THE RELATIONSHIP BETWEEN ETHNICITY AND
THE DIAGNOSIS OF ATTENTION-DEFICIT/HYPERACTIVITY
DISORDER IN CHILDREN AND ADOLESCENTS

by

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ABSTRACT

The Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV) of the American Psychiatric Association, has provided data on prevalence rates for ADHD in children; however, the definition and behavioral characteristics listed are from a population of largely White non-Hispanic participants. ADHD children and adolescents are commonly described as having persistent difficulties with inattention and/or hyperactivity-impulsivity. Additionally, numerous studies have examined the comorbid diagnoses found in children with ADHD. For example, research has shown that the comorbidity percentages range from 27% to 49% for anxiety disorders to 9% to 32% for mood disorders.

Since the vast majority of prevalence, assessment and treatment studies have focused mainly on White non-Hispanic children, there has been an increasing interest in the field on the contribution of gender and ethnicity to the frequency of the diagnosis of ADHD (e.g., Arnold, 1996). With the ever-changing and evolving ethnic composition of our schools, the challenges of competent assessment for all children becomes an increasingly important issue. Compared to previous years children of diverse cultural backgrounds currently comprise one third of all children enrolled in public schools (U. S. Department of Education, 1998-99).
The purpose of the present study was to determine the relationship between the diagnosis of Attention-Deficit/Hyperactivity Disorder and ethnicity in a sample of children and adolescents referred to two geographically different mental health clinics. Data were collected from these clinics and evaluated using chi-square and multi-way frequency analysis. Significant relationships were evaluated with a multiple comparison Least Significant Difference (LSD) post-hoc analysis. It was determined that both samples were significantly different ($p < .05$) in their make-up when compared to U. S. Census figures for each relevant region. Additionally, when evaluating comorbid conditions, there were no age group $\times$ gender interactions for Hispanic, White non-Hispanic, and other groupings. There was, however, a significant finding for the African American males 5 to 10 years of age, who were identified at a significantly higher rate to their sample representation for conduct disorder. We have found that gender and ethnic grouping accounts for much of the interaction effects seen in this study and the literature as a whole, however, until that literature provides more information on comorbidity and ethnicity, there is little that can be done to improve the current analysis.
CHAPTER ONE
INTRODUCTION

The child behavior disorder that has been known as “brain damage syndrome,” “minimal brain dysfunction,” and “hyperkinetic reaction to childhood” has evolved into the present day diagnosis of Attention-Deficit/Hyperactivity Disorder (ADHD). Schaughency & Rothlind (1991) state that “although frustrating to some, this trend of changing nomenclature does represent improved understanding of the population of children with ADHD” (p.200). The literature on ADHD suggests that attentional problems occur more frequently in males than females (e.g., Pliszka, Carlson, & Swanson, 1999), with some prevalence estimates suggesting overall occurrence to be five percent of all school-age children (e.g., Barkley, 1999).

The Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV) of the American Psychiatric Association (APA, 1994), has provided data on prevalence rates for ADHD in children; however, the definition and behavioral characteristics listed are from a population of largely White non-Hispanic participants (e.g., Lahey, Appelgate, McBurnett, Biederman, Greenhill, Hynd, Barkley, Newcorn, Jensen, Richters, Garfinkel, Kerdyk, Frick, Ollendick, Perez, Hart, Waldman, & Schaffer, 1994). ADHD children and adolescents are commonly described as having persistent difficulties with inattention and/or hyperactivity-impulsivity. They begin to express these difficulties early in development, to an extent that is considered
inappropriate for their age and developmental level, and across a multitude of situations that effects their ability to maintain attention (Pliszka, Carlson, & Swanson, 1999).

Besides the primary problems of inattention, impulsivity, and overactivity, ADHD children have been shown to express a variety of other difficulties, including: cognitive, developmental, emotional, academic, and medical problems. Although these latter problems are not considered to be part of the ADHD diagnostic characteristics, such problems have nevertheless been found to occur in these children in greater frequency than in non-ADHD children (e.g., Barkley, 1998). In addition, numerous studies have examined the comorbid diagnoses found in children with ADHD (e.g., Carron & Rutter, 1991). For example, research has shown that the comorbidity percentages range from 27% to 49% for anxiety disorders to 9% to 32% for mood disorders (e.g., Biederman, Newcorn, Sprich, 1991; Szatmari, Boyle, & Offord, 1989a). Moreover, Szatmari, Offord and Boyle (1989) state, “up to 44% of ADHD children may have at least one other psychiatric disorder, 32% have two others and 11% have at least three other disorders” (p. 220). In general, children with ADHD are rated as having more symptoms of anxiety, depression or dysthymia, and lower self-esteem than typical children or children with learning disabilities who do not have ADHD (e.g., Biederman, Faraone, Mick, Moor, & Lelon, 1996).

Since the vast majority of prevalence, assessment and treatment studies have focused mainly on White non-Hispanic children, there has been an increasing interest in the field on the contribution of gender and ethnicity to the frequency of the diagnosis of
ADHD (e.g., Arnold, 1996). The necessity for this particular type of identifying research becomes apparent, as Arnold (1996) states, “even at a basic level of clinical sample composition, if cultural gender role models affect parental referral decisions, those effects are probably modified across ethnic groups because various ethnic cultural models differ from each other as well as [from those of] the mainstream culture” (p. 566). With the ever-changing and evolving ethnic composition of our schools, the challenges of competent assessment for all children becomes an increasingly important issue. Compared to previous years children of diverse cultural backgrounds currently comprise one third of all children enrolled in public schools (U. S. Department of Education, 1998-99).

The purpose of the present study was to determine the relationship between the diagnosis of Attention-Deficit/Hyperactivity Disorder and ethnicity in a sample of children and adolescents. Specifically, the research hypotheses that were evaluated were that:

1. There is no significant difference ($p<.05$) in the ethnic composition of children and adolescents referred to two geographically different mental health clinics and those children and adolescents referred to these latter clinics who are specifically diagnosed as having ADHD.

2. There is no significant difference ($p<.05$) in the frequency of diagnosis of ADHD between White non-Hispanic, Hispanic American, African American, and Asian American children and adolescents referred to two geographically different mental health clinics.
3. There is no significant difference (p<.05) between White non-Hispanic, Hispanic American, African American, and Asian American ADHD youth referred to two geographically different mental health clinics regarding the frequency and type of comorbid diagnoses.

4. There is no significant difference (p<.05) within and/or across ethnic groupings by age and gender in the frequency of diagnosis of ADHD for those children and adolescents referred to two geographically different mental health clinics.

5. There is no significant difference (p<.05) within White non-Hispanic, Hispanic American, African American, and Asian American children and adolescent groupings by age and gender in the frequency and type of comorbid diagnoses for those ADHD children referred to the two geographically different mental health clinics.
CHAPTER TWO
LITERATURE REVIEW

Children characterized as "out of control" and who exhibit a variety of noncompliant, oppositional, disruptive and aggressive behaviors are amongst the most frequently referred for professional assessment by teachers and parents (DuPaul & Barkley, 1998). Interest in studying children manifesting these latter behaviors has increased dramatically over the past two decades (Barkley, 1998). This increased interest has also contributed to the expansion of empirical research on ADHD, particularly concerning issues related to the assessment, diagnosis, and treatment of the disorder (Mash & Terdal, 1998). For example, Barkley (1981) identified ADHD as the most widely studied disorder by mental health and educational professionals. Now, with the advent of electronic media, the number of articles on and references to ADHD are literally in the thousands. This focus of attention has led to an increase in the size of the literature relating to the assessment and treatment of disruptive behavior disorders. Such literature, however, has not necessarily transferred into practical methods for assessment and treatment (Breen & Altepeter, 1990). For example, Prinz, Moore, & Roberts (1986), in their review of strategies employed to assess hyperactivity, found considerable variability across such factors as source of information, behavioral criteria, age, and chronicity. They concluded that there has been far too much variability in the manner in which children have been identified as hyperactive and they argued that more behavioral specificity is needed. In addition, few, if any, studies have considered the contribution of ethnicity to
the assessment and diagnosis of ADHD.

Theoretical Basis of the Present Study

In a general form, cultural variability in assessment, diagnosis, and/or treatment has been addressed by numerous authors and covers topics from therapist-client relationships, stereotypes in assessment, to bias in testing and treatment (e.g., Barkley, 1998; Malgady, 1998; Schneider, 1998; & Mash & Terdal, 1998). Traditionally, assessment bias has been conceptualized, studied and discussed in terms of academic or intellectual ability. A number of writers, however, have suggested that these same types of questions and considerations should also be applied to personality measures and assessment instruments used to diagnose various behavioral disorders (e.g., Reynolds, 1995; Reynolds & Kaiser, 1990; as cited in Mayfield & Reynolds, 1998).

It should also be noted that in the past 10 - 15 years, various ethnic groups in the United States have experienced significant population growth (Mayfield & Reynolds, 1998). For example, since 1970 the Asian-Pacific population increased 107.8%, the Hispanic population increased 53%, and the African American population increased 13.2% (Mayfield & Reynolds, 1998).

Assessment Bias

The profile of the United States educational system is also changing rapidly, with short-term future estimates being that approximately one third of public school children are currently from culturally different backgrounds...with Hispanic individuals making-up the largest group (American Council on Education and Education Commission of the
States, as cited in Reid, 1995). Given the latest statistics available from the U. S. Department of Education for 1998-1999, there were 46.5 million students enrolled in public elementary and secondary schools in the 50 states and District of Columbia. Of these, 533,000 were American Indian/Native Alaska Natives (1.1%); 1,828,000 were Asian/Pacific Islander (3.9%); 6,939,000 were Hispanics (14.9%); 7,923,000 were black, non-Hispanics (17%); and 29,142,000 were white, non-Hispanics (62.6%”) (U.S. Department of Education, 1999).

In order to avoid systematic bias, assessment instruments must be appropriate to the cultures and groups studied. Common instruments should measure the same construct in different cultures and should contain adequate sampling of the relevant behaviors and constituent domains (Schneider, 1998). In addition to problems with measurement of psychiatric symptoms across racial groups, there is also evidence suggesting problems with interpretation of observed symptoms (e.g., Garretson, 1993; Gonzalez, Castillo-Canez, Tarke, Soriano, Garcia, and Velasquez, 1997).

Other researchers (Dana, 1998) tend to feel that there are more subtle and pervasive biases occurring in tests and measures constructed on the homogeneous population of White non-Hispanic America. With respect to the assessment of ADHD, some researchers indicate that both ADHD as a disorder and the instruments designed to assess it were derived from the perspective of Western professionals, using Western concepts of disorder and measurement, without regard to cultural difference (Bauermeister, Berrios, Jimenez, Acevedos, & Gordon, 1990). This suggests that there is
an expectation of conformity/acculturation and noncompliance with this expectation resulting in the identified behavior being viewed as pathological.

Researchers have only recently begun attempting to identify ethnic/cultural variability in diagnostic profiles of children and adolescents with mental disorders. There has also been an attempt to develop culture-specific personality theories for Mexican Americans (Ramirez, 1983) and Asian Americans (Hsu, 1971). Roberts and Chen (1995) examined the prevalence of depressive symptoms and suicidal ideation, comorbidity and associated risk factors in an adolescent population of middle school students (N=2,614). Nine hundred twenty-four of these students were White non-Hispanic and 1,354 were of Mexican origin. The minority adolescents in this study reported significantly higher prevalence rates for behaviors associated with depression and thoughts of suicide than their White, non-Hispanic counterparts. Prevalence rates were highest for females of Mexican-origin. The authors concluded that “Mexican-American youths appeared to be at higher risk than White non-Hispanic youths, particularly for suicidal ideation. The data also indicate that youths who spoke only or mostly English reported lower rates of depression and suicidal ideation, suggesting that acculturation may play a role as well” (Roberts & Chen, 1995, p. 81).

Finally, Jainchill, DeLeon, and Yagelka, (1997) examined ethnic differences in psychiatric disorders among adolescents in treatment. Their sample consisted of 829 adolescents distributed among African American (n=229), Hispanic (n= 165), EuroAmerican (n=386) and Other (Native American, Asian; n= 49). Over 90% of the
sample had a DSM-III-R nonsubstance diagnosis. There were significant differences among race/ethnic groups for attention deficit-hyperactivity and disruptive behaviors and affective disorders. What was generally found was that African American adolescents showed the lowest rates of disturbance across all categories of disorders (Jainchill et al., 1997).

Reid (1997), examined the extent to which behavioral rating scales could constitute a valid measure for the assessment of ADHD in culturally different groups. He performed a search for all ADHD studies conducted with a minority population (e.g., African American, Hispanic American, Puerto Rican, Chinese and Asian) that utilized a behavioral rating scale. He intended to collapse and compare the results and normative data available for each study found. In evaluating the normative data for the instrument used, Reid (1997) suggests that there are certain considerations in evaluating the extent to which a norm group is representative, namely, the proportional representation by age, gender, SES, and geographic location. In the case of ADHD, scales should also include separate norm tables for males and females because evidence suggests that different norms are indicated for them (DuPaul, 1991). Reid concluded that there was some evidence to suggest that some measure of cross-cultural conceptual equivalence exists, however, because of the small number of studies, firm conclusions were limited (Reid, 1997). Reid also concluded that there are cross-cultural differences across raters and that some culturally different individuals may be over-identified (Reid, 1997). Finally, he suggested that individuals from diverse cultural backgrounds are not adequately represented in the
norming groups of many available scales. This may imply that the normative use of rating scales for identification of ADHD with culturally different individuals appears to be questionable (Reid, 1997).

