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Distinct Group Differences and Discriminant Validity of the Adjustment Scales for Children and Adolescents: Attention Deficit-Hyperactivity Disorder versus Oppositional Defiant Disorder

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Distinct Group Differences and Discriminant Validity of the Adjustment Scales for Children and Adolescents: Attention Deficit-Hyperactivity Disorder versus Oppositional Defiant Disorder

(TITLE)

BY

Kim D. Miller

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RUNNING HEAD: VALIDITY OF THE ASCA

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Abstract

The present study examined the distinct group differences and discriminant validity of the Adjustment Scales for Children and Adolescents (ASCA). Participants included 36 children in Kindergarten through eleventh grade. Twenty-seven of the children met DISC-IV / DSM-IV (DSM-IV-TR, 2000) criteria for ADHD, and 9 met criteria for ODD. The participants were classified based on the results of the DISC-IV (Shaffer, Fisher, Lucas, Dulcan & Schwab-Stone, 2000) interview completed with the parent. The referring classroom teacher then completed the ASCA. Results of the present study did not support the distinct group differences and thus the discriminant validity of the ASCA. The results of the MANOVA/ANOVA did not show distinct differences between the ADHD and the ODD groups. Students in the ADHD group had slightly higher scores on the ADH syndrome of the ASCA (Δ = .133), while students in the ODD group had slightly higher scores on the OPD syndrome of the ASCA (Δ = .330). However, these results were not significant. Results from the present study were likely affected by low power due to a small sample size.

Distinct Group Differences and Discriminant Validity of the Adjustment Scales for Children and Adolescents: Attention Deficit-Hyperactivity Disorder versus Oppositional Defiant Disorder

Identifying behaviorally at-risk students in order to better understand their achievement and to address school safety became an important part of many school improvement plans in the 1990's (Thomas & Grimes, 2003). The primary goal for such a screening tool is to identify students who may need early intervention and additional support to prevent further deterioration of behavior (Thomas & Grimes, 2003. Traditionally, teachers refer students whom they feel are deviant from their classmates for a special education evaluation. This referral process may reflect personal biases of the teacher. Another weakness is that teachers differ in their tolerances for, and awareness of different behavior problems. Because of these weaknesses a systematic, less-biased behavior screening tool that provides information about the students behavior within the context of social norms is necessary (Thomas & Grimes, 2003).

Behavior rating scales are a necessary component in the assessment of children with behavioral concerns. They allow professionals, such as school psychologists to

determine the degree to which a student exhibits certain characteristics relative to same age and gender students (Thomas & Grimes, 2003; Reynolds & Kamphaus; (1992); McDermott, (1993) and Merrell, (1994). Behavior rating scales also allow for data collection on infrequent behaviors that may be missed with methods, such as direct observations (Thomas & Grimes, 2003). Rating scales should be selected and utilized during the first stage of assessment to help define the specific referral concerns. An unobtrusive observation should also be conducted at this stage to further define the referral concerns. The selected rating scale is then used in subsequent stages of assessment to aid in the development of a successful intervention.

Behavior rating scales that have been standardized with empirically based syndromes and large normative samples covering a wide range of ages for both males and females have a number of advantages. For example, (1) the information is quantifiable and amenable to psychometric tests of reliability and validity, (2) multiple items provide data on a broad range of problems rather than focusing on the referral concern, (3) the information is organized into groupings of different syndromes and broad scales, (4) they provide a standard for determining the

severity of problems, (5) rating scales are economical and efficient, and (6) rating scales can be used to compare data from multiple informants such as parents, teachers, and observers (Thomas & Grimes, 2003).

One behavior rating scale that has been shown to meet these criteria is the Adjustment Scales for Children and Adolescents (ASCA; McDermott, Marson, & Stott, 1993). The ASCA is a standardized behavior rating instrument designed to assess psychopathology in youths ages 5 through 17 that is completed by the student's teacher and then scored and interpreted by a qualified specialist such as a school psychologist. Through standardized teacher observation the ASCA assesses psychopathology in students on specific, multisituational, syndromes of behavior pathology that are found to be generalizable across age, gender, and ethnicity. The ASCA was standardized on a nationwide sample of 2,818 youths ages 5 through 17 in grades kindergarten through 12. This standardization included a normative sample of 1,400 youths stratified according to the 1990 U.S. Census relative to age, grade level, gender, race/ethnicity, mother's and father's education, family structure, national region, community size, and associated handicapping conditions. The remaining cases were used to

determine validity, generalization, and racial/ethnic bias investigations (McDermott, 1993; 1994).

