis.

Finally, most studies that have employed conditional probability methods have drawn distinctly different samples (clinic-referred vs. nonreferred) making it difficult to replicate the findings across a variety of settings. Another caveat of concern is the stability and reliability of some of the indices in the use of CP is suspect across settings (Robins, 1985); however, the rates that children exhibit behaviors across settings does change, and measurement of this phenomena is important in the decision making process. Relative to the stability of these indices, PPP and NPP rates are greatly affected by base rates. Therefore, the utility of items used as either exclusion or inclusion criteria are dependent on their base rates in the population of interest; varying between a clinical sample and the general population. Additionally, some of the symptoms that were used in the studies failed to operate as expected. That is, a symptom that is commonly associated with the diagnosis of disorder "X" is a more efficient predictor of disorder "Y" than disorder "X." This phenomenon occurs when two disorders share common symptoms, making it extremely difficult to separate these disorders as distinct entities. A final caveat it that it is difficult to determine why some items have better predicative power than others, and why some items differential inclusionary and exclusionary functions.

Constructs of Measures

The combined use of teacher ratings of achievement motivation, multidimensional self-concept, and self-perceptions of behavioral adjustment has not been attempted in the differential diagnosis of disruptive behavior disorders. The literature relevant to these constructs will be discussed below and provide the reader with a brief theoretical prospective and understanding of their meanings.

Interpersonal Relations

According to Bracken (1993) interpersonal relationships represent a behavioral construct that is defined as: "The unique and relatively stable behavioral pattern that exists or develops between two or more people as a result of individual and extra-individual influences" (p. 9). It has been suggested that childhood interpersonal relations are the source of critical characteristics such as a sense of equality, interpersonal sensitivity, need for intimacy, and mutual understanding (Youniss, 1980). The constructivists view of interpersonal relations holds that children tend to interpret, organize, and use information from their environment and in the process construct adult skills and knowledge (Corsaro, 1985; Gottman, 1983; Youniss, 1980). Children with conduct problems are viewed as having serious deficits in social skills as a result of inept parenting and accounts for some of the increased volume of delinquency seen in adolescence. Thus, their ability to establish and maintain close ties with positive role models and peers is hampered because good relationships require the use of adequately developed social skills. These relational problems might lead to truancy, cutting classes (Chesney-Lind, 1989; Chesney-Lind & Shelden, 1992), and aggressive behaviors directed against the source of the relational problems and perhaps others (Agnew, 1992). Furthermore, constructivists believe that children's perspectives change as a function of their cognitive development and the stable features in their life. Through their own experiences with either peers or adults, children learn to appreciate the capabilities, desires, and values of others. Therefore, childhood interpersonal relations have proven to

be reliable predictors of adolescent and adult psychosocial adjustment (Parker & Asher, 1987).

Proponents of the behavioral perspective believe that adult caretakers are considered to be a primary factor in children's development of friendship, as children learn how to relate to others through a reinforcement history (Gerken, 1987). Interestingly, both schools of thought recognize functional changes and age-related differences in the conceptions and development of friendships and peer groups (Bigelow & La Gaipa, 1975, 1980; Corsaro, 1985; Hartup, 1983; Selman, 1980; Youniss, 1980).

The quality and extent of childhood and adolescent interpersonal relations have shown to be related to future sex role development (Fagot, 1977); expression of intimacy (Buhrmester, 1990); moral development (Berndt, McCartney, Caparulo, & Moore, 1984); and emotional security and understanding of the social structure (Panella, Cooper, & Henggeler, 1982). The development of poor interpersonal relations in an educational setting has been related to aggression (Dodge, Coie, & Brakke, 1982; Hartup, 1979); school dropout (Elliot & Voss, 1974); behavioral problems (Panella & Heggeler, 1986); learning disabilities (Bryan, 1974, 1982); juvenile crime (Hartup, 1983; Parker & Asher, 1987); and social isolation (Wanlass & Prinz, 1982).

Self-Esteem

Rosenberg (1979) defines self-esteem as a person's evaluation of his her objectified self, and global self-esteem as a person's respect for oneself as a whole, including self-acceptance, self-respect, and feelings of self-worth. In a similar manner, Harter (1990) defined self-esteem as "how much a person likes, accepts, and respects

himself overall as a person" (p.225). Rosenberg (1979) further defined self-esteem formation using four principles, which focuses on self-esteem as both a social outcome and a social influence.

The first principle, reflected appraisals, influenced by Cooley's (1912) "looking-glass self" and Mead's (1934) concept of role taking, holds that an individuals self-esteem is deeply influenced by his perception of what others think of them. The second principle, social comparison, points out that individuals view themselves in comparison to other people (Festinger, 1954). According to Kelly (1967), the principle of self-attribution states that people evaluate themselves by observing their own behavior. The fourth principle, psychological centrality, holds that all self-components are equally important to the individual; some of the self are more central to a feeling of self-worth than others.

The self-esteem literature shows that it is a strong correlate of positive adjustment for children and adolescents (Pope, McHale, &Craighead, 1988). One the largest influences to the maintenance of self-esteem is the degree to which one's personal views and standards represent an adequate fit with the surrounding social environment, including the views and expectations of significant others in proximal contexts of development (Harter, 1993; Oosterwegel and Oppenheimer, 1993). As children move through the developmental sequence of childhood to adolescence, they begin to analyze the congruence of their abilities and traits with those of significant others in their lives, such as peers, parents and teachers. Consistency of these views may facilitate the development of positive interactions with others, leading to the promotion of social and

behavioral adaptation (Harter, 1986). Conversely, a lack of continuity can contribute to conflicts and misunderstandings in relationships (Oosterwegel and Oppenheimer, 1993).

Crocker and Major (1989) noted that stigmatized individuals are those "who by virtue of their membership in a social category are vulnerable to being labeled as deviant, are targets of prejudice or victims of discrimination, or have negative economic or interpersonal outcomes" (p. 609). Further, they indicated that where people are stigmatized (e.g., children with attentional and/or behavioral problems as perceived by their teachers), there may also be an effect on the way in which they perceive and behave as a result of negative feedback. These perceptions and behaviors, where a stigmatization explanation can be offered, result in a person not using negative feedback for corrective action. It also results in the maintenance of positive self-esteem to the neglect of using alternative and positive learning strategies and behaviors.

In accordance with these perceptions, Harter (1986) reported that children who overrated their cognitive competence relative to teachers exhibited greater levels of maladaptive classroom behavior in comparison to children whose ratings were commensurate with those of teachers. Connell and Ilardi (1987) found consistent results. In their study, they found that children who overrated their academic competence relative to teacher ratings were evident in several respects, (greater anxiety) in comparison to those children who underrated their competence relative to teacher ratings. The same pattern was not consistently found in children who either overrated or underrated their academic competence in comparison to an objective measure of competence (achievement test score). Thus, these patterns suggest the importance of a relativistic,

social-contextual perspective in which personal views of the self are compared to the views of significant others (DuBois, Bull, Sherman, Roberts, 1998).

In many cases, the self-esteem of children and adolescents is drawn from feelings of self-worth and personal satisfaction that is a result of their experiences at school and with their families (DuBois et al., 1998). Using these aspects of self-esteem as a foundation may promote behaviors that facilitate successful adjustment, including academic skill building efforts and adaptive patterns of interaction with parents and teachers (Crockenberg & Soby, 1989). Although these are important contributors to the development of self-esteem, there are other bases that provide equally important outcomes. For example, Harter (1993) found that various aspects of relationships with peers (e.g., popularity) as well as related attributes that are valued within the peer culture such as physical attractiveness and success in athletics are every bit as important to the shaping of an individuals self-esteem. The other possibility is that other bases for self-esteem can detract from efforts and ability to meet the adaptive demands that are required for school or social interactions with others. Peer-oriented bases for self-esteem could serve to increase susceptibility for negative outcomes such as school failure (Whaley, 1993) and involvement in delinquent behavior (Kaplan, 1980). These findings show that there are different aspects within the social-contextual perspective, which contribute to self-esteem that can have both positive and negative implications for the overall adjustment of children and adolescents. Therefore, it is imperative that the assessment of self-esteem is sensitive to these issues and the degree to which the affect the adjustment and functioning of the child.

Self-Reliance

Melvin Kohn and his associates (Kohn, 1963, 1969, 1977; Kohn & Schooler, 1973, 1978, 1982; Miller, Schooler, Kohn, Miller, 1979) have established that self-reliance promotes a sense of well-being (lower level of fatalism) among adults. In taking this postulate one step further Kohn (1969) concluded that self-reliance "requires opportunities and experiences that are much more available to people who are more favorably situated in the hierarchical order of society; conformity is the natural consequence of inadequate opportunity to be self-directed" (p. 189). Research from his studies on adults led Kohn (1969) to the conclusion that three conditions that tend to impair self-reliance among adults: (1) close supervision, (2) routinization, and (3) activities that lack substantive complexity. Throughout this time period, no attempts had been made to test this hypothesis among adolescents.

Although the literature suggests that similar conditions exist for adolescents in American high schools, Davis (1986) assessed Kohn's self-reliance hypothesis with adolescents. Students' curriculum assignments, College Preparatory (Academic), General, or Technical-Vocational, were obtained from their records and rank ordered. This ranking indicated the extent to which the students were able to exercise initiative and to engage in independent thought and action (Rosenbaum, 1975). It was hypothesized that once background differences (race, SES, ability) were controlled for, students' sense of well-being would be related to their track or curriculum assignment.

The results showed that adolescents, like adults, need to the opportunity to exercise initiative. As a result, both are less likely to be fatalistic. Moreover, an increased

level of self-reliance allows both to assume a greater sense of control over their lives, are less likely to attribute the luck to their positive outcomes, and are less likely to feel overwhelmed in the management of the events in their lives (Davis, 1986). Based on these results it seems that self-reliance can serve as a mediator between both stress and support and adjustment.

Greenberger and Sorensen (1974) in their construction of a model of psychosocial maturity, remarked that self-reliance was the most basic disposition that underlies adequate individual functioning. As such, they hypothesized that self-reliance was viewed as having three related manifestations: (1) absence of excessive dependence on others, (2) sense of control over one's life, and (3) initiative (Greenberger & Sorensen, 1974).

As an individual develops trust in their own capacity to judge and has a willingness to take risks and make mistakes, there is an absence of excess need for reliance on others. The acquisition of this trait gives the individual the opportunity to act on their own when no others are available to depend on, when others have less resources available, and when one possess the resources for action within themselves (Greenberger, Josselson, Kneer, Kneer, 1975). When an individual does not need to validate their decisions or opinions against those of others, they begin to develop autonomy and a clear sense of identity (Steinberg, 1990).