Diagnostic assessment may also be difficult when a clinician from one culture or ethnic background evaluates an individual from another background. For example, normal variations in an individual’s behavior from a different ethnic/cultural background may be misidentified as pathology by the clinician unfamiliar with such cultural practices (Malgady, 1998). “Applying Personality Disorder criteria across cultural settings may be especially difficult because of the wide cultural variations in concepts of self, styles of communication, and coping mechanisms” (APA, 1994, p. xxiv). It is for this reason that the DSM-IV has included a section “Ethnic and Cultural Considerations” in its 1994 edition. Within this section the APA attempted to provide ways to increase the recognition of “culture-bound syndromes.” First they include them as separate examples in the “Not Otherwise Specified (NOS)” categories (e.g., amok, ataque de nervios). Secondly, they have provided an appendix of these “culture-bound syndromes” (see DSM-IV, Appendix I) which includes the name of the condition, the cultures in which it was first described, and a brief description of the psychopathology. (APA, 1994). Malgady (1996) uses the limited presence of these caveats and cultural section combined with epidemiological research. Specifically, research indicating the need to adjust both inclusion criteria for symptoms and the Diagnostic Interview Schedule (DIS) algorithms cross-culturally. These issues and other research indicating higher prevalence and comorbidity rates of selected
DSM-III-R disorders in certain ethnic minority populations (Kessler, McGonagle, Zhao, & Nelson, 1994), are used to cast suspicion on the presumption of cross cultural uniformity of assessment. In the unstructured setting of the interview or observation, the minority client is implicitly compared to the clinician’s generalized perception of psychopathology relative to DSM-IV criteria (Gonzalez, Castillo-Canez, Tarke, Soriano, Garcia, and Velasquez, 1997).

Historical Perspectives on the Definition, Characteristics, and Diagnosis of ADHD

The term Attention-Deficit/Hyperactivity Disorder is the latest in a long line of diagnostic labels given to those children and adolescents having appreciable problems with attention, impulsivity, and overactivity. According to Barkley, (1998), these children “represent a heterogeneous population who display considerable variation in the degree of their symptoms, in the situational pervasiveness of the symptoms, and in the extent to which other disorders occur in association with it” (p. 3). At present, ADHD represents one of the most frequent reasons for referrals to professionals. In conjunction with Conduct Disorder (Kazdin, 1998) it is also one of the most prevalent psychiatric disorders of childhood. Barkley (1998), describes early interest in the “precursors of ADHD” that were found following an outbreak of encephalitis in the US during 1917-1918. This “Postencephalitic Behavior Disorder,” as it was called, appeared to be the result of brain damage.

The relationship between brain injury and behavior disorders continued to develop
in the early to mid-1900's. Barkley (1998) reports that during this time numerous diseases and disorders were studied, such as birth trauma, other infection (e.g., measles), lead toxicity, epilepsy, and head injury. The research findings suggested that many of these other diseases or injuries shared the same symptom profile of inattention, impulsivity, and hyperactivity. Following this time period, during the 1950's and early 1960's, the term “minimal brain dysfunction” (MBD) emerged in the literature and was applied to children whose behavioral characteristics matched the symptoms of inattention, impulsivity, and hyperactivity. In fact, Strauss and Lehtinen (1947) took the position that “the symptoms alone were, de facto, evidence of brain injury as the etiology.” (pp. 27)

By the end of the 1950's, the concept of MBD was beginning to be questioned, with the main criticism referring to the validity of “applying the concept of brain damage to children who had only equivocal signs of neurological involvement, not necessarily damage” (Barkley, 1998, p. 8). A new concept, therefore, began to emerge in the literature during the 1960's, the “hyperactive child syndrome” (Chess, 1960). Chess defined hyperactivity in the following manner, “the hyperactive child is one who carries out activities at a higher than normal rate of speed than the average child, or who is constantly in motion, or both” (p. 239). Barkley feels that there are several reasons for the significance of Chess's notion. Among them is the emphasis placed on “activity” as a defining feature of the behavior disorder. Additionally, the approach stressed the need for objective measurement of symptoms rather than anecdotal accounts from parents and teachers. By formalizing the concept as a “syndrome” it took responsibility for the child’s
problems away from the parents. Finally, it separated the concept of brain-damaged syndrome from hyperactivity. About this time, the term “Hyperkinetic” was being designated by the official diagnostic manual of the American Psychiatric Association’s (APA), *Diagnostic and Statistical Manual*, second edition, (DSM II, APA, 1968). The criteria for this diagnosis of “Hyperkinetic Reaction of Childhood (or Adolescence)” were “characterized by overactivity, restlessness, distractibility, and short attention span, especially in young children; the behavior usually diminishes in adolescence. If this behavior is caused by organic brain damage, it should be diagnosed under the appropriate non-psychotic organic brain syndrome (q.v.).” (p.50). According to Breen & Altepeter, (1990), “other than the recognition that hyperactive-like behaviors may result from organic brain damage (in which case such a behavior *should not* be diagnosed as hyperactive), the DSM-II did not identify other issues to be considered in the differential diagnostic process” (p. 8).

Since the late 1960's, research on ADHD has increased exponentially. In the early 1970s, the defining feature of the hyperactive or hyperkinetic child syndrome was broadened to include what was previously felt to be only complementary characteristics, including impulsivity, short attention span, low frustration tolerance, distractibility, and aggression (Marwitt & Stenner, 1972; Safer & Allen, 1972). Some of this research went towards the revising of DSM-II, resulting in the publication in 1980 of the *Diagnostic and Statistical Manual of Mental Disorders, third edition* (DSM-III). For example, several research topic issues dealt with the primary deficits of hyperactive children and concluded
that these primary deficits were their inability to sustain attention and inhibit impulsive responding in structured tasks (Breen & Altepeter, 1990). Because of these theoretical insights and empirical advances, the presentation of the disorder was changed in DSM-III. Breen & Altepeter (1990) for example, stated that "the core features of the disorder continued to be inattention, impulsivity, and hyperactivity. However, difficulties with attention were seen as primary, with motor restlessness secondary" (p. 8). Hyperkinetic Disorder now became "Attention Deficit Disorder" (ADD) as a way of emphasizing the primary feature. "Inattention" was described as having a short attention span and a deficit in the ability to sustain attention to relevant stimuli, particularly in a structured situation, like a classroom. "Impulsivity" was defined by deficits in self-control, rule-governed behavior and the metacognitions that are involved with delayed gratification (i.e., response-cost evaluations for particular behaviors). "Hyperactivity" was defined much as it is at present with excessive motor restlessness and overactivity as core features. With the emphasis on attention, the criteria allowed for an ADD diagnosis "with" or "without" the hyperactivity component (APA, 1987). Breen & Altepeter (1990) found that other significant changes to DSM-II further reflected developments in the literature. For example, "it was acknowledged that attention span, impulse control, and motor activity normally vary across the age span. Accordingly, a child's behavior was to be considered or evaluated with reference to his or her mental and chronological age" (Breen & Altepeter, 1990, p. 9). Behaviors must also be considered "developmentally inappropriate" to meet criteria. Furthermore, minimal time parameters were included (e.g., age of onset, duration
of symptoms) (Breen & Altepeter, 1990). Despite these advances, criticism continued to surround the DSM-III subtyping of ADD. Many still felt that the diagnoses ADD +/-H were not reliable enough to differentiate one from the other. The consensus was that the distinction between ADD +/-H did little to improve the understanding of the disorder and may actually lead to more confusion.

In the revised form of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III-R, APA, 1987), only diagnostic criteria for ADD+H were given, with ADD-H being included in “Undifferentiated Attention-deficit Disorder.” The behavior disorder was now called “Attention-Deficit Hyperactivity Disorder” for the first time. The new symptom profile for DSM-III-R consisted of objective measures and criteria (for full reference see Appendix B). Revisions to the previous two classification systems were significant in a number of respects. First, the separate listings for inattention, impulsivity and hyperactivity were replaced with a single symptom list and a single cutoff score. Secondly, behavior checklists and rating scales provided data for the empirically derived dimensions of those behaviors associated with the diagnosis of ADHD. “The items and cutoff score underwent a large field trial to determine their sensitivity, specificity, and discriminating power to distinguish ADHD from other psychiatric disorders and normal children” (Spitzer, Davies & Barkley, 1990). Third, the inappropriateness of the child’s behavior for his/her developmental age was now more stressed. Fourth, the presence of comorbid affective disorders no longer excluded the diagnosis of ADHD. Finally, the subtype of ADD without hyperactivity was removed as a subtype and relegated to a
vaguely defined category, Undifferentiated ADD (Barkley, 1998).

In the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV, APA, 1994), field trials were used to empirically develop the behavioral descriptions for ADHD. Those criteria can be seen in Appendix C. The DSM-IV (1994) indicates that “Attention-Deficit/Hyperactivity Disorder is a persistent pattern of inattention and/or hyperactivity that is more frequent and severe than is typically observed in individuals at a comparable level of development” (p. 78). The manual further stipulates that the individual being assessed must have symptoms present for a period of at least 6 months, that they be developmentally inappropriate, and that they have been present prior to the child reaching age seven. In looking at the criteria for diagnosis, it states that for inattention “six or more of the following symptoms of Inattention have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level” (APA, 1994, pp. 83-85). From the list of behaviors needed for the hyperactivity-impulsivity designation, six of nine total symptoms must be present for at least six months to a degree that is maladaptive and inconsistent with developmental level” (APA, 1994, pp. 83-85).

*Diagnostic Criteria*

As noted in the previous section, ADHD symptoms are separated into two groups (inattention and hyperactivity-impulsivity with nine symptoms in each. Dulcan (1997) lists these categories of symptoms in the following manner:

*Inattention* includes failing to give close attention to details or making careless
mistakes, having difficulty sustaining attention, not listening, not following through, having difficulty organizing, avoidance or dislike of sustained mental effort, losing things, being easily distracted, and forgetfulness. Hyperactivity includes six symptoms: fidgeting, being out of seat, running or climbing excessively, having difficulty playing quietly, being "on the go" or as if "driven by a motor," and talking excessively. The three impulsivity symptom criteria are blurring out answers, having difficulty awaiting turn, and often interrupting or intruding on others (underlining added, pp. 85s-86s). The presence or absence of specific symptoms indicates whether an individual has one of three types of ADHD: predominantly inattentive type, predominantly hyperactive-impulsive type or combined. The specific features of these "types" are further defined by Barkley (1998).

Inattention, "is a multidimensional construct that can refer to alertness, arousal, selectivity, sustained attention, distractibility, or span of apprehension, among others" (Barkley 1998, p. 57). More specifically, research tends to suggest that ADHD children have their greatest difficulties with persistence of effort, or sustaining their attention (responding) to tasks (or vigilance) (Douglas, 1983). These latter difficulties must be assessed relative to other children of the same age, gender, and developmental stage.

Impulsiveness or behavioral inhibition is frequently associated with a deficiency in inhibiting behavior in response to situational demands, or what may be called "impulsivity" (Barkley, 1998). Those forms of impulsivity often associated with the under-control of behavior, the inability to delay a response or defer gratification or to inhibit dominant prepotent responses are the ones frequently identified in children having ADHD (Barkley
1998). In a classroom setting these children often respond quickly without waiting for complete instructions, which often results in them making careless errors. These are also children who are frequently seen in emergency rooms and doctors’ offices because they have been in an accident as a result of their failure to consider the potential negative or dangerous consequences that may be associated with particular situations and/or behaviors.

Barkley finds that it is not inattention, per se, that distinguishes ADHD children from those with other disorders or from normal children as much as it is their hyperactive, impulsive, and disinhibited behaviors (Barkley, Grodzinsky, & DuPaul, 1992). This has led Barkley to suggest that behavior disinhibition is better supported in the literature as being the hallmark of children with ADHD than is inattention (Halperin, Matier, Bedi, Sharma, & Newcorn, 1992). Some of Barkley’s colleagues also state that when “[objective] measures of the three symptoms are subjected to discriminant functional analysis..., it is routinely the symptoms of impulsive errors, typically on vigilance tasks or those assessing response inhibition, and excessive activity level that best discriminate and classify ADHD children from non-ADHD children” (Corkum & Seigel, 1993, p. 1236).

The third area of identified problems involves behaviors such as restlessness, squirming, “constantly on the go,” driven, and generally excessive or developmentally inappropriate levels of activity. These behaviors can be motoric or vocal in nature and are often inappropriate to the immediate task at hand. In the classroom, these behaviors are manifested by talking out of turn, not sitting in their seat, moving about the room
without permission, and fidgeting at their desks. There is some question, however, regarding the validity of these behaviors being indicative of ADHD since the topography of these behaviors often vary over time and are dependent on specifics in the classroom setting (Douglas & Peters, 1979, Rosenthal & Allen, 1978). In this regard pervasiveness across settings (e.g., home and school) has now been included in DSM-IV as a criterion for separating ADHD from other diagnostic categories (Taylor, 1989).

Prevalence and Incidence Data

According to Tannock (1998), “ADHD occurs in 3% to 6% of children from diverse cultures and geographical regions with an over representation in boys by approximately 3:1” (p. 65). Although these estimates appear to be the norm, it is not uncommon to read of estimates ranging from a low of 1% to as high as 20% of the school-age population. Moreover, gender differences have been reported to vary from a low of 2:1 in boys versus girls to a high of 5:1 in boys over girls (e.g., Thorley, 1984; Berry, Shaywitz & Shaywitz, 1985; and Trites, Dugas, Lynch & Ferguson, 1979, Ackerman, Dykman, & Oglesby, 1983, Ross & Ross, 1982; and Cambell & Redfering, 1979). Trites, Dugas, Lynch & Ferguson (1979) also found hyperactivity using the Conner’s Teacher Rating Scale in a ratio of three boys to one girl in a sample of 14,000 elementary school children. Gaub and Carlson (1997) cite three specific biological models that may account for these gender findings: (1) the polygenic multiple threshold model (Cloninger, Christiansen, Reich, & Gottesman, 1978), (2) the constitutional variability model (Taylor and Ounsted, 1972, cited in Gaub & Carlson, 1997), and (3) the
immunoreactive model (Gualtieri & Hicks, 1985). These three models each suggest that behavior disorders are more often found in boys than girls and when similar disorders are found in girls the severity of the disorders tends to be more severe. While it has been consistently demonstrated that boys are more commonly identified as having ADHD, the severity of the symptoms for girls over boys has not been addressed (Gaub & Carlson, 1997). Furthermore, in the nonreferred population, girls with ADHD tend to display fewer inattentive, aggressive, and internalizing behaviors than boys with ADHD (Gaub & Carlson, 1997). On the other hand, girls with ADHD in clinic referred samples did demonstrate more severe cognitive impairment (i.e., lower IQ scores) than boys.

Recent literature suggests, however, that ADHD may occur across the life span (DuPaul, 1998). Moreover, although research has focused primarily on males, research literature involving females is emerging. For example, in a meta-analytic study Gaub and Carlson (1997) found that no gender differences existed between males and females for impulsivity, academic performance, social functioning, fine motor skills, parental education, or parental depression. They did find, however, that among the identified girls with ADHD there appeared to be greater intellectual impairment, lower levels of hyperactivity, and/or lower rates of externalizing behaviors (Gaub & Carlson, 1997). A somewhat contradictory finding was reported by Faraone (1997). Specifically, he found that when females were compared to males in relation to the risk of comorbid behavior problems the ADHD identified girls showed similar percentages of major depression (17%), anxiety disorders (32%), and bipolar disorder (10%) as those found in male
cohort. He further found that the only way in which girls differed from boys from earlier studies was that "approximately 33% of the ADHD girls had ODD [Oppositional Defiant Disorder] and 10% had Conduct Disorders," (Faraone, 1997, p. 1053) which was approximately 50% smaller than those seen in similarly matched boys. Girls may therefore have a lowered risk of ODD and Conduct Disorder than do boys.

In terms prevalence and incidence research done in other countries the Connor's Teacher Rating Scale (CTRS) has been one of the more commonly used instruments in cross-cultural research—-with this instrument used in studies in Australia (Holborow, Berry, & Elkins, 1984); New Zealand (Werry & Hawthorne, 1976, cited in Luk 1996), Germany (Sprague, et. al., 1975, cited in Luk 1996), and Hong Kong (Luk, 1988). These latter studies demonstrated that the occurrence of “hyperactive” behaviors in children ranges from 2.1% to 7.9 % for “definite” overactivity, 3.8% to 13.4% for inattentive behaviors, and from 2.1% to 7.7% for “definite” impulsivity (Luk, 1996).

In addition, factor analytic studies (e.g., Lahey, et al., 1994) have suggested that those factors that accounted for most of the variance involved “hyperactivity” and "conduct problems" or some combination of the two. These studies also found that “hyperactivity” was a separate factor from “inattention,” and that although “hyperactivity” and “conduct problem” items were divided into separate factors, there was always some overlap between them(Luk 1996).

Research has also been conducted comparing the frequency of diagnosis of ADHD in the United States (US) versus such countries as England (UK). For example, Taylor
(1985, as cited in Luk, 1996) compared the diagnostic rates between the US and the UK by examining data from clinical records including drug prescriptions records, case registries, and epidemiological studies. He estimated that the diagnosis was about 20 times higher in the US than in the UK (Luk, 1996). Prendergast, Taylor, Rapoport, Bartko, Donnelly, Zametkin, Ahearn, Dunn, & Weiselberg (1988), however, in a cross-national follow-up to Taylor's earlier findings, discovered that the aforementioned differences in reported rates were probably a result of different diagnostic criteria used as well as differences in the clinical training of these professionals making the diagnosis, across and within countries.

*Socioeconomic Factors*

In regard to children's socio-economic backgrounds and other related demographic factors, some research has found an increase in the rate of hyperactivity in children in urban areas versus rural areas (Luk, et. al., 1988; Schachar, et al., 1981; Goodman & Stevenson, 1989); however, if there is a marked difference in the degree of poverty in the rural versus urban area, then the poor rural area was found to have higher rates of ADHD (Shen, Wang, & Yang, 1985). Lambert, Sandoval, & Sassone (1978) found that when the parent, teacher, and physician each agreed on a child's ADHD diagnosis, then only slight differences were found in the prevalence of "hyperactivity" across social class. Differences were found when only two of the three sources of information were used (i.e., parent and teacher or parent and physician). In this instance, there was generally a higher incidence of ADHD found in the lower social classes. For
example, "when parent and teacher agreement (not physician) was required, 18% of children identified as hyperactive were in the high social class, 36% in the middle, and 45% in the low social class" (Lambert, et al. 1978). Szatmari (1992) in a review of prevalence research reported that rates of ADHD tended to increase with lower socioeconomic status (cited in Barkley, 1998). However, in an earlier study Szatmari, Offord and Boyle (1996) stated that "when [other comorbid conditions] were statistically controlled, such psychosocial variables as SES were no longer significantly associated with the disorder" (p. 215). Currently the consensus appears to be that ADHD occurs across all SES levels, and that when differences in prevalence are noted across levels of social class they may be the result of the particular inclusion criteria and assessment instruments used to define and assess the disorder and/or to the presence of comorbid behavior disorders such as aggression and conduct disorder that are also known to be related to social class (e.g., Barkley, 1998). It may be assumed that these conclusions also hold for ethnic grouping, however, no evidence has been provided in the literature to support this notion.

Theories of the Etiology of ADHD

Over the past 75 years there have been numerous theories concerning the etiology of hyperactivity. These theories have varied from brain dysfunction and environmental toxins, to dietary issues and cognitive deficits. It should be noted that these are general theories presented in the literature and that no theory has been applied to account for the contribution of the child's ethnic category or minority status.
Beginning in the 1970's, a number of theories emerged in the literature concerning the contribution of foods and other dietary factors to the development of ADHD. For example, Feingold (1974) hypothesized from anecdotal data that the ingestion of certain commonly occurring foods (e.g., milk, grain) and additives (e.g., red dye) had a toxic effect and contributed to behavioral problems in children. Feingold was primarily concerned with artificial colors and a group of compounds called “natural salicylates,” which are chemically related to the salicylic acid found in fruits and other common foods. To support this hypothesis, Feingold could only site anecdotal evidence. Relatedly, research on the effects of sugar ingestion on children’s activity and attentional levels has also been studied but, according to Goldstein & Goldstein (1998), the research has not been able to reliably report that refined sugar is a cause or contributing factor to the development of ADHD. For example, one group of researchers looked at sucrose ingestion in hyperactive boys and found that there was no difference in the boys’ motor activity after ingestion of sugar drinks (Wolraich, Milich, Stumbo, & Schultz, 1985; Milich & Pelham, 1986). Furthermore, Wolraich, et al., 1985) performed a controlled double-blind study in which they used 23 school-aged children with reported sugar sensitivity. The results showed that neither dietary sucrose nor aspartame affected the children’s behavior or cognitive function, even when intake exceeded typical levels.

**Fetal Alcohol/Drug Exposure**

Most substances ingested by mothers during pregnancy reach their developing
fetus. Perinatal experts have, therefore, indicated that mothers need to be cautious in terms of what they ingest during pregnancy. Some of these substances have been found to be correlated with many post-natal complications including low birth weight, immature lung development, learning disabilities, and mental retardation. Steinhausen, Williams, and Spoehr (1993), for example, studied 158 children affected with Fetal Alcohol Syndrome (FAS). Using structured interviews, behavior checklists for parents and teachers, and intelligence tests, these researchers found significantly more psychopathology in these children. Moreover, Nanson and Hiscock (as cited in Goldstein & Goldstein, 1998) compared 20 children with fetal alcohol exposure to 20 age-matched ADD and normal controls. They found that over time alcohol-affected children were significantly more impaired intellectually than either the ADD or normal controls. Additionally, attention deficits and behavior problems in FAS children were shown to be similar to those of the ADD group. These researchers concluded that children of alcoholics who developed ADHD were the result of the environment after birth as well as the fetal alcohol exposure.

With respect to other substances, Napierkowski, Lester, Freier, Brunner, Dietz, Nadra and Oh, (1996) investigated the contribution of cocaine exposure in infants to later behavior problems. They found that drug-exposed infants retested at one to two days of age showed increased tone and motor activity, more jerky movements, startle responses, tremors, back arching, and signs of central nervous system and visual stress than non-exposed infants. Poorer auditory and visual following were also seen. Similarly, in a study comparing 251 infants at 2 and 17 days-of-age Tronick, Cabral, Mirochnick, &
Zuckerman (1996 cited in Goldstein & Goldstein, 1998) found a dose response curve between cocaine exposure and an infant's regulation of arousal at 17 days of age.

The available research appears to be clear in that there is an appreciable concern that alcohol and drug exposure in utero represent a significant risk factor for the development of ADHD and other behavioral problems.

**Heredity**

The research literature suggests that parents of hyperactive children are four times more likely to have had hyperactivity themselves than the parents of "normal" control children (Biederman, Munir, Knee, Habelow, Armentano, Autor, Hoge, & Watermaux, 1986). Levy, Hay, McStephen, Wood and Waldman (1997) evaluated 1,938 families with twins and siblings, 4 to 12 years-of-age recruited from the Australian National Health and Medical Research Council Twin Registry. They found that ADHD was best characterized as an extreme of a behavior continuum that varies genetically throughout the entire population rather than as a specific disorder with discreet determinants. The heritability estimates for monozygotic twins versus dizygotic twins were significantly higher. They concluded that "ADHD has an exceptionally high heritability compared with other behavioral disorders...reporting that 82% of monozygotic twins and 38% of dizygotic twins met an eight-symptom ADHD cutoff for proband concordance" (Levy, et al. 1997, p. 742).

Thapar, Holmes, Poulton, and Harrington (1999), however, indicate that genetic research is dependent on the accurate definition of the phenotypic symptoms associated
with the suspected gene or genetic cluster. This is often difficult in psychiatry and psychology where phenotypes are defined, at times, on the basis of subjective reports rather than objective measures (Thapar, et al., 1999). When looking at the literature on family studies they further acknowledged that the evidence suggests that there is a high familial component for ADHD. For example, in studies where standardized interviews and operationalized diagnostic criteria were used, relatives of individuals with ADHD were found to be at increased risk for the disorder. In fact, first degree biological relatives of ADHD identified males were five times more likely to be diagnosed with ADHD than similar relatives of “normal” controls (Thapar, et al. 1999). It should also be noted, according to Biederman et al. (1991), that first and second order relatives of children with ADHD also display an increased risk for other psychiatric conditions not just ADHD (e.g., conduct disorder, alcoholism, depression, anxiety, and learning disabilities).

With respect to adoption studies, the presumption is that blood relatives of affected children will show greater prevalence for these genetically influenced disorders than will adoptive relatives. Accordingly, research has shown that biological parents of children with hyperactivity show significantly higher rates of hyperactivity (7.5%) compared with adoptive parents (2.1%)” (Thapar, et al., 1999, p. 108). Similarly, greater concordance rates were reported for adopted-away full siblings of children with hyperactivity than for half-siblings (McGuffin, et al., as cited in Thapar et al.1999). This suggests that there may be at least a moderately strong genetic link for hyperactivity.
**Neurological Factors**

Research on brain and neurological dysfunction in ADHD children have increased since the development of Positron Emission Tomography (PET) and Magnetic Resonance Imaging (MRI) assessment devices. Beginning in the 1980s and early 1990s, these neuroimaging research instruments permitted researchers to examine the brain’s structure, metabolism, and pathology while the patient was living. PET is a technique which allows researchers to detect localized areas of activity within the brain. For example, Zametkin, Nordahl, Gross, King, Semple, Rumsey, Hamburger and Cohen (1990) evaluated the metabolism of 25 adults with ADHD who also had children that were positive for ADHD. The results showed that there was significantly less activity in the frontal and striatal regions of the cortex in adults with ADHD in relation to non-ADHD controls. In another neuroimaging study, Hynd, Semrud-Clikeman, Lorys, Novey, & Eliopulis (1990) found that children with ADHD had abnormally smaller anterior cortical regions, especially on the right side, and lacked the normal right-left frontal irregularities. Barkley (1998) also reports that more recent studies have documented significantly smaller right prefrontal lobe and striatal regions in children with ADHD. This suggests that there may be some type of “drop-off” in regulatory ability for those brain mechanisms normally associated with the management of behavior, emotion, and cognition (i.e., executive functions).

Another procedure, Single Photon Emission Computed Tomography (SPECT), scans brain activity through the use of radioisotopes. These brain scans have revealed that individuals with ADHD appear to have measurable biochemical differences from normal
controls (Lancet, 1999). For example, researchers found that individuals with ADHD had 70% more dopamine transporters than normal controls (Lancet, 1999).