A sense of control can be conceptualized as the feeling that an individual's actions play a large role in what comes about, and that within limits, the individual can bend the environment to serve their own interests (Crandell, Katkovsky, Crandell, 1965; Rotter, 1966). In some instances, an individual with a sense of control may also feel that their work performance will have a major influence on their occupational advancement.

Therefore, an individual sense of control acts as both a cause and a by-product of functioning effectively, and in either case seems a reasonable indicator of the capacity for self-maintenance (Greenberger & Sorensen, 1974).

Initiative has been identified as being closely linked between a sense of control and an absence of excessive dependence on others (Greenberger & Sorensen, 1974). Initiative describes an action orientation, whereby there is disposition to respond with resilience and relying on one's own resources when the situation demands it (Pelham & Swann, 1989). The significance of initiative for self-maintenance is the relationship between situations that call for an individual to take action into their own hands and the ability to satisfy one's emotional well-being.

A review of the available literature on the extent and importance that self-reliance has on the adjustment of children and adolescents is scarce. Consequently, the various findings related to an individuals degree of self-reliance is often linked with other constructs such as kinship support (e.g., Taylor, 1993, 1995), autonomy (Steinberg, 1990), and psychosocial maturity (Greensberger, 1974).

Academic Achievement Motivation

Achievement motivation defined by McClelland, Atkinson, Clark, & Lowell (1953) as competition with a standard of excellence. Additionally, they added that another quality was that it was defined by an enduring personality trait. According to Heckhausen (1991) achievement is undoubtedly the most studied motive. The concept of achievement first appeared in H. A. Murray's (1938) list of needs as "n)eeds Achievement." The essential component of Murray's description of "needs Achievement" is now inherent in

the definition of achievement motivation "concern with a standard of excellence." (McClelland et al., 1953, pp. 6-89)

Because of the abstract nature of the definition it could encompass the multifariousness of activities, of standards of excellence, and of activity objects (Heckhausen, 1991). As plausible as these distinctive features and facets are they emphasize that "achievement involves doing something as well as one can, or better than before or than others" (Heckhausen, 1991, p. 199). From a psychological perspective, there is a consistent theme that achievement-oriented behavior does emphasize a commitment standard of excellence for performance and performance outcomes. In addition to these components, an equally important component is the consequence-laden self-evaluation after the performance. The role of this self-evaluation represents expressive reactions to the success or failure of an activity. A closer examination of this phenomena indicates that these expressive reactions, which Piaget (1936) interpreted as circular reactions, are displayed in children who are between 2 and 3.6 years of age during familiar routines in the home (Heckhausen, 1967). Initially there are facial expressions of joy and success with the experience of success and the display of grief, corners of the mouth turned downward, after experiencing failure. These two emotional events signify that even at this age they are concerned about success and failure based on the outcome of an action. Because these expressions are both behaviorally and emotionally linked, there appears to be sufficient evidence for the notion that "achievement behavior has an independent affective base which evolves ubiquitously in human ontogeny" (Heckhausen, 1991, pp. 200). Therefore, it is difficult to rule out the possibility that achievement behavior should not be identified as biologically anchored. In

fact, Heckhausen (1967) asserted that these modes of behavior seem more instinctual than acquired because each child pursued the task with concentration, persistence, and satisfaction and positive reinforcement was not needed for continued performance despite negative sanctions.

Based on the aforementioned conceptualization of achievement motives, it is important to explore the unique characteristics that are measurable through operant and respondent techniques. The measurement of achievement motivation owes its inception to the concept of projection. In the 1930's Murray developed the Thematic Appreciation Test (TAT; Murray, 1938; Morgan & Murray, 1935). Development of the TAT served as a predecessor for a premature classification system of motives. Some of Murray's (1938) catalog of psychogenic needs such as "need achievement" (n Ach), "need affiliation" (n Aff), and "need dominance" (n Dom) became well known as a result of the experimental research on motivation during the 1950s. In developing a method to describe and explain a course of behaviors across situations, Murray selected needs from a list and employed as models for the construction of motive-scaling questionnaires or thematic appreciation methods. The test consists of pictures with specific thematic content to which the respondent is asked to develop fictional stories, which are then analyzed in terms of need, press, and "thema," which are an equivalent set of situations for a particular individual (Heckhausen, 1991). Although there is a robust body of research documenting the TAT technique, the focus of this literature will be on the integration of constructs related to the achievement motive, including expectancy, incentive, persistence, and risk-taking.

The expectancy principle, developed by Tolman (1955), is cognitive anticipation of the individual at the time when their goal is set as to the probability of reaching a given level of performance. The strength of expectancy can be represented as the subjective probability of the consequence, given the act. That is, a probability can be calculated based on an individual's subjective estimate of how well he/she is able to succeed after some successful and unsuccessful experiences. Therefore, the range of the subjective probability is restricted between 0 and 1.00.

According to Tolman (1955) and Rotter (1954), incentive represents the relative attractiveness of a specific goal that is offered in a situation or the relative unattractiveness of an event that might occur as a consequence of some act. The incentive value of success at a particular task is considered one of the immediate determinants of strength of motivation to achieve a particular task (Atkinson, 1964). Based on these conceptualizations of motive, expectancy and incentive, strength to perform some act is assumed to be a multiplicative function. The function is the product of the motive, the expectancy (subjective probability) that the act will have as a consequence the attainment of an incentive, and the value of the incentive: Motivation = f (Motive X Expectancy X Incentive). Although the same components are used are discussed in the literature of Atkinson and Feather (1966), they denoted this concepts as the risk taking model. Knowledge of this theoretical formula can be applied to achievement related activities in schools. In general, we can look at children's motivation to approach and enjoy challenging situations or at their tendency to avoid and dislike an achievement situation. Because the theoretical emphasis of this formulation is on individual differences in

motives this risk-taking model has stimulated a large body of research, producing a variety of different findings.

Persistence can be conceptualized in accordance with how it is manifested. For example, it can be seen as the duration in pursuit of a task. A second way that it is manifested is as the continuation of an interrupted or failed task. Last, it may be manifested as the long-term pursuit of a global goal. In any one of these conceptualizations, its relationship with the overall level of achievement motivation attained is a function of the persistence employed to accomplish the task. One factor to consider relative to this relationship is that the resultant motivation tendency can be either positive and high or negative and low. If the motivation tendency is positive and high, there is a greater probability that the task will be pursued longer than if it were low.

Lewin (1946) considered persistence in terms of the person-barrier-goal situation and defined by stating, "What is usually called persistence is an expression of how quickly goals change when the individual encounters obstacles" (p. 824). In Lewinian terms the investigation of persistence was looked upon as a frustration situation in which a person in a state of tension is separated at some psychological distance from a goal by a barrier. The barrier appeared to be the source of restraining forces that oppose the driving forces acting upon the person in the direction of the goal.

When we consider persistence as the interaction between motive and success expectancy (Feather, 1961), it becomes important to discuss the action tendency, which must be persistent in order to successfully pursue goals that are not immediately or easily reached. At a primary level, persistence only accounts for the action tendency's ability to communicate to itself that there is a situation that requires attention and no other action

tendency is being managed. A greater degree of persistence is required when the action tendency has to block out an instigating force of strong distractive environmental. This level of persistence is excelled by a third level of persistence that is used when priority to an action tendency needs to be given over a competing tendency of greater strength. It is the third level of persistence that maximizes the employment of time, space, and resources in the discharge of many action tendencies (Heckhausen, 1967).

Atkinson's (1957) model of risk-taking behavior was designed to predict individual preferences for task difficulty levels, but also represented an extension of Lewin, Dembo, Festinger, and Sears' (1944) theory of resultant valence. They conceptualized level of aspiration as a choice, consisting of several alternatives. This requires an individual to choose between tasks of varying levels of difficulty (task choice) or between different levels of performance for the same task (goal-setting). Each level of difficulty has both a positive and a negative valance, in the case of success and failure respectively. According to the theory, the positive valence of success increased as a function of increased difficulty level until it reaches an upper limit. Beyond this upper limit is the area in which success is seen as completely out of the reach of the individual. On the other hand, the negative valence of failure increases as a function of decreasing levels of difficulty. Equally important is the lower limit of the difficulty level, beyond which "the task is seen as child's play and failure can easily be blamed on the circumstances" (Heckhausen, 1991, pp. 148). In summary, given a series of tasks, the knowledge of success and failure valences and the probability for success and failure of each task, allows the individual to determine which level of aspiration should be selected for the next task.

When motives are measured through questionnaires, they are respondent and not operant in nature. That is, the respondent indicates agreement or disagreement with a predetermined statement. Utilization of this format requires subjects to recall relevant introspections leading to a general assessment which applies to all test situations. In an effort to conceptualize these introspections, White (1959) posited a competence motivation or effectance motivation and directs the exploration, manipulation, and attention one with his environmental surroundings. Moreover, the behaviors that are involved in the effective manipulating are selective, persistent and direct, and are motivated by the intrinsic need to deal effectively with their environment. White also pointed out effectance motivation causes behaviors that allow the person to experience feelings of efficacy. Therefore, the person is "intrinsically" motivated by effectance motivation to engage in behaviors that allow the individual to feel competence or efficacy. A unique aspect of effectance motivation is that it can be differentiated into more specific motives for mastery, competition, cooperation, or achievement (White, 1959). These specific motives are learned through experiences that emphasize different aspects of effective functioning with the environment

Collectively the works of all the aforementioned researchers and many others not listed has contributed to the development of the construct known as academic achievement motivation. It has been identified as multidimensional social-psychological construct that contributes to the understanding of students' achievement behaviors. Hughes, Refield, and Martray (1989) have conceptualized it as the component of a broader achievement motivation construct. Due to its multifaceted nature, it includes what Gottfried (1990) describes as academic intrinsic motivation, and unites the

enjoyment of school learning characterized by mastery orientation, curiosity, persistence, task-endogeny, and the learning of challenging, difficult and novel tasks.

Equally important to composition of academic achievement motivation are the negative dimensions, external motivation and/or failure avoidant/amotivation. Harter's (1978) description of her model explained that success leads to positive intrinsic motivation, while failures/lack of competence contributed to external motivation. The external modes include preference for easier tasks, reliance on external feedback, and setting of performance goals.