**Environmental and Toxin Interaction Theories**

The impact of the environment on the development and course of ADHD originates from interactional theories concerning the genetic basis for the disorder. These theories suppose that some children are genetically predisposed to ADHD development and will manifest such symptoms as a function of the environment to which they are exposed. Genetic expression of ADHD may show individual differences as a result of biological events, family influence, and/or other influences within the psychosocial domain. Barkley (1998) casts aside the implications of these theories by stating that “twin studies...show minimal or non-significant contributions of the common or shared [social] environment to the expression of symptoms of ADHD,” and further states that, “theories based entirely on the social explanations of the origins of ADHD are difficult to take seriously any longer” (p. 175). According to Barkley (1998), the few environmental theories that focus on psychosocial contributions to ADHD have gained little support in the literature. Biederman, et al. (1996), on the other hand, seem to feel that “the actual severity of the symptoms, the continuity of those symptoms over development, the types of secondary symptoms, and the outcome of the disorder are related in varying degrees to environmental factors” (p. 349).

**Lead**

The neurotoxic effects of lead have been studied for many years. High blood-lead
levels may lead to decreased brain functioning, convulsions and even death (Goldstein & Goldstein, 1998). What researchers have focused on are the much smaller trace levels of lead in the blood of children (levels in the 5-10 μg/dL range). It is believed that children are most susceptible to exposure between the ages of 12 and 24 months (Centers for Disease Control, 1991). A number of studies have pointed to a relationship between these low levels of lead in the blood and neurodevelopmental problems such as, low attention span, high activity level, and lowered intellectual functioning (Bellinger, Stiles, & Needleman, 1992; Needleman, & Gatsonis, 1990). Among these early studies, the collective findings suggest that there may be a group of children with ADHD, or other developmental symptoms, that is in some part due to lead exposure.

Some researchers, however, have failed to find a link between lead exposure and attentional problems in children. For example, Kahn, Kelly, & Walker (1995), conducted lead screening tests on 43 children with developmental delays or ADHD and 98 matched control children. They found that at the time of diagnosis, there was no significant association between the clinical diagnosis of ADHD or developmental delay and serum blood levels (Kahn, Kelly, & Walker, 1995). One reason that the results of this study may have differed from those conducted by others is that a different method for measuring lead levels was used. Specifically, researchers used isolated blood lead levels which may vary with time from exposure (30 day half-life). In earlier studies, more systemic measurements were evaluated, such as X-ray spectroscopy of bone matter and dentine levels. Currently, Goldstein & Goldstein (1998) report that there is no evidence that treatment for lead
poisoning would improve the performance of children with higher lead levels on any of the
intellectual or developmental measures. They do caution, however, that understanding
how children acquire such high lead levels is more crucial than using these measurements
to screen for ADHD.

Assessment Methods

A number of methods have been discussed in the research literature regarding the
assessment of ADHD. These methods can be divided into the following categories: clinical
interview, behavior rating scales and checklists (e.g., teacher, parent and self-report
forms), personality measures, cognitive and achievement tests, physiological and
neurological measures, direct observation, and medical assessment (e.g., blood work,
medical history). Recent versions and revisions to many of these behavior rating scales and
checklists have included expanded norms and samples to include the greater representation
of minorities and ethnic groups in the dominant culture. For example, the Connor’s Rating
Scale has an expanded “Spanish Version” of the parent rating form which is normed on a
larger representation of Hispanics (Connors, 1997).

Clinical Interview

The clinical interview is often used to rule out possible co-morbid psychiatric
conditions or environmental causes of the children’s behavior disorders, as well as to
gather supportive data for the diagnosis of ADHD. During the interview the clinician
inquires about family history of ADHD and other psychiatric disorders and various family
issues. When interviewing the child, Barkley (1981) believes that it is important to pay
close attention to the child's style and quality of responses. Since the clinical interview can be a wearisome process for children and adolescents, it presents an opportune moment for the clinician to observe a client's reported lack of inhibitory control. Kirby and Grimley (1986) also suggest that when interviewing children, the focus should be on the child's (1) perception of the problem; (2) attributional style; (3) awareness of attention variables; and (4) perception of treatment. It can also be noted here that no literature exists that suggests how to specialize clinical interviews for minority groups.

**Behavior Rating Scales & Checklists**

The most popular way to measure hyperactive behavior, according to Luk (1998), has been the use of behavior checklists and rating scales for parents and teachers. The literature on these instruments is quite extensive and is positive and supportive of their utility. Three such assessment instruments are the *Behavior Assessment System for Children* (BASC; Reynolds & Kamphaus, 1992, 1998), the *Child Behavior Checklist* (CBCL Achenbach, 1991) and the *Connors' Rating Scales* (CTRS and CPRS; Connors, 01989, 1990). For example, Strander, Weinfurt, Yarnold and August (1998) looked at the construct validity of the BASC and CBCL in discriminating between ADHD and non-ADHD children and with differentiating between students with predominantly inattentive and combined types of attentional and hyperactive behavior problems. The findings showed that the BASC Attention scale had an accuracy of 97% in correctly classifying nonspecific ADHD (based on structured interview diagnosis). For non-ADHD versus ADHD classification, the accuracy rating for the Attention Problem scales indicated a
responsiveness of 93.3%, with a false positive rate of 6.5% and false negative rate of 6.7%. In comparison, the CBCL was also generally good with a responsiveness of 93.1%, a false positive rate of 25.2% and a false negative rate of 6.9%. Both measures, therefore, appear to be able to distinguish between ADHD and non-ADHD students, with the BASC being more accurate at predicting ADHD combined and the CBCL predicting primarily inattentive type. Other types of questionnaires have been evaluated and critiqued in the literature including the Attention Deficit Disorders Evaluation Scale (ADDES) and the 10 item Conners Abbreviated Symptom Questionnaire (ASQ; Bussing, Schumann, Belin, Widawski, and Perwien, 1998); the Adolescent Behavior Checklist (ABC; Adams, Kelley, & McCarthy, 1997); the ADHD Rating Scale-IV (DuPaul, Power, Anastopolous, Reid, McGoe, & Ikeda, 1997; Vaughn, Riccio, Hynd and Hall, 1997). Vaughn et al. also compared the BASC and the CBCL parent and teacher rating scale forms. Factor analysis of these questionnaires led to some generalized findings. First, teachers can discriminate between ADHD combined type and ADHD inattentive type based on behavioral checklists and rating scales (Brown, 1985). Also, correlations between parents and teachers, although low for individual symptoms, are fairly high (77%) when thresholds for meeting diagnostic criteria are used as dependent measures (Biederman, Faraone, Milberger, & Doyle, 1993).

The Connors Teacher/Parent Rating Scales. The Connors Teacher Rating Scale (TRS) and the Connors Parent Rating Scale (PRS) have been reported as being the most widely used questionnaires for academic reports of symptoms related to ADHD (Connors,
Connors indicates that the purpose of these instruments is to characterize the behaviors of a child and compare these levels to appropriate normative groups (Connors, 1990).

In terms of reliability, according to Connors (1990), the temporal stability of the TRS and PRS have been demonstrated in a number of studies. Reliability for the "Hyperactivity Index", for example, was demonstrated by Zental & Barack, as cited in Connors, 1990), over a two week interval at .89, and over a one month interval at .86 by Epstein & Niemenen (as cited in Connors, 1990). Test-retest reliability for a one year period for the Connors’ Parent Rating Scales-39 range from .40 on the Psychosomatic factor to .70 on the Immature-Inattentive and Hyperactive-Impulsive factors (Glow, et al., as cited in Connors, 1990). Moderate interrater reliability for the CTRS has also been reported by Taylor and Sandberg (1984), and Trites and his colleagues, who report that teachers show considerable agreement in the percentages of children they identify as hyperactive using the CTRS-39 (Trites, Dugas, Lynch, & Ferguson, 1979).

In terms of internal consistency Edelbrock, Greenbaum, and Conover (as reported in Connors, 1990) demonstrated an average reliability of .94 for the various scales. A detailed item analysis by Trites and his colleagues (1982) supports the internal consistency of the CTRS-39, reporting alpha reliability coefficients ranging from .61 on the Daydreaming factor to .95 on the Hyperactivity factor (Connors, 1990).

The Behavior Assessment System for Children (BASC). The BASC was developed over a period of six years. This instrument was designed with an emphasis on
constructing self-report and behavior-rating measures with strong content and construct validity. This belief was based on research on personality and behavioral assessment which suggested that such scales with strong content and construct validity give more stable and replicable results than do purely empirically derived scales (Reynolds & Kamphaus, 1998).

With respect to reliability, the Teacher Rating Scales (TRS) were evaluated at three levels (Preschool, Child, and Adolescent). At these levels, the test-retest correlations reported were quite high, with median values of .89, .91, and .82 respectively (Reynolds & Kamphaus, 1998). In addition, test-retest correlations for the Parent Rating Scales (PRS) were .85, .88, and .70, respectively. For the composite, the test-retest correlations were in the upper .80's for the preschool level, the .90's for the child level, and the .70's for the adolescent level (Reynolds & Kamphaus, 1998). Finally, for the Self-Report Scale (SRP) which evaluates children 8-14 years-of-age and adolescents 12-18 years-of-age, the test-retest reliability correlations demonstrated an internal consistency of .76 at each age level and retest correlations for the composites in the low to mid .80s (Reynolds & Kamphaus, 1998).

For validity, correlational data have been gathered for the PRS and TRS forms of the BASC with a number of other instruments. Many of the scales and composites correlated highly with the corresponding scores on these other instruments, particularly those measuring externalizing and school problem behaviors, providing support for the construct validity of the TRS and PRS dimensions (Reynolds & Kamphaus, 1998).
Physiological and Neurological measures

A number of studies of ADHD have used a variety of physiological and/or neurological measures to assess potential differences between children with ADHD and "normal" controls or other clinical populations. However, according to Barkley (1998) these laboratory measurements have not yet proven useful in the diagnostic process. The general consensus on Electroencephalogram (EEG) usage in assessing ADHD is that it cannot be done. For example, EEG data will not exclude ADHD, and variations in the EEG do not determine whether ADHD is improving, worsening, or responding to medications (Goldstein & Goldstein, 1998). Neurological “soft signs” have also been suggested as mechanisms for assessment of ADHD. Two different groups of “soft signs” are described by Mikkelsen et al. (as cited in Goldstein & Goldstein, 1998). The first of these dimensions includes such signs as clumsiness, overflow, and speed of movements that can be reliably reproduced from day to day and from one examiner to the next. The term “soft” is used because these symptoms are not clearly associated with a dysfunction in a specific area of the brain (Goldstein & Goldstein, 1998). The second dimension includes traditional neurological indicators such as reflex, muscle tone, and asymmetry. Reeves and Werry (as cited in Goldstein & Goldstein, 1998) found that the variability of “soft signs” described accounted for the difficulty in drawing any conclusions as to their relationship with hyperactivity. Even though there has been a reported increase in the number of “soft signs” in hyperactive as compared to “normal” children, there is yet to be any clear clinical utility for this finding in the diagnosis of hyperactivity (Goldstein &
Goldstein, 1998). These authors further suggest that if you were to take a randomized sample of children and evaluate them for neurological soft signs, more will have them than will have attention deficit and therefore, a child with a positive soft sign examination may have either normal attention skills or ADHD (Goldstein & Goldstein, 1998).

Direct Observation

The use of direct observation of targeted ADHD children in school, home and/or laboratory clinic settings has frequently been recommended by researchers (e.g., Barkley, 1998). Fischer, Newby, and Breen (1988), however, have suggested that these observations are better at assessing medication response than aiding in diagnosis. An informal clinical observation of the child in question during an unstructured activity, such as the playground or cafeteria, or while in the classroom can provide valuable data regarding the child's behavior, the teacher's management style, and other key factors and characteristics of the social and academic environment (Vitaro, Tremblay, & Gagnon, 1995). The importance of direct observation is best summed-up in the three functions it fulfills: objective, communicable to others, and produces low error variance (Costello, 1973).

Medical Assessment

One major purpose of the medical evaluation that distinguishes it from the psychological evaluation is its focus differentiating the diagnosis of ADHD from various medical conditions. In rare cases, ADHD may have developed secondary to a clear physically compromising event, such as smoke inhalation, near drowning, significant head
trauma, or some type of central nervous system infection (Barkley, 1998). Similarly, as many as 20% of epileptic children may have ADHD as a comorbid condition, and as many as 30% may develop ADHD or have ADHD symptoms worsened by the use of phenobarbital or dilantin as anticonvulsants (Wolf & Forsythe as cited in Barkley, 1998).

A second purpose of the medical evaluation is to evaluate whether or not there is a significant coexisting condition that may require some type of medical intervention. For example, ADHD has often been associated with higher risk motor incoordination, enuresis, encopresis, allergies, otitis media, and greater somatic complaints (Barkley, 1998).

Finally, medical examinations can determine whether or not a condition exists that may be a contraindication for treatment with medication. For example, a child with a history of cardiac difficulties or high blood pressure may not warrant treatment with a stimulant drug. Also, having a family history of tic disorders or Tourette's Disorder may mandate caution against the use of stimulant medication. These medications have been shown to increase the likelihood of bringing out such movement disorders or increasing the occurrence of those that already exist (Barkley, 1998).

Comorbidity Research and Children's Behavior Disorders

Children diagnosed with ADHD also show appreciable comorbidity problems (Biederman, Newcorn, & Sprich, 1991) and many researchers have studied ADHD comorbidity with varied results. For example, Bird et al. (1993) studied a sample of children 4 through 16 years-of-age in Puerto Rico.
Schedule for Children (DISC) to obtain diagnoses of 222 children they found that 73% of the children were classified as having one or more DSM-III diagnoses (Bird et al. 1993). Of those identified as having ADD based on DSM-III, 93.0% also had conduct/oppositional disorders, 50.8% had an Anxiety disorder, and 26.8% experienced depression (Bird et al., 1993). Further support for comorbidity in ADHD children comes from numerous studies and includes ADHD with Conduct Disorder (Abikoff and Klein, 1992), Overanxious Disorder (Pliszka, 1992), Learning Disabilities (San Miguel, Forness, & Kavale, 1996), Mania (Faraone, Beiderman, Wozniak, Mundy, Mennin, & O'Donnel, 1997) and Oppositional Defiant Disorder (Waldman & Lilienfeld, 1991).

Comorbidity rates were also reported in the Dunedin longitudinal birth cohort study in New Zealand (as cited by Jensen, 1997). Jensen reports that these investigators looked at the prevalence of DSM-III disorders based on child, parent, and teacher reports in 792 children who were 11 years-of-age. Fifty-three children (6.7%) met criteria for ADD. Within this group of 53, 14 children (26.4%) also had an anxiety disorder, 8 (15.1%) had a depressive disorder, and 25 (47.2%) had CD/ODD (Jensen 1997).

In similar longitudinal studies, Cohen, Velez, Brook and Smith (1989) and Velez, Johnson, and Cohen (1989) studied 776 children and adolescents 9 to 18 years-of-age. Pooling data from the two studies, the researchers (Cohen et al. 1989, cited in Jensen 1997) noted that 56% of the children with ADD (n=93) had comorbid conduct disorder (CD). Fifty-four percent had oppositional defiant disorder (ODD), 23% had overanxious disorder, 24% had separation anxiety, and 13% had major depressive disorder.
Additionally, McConaughy and Achenbach (1994) in their review of 2,705 children from clinic referred and general population samples stated that a number of distinct psychiatric disorders have been represented as being comorbid with ADHD.

Abikoff and Klein (1992) suggest that ADHD and CD share a common dysfunction that maximizes interpersonal conflict which, in turn, facilitates the development of aggressive behavior. According to Barkley (1998), there is a common belief and understanding by researchers in the field of ADHD that these children display a greater degree of difficulties with oppositional and defiant behavior, aggressiveness and conduct problems, and antisocial behavior relative to “normal” children. There are studies that suggest that 54% to 67% of ADHD children and adolescents will meet diagnostic criteria for ODD (Barkley & Biederman, 1997; Barkley, DuPaul & McMurray, 1990; Szatmari, et al., 1993) with an average across studies of at least 35%. These same researchers also indicate that as many as 20% to 56% of ADHD children and 44% to 50% of adolescents will be diagnosed as having an associated Conduct Disorder. Moreover, Bird, Gould, & Staghezza, (1993) found that 93% of the Puerto Rican children in their study who were diagnosed as having ADHD also had either ODD or CD. Barkley (as cited in Goldstein & Goldstein, 1998) writes that children with ADHD and comorbid CD and ODD exhibit greater frequencies of antisocial behavior including, lying, stealing, and fighting than those with ADHD who do not develop the second disruptive comorbid disorder.

The overlap between ADHD and depression occurs at greater than chance levels,
with some studies reporting nearly 30% according to McLelland et al., (as cited in Goldstein & Goldstein, 1998). In children, it is often difficult to separate the symptoms of depression, anxiety and ADHD. Currently, the literature appears to support the notion that a depressive symptom profile is exhibited in children with externalizing behavior problems such as ADHD. However, Cody, Hynd, and Hall (as cited in Goldstein & Goldstein, 1998), using measures including parent, teacher and child ratings of depression, more specifically suggest that ADHD Combined Type demonstrates significantly more symptoms of depression, anxiety, and internalizing behaviors when compared to the Inattentive Type and controls.

A large epidemiological study undertaken by Szatmari, Offord and Boyle in Ontario found that 21% of boys and 17% of girls with ADHD between the ages of 4 and 11 years-of-age had a neurotic disorder (Szatmari, Offord, & Boyle, 1989). Meanwhile, Jensen, Shervette, Xenakis, & Richters, (1993) found that nearly 49% of their sample had an anxiety disorder along with their ADHD. Additionally, children with ADHD plus a comorbid anxiety or depressive disorder had higher levels of coexisting life stress and their parents reported more symptoms of depression than did children who had only ADHD. Other studies have also found rates between 13% and 30% for comorbid anxiety or mood disorder in children with ADHD (Anderson, Williams, Mcgee, & Silva, 1987; Bird, Canino, Rubio-Stipec, et al., 1988; Jensen et al., as cited in Barkley, 1998). In their review of the literature on the overlap of ADHD and anxiety disorders, Biederman, Newcorn & Sprich, (1991) reported a range of 10% to 40% and suggested that about 25% of ADHD
children were likely to have this disorder. The evidence of a comorbid anxiety with ADHD is so overwhelming that some researchers have called for the identification of an additional subtype of ADHD (Jensen, Martin, & Cantwell, 1997). This subtype would be characterized by decreased impulsivity and severity of other associated disruptive problems.

With regard to Tourette's Disorder, in a family history study of 130 Tourette's patients, over 1,800 relatives and a population of controls were evaluated by Comings and Comings (1990). The frequency of ADHD and learning disorders was significantly increased in the relatives of the Tourette's children (Goldstein & Goldstein, 1998). Additionally, these authors report that the data suggest that other than tics, ADHD is the most common behavioral disorder associated with Tourette's, occurring in more than half of all Tourette's cases. Knell and Comings also report that the relatives of children with Tourette's present with a high rate of comorbid Tourette's and ADHD (as cited in Goldstein & Goldstein, 1998). In a representative study, Dykens, Leckman, Riddle, Hardin, Schwartz, & Cohen (1990), examined 30 non-medicated children between the ages of 7 to 14 years with a diagnosis of Tourette's. After administering a large battery of psychoeducational tests, these authors found that there were similar socialization, academic and intellectual profiles. For example, the 19 children with Tourette's and ADHD and the 11 without ADHD both showed significant weaknesses in mental and written arithmetic and relative strengths in reading achievement and abstract logical thinking, as well as, a significant weakness in socialization skills in adaptive functioning.
The one area of difference occurred in the children’s performance IQ, where the children with Tourette’s and ADHD were significantly lower (Dykens, Leckman, Riddle, Hardin, Schwartz, & Cohen, 1990). Identification of children at-risk for the development of Tourette’s Disorder is important because of the nature of the disorder. According to Lowe, Cohen and Detlor, the treatment of ADHD with psychostimulants can be associated with the development of Tourette’s Disorder (as cited in Biederman, Newcorn & Sprich, 1991) and may be contraindicated in children at high risk for Tourette’s.

In summary, Biederman, Newcorn, & Sprich (1991) suggested that the literature supports comorbidity of ADHD with conduct disorder, oppositional defiant disorder, mood disorders, anxiety disorders, learning disabilities, and other disorders such as mental retardation, Tourette’s Disorder, and borderline personality disorder. As Goldstein & Goldstein, (1998) suggest, “the qualities of ADHD act as a catalyst. Leave them alone, and they may not be terribly aversive; mix them with negative life events or risk factors, and they appear to catalytically worsen those events and the impact they have on children’s current and future functioning.
Purpose of Study

Based on the theoretical position that there exists a cultural variability in the assessment, diagnosis, and/or treatment of minorities and given the paucity of literature on the relationship between ethnicity and the frequency of diagnosis of ADHD in children and adolescents referred to mental health clinics, the purpose of the present study was to determine the relationship between the diagnosis of Attention-Deficit/Hyperactivity Disorder and ethnicity in a sample of children and adolescents referred to two geographically different mental health clinics. Data were collected from these clinics and evaluated using chi-square and multi-way frequency analysis. Significant relationships were evaluated with a multiple comparison Least Significant Difference (LSD) post-hoc analysis. Specifically, the research hypotheses that were evaluated were that:

1. There is no significant difference (p<.05) in the ethnic composition of children and adolescents referred to two geographically different mental health clinics and those children and adolescents referred to these latter clinics who are specifically diagnosed as having ADHD.

2. There is no significant difference (p<.05) in the frequency of diagnosis of ADHD between White non-Hispanic, Hispanic American, African American, and Asian American children and adolescents referred to two geographically different mental health clinics.

3. There is no significant difference (p<.05) between White non-Hispanic, Hispanic American, African American, and Asian American ADHD youth referred to two
geographically different mental health clinics regarding the frequency and type of comorbid diagnoses.

4. There is no significant difference (p<.05) within and/or across ethnic groupings by age and gender in the frequency of diagnosis of ADHD for those children and adolescents referred to two geographically different mental health clinics.

5. There is no significant difference (p<.05) within White non-Hispanic, Hispanic American, African American, and Asian American children and adolescent groupings by age and gender in the frequency and type of comorbid diagnoses for those ADHD children referred to the two geographically different mental health clinics.
Participants

The participants for this study were selected from client data pools at two children’s clinics, one from Southeastern Florida and the other from central Texas. The racial/ethnic profile for these groups included representation from White non-Hispanic, Hispanic (e.g., Cuban, Mexican, Central/South American), African American, and Asian American groups. The children and adolescents varied in age from 3 to 18 years-of-age. The children and adolescent data were differentiated by age category similar to those used for public schooling. Specifically, group 1 (n = 959) included children 3 to 4 years-of-age (Pre-School), group 2 (n = 7,474) included children 5 to 10 years-of-age (K- 5th grade, Elementary), group 3 (n = 1535) included adolescents 11 to 14 years-of-age (6th - 8th grades, middle school) and group 4 (n = 47) included adolescents 15 to 18 years of age (9th - 12th, high school). The data set that was selected encompassed all children and adolescents seen and diagnosed at these clinics between the years 1998 and 2000, (N = 6,338) for the Fort Worth, Texas clinic and the years 1998 and 2000, (N = 3,710) for the Southeast Florida site. The clinical samples were made-up of all children diagnosed with Attention-Deficit/Hyperactivity Disorder (Combined Type, Predominantly Inattentive type, or Predominantly Hyperactive-Impulsive Type), Conduct Disorder and Depression as primary diagnoses and who also had a secondary DSM-IV diagnosis.
Clinical Settings

The first of these clinics is located in Fort Worth, Texas. This center specializes in providing diagnostic care and treatment for child and adolescent disorders ranging from learning disabilities, autism, hearing/seeing impairment, and behavioral disorders. The socioeconomic make-up for this clinic covers the broad spectrum of privately insured self-pay to government-assisted medicaid recipients. The individuals seen at this location represent a large section of central, northern and west Texas cities. Analysis of the client population was examined with respect to the 2000 US Census Data for this region (see United States Department of Commerce. (n.d.).

The second group of participants was selected from a similarly modeled clinic in South Florida. This center specializes in the treatment of children with neurological impairments including: Autism, Developmental Delay, Attention-Deficit/Hyperactivity Disorder, and other psychological difficulties. The pool of participants encompassed the 2 year period from 1998 to 2000. Consistent with the Fort Worth clinic, the same criteria from DSM-IV (APA, 1994) was used for diagnostic purposes. All diagnosis, at both locations were made by licensed Psychiatrists and Psychologists, who specialize in the treatment of child and adolescent psychopathology.

Procedure

Data for this study was collected from each location by accessing individual site data storage systems. Specific reporting profiles were generated that addressed the factors being evaluated. Specifically, client data reports included: date of birth, date client was
first seen in the clinic, gender, primary diagnoses, any secondary or tertiary diagnosis, and ethnicity. No personal identifying data was collected in order to avoid issues of confidentiality.

Data Analysis

The SAS and SPSS statistical computer packages were utilized in the analysis of these data. Due to the nature of this study and the make-up of the clinical samples the statistical procedures used for data analysis were adapted to each of the hypotheses. To measure for significant differences, chi square and multi-way frequency analysis were used. Multi-way frequency analysis is utilized when you have a multi-variate form of chi square (Tabachnick & Fidell, 1998). For all tests, effect sizes/amount of variance accounted for were reported in addition to the significance levels indicated by the Chi square and multi-way frequency analysis. All tests were set at an alpha = .05.
CHAPTER FOUR
RESULTS OF THE STUDY

This chapter presents the results of the statistical analyses associated with each hypothesis. The results of the present study are organized by the hypothesis being tested. The data associated with each hypothesis were analyzed using chi-square and multi-way frequency analyses. Multi-way frequency analyses are utilized when testing the association of multivariate discrete variables (Tabachnick & Fidell, 1998). Multiple comparison Least Significant Difference (LSD) post-hoc tests were utilized to identify the location of differences when appropriate. For all analyses, percentage differences were reported, and an alpha level of significance of .05 is used.

Hypothesis 1. There is no significant difference ($p \leq .05$) in the ethnic composition of children and adolescents referred to two geographically different mental health clinics.