Another set of components that deserve consideration for being a part academic achievement motivation are those that relate to the public performance nature of academic work. Here we are considering those activities that call for performance in front of other students, and tasks that can be presented in a cooperative or competitive manner. Although this may be viewed as manipulating the environment to motivate students through the introduction of competition into academic tasks, there is evidence (Covington & Omelich, 1984; Epstein & Harackiewicz, 1992) that overconcern with competition, can undermine intrinsic motivation and create an ego-involved rather than task involved state (Nicholls, 1989). In the case of tasks that are naturally external to the task and artificially introduced, children either perform with a great deal of success or fail miserably.

Irrespective of how inclusive this construct is represented, many practitioners fail to include this as part of their multifactored approach to assessment. Moreover, many of the available motivation inventories for children are paper-and-pencil self-report forms

with low reliability and validity (see Naccarato, 1988). Therefore, there is a need for an accurate and more comprehensive assessment of achievement motivation.

CHAPTER III

METHODOLOGY

Participants

A total of 72 boys were selected to participate in this study: 33 whose primary DSM-IV Axis I diagnosis was conduct disorder and 29 whose primary DSM-IV Axis I diagnosis was oppositional defiant disorder. Of the initial 72 boys who were selected for possible inclusion in the study, 10 participants were excluded because they did not meet DSM-IV criteria for CD or ODD or exhibited mental retardation, pervasive developmental disorder, psychosis by presentation history, or clear neurological disorder. The children for possible inclusion in the ADHD sample were excluded from this study because they represented a relatively normal sample with attentional, learning, and memory difficulties and they did not have complete assessment data on all the study variables.

Among the participants that met DSM-IV criteria for CD or ODD, some of the children met criteria for a diagnosis in at least one of the following disorders: Adjustment Disorder, Attention Deficit Hyperactivity Disorder, Dysthymic Disorder, Generalized Anxiety Disorder, Language Disorder, and Post-Traumatic Stress Disorder. Most of the participants also has an Axis II diagnosis of a coexisting learning disability, which is consistent with expectations based on current literature (Harris, King, Reifler, &

Rosenberg, 1984; Sturge, 1982). In addition, all the participants had a previous clinical diagnosis and the diagnosis could be considered a confounding variable for this study, therefore, an independent diagnosis was conducted. The computer-assisted Diagnostic Interview Schedule for Children – IV was used to generate child psychiatric diagnoses, with a member of the milieu staff (i.e., social worker, cottage manager, psychological assistant, or youth guidance specialist) serving as the informant.

The 33 participants with CD were randomly selected from the pool of juveniles with that diagnosis who were in residence at L. E. Radar Treatment Center in Sand Springs, Oklahoma, a state juvenile detention facility. Approximately 200 children and adolescents reside at this facility, ranging in age from 13 to18. During the first 15 days of their stay at the facility, the residents are given a battery of tests comprised of the Wechsler Intelligence Scale for Children-Third Edition (WISC-III; Wechsler, 1991a) or the Kaufman Brief Intelligence Test (K-BIT; Kaufman & Kaufman, 1990), Wechsler Individual Achievement Test (WIAT; Wechsler, 1991b), Minnesota Multiphasic Personality-Adolescent (MMPI-A; Butcher et al., 1992), and the House Tree Person (HTP; Buck, 1947). Additionally, a risk assessment is completed for each of the residents to determine their estimated length of stay at the facility. The components of the risk assessment include categorization of the youth's offense severity, chronicity adjustment, and adjustment for aggravating/mitigating factors. DSM-IV diagnoses for the residents were made in conjunction with the pertinent psychological data, the risk assessment and the clinical judgements of the senior psychologist and psychological assistant.

The residents at Radar live with up to 23 other children in one of nine cottages staffed by a social worker, cottage manager, psychological assistant, and two youth

guidance specialists. The residents receive individual psychotherapy up to two times a week, group psychotherapy twice a week, and attend a private school on the facility grounds. Family therapy, milieu therapy, and medication when appropriate also are provided.

The CD participants ranged in age from 13 to 15 with a mean age of 14.7 years. Almost half (48.6%) were Caucasian, and more than one fifth (24.2%) were Native American. The remainder of the sample was composed of a small percentage of Afro-American (18.2%), Hispanic (6.1%), and (3%) of other racial or ethnic heritage. This group of children had been in state custody for an average of 6.24 months (SD = 4.73 months, range = 1-20 months). The majority of this group had been adjudicated for a crime involving a combination of person and property (36.4%), and almost one fourth for a sex offense (24.2%). The remainder of the sample was adjudicated for property (18.2%), person(12.1%), and (9.1%) for drugs and/or alcohol. The mean scale score ratings on the BASC-TRS for this group were Aggression ($\underline{M}$ = 55.67, SD = 9.74), Attention ($\underline{M}$ = 53.52, SD = 9.61), Conduct Problems ($\underline{M}$ = 60.06, SD = 14.45), Hyperactivity ($\underline{M}$ = 53.18, SD = 10.90), and Learning Problems ($\underline{M}$ = 52.48, SD = 9.95). The mean self-report ratings on the BASC-SRP for the scales selected were Anxiety ($\underline{M}$ = 54.09, SD = 8.18), Depression ($\underline{M}$ = 51.21, SD = 9.61), Interpersonal Relations ($\underline{M}$ = 48.30, SD = 14.45), Locus of Control ($\underline{M}$ = 51.94, SD = 9.64), Self-Reliance ($\underline{M}$ = 49.76, SD = 9.92), and Social Stress ($\underline{M}$ = 51.52, SD = 9.70).

The ODD sample was gathered at the John Cohn Middle School (JCMS) in Hawthorne, New York, a residential treatment center. Approximately 116 children and adolescents reside at this facility, ranging in age from 11 to 17. Residents of the JCMS

were admitted to the agency through referrals made by the Administration of Children's Services. Each referral application (i.e., admission/discharge summary from previous agencies, psychoeducational and psychological evaluations) was reviewed on a case-by-case basis, and their eligibility for placement was determined by an intake team composed of the principal, teachers, and other milieu staff. The children attending JCMS were placed in this residential setting because the previous placements (e.g., foster home or group home) could not maintain the child's level of conduct disturbance or oppositional behavior, which was deemed detrimental to their school functioning and mental health needs. This was documented in the referral application.

The residents live with up to 10 other adolescents in one of twelve cottages staffed by a cottage manager and two social workers, who supervise the residents at all times. Residents attend the alternative school on campus and participate in regularly scheduled individual counseling with a social worker. The residents receive individual psychotherapy up to two times a week, group psychotherapy twice a week, and attend a private school on the facility grounds. Each resident has the opportunity to have family visits if they obtain a predetermined number of points during the week by exhibiting appropriate behavior in school and at their cottage.

The ODD participants ranged in age from 12 to 15 with a mean age of 13.3 years. The ethnic composition of this group was 62.1% Afro-American, 24.1% Hispanic, and 13.8% Caucasian. This group of children had been in state custody (i.e., foster care) for an average of 9.79 months (SD = 5.14 months, range = 2-23 months). On average, the children had lived in 1.14 previous residential placements (Median = 1.0 placement; range = 0-10 past placements). The mean scale score ratings on the BASC-TRS for this

sample were Aggression (M = 60.10, SD = 6.81), Attention (M = 53.72, SD = 7.08), Conduct Problems (M = 62.55, SD = 11.93), Hyperactivity (M = 55.24, SD = 8.11), and Learning Problems (M = 53.62, SD = 7.60). The mean self-report ratings on the BASC-SRP for the scales selected were Anxiety (M = 51.59, SD = 9.05), Depression (M = 52.31, SD = 11.01), Interpersonal Relations (M = 43.31, SD = 9.06), Locus of Control (M = 51.86, SD = 9.28), Self-Reliance (M = 52.34, SD = 7.88), and Social Stress (M = 51.89, SD = 10.30).

Instruments

Teacher Rating of Academic Achievement Motivation

The Teacher Rating of Academic Achievement Motivation (TRAAM; Stinnett & Oehler-Stinnett, 1990) is currently a 44-item teacher rating scale that can be used to assess academic achievement motivation in children (third- though sixth grade students). The TRAAM items are descriptive statements, and the teacher rates each child using a 5-point, Likert format: (a) a = strongly agree, (b) b = agree, (c) c = don't agree or disagree, (d) d = disagree, (e) e = strongly disagree. Each Likert is assigned a numeric value (1 to 5) for scoring. Raw scores on the TRAAM can range from 44 to 220. High scores reflect motivated behavior. The academic achievement items are organized into six subscales derived from a principal components analysis: Factor 1 (Amotivation, measures student avoidant/resistant learning behaviors), Factor 2 (Mastery, measures positive motivational behaviors), Factor 3 (Skill/Ability, a teacher estimate of academic

capability), Factor 4 (Work Completion), Factor 5 (Competition), and Factor 6 (Cooperation).

Reliability studies using coefficient alphas (α) of the TRAAM have reported internal consistencies ranging from .79-.97 for subscales and .98 for total score. Criterion-related validity studies have shown small to moderate relationships with the Children's Academic Intrinsic Motivation Inventory (CAIMI; Gottfried, 1986) with 80% of the correlations ranging from 0.17 to 0.48 and the Scale of Intrinsic versus Extrinsic Orientation in the Classroom (SIEOC; Harter, 1980) with 92% of the correlations between 0.17 and 0.48.

Behavioral Assessment System for Children

The Behavioral Assessment System for Children - Self Report of Personality (BASC-SRP; Reynolds & Kamphaus, 1992) is part of a broad multidimensional multi-rater (parent, teacher, and self-report) assessment system designed to assess the behavior and self perceptions of children aged 4 to 18 years. The SRP is comprised of 186 items conceptually derived scales created for use in conjunction with psychiatric and educational classification systems. The child responds to each statement by circling "Yes" if the item is generally descriptive of the child's feelings or actions or "No" if the item does not describe him or her. The SRP yields standard scores and percentile ranks for each of the subscales and composite scales with high scores on the clinical scales reflecting negative or undesirable characteristics and high scores on the adaptive scales representing positive adjustment and characteristics.

Internal-consistency reliabilities (coefficient alphas) for the Clinical and General norm sample are almost identical, ranging from 0.61 to 0.89 for the subscales and between 0.85 to 0.96 for the composite scales. Criterion-related validity studies have documented the criterion-related, construct, and convergent-discriminant validity of the BASC (Doyle, Ostrander, Skare, Crosby, & August, 1997; Flanagan, Alfonso, Primavera, Povall, & Higgins, 1996; Vaughn, Riccio, Hynd, & Hall, 1997).

The Behavioral Assessment System for Children - Teacher Report Scales (BASC-TRS; Reynolds & Kamphaus, 1992) is a comprehensive measure of both adaptive and problem behaviors in the school setting. The BASC-TRS that will be used for this study will include those targeted for two age levels: child (6-11) and adolescent (12-18). It is comprised of 148 items conceptually derived scales created for use in conjunction with psychiatric and educational classification systems. The responses on the items are rated on a four-point scale of frequency, ranging from Never to Almost always.

Internal-consistency reliabilities (coefficient alphas) for the Clinical and General norm sample are almost identical, ranging from 0.74 to 0.95 for the subscales and between 0.89 to 0.95 for the composite scales. Criterion-related validity studies have documented the criterion-related, construct, and convergent-discriminant validity of the BASC (Doyle, Ostrander, Skare, Crosby, & August, 1997; Flanagan, Alfonso, Primavera, Povall, & Higgins, 1996; Vaughn, Riccio, Hynd, & Hall, 1997).

Computer-Assisted Diagnostic Interview Schedule for Children-IV

The computer-assisted Diagnostic Interview Schedule for Children – IV (C-DISC-IV; NIMH-DISC, 1997) is a structured interview instrument designed to assess

symptoms and behaviors associated with child psychiatric disorders and to provide diagnoses for disorders defined by the DSM (American Psychiatric Association, 1980, 1987, 1994) classification system. The C-DISC-IV uses situation-specific items to tap behaviors that occur in school and in the child's home and is intended for use with parents who have children aged 6 through17 years. To facilitate the diagnostic process, the instrument has algorithms built into the application program that presents a list of diagnoses, criteria, and positive symptoms reported during administration in a written report. The program uses a computer algorithm to render a diagnosis according to the symptom criteria listed in the DSM-IV diagnostic system.

The psychometric properties of the C-DISC-IV has shown moderate agreement with a criterion interview by clinicians for ODD (kappa = .51), CD (kappa = .60), and ADHD (kappa = .54). Test-retest reliability studies for symptom scales over an interval of 1 year in a clinical sample have shown kappas that ranged from (0.43 to .79) for all the disruptive behavior disorders (Fisher et al., 1999).

Procedure

The children in ODD and CD samples completed the BASC-SRP at their respective facilities. The questionnaire was group administered at scheduled intervals, while the participants were in their respective classrooms, using the standard administration procedures. Because the reading ability varies widely among the participants who completed the instrument, the examinee's whose reading ability was of concern had the self-report questionnaire read to them. Additionally, the child's primary teacher completed the TRAAM and the BASC-TRS, with the order of administration was

counter-balanced, with no teacher rating more than 5 students. Parents were not available for the participants in the juvenile detention or residential treatment center; therefore, milieu staff (i.e., social worker or cottage) who have close contact with the residents were randomly selected to complete the structured interview using the C-DISC-IV. Diagnoses were based on independent interviews with the milieu staff member. The results of the structured interview generated diagnoses according to DSM-IV diagnoses and a variety of alternative DSM-IV diagnoses based on computer algorithms in the same sample. Reliability of each diagnosis was assessed by two licensed health service providers, who are blind to the to the child's ascertainment site, data collected from the child's primary teacher and nondiagnostic data. Diagnoses were considered positive if, on the basis of the interview results, the DSM-IV criteria were unequivocally met and consensus between the independent raters and the interviewer was reached. Participants in whom the diagnosis reached consensus between the independent raters and the interviewer were included in the study. Potential participants were excluded from the study if they exhibited mental retardation, pervasive developmental disorder, psychosis by presentation or history, or clear neurological disorder.

In order to match the instruments completed by each participant and teacher, a random 3-digit numbers was assigned to each student at the detention and treatment centers. The primary investigator collected a list of the participants' ID-numbers and identifying information (age, ethnicity, number of months at the facility, and class of offense) for the sole purpose of demographic data and scoring of the instruments. This information was destroyed following the scoring of all the instruments and structured interviews.

Analysis of Data

The base rate for each of the symptoms and DBD categories was calculated using the diagnosis obtained from the C-DISC-IV and agreed upon by the interviewer and independent raters. The calculation of the item statistics required dichotomous data, thus the responses on the data collected from each child's assessment battery (i.e., the items from the TRAAM, BASC-TRS, BASC-SRP) was coded into symptom-present and symptom-absent categories. The symptoms rated "sometimes," "often," and "almost always" for the BASC-TRS were scored as present, while symptoms rated "never" were scored as absent. The symptoms rated "strongly agree" and "agree" for the TRAAM were scored as present, while symptoms rated "strongly disagree" and "disagree" were scored as absent. Those symptoms rated "don't agree or disagree" on the TRAAM were not included in the analysis when scores were computed. The symptoms on the BASC-SRP were in the form of dichotomous data and the responses rated "yes" were scored as present, while the responses rated "no" were coded as absent. After the coding procedure was completed the base, PPP, NPP, SEN, and SPE rates were determined for the teacher rated items and the children's self-reported symptoms. These findings were then examined to determine which items are most efficient in the prediction of a diagnosis CD and ODD.

CHAPTER IV

RESULTS

Introduction

This research study attempted to answer the following questions:

1. Are Amotivation, Mastery, and Skill/Ability items of the TRAAM useful inclusionary and/or exclusionary markers for diagnosis of children labeled CD and ODD?
2. Are Aggression, Attention Problems, Conduct Problems, Hyperactivity and Learning Problems items of the BASC-TRS useful inclusionary and/or exclusionary markers for diagnosis of children labeled CD and ODD?
3. Are Locus of Control, Social Stress, Self Reliance, and Interpersonal Relations items of the BASC-SRP useful inclusionary and/or exclusionary markers for diagnosis of children labeled CD and ODD?

To address each of these questions base rates, sensitivity, specificity, PPP, and NPP rates were calculated for each of the items on the instruments for the diagnoses of CD and ODD. Table 1 presents the conditional probability statistics for the TRAAM items. The statistics for the BASC-TRS and BASC-SRP are presented in Tables 2 and 3, respectively. The results presented in these tables reflects the diagnostic effectiveness of

Table 1

Conditional Probabilities and Base Rates of ODD and

CD Symptoms for the TRAAM

	Oppositional Defiant Disorder					Conduct Disorder			
Symptom	BR	SEN	SPE	PPP	NPP	SEN	SPE	PPP	NPP
Prefers easy assignments	.69	.69	.30	.47	.18	.82	.17	.53	.15
Gives up easily on tasks	.60	.69	.48	.54	.32	.52	.31	.46	.18
Must be supervised	.69	.66	.54	.44	.22	.73	.34	.56	.24
Does only the minimum that is required	.68	.66	.32	.45	.17	.70	.34	.55	.17
Needs improvement in organization	.87	.93	.18	.50	.10	.82	.07	.50	.03
Bored easily	.79	.83	.24	.49	.14	.76	.17	.51	.09
Doesn't like to do more school work	.81	.79	.18	.46	.11	.82	.21	.54	.11
Often does not complete assignments	.44	.59	.70	.63	.46	.30	.41	.37	.24
Does not work to ability	.73	.79	.33	.51	.31	.67	.21	.49	.17
Blames failure on outside sources	.84	.76	.09	.42	.05	.91	.24	.58	.11
Occasionally will work with persistence	.69	.69	.30	.47	.22	.70	.31	.53	.20

Table 1 – Continued

	Oppositional Defiant Disorder					Conduct Disorder			
Symptom	BR	SEN	SPE	PPP	NPP	SEN	SPE	PPP	NPP
Often prefers to repeat a task already mastered	.66	.59	.27	.41	.15	.73	.41	.59	.19
Gives up quickly, easily embarrassed	.61	.69	.45	.53	.24	.55	.31	.47	.15
Enjoys learning	.82	.83	.18	.47	.18	.82	.17	.53	.15
Works on problems until solved	.63	.69	.42	.51	.37	.58	.31	.49	.24
Demonstrates mastery of work	.76	.83	.30	.51	.25	.70	.17	.49	.13
Able to keep up	.79	.72	.15	.43	.10	.85	.28	.57	.16
Not discouraged easily	.66	.72	.39	.51	.28	.61	.28	.49	.17
Will try a new task readily	.61	.62	.39	.47	.22	.61	.38	.53	.19
Often makes efforts to learn more	.63	.69	.42	.51	.26	.58	.31	.49	.17
Almost always completes homework	.69	.59	.21	.40	.12	.79	.41	.60	.21
Prefers to work independently	.58	.59	.42	.53	.23	.58	.41	.59	.20
Good overall motivation	.65	.66	.36	.48	.24	.64	.34	.53	.20
Attributes success to hard work	.71	.76	.33	.50	.22	.67	.24	.50	.14

Table 1 – Continued

	Oppositional Defiant Disorder					Conduct Disorder			
Symptom	BR	SEN	SPE	PPP	NPP	SEN	SPE	PPP	NPP
Can monitor and correct work	.61	.62	.39	.47	.21	.61	.38	.53	.18
Expects to do well in school	.79	.79	.21	.47	.11	.79	.21	.53	.10
Successes and failures under own control	.65	.69	.39	.50	.21	.61	.31	.50	.15
Enjoys improving own personal best	.65	.72	.42	.53	.23	.58	.28	.48	.13
Poor grades result of lack of ability	.19	.17	.79	.42	.46	.21	.14	.58	.07
No ability to perform at an average academic	.42	.48	.64	.54	.38	.36	.52	.46	.27
Comprehends grade level material	.52	.59	.55	.53	.29	.45	.41	.47	.19
Lacks basic academic skills	.63	.48	.24	.36	.21	.76	.52	.64	.39
Works hard but still makes poor grades	.29	.31	.73	.50	.39	.27	.69	.50	.32
School failures result of limited ability	.23	.24	.79	.50	.42	.21	.76	.50	.35
M	.64	.65	.38	.48	.24	.62	.33	.52	.18
SD	.16	.16	.18	.05	.10	.18	.14	.05	.08