Figures 1 and 2 show the observed vs. expected frequencies of ethnic composition of children and adolescents referred to two geographically different mental health clinics. Expected frequencies were obtained for each region from the 2000 U.S. Census (United States Department of Commerce, [n.d.]). The chi-square results indicate a significant difference between expected and observed percentages in both sites; $X^2 (4) = 429.34, p = .05$ for the Florida sample and $X^2 (4) = 605.28, p = .05$ for the Texas sample. In the Florida sample, the observed levels were less than the expected levels for Asian American
Figure 1. Observed vs. Expected frequencies of ethnic composition of children and adolescents with ADHD for the mental health clinic in Florida.
Figure 2. Observed vs. Expected frequencies of ethnic composition of children and adolescents with ADHD for the mental health clinic in Texas.
(0.2% vs. 4.8%), African American (4.8% vs. 11.7%), Other (0.6% vs. 1.2%), and White non-Hispanic (60.4% vs. 62.4%), while Hispanic Americans were observed in higher levels than expected (34.0% vs. 19.8%). In the Texas sample (see Figure 2), the observed levels were less than the expected levels for Asian American (0.4% vs. 3.6%), African American (9.2% vs. 12.8%), Hispanic American (10.1% vs. 19.7%), and Other (0.6% vs. 2.0%), while White non-Hispanics were observed in higher levels than expected (79.8% vs. 61.9%).

A multiple comparison LSD post-hoc was performed to determine the exact nature of the significance between these groups. As can be seen in Table 4.1, there was a significant difference for the Hispanic American sample when compared with all other ethnic groups ($p < .05$). There were also significant interactions for the African American sample when compared to White non-Hispanics and Others. The data for the Florida sample revealed significant interactions for each combination of variables, except for the African American x Other comparison (see Table 4.2). Similarly, for the Texas sample all interactions were significant (see Table 4.3).

Hypothesis 2. There is no significant difference in the frequency of diagnosis of ADHD between White non-Hispanic, Hispanic American, African American, and Asian American children and adolescents referred to two geographically different mental health clinics.

Figure 3 shows the frequencies of ethnic composition of children referred to the two mental health clinics who are diagnosed with ADHD. The chi-square results indicate
Table 4.1

Least Significant Difference (LSD) post-hoc results for combined state samples

<table>
<thead>
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<th>Ethnicity</th>
<th>Ethnic Group</th>
<th>Significance</th>
</tr>
</thead>
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<td>.48</td>
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<tr>
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<td>Hispanic American</td>
<td>.00*</td>
</tr>
<tr>
<td>African American</td>
<td>Other</td>
<td>.00*</td>
</tr>
<tr>
<td>African American</td>
<td>White non-Hispanic</td>
<td>.00*</td>
</tr>
<tr>
<td>Hispanic</td>
<td>Asian American</td>
<td>.00*</td>
</tr>
<tr>
<td>Hispanic</td>
<td>African American</td>
<td>.00*</td>
</tr>
<tr>
<td>Hispanic</td>
<td>Other</td>
<td>.00*</td>
</tr>
<tr>
<td>Hispanic</td>
<td>White non-Hispanic</td>
<td>.00*</td>
</tr>
<tr>
<td>Other</td>
<td>Asian American</td>
<td>.20</td>
</tr>
<tr>
<td>Other</td>
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</tr>
<tr>
<td>Other</td>
<td>Hispanic American</td>
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</tr>
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<td>Other</td>
<td>White non-Hispanic</td>
<td>.23</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>Ethnic Group</td>
<td>Significance</td>
</tr>
<tr>
<td>------------------</td>
<td>----------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Asian American</td>
<td>.48</td>
<td></td>
</tr>
<tr>
<td>White non-Hispanic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>.00*</td>
<td></td>
</tr>
<tr>
<td>Hispanic American</td>
<td>.00*</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>.23</td>
<td></td>
</tr>
</tbody>
</table>

* Significant at $p \leq .05$. 
TABLE 4.2

Least Significant Difference (LSD) post-hoc results for Florida sample

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Ethnic Group</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>African American</td>
<td>.00*</td>
</tr>
<tr>
<td>Asian American</td>
<td>Hispanic American</td>
<td>.00*</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>.00*</td>
</tr>
<tr>
<td></td>
<td>White non-Hispanic</td>
<td>.00*</td>
</tr>
<tr>
<td>Asian American</td>
<td>African American</td>
<td>.00*</td>
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<td>Hispanic American</td>
<td>.00*</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>.37</td>
</tr>
<tr>
<td></td>
<td>White non-Hispanic</td>
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</tr>
<tr>
<td>Hispanic</td>
<td>Asian American</td>
<td>.00*</td>
</tr>
<tr>
<td></td>
<td>African American</td>
<td>.00*</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>.00*</td>
</tr>
<tr>
<td></td>
<td>White non-Hispanic</td>
<td>.00*</td>
</tr>
<tr>
<td>Other</td>
<td>Asian American</td>
<td>.00*</td>
</tr>
<tr>
<td></td>
<td>African American</td>
<td>.37</td>
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<tr>
<td></td>
<td>Hispanic American</td>
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<tr>
<td></td>
<td>White non-Hispanic</td>
<td>.00*</td>
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</table>
TABLE 4.2 (continued)

<table>
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<th>Ethnicity</th>
<th>Ethnic Group</th>
<th>Significance</th>
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<tbody>
<tr>
<td>Asian American</td>
<td></td>
<td>.00*</td>
</tr>
<tr>
<td>White non-Hispanic</td>
<td>African American</td>
<td>.00*</td>
</tr>
<tr>
<td></td>
<td>Hispanic American</td>
<td>.00*</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>.00*</td>
</tr>
</tbody>
</table>

* Significant at $p \leq .05$. 
TABLE 4.3

Least Significant Difference (LSD) post-hoc results for Texas sample

<table>
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<th>Ethnicity</th>
<th>Ethnic Group</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
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<td>.00*</td>
</tr>
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<td>Asian American</td>
<td>Hispanic American</td>
<td>.00*</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>.00*</td>
</tr>
<tr>
<td></td>
<td>White non-Hispanic</td>
<td>.00*</td>
</tr>
<tr>
<td>Asian American</td>
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<td>.00*</td>
</tr>
<tr>
<td>African American</td>
<td>Hispanic American</td>
<td>.00*</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>.00*</td>
</tr>
<tr>
<td></td>
<td>White non-Hispanic</td>
<td>.00*</td>
</tr>
<tr>
<td>Hispanic</td>
<td>Asian American</td>
<td>.00*</td>
</tr>
<tr>
<td></td>
<td>African American</td>
<td>.00*</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>.00*</td>
</tr>
<tr>
<td></td>
<td>White non-Hispanic</td>
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</tr>
<tr>
<td>Other</td>
<td>Asian American</td>
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</tr>
<tr>
<td></td>
<td>African American</td>
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</tr>
<tr>
<td></td>
<td>Hispanic American</td>
<td>.00*</td>
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<tr>
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TABLE 4.3 (continued)

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<th>Ethnic Group</th>
<th>Significance</th>
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<tbody>
<tr>
<td>Asian American</td>
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<td></td>
</tr>
<tr>
<td>White non-Hispanic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>.00*</td>
<td></td>
</tr>
<tr>
<td>Hispanic American</td>
<td>.00*</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>.00*</td>
<td></td>
</tr>
</tbody>
</table>

* Significant at $p \leq .05$. 
<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Florida</th>
<th>Texas</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian American</td>
<td>0.2%</td>
<td>0.4%</td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>4.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>10.1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>0.6%</td>
<td>0.6%</td>
<td></td>
</tr>
<tr>
<td>White non-Hispanic</td>
<td>79.8%</td>
<td>60.4%</td>
<td></td>
</tr>
</tbody>
</table>

Figure 3. Observed frequencies of ethnic composition of children and adolescents referred to the two geographically different mental health clinics who are diagnosed with ADHD.
a significant difference between the Florida and Texas samples, $\chi^2 (4) = 890.77, p = .05$.

The Texas sample contained significantly more observed versus expected frequencies of White non-Hispanics (79.8% vs. 60.4%) and African Americans (9.2% vs. 4.8%) than the Florida sample, while the Florida sample contained significantly more Hispanic Americans (34.0% vs. 10.1%). The observed versus expected rates of the Asian American (0.2% vs. 0.4%) and Other category (0.6% vs. 0.6%) were relatively small.

**Hypothesis 3.** There is no significant difference between White non-Hispanic, Hispanic American, African American, and Asian American ADHD youth referred to two geographically different mental health clinics regarding the frequency and type of comorbid diagnoses.

A multi-way frequency analysis was conducted and, as can be seen in Table 4.4, the results showed that one-way, two-way and three-way effects were significant. A multiple comparison LSD post-hoc was completed for the statistically significant one-way, two-way, three-way and interaction effects. Table 4.5 shows the results of this analysis. The significant effects observed in the multi-way frequency analysis for the Ethnicity x State interaction occurred between the African American vs Hispanic American groups, African American vs White non-Hispanic groups, Other vs Hispanic American, and Other vs White non-Hispanic groups for the Florida sample. For the Ethnicity x Secondary (diagnosis) interaction, significance was observed between the African American vs Hispanic American groups and White non-Hispanic vs Hispanic American groups in the Texas sample. Looking at type of comorbid diagnosis observed, State x Secondary
Table 4.4

Results of Multi-way frequency analysis for Ethnicity, Site, Frequency and Type of comorbid diagnosis

<table>
<thead>
<tr>
<th>Effect</th>
<th>df</th>
<th>$G^2$</th>
<th>Probability</th>
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</thead>
<tbody>
<tr>
<td>All (total)</td>
<td>39</td>
<td>516.88</td>
<td>.00*</td>
</tr>
<tr>
<td>Ethnicity x State</td>
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<td>.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Ethnicity x Secondary</td>
<td>12</td>
<td>37.54</td>
<td>.00*</td>
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<tr>
<td>State x Secondary</td>
<td>3</td>
<td>.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>4</td>
<td>118.53</td>
<td>.00*</td>
</tr>
<tr>
<td>State</td>
<td>1</td>
<td>181.60</td>
<td>.00*</td>
</tr>
<tr>
<td>Secondary</td>
<td>3</td>
<td>179.20</td>
<td>.00*</td>
</tr>
</tbody>
</table>

*p ≤ .05
Table 4.5

Multiple Comparisons, Least Significant Difference (LSD) for Ethnicity x State and Ethnicity x Secondary

<table>
<thead>
<tr>
<th>Ethnicity x Secondary</th>
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<th>Hispanic</th>
<th>White non-Hispanic</th>
</tr>
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<tbody>
<tr>
<td>Ethnicity</td>
<td>American</td>
<td>American</td>
<td>Other</td>
</tr>
<tr>
<td>State (n = 2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>.01*</td>
<td>.18</td>
<td>.00*</td>
</tr>
<tr>
<td>Hispanic American</td>
<td>.01*</td>
<td></td>
<td>.67</td>
</tr>
<tr>
<td>Other</td>
<td>.18</td>
<td>.02*</td>
<td>.01*</td>
</tr>
<tr>
<td>White non-Hispanic</td>
<td>.00*</td>
<td>.67</td>
<td>.01*</td>
</tr>
</tbody>
</table>

Secondary (n = 3)

<table>
<thead>
<tr>
<th>Ethnicity x Secondary</th>
<th>African</th>
<th>Hispanic</th>
<th>White non-Hispanic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnicity</td>
<td>American</td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>.01*</td>
<td>.34</td>
<td>.68</td>
</tr>
<tr>
<td>Hispanic American</td>
<td>.01*</td>
<td>.97</td>
<td>.00*</td>
</tr>
<tr>
<td>Other</td>
<td>.34</td>
<td>.97</td>
<td>.26</td>
</tr>
<tr>
<td>White non-Hispanic</td>
<td>.68</td>
<td>.00*</td>
<td>.26</td>
</tr>
</tbody>
</table>

*p ≤ .05.
(comorbid) and Ethnicity x Secondary multiple comparisons are shown in Table 4.6. These results indicate that at the State level there were significant effects for all of the diagnostic categories and their interactions. Within Ethnic groups there was a significant relationship between ADHD and Conduct Disorder and Conduct Disorder and Depression.

**Hypothesis 4.** There is no significant difference within and/or across ethnic groupings by age and gender in the frequency of diagnosis of ADHD for those children and adolescents referred to two geographically different mental health clinics.

A multi-way frequency analyses was utilized to determine the effects of the variables after partialing out the previously listed combination of main effects and interactions (i.e., Ethnicity, Site, Primary diagnosis). The results of this analysis can be seen in Table 4.7. These results showed that all main effects and interactions were significantly different except for Age group by Gender $G^2 (3) = .939, p = .81$ and the three-way interaction $G^2 (12) = 15.66, p = .20$. While the distribution is somewhat complicated, a visual representation is presented in Figure 4.

A multiple comparison LSD post-hoc was completed for the statistically significant main effects and interactions. Table 4.8 displays the results of the LSD post-hoc which identified that the significant interaction for between groups occurred between the White non-Hispanic and Hispanic groups ($p \leq .05$).