Table 2

Conditional Probabilities and Base Rates of ODD and CD Symptoms for the BASC-TRS

	Oppositional Defiant Disorder					Conduct Disorder			
Symptom	BR	SEN	SPE	PPP	NPP	SEN	SPE	PPP	NPP
Dares other children	.39	.21	.45	.25	.39	.55	.79	.75	.61
Listens to directions	.52	.03	.06	.03	.07	.94	.97	.97	.93
Steals	.24	.34	.85	.67	.60	.15	.66	.33	.40
Disturbs the school work	.34	.14	.48	.19	.39	.52	.86	.81	.61
Textbooks are hard to read	.77	.90	.33	.54	.79	.67	.10	.46	.21
"Sore loser"	.52	.24	.24	.22	.27	.76	.76	.78	.73
Trouble with the police	.71	.45	.06	.30	.11	.94	.55	.70	.89
Rushes through work	.44	.03	.21	.04	.20	.79	.97	.96	.80
Problems with mathematics	.85	1.00	.27	.55	1.00	.73	.00	.45	.00
Threatens to hurt	.29	.17	.61	.28	.45	.39	.83	.72	.55
Complains about police	.52	.45	.42	.41	.47	.58	.55	.59	.53
Bothers other children working	.37	.17	.45	.22	.38	.55	.83	.78	.62
Complains about rules	.45	.03	.18	.04	.18	.45	.82	.97	.82
Acts without thinking	.47	.03	.15	.03	.15	.47	.85	.97	.85
Argues when denied way	.48	.07	.15	.07	.16	.85	.93	.93	.84

Table 2 – Continued

	Oppositional Defiant Disorder					Conduct Disorder			
Symptom	BR	SEN	SPE	PPP	NPP	SEN	SPE	PPP	NPP
Easily distracted	.92	.93	.09	.47	.60	.91	.07	.53	.40
Stay after school for punishment	.49	.90	.88	.87	.94	.12	.07	.13	.06
Seeks attention doing schoolwork	.50	.21	.24	.19	.26	.76	.79	.81	.74
Completes assignments incorrectly	.89	.93	.15	.49	.71	.85	.07	.51	.29
Brags about getting in trouble	.58	.52	.36	.42	.46	.64	.48	.58	.54
Skips classes	.32	.45	.79	.65	.62	.21	.55	.35	.38
Overly active	.40	.31	.52	.36	.46	.48	.69	.64	.54
Failing grades	.69	.86	.45	.58	.79	.55	.14	.42	.21
Orders others	.52	.28	.27	.25	.30	.73	.72	.75	.70
Suspended from school	.50	.59	.58	.55	.61	.42	.41	.45	.39
Taps foot or pencil	.40	.34	.55	.40	.49	.45	.66	.60	.51
Breaks children's things	.31	.48	.85	.74	.65	.15	.52	.26	.35
Hits children	.19	.10	.73	.25	.48	.27	.90	.75	.52
Does not pay attention	.76	.76	.24	.47	.53	.76	.24	.53	.47
Uses drugs	.27	.17	.64	.29	.47	.36	.83	.71	.53
Poor handwriting or printing	.66	.69	.36	.49	.57	.64	.31	.51	.43
Bullies	.32	.14	.52	.20	.40	.48	.86	.80	.60

Table 2 – Continued

	Oppositional Defiant Disorder					Conduct Disorder			
Symptom	BR	SEN	SPE	PPP	NPP	SEN	SPE	PPP	NPP
Forgets	.74	.86	.36	.54	.75	.64	.14	.46	.25
Cheats	.52	.48	.45	.44	.50	.55	.52	.56	.50
Does not complete tests	.45	.69	.76	.71	.74	.24	.31	.29	.26
Talks back to teachers	.32	.10	.48	.15	.38	.52	.90	.85	.62
Truant	.35	.52	.79	.68	.65	.21	.48	.32	.35
Makes errors	.44	.03	.21	.04	.20	.79	.97	.96	.80
Calls children names	.31	.07	.48	.11	.37	.52	.93	.89	.63
Distracted from classwork	.50	.10	.15	.10	.16	.85	.90	.90	.84
Drinks alcoholic beverages	.47	.83	.85	.83	.85	.15	.17	.17	.15
Reading problems	.45	.31	.42	.32	.41	.58	.69	.68	.59
Teases	.35	.03	.36	.05	.30	.64	.97	.95	.70
Trouble concentrating	.52	.10	.12	.09	.13	.88	.90	.91	.87
Has friends in trouble	.60	.28	.12	.22	.16	.88	.72	.78	.84
Spelling problems	.42	.21	.39	.23	.36	.61	.79	.77	.64
Blames others	.42	.10	.30	.12	.28	.70	.90	.88	.72
Smokes or chews tobacco	.48	.97	.94	.93	.97	.06	.03	.07	.03
M	.49	.39	.42	.35	.46	.58	.61	.65	.54
SD	.17	.31	.24	.25	.24	.24	.32	.25	.24

Table 3

Conditional Probabilities and Base Rates of ODD and CD Symptoms on BASC-SRP

	Oppositional Defiant Disorder					Conduct Disorder			
Symptom	BR	SEN	SPE	PPP	NPP	SEN	SPE	PPP	NPP
Good at making friends	.94	.97	.09	.48	.09	.91	.03	.52	.03
Can't control what happens to me	.21	.17	.76	.38	.44	.24	.83	.62	.42
People don't hear me	.29	.38	.79	.61	.52	.21	.62	.39	.36
Likeable person	.95	1.00	.09	.49	.07	.91	.00	.51	.00
Parents expect too much of me	.24	.14	.67	.27	.58	.33	.86	.73	.66
Sometimes I feel lonely	.61	.55	.33	.42	.19	.67	.45	.58	.22
Good at making decisions	.71	.79	.36	.52	.30	.64	.21	.48	.15
Needs help to get along	.21	.24	.82	.54	.47	.18	.21	.46	.11
Parents blame their problems on me	.27	.34	.79	.59	.51	.21	.66	.41	.37
People are against me	.31	.31	.70	.47	.38	.30	.69	.53	.33
Others respect me	.92	.93	.09	.47	.05	.91	.07	.53	.03
Parents control my life	.13	.07	.82	.25	.48	.18	.93	.75	.48
Left out of things	.34	.41	.73	.57	.52	.27	.59	.43	.37

Table 3 – Continued

	Oppositional Defiant Disorder					Conduct Disorder			
Symptom	BR	SEN	SPE	PPP	NPP	SEN	SPE	PPP	NPP
What I want never matters	.29	.34	.76	.56	.42	.24	.66	.44	.32
Good at modeling things	.89	.90	.12	.47	.08	.88	.10	.53	.06
People think I am fun	.95	1.00	.09	.49	.05	.91	.00	.51	.00
Can't cope with my responsibilities	.45	.45	.55	.46	.31	.45	.55	.54	.28
Feels invisible	.31	.34	.73	.53	.39	.27	.66	.47	.31
Enjoy making friends	.94	.90	.03	.45	.02	.97	.10	.55	.05
Blamed for things I don't do	.53	.52	.45	.45	.30	.55	.48	.55	.28
"Stressed out"	.47	.45	.52	.45	.47	.48	.55	.55	.44
People say bad things to me	.52	.62	.58	.56	.31	.42	.38	.44	.18
Classmates don't like me	.11	.10	.88	.43	.58	.12	.90	.57	.52
Dependable	.89	.86	.09	.45	.07	.91	.14	.55	.09
Feel close to others	.79	.90	.30	.53	.26	.70	.10	.47	.08
People get mad at me	.45	.45	.55	.46	.37	.45	.55	.54	.33
Others do not like the way I do things	.44	.48	.61	.52	.32	.39	.52	.48	.24
Liked by others	.89	.90	.12	.47	.06	.88	.10	.53	.05
Can't stop myself from making mistakes	.34	.34	.67	.48	.35	.33	.66	.52	.31

Table 3 – Continued

	Oppositional Defiant Disorder					Conduct Disorder			
Symptom	BR	SEN	SPE	PPP	NPP	SEN	SPE	PPP	NPP
Lonely	.34	.28	.61	.38	.32	.39	.72	.62	.34
Kids hate to be with me	.16	.10	.79	.30	.42	.21	.90	.70	.42
Makes decisions on my own	.92	.97	.12	.49	.06	.88	.03	.51	.02
People expect too much	.31	.38	.76	.58	.40	.24	.62	.42	.29
Children are happier than me	.50	.34	.36	.32	.19	.64	.66	.68	.31
Enjoys meeting others	.94	.00	.09	.00	.05	.91	1.00	.52	.47
Feel out of place	.32	.38	.73	.55	.39	.27	.62	.45	.29
When wrong I can change things	.71	.72	.30	.48	.16	.70	.28	.52	.13
Bad things just happen	.60	.83	.61	.65	.32	.39	.17	.35	.08
People find things wrong with me	.32	.31	.67	.45	.35	.33	.69	.55	.32
Parents always tell me what to do	.52	.48	.45	.44	.24	.55	.52	.56	.24
Friends have more fun than me	.23	.10	.67	.21	.35	.33	.90	.79	.42
Dependable friend	.92	.97	.12	.49	.06	.88	.03	.51	.02
M	.53	.52	.48	.46	.29	.52	.47	.53	.25
SD	.28	.31	.27	.12	.17	.27	.31	.09	.17

the items from the TRAAM, BASC-TRS, and BASC-SRP in predicting and differentiating the CD and the ODD groups.

Milich, Widiger, and Landau (1987) identified that the "optimal" criteria for determining an item as useful in the diagnostic process is if it has a value of .85 or higher. The terminology that some researchers (e.g., Milich, Widiger, and Landau, 1987; Pelham et al., 1992a, Pelham et al., 1992b) have used to describe how efficient an item is in the diagnostic process considers values of .80 or greater to be "high," values from .60 to .79 as "moderately good," and values of .40 or less to be "poor."

In an effort to identify the most efficient inclusion criteria for academic achievement motivation symptoms, PPP rates for the individual items were examined. The PPP rates for the participants diagnosed with ODD ranged from .40 to .63 (M = .48, SD = .05). The pattern of PPP rates across the TRAAM items were moderately low (.63 or less) and not indicative of the presence of ODD. Although the item "often does not complete assignments," was somewhat effective in predicting the presence of ODD, it was not useful in ruling out the disorder by its absence (NPP = .46). The same pattern was displayed among those participants diagnosed with CD (all PPPs .64 or less). Given that the mean PPP rates for both CD and ODD were very similar, none of these items were effective inclusionary items. Additionally, the mean specificity and sensitivity rates were comparable across the items; ODD sample (.65 and .38, respectively), and the CD sample (.62 and .33, respectively). The items on the TRAAM were not effective exclusionary items for this sample. The ODD NPP rates ranged from .05 to .46 (SD = .10), while the NPP rates for CD ranged from .03 to .39 (SD = .08).Thus, items measuring the constructs Amotivation, Mastery, and Skill/Ability were neither good inclusionary nor exclusionary

markers for diagnosing children labeled CD or ODD. In evaluating the predictive ability of the TRAAM, it is imperative to remember that it was not designed to differentially diagnosis disruptive behavior disorders. The pattern of PPP and NPP rates shows that these clinical groups have a similar set of academic achievement problems. This is not an usual finding because Tremblay et al. (1992) found poor academic achievement to be a significant variable in a causal path between disruptive behavior and later delinquent personality.