**Hypothesis 5.** There is no significant difference within White non-Hispanic, Hispanic American, African American, and Asian American children and
Table 4.6
LSD multiple comparisons of Type and Frequency of comorbid diagnosis x State and Ethnicity

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>ADHD</th>
<th>Conduct Disorder</th>
<th>Depression</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>State (n=2)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADHD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conduct Disorder</td>
<td>.73</td>
<td>.01*</td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>.01*</td>
<td>.01*</td>
<td></td>
</tr>
<tr>
<td><strong>Ethnicity (n=5)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADHD</td>
<td>.00*</td>
<td></td>
<td>.78</td>
</tr>
<tr>
<td>Conduct Disorder</td>
<td>.00*</td>
<td></td>
<td>.05</td>
</tr>
<tr>
<td>Depression</td>
<td>.78</td>
<td>.05</td>
<td></td>
</tr>
</tbody>
</table>

*p ≤ .05.
Table 4.7

A multi-way frequency analyses of Ethnicity, Age group, Gender, and the interactions

<table>
<thead>
<tr>
<th>Effect</th>
<th>df</th>
<th>$G^2$</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>All (total)</td>
<td>39</td>
<td>31659</td>
<td>.00*</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>4</td>
<td>16336</td>
<td>.00*</td>
</tr>
<tr>
<td>Age Group</td>
<td>3</td>
<td>12631</td>
<td>.00*</td>
</tr>
<tr>
<td>Gender</td>
<td>1</td>
<td>2641</td>
<td>.00*</td>
</tr>
<tr>
<td>E x A</td>
<td>12</td>
<td>21.69</td>
<td>.04*</td>
</tr>
<tr>
<td>E x G</td>
<td>4</td>
<td>11.39</td>
<td>.02*</td>
</tr>
<tr>
<td>A x G</td>
<td>3</td>
<td>.939</td>
<td>.81</td>
</tr>
<tr>
<td>E x A x G</td>
<td>12</td>
<td>15.66</td>
<td>.20</td>
</tr>
</tbody>
</table>

*p ≤ .05.
Figure 4. Relationship between ethnic groupings by age and gender in the frequency of diagnosis of ADHD for those children referred to the two geographically different mental health clinics.
Table 4.8

Post-hoc LSD for Ethnicity x Gender and Ethnicity x Age Group comparison

<table>
<thead>
<tr>
<th>DV</th>
<th>Ethnicity</th>
<th>Ethnic Group</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Asian American</td>
<td>Hispanic American</td>
<td>.13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other</td>
<td>.30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>White non-Hispanic</td>
<td>.29</td>
</tr>
<tr>
<td></td>
<td>African American</td>
<td>Asian American</td>
<td>.28</td>
</tr>
<tr>
<td></td>
<td>Hispanic American</td>
<td>Other</td>
<td>.83</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>White non-Hispanic</td>
<td>.79</td>
</tr>
<tr>
<td></td>
<td>Hispanic American</td>
<td>Asian American</td>
<td>.13</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>White non-Hispanic</td>
<td>.72</td>
</tr>
<tr>
<td></td>
<td>Hispanic American</td>
<td>White non-Hispanic</td>
<td>.00*</td>
</tr>
<tr>
<td>Gender</td>
<td>Other</td>
<td>African American</td>
<td>.83</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hispanic American</td>
<td>.72</td>
</tr>
<tr>
<td></td>
<td></td>
<td>White non-Hispanic</td>
<td>.77</td>
</tr>
</tbody>
</table>
TABLE 4.8 (continued)

<table>
<thead>
<tr>
<th>DV</th>
<th>Ethnicity</th>
<th>Ethnic Group</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Asian American</td>
<td>.29</td>
</tr>
<tr>
<td>Gender</td>
<td>White non-Hispanic</td>
<td>African American</td>
<td>.79</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hispanic American</td>
<td>.00*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other</td>
<td>.77</td>
</tr>
<tr>
<td></td>
<td>African American</td>
<td>Other</td>
<td>.09</td>
</tr>
<tr>
<td>Agegroup</td>
<td>Asian American</td>
<td>Hispanic American</td>
<td>.09</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other</td>
<td>.06</td>
</tr>
<tr>
<td></td>
<td></td>
<td>White non-Hispanic</td>
<td>.08</td>
</tr>
<tr>
<td></td>
<td>Asian American</td>
<td>Other</td>
<td>.09</td>
</tr>
<tr>
<td>Agegroup</td>
<td>African American</td>
<td>Hispanic American</td>
<td>.79</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other</td>
<td>.45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>White non-Hispanic</td>
<td>.94</td>
</tr>
<tr>
<td></td>
<td>Asian American</td>
<td>Other</td>
<td>.09</td>
</tr>
<tr>
<td>Agegroup</td>
<td>Hispanic</td>
<td>African American</td>
<td>.79</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other</td>
<td>.39</td>
</tr>
<tr>
<td></td>
<td></td>
<td>White non-Hispanic</td>
<td>.58</td>
</tr>
</tbody>
</table>
**TABLE 4.8 (continued)**

<table>
<thead>
<tr>
<th>DV</th>
<th>Ethnicity</th>
<th>Ethnic Group</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Asian American</td>
<td>.06</td>
</tr>
<tr>
<td>AgeGroup</td>
<td>Other</td>
<td>African American</td>
<td>.45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hispanic American</td>
<td>.39</td>
</tr>
<tr>
<td></td>
<td></td>
<td>White non-Hispanic</td>
<td>.45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Asian American</td>
<td>.08</td>
</tr>
<tr>
<td>Agegroup</td>
<td>White non-Hispanic</td>
<td>African American</td>
<td>.94</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hispanic American</td>
<td>.58</td>
</tr>
<tr>
<td></td>
<td></td>
<td>White non-Hispanic</td>
<td>.45</td>
</tr>
</tbody>
</table>

*p ≤ .05.*
adolescent groupings by age and gender in the frequency and type of comorbid diagnoses for those ADHD children referred to two geographically different mental health clinics. Results of the Asian American subgroup were not analyzed due to lack of sufficient observations per cell. Additionally, ethnic distribution was addressed separately in hypothesis two.

A chi square analysis was conducted on the frequency and type of comorbid diagnoses for those ADHD children referred to two geographically different mental health clinics. The results (Table 4.9) showed no Age by Gender interaction effect for Hispanic American ($X^2 (3) = 1.76, p > .05$), Other ($X^2 (3) = 3.03, p > .05$), or White non-Hispanic children ($X^2 (3) = 0.03, p > .05$), however a significant difference was found for African American children ($X^2 (3) = 8.80, p = .03$).

A multiple comparison LSD post-hoc was completed for the statistically significant African American subject group. Table 4.10 shows the results of this analysis. These results indicate that the significance found occurs between the two age groups 5 to 10 year-olds and 11 to 14 year-olds.
Table 4.9

Results of the chi-square analysis conducted on the frequency and type of comorbid diagnosis

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Value</th>
<th>df</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian American</td>
<td>2.95</td>
<td>3</td>
<td>.40</td>
</tr>
<tr>
<td>N of valid cases</td>
<td>31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>8.81</td>
<td>3</td>
<td>.03*</td>
</tr>
<tr>
<td>N of valid cases</td>
<td>751</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic American</td>
<td>1.77</td>
<td>3</td>
<td>.62</td>
</tr>
<tr>
<td>N of valid cases</td>
<td>1918</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>3.04</td>
<td>2</td>
<td>.22</td>
</tr>
<tr>
<td>N of valid cases</td>
<td>62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White non-Hispanic</td>
<td>0.04</td>
<td>3</td>
<td>1.00</td>
</tr>
<tr>
<td>N of valid cases</td>
<td>7253</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p ≤ .05.
Table 4.10

Multiple Comparisons Least Significant Difference (LSD) for the within group (African American) Gender x Age Group interaction

<table>
<thead>
<tr>
<th>DV</th>
<th>AgeGroup</th>
<th>AgeGroup</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5 to 10 years old</td>
<td>.22</td>
<td></td>
</tr>
<tr>
<td>GENDER</td>
<td>3 to 4 years old</td>
<td>11 to 14 years old</td>
<td>.39</td>
</tr>
<tr>
<td></td>
<td>15 to 18 years old</td>
<td>.59</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 to 4 years old</td>
<td>.22</td>
<td></td>
</tr>
<tr>
<td>GENDER</td>
<td>5 to 10 years old</td>
<td>11 to 14 years old</td>
<td>.00*</td>
</tr>
<tr>
<td></td>
<td>15 to 18 years old</td>
<td>.33</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 to 4 years old</td>
<td>.39</td>
<td></td>
</tr>
<tr>
<td>GENDER</td>
<td>11 to 14 years old</td>
<td>5 to 10 years old</td>
<td>.00*</td>
</tr>
<tr>
<td></td>
<td>15 to 18 years old</td>
<td>.84</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 to 4 years old</td>
<td>.59</td>
<td></td>
</tr>
<tr>
<td>GENDER</td>
<td>15 to 18 years old</td>
<td>5 to 10 years old</td>
<td>.33</td>
</tr>
<tr>
<td></td>
<td>11 to 14 years old</td>
<td>.84</td>
<td></td>
</tr>
</tbody>
</table>

*p \leq .05.
CHAPTER FIVE
DISCUSSION

This chapter presents a review of the purpose of the study, analysis and summary of the results, discussion of how these findings relate to the current research literature, implications and limitations of the study, and future directions for research.

The purpose of the present study was to determine the relationship between the diagnosis of Attention-Deficit/Hyperactivity Disorder (ADHD) and ethnicity in a sample of children and adolescents from two geographically different mental health clinics in the Southern region of the United States. The current literature provides little information regarding the contribution of ethnicity to the assessment and diagnosis of children having ADHD (e.g., La Roche & Turner, 2002). Moreover, there is a paucity of research available on ADHD rates in various ethnic groups.

Who is being diagnosed and how often

Taking note of the differences in group make-up, the results of the present study demonstrate that Hispanic individuals were identified at much greater rates in Florida. The amount of the proportion demonstrated by this group was (26.92). Similarly, White non-Hispanic (70.85) and African American (10.98) populations were identified at considerably higher levels in Texas. These findings suggest that the present results are consistent with previous findings with adult populations that demonstrate a relationship between ethnicity and psychiatric diagnosis (Flaskerud & Hu, 1992). In other words, being a member of an ethnic group (minority) tends to suggests that you will also have a
psychiatric diagnosis at some point during your life span. The Florida results in the present study were also reflective of other findings with adults (e.g., Cheung & Snowden, 1990; Sue, Fujino, Hu, Takeuchi, & Zane, 1991) which found that "Whites used services at a rate which was actually slightly less than their proportion in the general population" (Cheung & Snowden, 1990, p.278). This finding, however, was not found in the Texas sample. The present results also diverge from the general research literature in that the Florida sample had an over-identification of Hispanics. This, however, may be due to the large influx of Hispanic families into the Florida mental health center's catchment area.

**Frequency and type of comorbid diagnosis**

It is apparent from the review of the research literature that there is considerable support for the presence of comorbidity with ADHD (Biederman, Newcorn, & Sprich, 1991). For example, ADHD has been found to be associated with Conduct Disorder in 30% to 50% of cases in both epidemiologic and clinic samples, while ADHD and Affective Disorders were found together in 15% to 75% of cases, in both epidemiologic and clinic samples (Biederman, Newcorn, & Sprich, 1991). The present study found that there was a significant relationship between ethnicity and comorbid diagnosis consistent with the literature. For example, among those individuals identified as having a secondary diagnosis, the African American ADHD group had a significantly larger percentage of children identified with Conduct Disorder, while Hispanic ADHD group were often given the affective comorbid diagnosis of depression. A possible reason for this finding may be found in the research by (Klonoff, Landrine, & Ullman, 1999; Wyatt, Powell, & Bass,
1982), namely, that African Americans’ symptom presentation are often perceived as more severe than those of other ethnic groups. This suggests a potential source of bias in the diagnosis of comorbid conditions in ethnic groups seeking mental health services, and certainly one needing further study.

*Differences within groups by age and gender in frequency and type of comorbidity*

The results of the present study showed that there was an increase in the identification of ADHD children in the 5 to 10 years-of-age grouping across ethnic category. In addition, ADHD males had the highest percentage of comorbid conditions (i.e., Conduct Disorder and Depression), with African American males 5 to 10 years of age having a significantly higher level of Conduct Disorder as a comorbid diagnosis. Similarly, Hispanic males in the same age grouping were found to have more affective symptomatology, although not at a significant level. In relation to the current literature, the present results are consistent with the general trend found for both adults and children, namely, comorbid Conduct Disorder is found at higher levels by ethnicity followed by the Affective Disorders (Biederman, Newcorn, & Sprich, 1991; Manteuffel, Stephens, & Santiago, 2002).

*The role of gender and age across and within ethnic categories*

The results of the present study tend to support the DSM-IV standard for diagnosis of ADHD (APA, 1994, also see Appendix B). For example, in the present study, boys were found to outnumber girls by a three to one margin which is consistent with the research literature (Barkley 1998; Faraone, 1997; and Tannock, 1998). Similarly, the
present study found that the age of identification largely centered on the 5 to 10 years-of-age range, regardless of ethnic category. This age grouping apparently is consistent with the age of onset criteria indicated in the DSM-IV. Barkley (1998), however, suggests that the behavioral items comprising the ADHD diagnostic lists decline significantly with age, particularly, the hyperactive-impulsive symptoms. Thus, the ability to adequately identify and diagnose disorders, including ADHD, based on behavioral items becomes less efficient with age. This alternative concept of diminished sensitivity could be an explanation for the current results found in this study. The pattern of identification seen, where \( n = 7474 \) (75%) of the sample falls in the 5 to 10 years-of-age group and \( n = 47 \) (1%) falls in the 15 to 18 years-of-age group, resembles the phenomena that Barkley (1998) alludes to.