As shown in Table 2, the mean PPP on the BASC-TRS items for the ODD group was .35, which is substantially lower than the mean PPP of the symptoms for the CD group (.65). The mean NPP of the symptoms for the ODD group was .46, only slightly lower than the mean NPP of these symptoms for the CD group (.54). Upon examining the differential utility of the symptoms as inclusionary and exclusionary items, there were significantly more items that were useful in predicting CD than ODD. On the BASC-TRS, 9 of the symptoms appeared to be two-way pathognomic, that is, able to serve as both inclusion and exclusion criteria, for conduct disorder. The symptoms "listens to directions," "acts without thinking," "complains about rules," "rushes through assigned work," "makes careless errors," "teases others," "argues when denied own way," "has trouble concentrating," and "is easily distracted from classwork" were highly useful as both inclusion and exclusion criteria (PPPs ranged from .97 to .90; NPPs ranged from .93 to .84). These symptoms occurred relatively frequently (base rates ranged from .52 to .335); identified a high to moderate proportion of CD children (sensitivities ranged from .94 to .45); and were highly specific to the disorder (specificities ranged from .97 to .82). Interestingly, with the exception of "listens to directions," these symptoms represent a

broad dimension of behaviors that include aggression, hyperactivity, and attention problems. Additionally, these behaviors are also indicative of children with ODD and represent a less mature and less severe manifestation of the behaviors exhibited by children with CD (Lahey et al., 1992; Spitzer et al., 1991; Walker et al., 1991). The symptoms "has friends who are in trouble" and "blames others," obtained relatively high PPP rates (.78 and .88, respectively); and their absence strongly suggested that a conduct disorder was not present (NPP rates were .84 and .73, respectively). These items also identified most of the CD children (sensitivities were .88 and .70, respectively); and were specific to the disorder (specificities were .72 and .90, respectively). The symptoms "seeks attention while doing schoolwork" and "orders others around" also were found to have utility in the diagnosis of CD (PPP rates were .81 and .75, respectively), and their absence moderately predicted that CD was unlikely (NPP rates .74 and .70, respectively). In addition, these symptoms were quite characteristic of CD children (sensitivities were .76 and .73, respectively), and were rarely present in children diagnosed as ODD (specificities were .79 and .72, respectively). Finally, the base rates of these symptoms (.50 and .52, respectively) suggest that they occurred with enough frequency to aid in the diagnostic process.

The BASC-TRS symptoms "has to stay after school for punishment" and "smokes or chews tobacco,"were the most efficient symptoms for identifying the presence of ODD in this sample (PPP rates were .87 and .93, respectively); and their absence strongly predicted that ODD was unlikely (NPP rates were .94 and .97, respectively). In this way, both the symptoms could be considered two-way pathognomic for the disorder. These two symptoms had high sensitivity values (.90 and .97, respectively); identified a large

proportion of the children with oppositional defiant disorder, and were specific to the disorder (specificity rates .88 and .94, respectively). Moreover, the base rates suggested that they occurred frequently enough to be useful in the diagnostic process (base rates were .49 and .48, respectively). The symptom, "drinks alcoholic beverages," functioned moderately well at predicting the presence of ODD (PPP = .83), and performed as well in indicating the absence of ODD (NPP = .85).

Table 3 presents the findings of the BASC-SRP for the disorders. The mean PPP rate for the ODD group on self-reported symptomology was .46 (SD = .12), slightly lower that the mean PPP rates for the CD group (M = .53, SD = .09). The mean NPP rate for the ODD group was .29 (SD = .17), whereas the mean NPP rate for the CD was .25 (SD = .17). The pattern of PPP rates showed very poor diagnostic efficiency in terms of inclusion and exclusion criteria for both groups. Even NPP rates provided very little support in concluding that the absence of the symptom suggested that an oppositional defiant or conduct disorder was not present (.58 or less, .66 or less, respectively). Although none of the symptoms were especially useful as either inclusion or exclusion criteria, many of the symptoms with "moderately good" to "high" base rates showed that both groups have similar emotional difficulties that could be characteristic of ODD and CD children.

Examination of items with "moderately good" to "high" base rates revealed that both groups provided positive ratings of their interpersonal relations skills. For example, the symptoms "good at making friends," "likeable person," "others respect me," "people think I am fun," "enjoy making friends," "liked by others," and "dependable friend" had virtually the same PPP rates (range = .45 to .58); and the absence of the symptoms did not

suggest that ODD or CD was absent (NPPs .09 or less). In a similar manner, many of the PPP rates for items reflecting locus of control and/or social stress (i.e., "parents control my life," "sometimes I feel lonely," "can't control what happens to me," and "others don't like the way I do things") were virtually the same for both groups (range = .44 to .56). Given that there was considerable overlap among the self-reported symptoms endorsed by both groups, it may suggest that this sample of CD and ODD children exhibit a set of underlying affective syndromes, which effects their adaptive behavior and operate concomitantly with their conduct problems.

In order to assess whether the ODD and CD groups differed globally on the BASC teacher ratings of maladaptive behavior, and self-report measures of personal adjustment and maladjustment two one-way analyses of variance (ANOVA) were performed. On the teacher ratings of maladaptive behavior, group (CD or ODD) was used as the independent variable and the BASC-TRS scales of Aggression, Attention Problems, Conduct Problems, Hyperactivity, and Learning Problems served as the dependent measures. In a similar manner, on the self-reported measures of personal adjustment and maladjustment group (CD or ODD) was used as the independent variable, while the BASC-SRP scales of Anxiety, Depression, Interpersonal Relations, Locus of Control, Self-Reliance and Social Stress served as the dependent variables.

The first ANOVA revealed that, compared with the ODD group, the CD group obtained significantly higher ratings on the Aggression scale of the BASC-TRS [$F(1,60) = 4.21$, $p < .05$], but the effect size was small (.02). Since the effect size was small, this rating of Aggression was not considered a meaningful difference between CD and ODD

(see Cohen, 1988, for discussion of effect size). The second ANOVA revealed no significant differences between the CD and ODD groups on the BASC-SRP.

A separate point-biserial correlation was completed for each group using demographic variables and ratings from the BASC-TRS and BASC-SRP scales to determine if there was any correspondence between these sets of variables. The relationships within the CD group are presented in Table 4 and those for the ODD group are presented in Table 5. In the CD group, the AG scale was significantly and positively related to four of the other BASC-TRS scales (ATN, CP, HYP, and LP). This pattern of relationships seems to reflect a cluster of behaviors that reflect deficits in appropriate behaviors associated with learning. The ANX scale was significantly and positively related to three of the BASC-SRP scales (DEP, LOC, and SS). The strong relationships shown here seems to confirm the moderate to high comorbidities between diagnoses of CD and affective disorders and between CD and anxiety disorders (McConaughy & Achenbach, 1994). On the other hand, the ANX scale had a significant and inverse relationship with LOS and the IR scale of the BASC-SRP.

In the ODD group, a similar pattern of significant and positive relationships emerged between the AG scale and three of the other BASC-TRS scales (ATN, CP, and HYPER). The SS scale was significantly and positively related to two of the BASC-SRP scales (DEP and LOC), whereas it had a significant inverse relationship with the HYP scale of BASC-TRS. In contrast to the CD group, the pattern of relationships exhibited by the ODD group seems to reflect a different underlying set of affective and anxiety related problems.

Table 4

Correlations among BASC-TRS, BASC-SRP, Scales, Length of Stay,

And Crimes Committed for CD Group

	AG	ANX	ATN	CC	CP	DEP	HYP	IR	LOC	LOS	LP	SR	SS
AG	-	-	-	-	-	-	-	-	-	-	-	-	-
ANX	.27	-	-	-	-	-	-	-	-	-	-	-	-
ATN	.72**	.29	-	-	-	-	-	-	-	-	-	-	-
CC	-.16	-.11	.33	-	-	-	-	-	-	-	-	-	-
CP	.51**	.03	.40*	.09	-	-	-	-	-	-	-	-	-
DEP	.17	.44**	.17	-.11	.06	-	-	-	-	-	-	-	-
HYP	.84**	.26	.77**	.16	.44*	.16	-	-	-	-	-	-	-
IR	-.01	-.39	-.10	.17	-.20	-.67**	-.07	-	-	-	-	-	-
LOC	.01	.49**	-.08	-.10	-.09	.77**	-.004	-.43*	-	-	-	-	-
LOS	-.22	-.54**	-.04	.20	.01	-.15	-.08	.14	.31	-	-	-	-
LP	.69**	.13	.82**	.16	.59**	.05	.74**	.04	-.20	.01	-	-	-
SR	-.18	-.21	-.32	-.09	-.28	-.27	-.33	.43*	-.03	.11	-.25	-	-
SS	.23	.68**	.22	-.36*	-.03	.59**	.29	-.46**	.58**	-.46**	.24	-.05	-

Note: AG = Aggression Scale; ANX = Anxiety Scale; ATN = Attention Scale; CP = Conduct Problems Scale; CC = Crime Committed; DEP = Depression Scale; HYP = Hyperactivity Scale; IR = Interpersonal Relations Scale; LOC = Locus of Control Scale; LOS = Length of Stay; LP = Learning Problems Scale; SR = Self-Reliance Scale; SS = Social Stress Scale