*Who is using community mental health services*

The present study also suggest that the utilization of mental health services for these two geographically different communities is primarily White non-Hispanic children and youth. Interestingly, despite an under-representation in the Florida sample compared to their make-up in the community, White non-Hispanics were the majority users of these clinical services. In addition, in the Florida sample there appeared to be an overutilization of mental health services by Hispanics relative to their make-up in the community. Further investigation into the community surrounding the clinic suggested an apparent reason for the larger representation than expected. Specifically, with the war in Columbia, economic collapse in Argentina and Uruguay, and political imbalance in Peru and Venezuela (e.g., Uruguay Closes, 2002), there has been a steady influx of middle- and upper-class political
and economic refugees/immigrants from South America coming to South Florida.

Individuals from these nations have been in the United States a relatively short period of time (approximately 1 - 3 years) and many were not included in recent census figures. However, these individuals have quickly acclimated to the community at large including the schools and mental health services available to them. According to Mezzich, Ruiz and Muñoz (1999), "the hispanic population’s immigration and birth rate exceed that of any other U. S. ethnic group" (p. 92). The true impact of this immigration on the region’s population distribution may not be fully known until the next census in 2010.

Limitations of the study

There are four potential limitations to the present study. The first has to do with the representativeness of the samples to the demographics of the areas they were drawn from. Although the make-up of these samples are diverse, it does not appear to be significantly representative of the recorded (U. S. Census Bureau, 2000) population for the areas involved, as was the assumption when the study began. Other factors such as access to services, utilization of services, and ethnicity of the clinician, may also contribute to the make-up of this sample.

Another possible limitation of this research is its retrospective design and the use of data collected more for clinical than research purposes. However, the large sample size, the independence of the samples and the collection of data over a two year period of time may offset some of this limitation.

Thirdly, the large sample size, while increasing the probability of finding
significance in some variables appeared to dilute the impact of others. For example, the identification of Conduct Disorder and Depression as comorbid diagnoses was seen in such small percentages partly because of the large number of individuals in the overall sample.

Lastly, there is a general limitation in the literature with respect to frequency and prevalence data for comorbidity. Researchers like Beiderman, et al. (1991) have developed a foundation for this line of research with the majority population that needs to be carried out with minority groups. True representations of these disorders and comorbid conditions are likely reflective of the majority population, however, they are highly dependent on the level of acculturation experienced by the minority sample.

_Implications and future directions for research_

There are several practical implications and considerations that can be drawn from this study. First, the present findings suggest that ethnic identity in mental health is an important area of consideration when examining the access, utilization, and outcome of children's and adolescent's mental health services. The under-representation of some individual groups, as well as the over-representation of others may suggest that the same mental health services for individuals sharing the same ADHD diagnosis may not be an appropriate strategy. This is consistent with the views of Farmer (2000) and Manteuffel, Stephens & Santiago (2002) in terms of evaluating the importance of evaluating the relative effectiveness of clinical interventions and community based services. Secondly, given the diverse population of ADHD children and adolescents receiving mental health
services in clinics, it may be a good idea for clinicians to examine whether they can provide services to all ADHD children and adolescents, or are there certain ethnic groups that some clinicians feel they cannot be as effective as with other ethnic groups.

In terms of future research, one suggestion would be to repeat the present study in other venues across the country (e.g., Chicago, New York City, Denver, Phoenix, Los Angeles, etc.) to determine if the present findings are supported. Another avenue of research would be to develop an ADHD symptom profile sheet to determine which types of symptoms clinicians feel they are most effective in treating with which type(s) of ethnic groups, this would be consistent with the writings of Zhang & Snowden (1999).

Conclusions

Historically, mental health services for racial/ethnic groups have been underutilized because these groups were either denied access or presented with inferior, less costly, or culturally inappropriate services (Dana, 1998). In more recent times, barriers to access and use have come from financial, institutional or cultural means as well as the availability of alternative resources. Leong, Wagner, and Tata (1995) found that because mental health services require either insurance or self pay ability, reductions in public sector services most seriously affect those with the lowest incomes. Institutional barriers are associated with the dilemmas faced by many individuals in getting to centrally located agencies and arranging child care and/or transportation. Once clients have overcome these obstacles they are often faced with practitioners who were usually resistant to or biased towards client symptom presentations (Klonoff, Landrine, & Ullman, 1999; Wyatt, Powell, & Bass,
There are also the cultural barriers of language, community stigmatization, values/beliefs, and the limited availability of culturally relevant services. Most often, individuals from these groups chose the more comfortable, credible, and relevant services that were found in churches and hospital emergency rooms or from community individuals or ‘elders’ (Leong, Wagner, & Tata, 1995). Due to managed healthcare many early segregated service settings have been consolidated with mainstream agencies and access to providers of the same race/ethnicity or primary language has become increasingly infeasible for most individuals. This, despite a research literature suggesting that matching improves retention of clients and intervention outcomes (Kuraski, Sue, Chun, & Gee, 2000).

Current investigations on service utilization are showing that African Americans and Native Americans tend to overutilize, whereas Asian Americans and Hispanic Americans tend to underutilize (Beiser & Atteave, 1982; Mollica, Blum, & Redlich, 1980; Scheffler & Miller, 1989, Snowden, & Cheung, 1990). What the present study has discovered appears to be an overall underutilization of services by groups in these communities.

What the present study provides is further evidence of the potential failings of our mental health system with our most important population: children and adolescents. Although we cannot overly interpret the present data and/or over generalize the results, there were a number of findings that came from these two geographically different samples. First, it was evident that there continues to be some indications of bias in the
diagnosis of minority children. Specifically, an over-identification of African American males into ADHD comorbid categories of Conduct Disorder in relation to their proportion in the community. Secondly, ADHD continues to be a condition dominated by males, with this finding holding true across ethnic category. With Asian American’s having the highest percentage 83.9% and Hispanic’s the lowest at 72.3% the consensus was a 3:1 ratio of boys to girls across ethnic group in both clinics. Thirdly, Conduct Disorder and Depression as comorbid conditions presented at higher rates than other disorders. Finally, and relatedly, these comorbid conditions appear to be closely linked to ethnicity. African American and Hispanic children were disproportionately represented by comorbid conditions, both internalizing and externalizing in nature. The potential consequence of such a finding is that the identification of these specific comorbid conditions has been linked to poorer outcomes from treatment (Biederman, et al. 1995; Barkley, 1998). This ultimately is another expectation to be overcome by the minority child or adolescent in their struggle to achieve the status quo. The present study suggests that a child’s or adolescent’s ethnicity needs to be considered in the provision of mental health services.
Appendix A

308.0 Hyperkinetic reaction of childhood (or adolescence)
This disorder is characterized by overactivity, restlessness, distractibility, and short attention span, especially in young children; the behavior usually diminishes in adolescence.

If this behavior is caused by organic brain damage, it should be diagnosed under the appropriate non-psychotic organic brain syndrome(q.v.).

American Psychiatric Association, 1968
Appendix B

Diagnostic criteria for 314.01 Attention-deficit Hyperactivity Disorder (ADHD)

Note: Consider a criterion met only if the behavior is considerably more frequent than that of most people of the same mental age.

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

   (1) often fidgets with hands and feet or squirms in seat (in adolescents, may be limited to subjective feelings of restlessness)
   (2) has difficulty remaining seated when required to do so
   (3) is easily distracted by extraneous stimuli
   (4) has difficulty awaiting turn in games or group situations
   (5) often blurts out answers to questions before they have been completed
   (6) has difficulty following through on instructions from others (not due to oppositional behavior or failure of comprehension), e.g., fails to finish chores
   (7) has difficulty sustaining attention in tasks or play activities
   (8) often shifts from one uncompleted activity to another
   (9) has difficulty playing quietly
   (10) often talks excessively
   (11) often interrupts or intrudes on others, e.g., butts into other children’s games
   (12) often does not seem to listen to what is being said to him or her
   (13) often loses things necessary for tasks or activities at school or at home (e.g., toys, pencils, books, assignments)
   (14) often engages in physically dangerous activities without considering possible consequences (not for purpose of thrill-seeking), e.g., runs into street without looking

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

B. Onset before the age of seven.

C. Does not meet the criteria for a Pervasive Developmental Disorder
Criteria for severity of Attention-Deficit Hyperactivity Disorder: continued

**Mild:** Few if any, symptoms in excess of those required to make the diagnosis and only minimal or no impairment in school and social functioning.

**Moderate:** Symptoms or functional impairment intermediate between “mild” and “severe.”

**Severe:** Many symptoms in excess of those required to make the diagnosis and pervasive impairment in functioning at home and school and with peers.

**314.00 Undifferentiated Attention-deficit Disorder**

This is a residual category for disturbances in which the predominant feature is the persistence of developmentally inappropriate and marked inattention that is not a symptom of another disorder, such as Mental Retardation or Attention-deficit Hyperactivity Disorder, or of a disorganized and chaotic environment. Some of the disturbances that in DSM-III would have been categorized as Attention Deficit Disorder without Hyperactivity would be included in this category. Research is necessary to determine if this activity is a valid diagnostic category and, if so, how it should be defined.

* American Psychiatric Association (1987)
Appendix C

Diagnostic Criteria for Attention-Deficit/Hyperactivity Disorder (DSM-IV)

A. Either (1) or (2):

(4) six (or more) of the following symptoms of **inattention** have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

*Inattention*

(a) often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities
(b) often has difficulty sustaining attention in tasks or play activities
(c) often does not seem to listen when spoken to directly
(d) often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions)
(e) often has difficulty organizing tasks and activities
(f) often avoids, dislikes, or reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework)
(g) often loses things necessary for tasks or activities (e.g., toys, school assignments pencils books or tools)
(h) is often easily distracted by extraneous stimuli
(i) is often forgetful in daily activities

(5) six (or more) of the following symptoms of **hyperactivity-impulsivity** have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

*Hyperactivity*

(a) often fidgets with hands or feet or squirms in seat
(b) often leaves seat in classroom or in other situations in which remaining seated is expected
(c) often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness)
(d) often has difficulty playing or engaging in leisure activities quietly
(e) is often “on the go” or often acts as if “driven by a motor”
(f) often talks excessively

*Impulsivity*

(g) often blurts out answers before questions have been completed
(h) often has difficulty awaiting turn
(i) often interrupts or intrudes on others (e.g., butts into conversations or games)

B. Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before age 7 years.

C. Some impairment from the symptoms is present in two or more settings (e.g., school [or work] or at home).

D. There must be clear evidence of clinically significant impairment in social, academic, or occupational functioning.

E. The symptom do not occur exclusively during the course of a Pervasive Developmental Disorder, Schizophrenia, or other Psychotic Disorder and are not better accounted for by another mental disorder (e.g., Mood Disorder, Anxiety Disorder, Dissociative Disorder, or a Personality Disorder).

*American Psychiatric Association (1994)*
Appendix D
Permissions
August 7, 2001

Albert Gamarra
1000 Tupelo Way
Weston, Florida 33327

Dear Albert:

This letter is to serve as written permission for you to use the data you collected while at the Child Study Center for your doctoral dissertation. This is with the understanding that no identifying information will be used and that confidentiality will be maintained.

Sincerely,

Ray E. Austin, PsyD
Director of Psychology
Child Study Center

REA:icw
September 6, 2001

Alberto Gamarra  
1000 Tupelo Way  
Weston, FL 33327

Dear Mr. Gamarra:

This letter is to serve as written authorization for you to use our database in collecting data for your doctoral dissertation. With the understanding that no identifying information will be accessed or collected during your research and that confidentiality will be maintained.

Sincerely,

Paul Pet
President
Children's Psychology Associates

September 6, 2001

Alberto Gamarra  
1000 Tupelo Way  
Weston, FL 33327

Dear Mr. Gamarra:

This letter is to serve as written authorization for you to use our database in collecting data for your doctoral dissertation. With the understanding that no identifying information will be accessed or collected during your research and that confidentiality will be maintained.

Sincerely,

Paul Pet
President
Children's Psychology Associates
Appendix E
Human/Animal Subjects Approval
29 April 2002

Alberto Gamarra, M.S.
Advisor: Richard Morris, Ph.D.
Department of Special Education,
Rehabilitation/School Psychology
Education Building, Room 412
PO BOX 210069

RE: ETHNICITY AND THE DIAGNOSIS OF ATTENTION-DEFICIT/HYPERACTIVITY DISORDER IN CHILDREN AND ADOLESCENTS

Dear Mr. Gamarra:

We received documents concerning your above cited project. This project involves secondary analysis of existing data (data to be provided by Child Study Center, Fort Worth, Texas and Children's Psychology Associates, Fort Lauderdale, Florida without individual identifiers; site authorization letters submitted for review). Therefore, regulations published by the U.S. Department of Health and Human Services [45 CFR Part 46.101(b)(4)] exempt this type of research from review by our Institutional Review Board.

Thank you for informing us of your work. If you have any questions concerning the above, please contact this office.

Sincerely,

Rebecca Dahl, R.N., Ph.D.
Director
Human Subjects Protection Program

RD/fs
cc: Departmental/College Review Committee
TO: Alberto Gamarra  
SERSP  
Education  
Room 412

FROM: Alice C. Langen  
Director, Research Standards and Compliance

DATE: 3/13/02

SUBJECT: Human Subjects Protection Certification

On 3/13/02 you successfully completed the Rochester Program, "Protecting Study Volunteers in Research." Therefore, you have met the criterion required by the University of Arizona to be certified in human subjects protection.

This is the only notification you will receive. Please give a copy of this memo to your department head and keep this memo in your files.

AL:ln
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