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Table 5

Correlations among BASC-TRS, BASC-SRP Scales

And Length of Stay for ODD Group

	AG	ANX	ATN	CP	DEP	HYP	IR	LOC	LOS	LP	SR	SS
AG	-	-	-	-	-	-	-	-	-	-	-	-
ANX	.18	-	-	-	-	-	-	-	-	-	-	-
ATN	.78**	-.04	-	-	-	-	-	-	-	-	-	-
CP	.54**	.13	.43*	-	-	-	-	-	-	-	-	-
DEP	-.17	.47**	-.05	-.02	-	-	-	-	-	-	-	-
HYP	.82**	-.16	.77**	.32	-.24	-	-	-	-	-	-	-
IR	-.30	.25	-.19	-.07	-.12	-.06	-	-	-	-	-	-
LOC	-.25	.25	-.21	-.16	.41**	-.36	-.29	-	-	-	-	-
LOS	.04	-.08	.02	-.05	.08	-.08	-.02	-.05	-	-	-	-
LP	.37	-.004	.49**	.47**	-.07	.25	-.28	.07	.04	-	-	-
SR	-.18	-.32	-.31	-.22	-.27	-.14	.26	-.16	.10	-.25	-	-
SS	-.25	.26	-.25	-.22	.63**	-.39*	-.29	.67**	.12	-.14	-.20	-

Note: AG = Aggression Scale; ANX = Anxiety Scale; ATN = Attention Scale; CP = Conduct Problems Scale; DEP = Depression Scale; HYP = Hyperactivity Scale; IR = Interpersonal Relations Scale; LOC = Locus of Control Scale; LOS = Length of Stay; LP = Learning Problems Scale; SR = Self-Reliance Scale; SS = Social Stress Scale

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Summary of Findings

The results indicate that both the CD and ODD groups exhibit a similar set of academic achievement motivation difficulties that tap the constructs of Amotivation, Mastery and Skill/Ability, which the TRAAM has demonstrated as having adequate psychometric qualities. Additionally, the teacher rated symptoms of adaptive and maladaptive behavioral patterns on the BASC-TRS revealed a broad dimension of behaviors encompassing aggression, hyperactivity and attention problems that were highly specific to the CD group and discriminated themselves from the ODD group. On the other hand, the BASC-TRS ratings also identified a smaller set of symptoms representing conduct problems that were highly specific to ODD group in this sample.

The self-reported symptoms on the BASC-SRP did not yield a specific set of behaviors that were diagnostically effective for identifying either group. However, the findings did suggest that the children in both groups feel confident about their own interpersonal relationship skills. Moreover, the participants endorsed symptoms reflecting difficulties in managing their adaptive behavior in the areas of locus of control and/or social stress.

CHAPTER V

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

Summary

Introduction

This study examined the utility of the symptoms of the TRAAM, BASC-TRS, and the BASC-SRP for the diagnoses of ODD and CD using conditional probability indices of positive predictive power, negative predictive power, sensitivity, and specificity. Previous research has focused exclusively on the symptomology presented in different editions of the *Diagnostic and Statistical Manual of Mental Disorders* and on the differential prevalence of symptoms once the diagnosis has been established. Additionally, they have rarely incorporated behaviors generated from teacher ratings of academic achievement motivation, adaptive and problem behaviors in a school setting and self-report of personality, in the differential diagnosis of disruptive behavior disorders. According to Dawes (1968) approaches such as this are necessary to establish the descriptive validity of disorders; however, they offer little information to clinicians who identify the symptoms and then must derive a diagnosis.

Discussion

The results of the present investigation reflect four points to be considered by those interested in the diagnoses of conduct and oppositional defiant disorders in children using conditional probability indices. First, the Teacher Rating of Academic Achievement Motivation was not designed to differentially diagnosis children that fall within the categories of CD and ODD, but was designed specifically to assess academic motivation and problem behaviors. The TRAAM demonstrated, the mean base rate for the all its items was .64, suggesting that children diagnosed with ODD and CD have clinically significant impairments in academic functioning. The relationship between disruptive behavior and impairments in academic functioning are the result of multiple school factors including antisocial behavior and delinquency (Hawkins & Weis, 1985), cognitive and linguistic problems (Schonfeld, Shaffer, O'Connor, & Portnoy, 1988), and emphasis on academic work and individual responsibility (Rutter et al., 1976). The findings are consistent with the literature documenting that conduct problems lead to poor school achievement (Farnsworth, Schweinhart, & Berrueta-Clement, 1985; Hawkins & Lishner, 1987; Huesmann, Evon, & Yarmel, 1987). Moreover, it is not surprising that children with CD and ODD characteristically show higher rates of emotional and motivational problems than what is likely found in schools (Ames, 1986; McDermott, 1983; Moffitt et al., 1996). Thus, the academic skill and/or performance deficits for these disorders may be a similar set of behaviors in the repertoire of these children, making their distinction as different sets of behavior an elusive process.

Additionally, the results suggest that because the ratings were similar across both groups, the maladaptive motivational style exhibited by these children may be homogeneous requiring a better understanding of the link between academic achievement and motivation, as well as the development of a similar set of interventions. Perhaps one of the obstacles in unraveling the link between academic achievement and motivation is discerning the intentionality of behaviors (i.e., escape a difficult task, gain attention, protect their sense of self-worth) characterized by children who give up trying when confronted by difficult tasks or exhibit some for of disruptive behavior.

Thus, there seems to be an implied expectation for teachers to provide ratings that accurately reflects the relative frequency of a behavior without intentional bias. However, McConaughy (1992, 1993) expressed that this is a limitation of rating scales because they involve the informant's perceptions of the child's behavior or problems, are apt to vary from one informant to the next and can be influenced by a variety of factors (i.e., context in which they see the child, relationship and interactions with the child, and tolerance for behavior observed). Moreover, because rating scales are perceptions of a teacher observing and rating the behaviors exhibited by children, it could be seen as either an attention, learning, or conduct problem. The intention of the behavior may be misinterpreted because it was not systematically analyzed through direct observation. In light of this limitation, multiple assessment methods and sources have been endorsed as best practice irrespective of the degree of objectiveness an assessment technique purports and it is often necessary to complete a functional analysis of the problem (Elliot, Busse, & Gresham, 1993; McConaughy, 1993). Therefore, gaining an understanding of the intent

of behaviors in an academic setting may assist in distinguishing why a specific behavior is exhibited.

A second explanation for the similar rating across both groups is interrelationship of intentionality and compliance. Because both groups resided and attended school in a restricted setting. There was an imposed adaptive requirement within both environments where they were required to function. The demand characteristics of a setting impose options and constraints on the individuals through structure, norms, policies, and attitudes of both peers and individuals in positions of authority (Kelly, 1968). Thus, the teacher ratings of academic achievement motivation may have been a reflection of their compliance rather than their actual abilities.

Second, current findings indicate that teacher rated symptoms of maladaptive behavior patterns proved to be a moderately positive source of information in differentiating behavioral problems exhibited by children with conduct disorder versus those with oppositional defiant disorder. For example, some of the symptoms are particularly useful as both inclusion and exclusion criteria as indicated by high PPP and NPP rates (e.g., "acts without thinking" and "complains about rules" in the diagnosis of CD). Specifically, the symptoms that provided the best differential utility represented a cluster of behaviors measuring the constructs of aggression, hyperactivity, attention and conduct problems. Because these symptoms functioned well in differentiating CD from ODD, they represent an aggregate set of symptoms for generating more specific symptomology, which are related to the ultimate diagnosis.

Primarily the aggression and conduct problem symptoms, which were more effective in differentiating the CD and ODD groups, were complimentary to those found

in the literature that used dimensional approaches to investigate the distinction between disruptive behavior disorders (Achenbach et al., 1989; Loeber & Lahey, 1989; Rey & Morris-Yates, 1993). In a similar manner, the conduct problem symptoms that were efficient in predicting ODD were also consistent with those found in the dimensional literature and represent oppositional symptoms that do not deal with others in a confrontational manner. However, it is interesting to note that some of the symptoms that are characteristic of children with attention deficit hyperactive disorder (e.g., hyperactivity, attention problems) converged towards the CD group and effectively discriminated the CD and ODD group. In a special education sample, Pelham et al. (1992a) found that several of the hallmark symptoms of ADHD had high sensitivity rates with ODD diagnoses. Waldman and Lilienfeld (1991) found considerable overlap between ADD and ODD symptomology in a nonclinical sample, which is consistent with previous research investigating the relationship among externalizing problems (Hinshaw, 1987).

In contrast to the above findings, results of this study were contradictory to those discussed in the literature that supports the use of categorical approaches. The symptoms that were similar to DSM-IV criteria for CD and ODD had poor diagnostic efficiency in differentiating the groups. The PPP rates did not meet the "optimal" inclusion criteria and in some cases, the hallmark symptoms were not predictive of the disorder for which they are typically associated. For example, symptoms such as "skips classes at school," "has been suspended from school," and "bullies others" had high diagnostic utility in other studies (e.g., Frick et al., 1994; Waldman & Lilienfeld, 1991; Pelham et al., 1992a, 1992b) that used DSM-IV symptoms as items on the rating scale in predicting the

diagnosis of ODD or CD, but were effective predictors for this sample. In evaluating these findings, it is important to consider that the children in this sample resided in clinical settings with an imposed adaptive structure, and would be expected to display fewer oppositional and conduct problems than would typically be seen outside a treatment facility. This may suggest that if these groups were rated by teachers prior to their placement in a treatment facilities, the behaviors exhibited would have occurred a higher frequency and at a more deviant level. It could be that the ratings were truncated by the compliant nature of children and may reflect a treatment effect. Thus, the ratings obtained in this clinical group need to take into account the level of behavior control exerted and the interpretation of clinically significant levels may reflect a need to be found in nonclinical groups versus clinical groups.

Similar to Pelham et al. (1992b), the results here do not explain why some items are more predictive than others or why they have differential inclusionary and exclusionary functions. It is likely that the teachers in this sample that provided ratings on the BASC-TRS have similar beliefs and tolerance levels for what behaviors are considered deviant or disruptive in the classroom and therefore, relatively more salient. Many of the teachers who provided ratings for this sample had an average of 12 years working with a clinical sample and their ratings of the boys in their respective sites may be what they expect to see given the characteristics of the sample. Therefore, their ratings may reflect greater tolerance of deviance than what would be found in a school with a special education population. The teacher's ratings might have been affected by knowledge of the childs' background history, and thus, the symptomology endorsed may have been an artifact of the child's history and not their current function.

Third, using self-reported symptomology of children diagnosed with CD and ODD, gave very limited information in the eventual diagnosis of these disorders in this sample. In this study neither clinical group showed a higher levels of self-reported internalizing or externalizing problems than the other and based on the initial hypothesis, the symptoms selected are not effective inclusionary or exclusionary items discriminating the CD and ODD groups. Although the BASC-SRP did not function as an adequate diagnostic tool in itself, it does provide useful information to the clinician, and thus aid diagnosis. The BASC-SRP functioned as an affective measure of problem and adaptive behaviors for this sample and supports evidence in previous studies that children with disruptive behavior disorders display a significant degree of covarying behavioral and emotional difficulties (Carson & Rutter, 1991; Hinshaw, Lahey, & Hart, 1993; Garnefski & Diekstra,1997).

Fourth, the research samples selection for this study were drawn from clinical populations and had a disproportionately high rate of problems that were comorbid. Their subsequent placement was based on the display of a specific set problematic behaviors. For example, the CD group had to display a level of behavioral problems that are characteristically a violation of age-appropriate societal norms and rules, while the ODD group exhibited behaviors that were intolerable and unmanageable and required significant training beyond "normal" parenting. Therefore, the behaviors that were exhibited by these children are typically not seen in a school environment, are resistant to intervention, and usually results in their expulsion. It has been documented that samples drawn from different setting and referral sources can vary significantly from one another with respect to the nature and severity of their problems and with respect to their

associated behavioral, learning and developmental characteristics (e.g., Barkley, 1996). Thus, the groups were formed as a function of their behavior rather than by a means of classification. Therefore, the findings of this study, as well as others, emphasizes the need to carefully examine the ways in which the characteristics of a specific setting can influence research results, and the need to take this into account when attempting to generalize the results to other groups of children.

Recommendations

Although the results of this study identified that children diagnosed with ODD and CD to have a common set of underlying academic achievement, motivational and emotional problems that significantly effects their school-based and overall social functioning, these constructs are not given the appropriate level of attention in the diagnostic process using categorical approaches. The recognition of these underlying patterns can help to expand our view of the broader scope of the phenomenology of various disruptive behavior disorders and it may point to areas of particular promise with respect to research in the etiology and intervention of these disorders. However, one suggested change in attempt to remedy these issues is to focus our attention on developing interventions that will increase appropriate motivational and behavioral orientations rather than list the number of deficits that need to be identified to meet criteria for diagnosis. This would move from the absolute acceptance of a classical category model, which attempts to classify individuals into discrete disorders without using assessment methods that have adequate levels of reliability and validity. It would seem logical to incorporate model that acts as a mediating factor between the

identification of a disorder and interventions to enhance the functioning of the individual. In light of the problems associated with a DSM's system of classification, it could be improved by using empirically based syndromes to derive cooccurring problems. Additionally, it provides a stepping stone for understanding the etiology of problems and developing interventions that expand to the child's broader social context, including the family, school, and community.

The use of treatment based model empirically derived syndromes can utilize the most effective and promising results of interventions that have been developed for teachers, parents, and children, offering some hope in treatment of children with disruptive behavior disorders. The integration of interventions that target multiple symptoms associated with disruptive behavior disorders can also lead to methods that can change the developmental trajectory of children with these disorders. This type of model holds the promise of developing prevention programs, which can assist in the identification of high risk factors prior to the development of the disorder.

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APPENDIXES

APPENDIX A

ADOLESCENT ASSENT FORM

ADOLESCENT ASSENT FORM

I,_____, (print your name), hereby agree to participate in the following research conducted by Danel A. Koonce, S.S.P. and Terry A. Stinnett, Ph.D., Faculty Members of Oklahoma State University, to gather information for scientific research. My participation in this study will involve completing a structured computer-assisted interview, a demographic sheet and a questionnaire to be given to me in a group setting. understand that the interview will take about 45 minutes and the completion of the forms will take approximately 40 minutes. I authorize the use of the information collected in this research as part of a study of characteristics of young people with various problem behaviors.

I am aware that all of the information provided by me is and will remain strictly confidential. My name, birth date, and any other information that could identify will not be used in any way and except to assign a code number. Information gathered in the study will be used for group comparison research purposes only. For my protection, all information related to me will be coded with an identification number. This assent form and all information that may identify me will be kept in secure storage at the principal researcher's office at Oklahoma State University, Stillwater, Oklahoma, and will be destroyed at the conclusion of the research study or three (3) years from the date I sign this Assent Form, whichever comes first. No report of any type and no publication resulting from this research will identify me by name, birth date, or other identifying information resulting from this research will identify me by name, birth date, or other identifying information.

I understand my responses will not be available to my parents, or to staff members, teachers or the administration of the L.E. Rader Center.

My responses will be reviewed only by the current research team or further research teams who are authorized by the principal researchers and who have been approved in writing by the Office of Juvenile Affairs.

If I choose not to participate, the researchers from Oklahoma State University and the staff from the L.E. Rader Center will not be made aware of my decision. Furthermore, I am aware that I may choose to end my participation in this study at any time without penalty. I also understand that if I feel any undue stress or anxiety as a result of participation in this study, I may consult with the researchers associated with this study, and I may ask questions related to this study.

I am aware that there is no connection between participation in this study and the treatment I will receive at this facility, and that my confidentiality and anonymity within this facility will be protected. If I choose not to participate in this study, no documentation indicating this decision will be placed in my file.

American Psychological Association ethical standards for research with human subjects will be followed in all stages of this study. I understand that if I have any questions about this study that are not satisfactorily answered, I may contact Terry A. Stinnett, Ph.D. or Danel A. Koonce, S.S.P. at (405) 744-9456. I may also contact Sharon Bacher, Department of Research, 203 Whitehurst, Oklahoma State University, Stillwater, OK 74078 or by phone at (405) 744-5700.

I have read and fully understand the Assent Form. I sign it freely and voluntarily. A copy has been given to me.

Research Participant	Date
Witness	Date

APPENDIX B

PARENT CONSENT FORM

PARENT CONSENT FORM

ADJUSTMENT AND ACHIEVEMENT MOTIVATION OF JUVENILE OFFENDERS

Date

Dear Parent:

Faculty members at Oklahoma State University in the College of Education are studying behavior of youth that have been in trouble with the law. Our interest is in determining the level of behavioral adjustment and academic achievement motivation behaviors displayed in a detention center. If problems in these areas can be identified and treated early, later problems might be preventable. This research is expected to provide information useful in understanding and helping adolescents who encounter problems with the law and who are at risk for later problems.

We are interviewing youth who have been involved with the law and who are receiving treatment and educational services in a structured setting. The interview will last about 45 minutes. The interview includes questions about your child's behavior and when he began having problems with the law. The youth will also be asked to complete a survey that identifies behavioral adjustment problems they may be displaying. A trained interviewer will administer both the survey and the interview, and the responses will be recorded in a computer database.

Your child will not be asked to provide his name, birthdate, or any other identifying information. Interviews will be numbered. Once the interview is completed, we will not know which youth matches that interview. Number and date instead of your child's name will introduce the interview. Researchers will also have access to your child's legal records and numbers will be used to code these. By signing this letter, you agree that all the district court and Office of Juvenile Affairs records on your child may be reviewed by the people doing the research. In any publication resulting from this research, name, birthdate or any other identifying information will not identify your child.

If your child's legal case has not been completed, we will notify his attorney and obtain permission for his participation in the study. If you have any questions about your child's rights as a research subject, you may contact the IRB Executive Secretary, Sharon Bacher, at 203 Whitehurst, Oklahoma State University, Stillwater, OK 74078 or by phone at (405) 744-5700.

Participation in this study should in no way harm your child. Participation is voluntary and those who do not wish to participate or wish to stop before completing the interview will in no way be penalized.

If you would like to know about the results of this and how it relates to your child you may contact:

Terry A. Stinnett, Ph.D.
School of Applied Health and Educational Psychology
434 Willard Hall
Stillwater, OK 74078
(405) 744-9456

Danel A. Koonce
School of Applied Health and Educational Psychology
434 Willard Hall
Stillwater, OK 74078
(405) 744-6040

If you are willing for your child to participate in this study, please sign below and return this letter to the child's JSU worker. Your child will also be asked to give assent. Thank for your assistance in advance.

Sincerely,

Danel A. Koonce, S.S.P.
School Psychologist

_____
Name of Subject (Your child)

_____ _____
Parent or Guardian (Signature) Date

APPENDIX C

INSTITUTIONAL REVIEW BOARD

APPROVAL FORM

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD

Date: July 9, 1999 IRB #: ED-99-131

Proposal Title: "DIFFERENTIAL DIAGNOSIS OF DISRUPTIVE BEHAVIOR DISORDERS USING ACADEMIC ACHIEVEMENT MOTIVATION AND BEHAVIORAL ADJUSTMENT VARIABLE"

Principal Investigator(s): Terry Stinnett
Danel Koonce

Reviewed and Processed as: Full Board

Approval Status Recommended by Reviewer(s): Approved

Signature:

Carol Olson, Director of University Research Compliance — July 9, 1999 (Date)

Approvals are valid for one calendar year, after which time a request for continuation must be submitted. Any modification to the research project approved by the IRB must be submitted for approval. Approved projects are subject to monitoring by the IRB. Expedited and exempt projects may be reviewed by the full Institutional Review Board.

VITA

Danel Antwon Koonce

Candidate for the Degree of

Doctor of Philosophy

Thesis: DIFFERENTIAL DIAGNOSIS OF DISRUPTIVE BEHAVIOR DISORDERS WITH ACADEMIC ACHIEVEMENT MOTIVATION, BEHAVIORAL ASSESSMENT SYSTEM FOR CHILDREN - TEACHER RATING SCALE AND BEHAVIORAL ASSESSMENT SYSTEM FOR CHILDREN - SELF REPORT OF PERSONALITY

Major Field: Applied Behavioral Studies

Biographical:

Personal Data: Born in Chicago, Illinois, January 8, 1969; the son of Lamar and Ocie Koonce.

Education: Graduated from Downers Grove South Community High School, Downers Grove, Illinois in May, 1987; received a Bachelor of Science degree in Psychology from Eastern Illinois University, Charleston, Illinois in May, 1993; received a Specialist in School Psychology degree from Eastern Illinois University, Charleston, Illinois in May, 1996. Completed the requirements for the Doctor of Philosophy degree with a major in School Psychology at Oklahoma State University in December 2000.

Professional Experience: Personnel Director, Equity Bank for Savings, June 1987 to January 1990; Administrator, Redlands Community College, January 1990 to August 1994; Director of Evening/Weekend Studies, University of Central Oklahoma, August 1994 to July 1995; Extension Educator, Oklahoma State University, July 1995 to December 1999; Associate Professor, University of Rhode Island, 2000 to present.

Professional Organizations: National Association of School Psychologists, American Psychological Association, Kappa Delta Pi.