Two forms of the ASCA are provided, a male version and a female version differing only in the use of gender referents ("he" vs. "she") to help focus the teacher's attention on the specific child/student. The rating form must be completed by a teacher who is very familiar with the behavior of the student being assessed. Prior to completing the ASCA the teacher must have observed the child at least 40 to 50 school days. The ASCA takes approximately 10-20 minutes to complete and applies an easy, one-step scoring system. It assesses psychopathology by having raters indicate which specific behaviors typify the child in a variety of situations and contexts (McDermott, 1993; 1994).

The format of the ASCA differs from most other empirical observation scales because it contains 156 behavioral descriptions presented with reference to 29 specific social, recreational or learning situations in which a youth's adjustment to each specific situation may be observed. This format allows professionals to clarify whether the behavior is isolated to specific circumstances or whether it is pervasive across varied circumstances.

This information then helps professionals to determine motivation and plan for remedial action.

The ASCA manual (McDermott, 1994) provides three methods for interpretation of ASCA results. The cut-score method identifies Adjusted, At-Risk, and Maladjusted behavior based on *T* score elevations and allows for interpretation of specific syndrome pathology. The syndromic profile method, allows for the association of any youth's profile with a typology of similar profiles in the general youth population, and gives descriptions of common typological characteristics. Within the normative syndromic profiles there are 14 major types and 8 clinical subtypes which are based on the profile of core syndromes. The discriminant classification method allows for the classification of any youth's profile in terms of its similarity to normal and disturbed youth populations. This is done by applying the core syndromes to discriminant function equations to classify a youth as more closely resembling the population of the socially and/or emotionally normal or disturbed youth.

The ASCA consists of six core behavior syndromes, two supplementary syndromes, and two overall adjustment scales, all of which are reported as normalized *T* scores with a mean of 50 and a standard deviation of 10. The six core

syndromes consist of Attention Deficit/Hyperactive (ADH), Solitary Aggressive-Provocative (SAP), Solitary Aggressive-Impulsive (SAI), Oppositional-Defiant (OPD), Diffident (DIF), and Avoidant (AVO). These six core syndromes have been found to be reliable and invariant across gender, age, race, and ethnicity (McDermott, 1993, 1994). They also combine to form the two overall adjustment scales: Overactivity (ADH, SAP, SAI, and OPD syndromes) and Underactivity (DIF and AVO syndromes)(McDermott, 1993, 1994; Canivez, 2004). The two supplementary syndromes are comprised of Delinquency (DEL) and Lethargic-Hypoactive (LEH).

The core syndrome factor structure of the ASCA was replicated by Canivez (2004) and it was concluded that the ASCA measures two independent dimensions of psychopathology as the two factors had correlations near zero. These dimensions, Overactivity and Underactivity, are similar to conduct problems/externalizing and withdrawal/internalizing dimensions commonly found in other child psychopathology assessment tools (Achenbach, 1991; Merrell, 1994; Quay, 1983; Reynolds & Kamphaus, 1992).

The ASCA manual (McDermott, 1994) presents extensive evidence for score reliability and validity. Internal consistency estimates ranged from .68 to .86 for the total

standardization sample on the six core syndromes and two supplementary syndromes. The Overactivity scale had an internal consistency of .92, and the internal consistency of the Underactivity scale equaled .83. Test-retest stability is also reported in the ASCA manual (McDermott, 1994) based on a sample of 40, 14 to 17-year-old female students in Pennsylvania observed by five teachers. The students were all white, non-handicapped, and attending regular high-school classes. The ASCA was given two times with a thirty school day interval. The stability coefficients ranged from .66 to .91 for the six core syndromes and from .75 to .79 for the Overactivity and Underactivity scales (McDermott, 1994).

Canivez, Perry, and Weller (2001) also reported significant test-retest stability for the ASCA. The sample consisted of 67 males and 57 females ranging in age from 5 to 19 years. Of these 124 students, 35 did not have ethnicity data provided, 79.8% were White, 2.2% were African American, 13.5% were Hispanic, 2.2% were Native American, 1.1% was Asian American, and 1.1% was Bosnian. The teachers of the students volunteered to randomly select and rate 10 students on the ASCA. The teachers again rated the students 90 days later. Stability coefficients ranged from .48 to .68 for the *T* scores. Test-retest stability

coefficients across the 90-day interval were significant; however, they were lower than those reported in the ASCA manual with a 30 school day retest interval.

Estimates of interobserver agreement, reported in the ASCA manual (McDermott, 1994), were based on independent observations of 22 Arizona special education children ages 7 to 17 over a two month period. The sample of 17 males and 5 females included 18 students classified as emotionally disturbed and 4 classified as learning disabled. All of the students were observed by their teacher and a teacher's aid or a psychologist. Interobserver agreement correlations ranged from .65 to .85 for the six core syndromes and two supplementary syndromes. The Overactivity scale had a correlation of .81, and the Underactivity scale had a correlation of .84.

The two supplementary syndromes, Delinquency and Lethargic-Hypoactive are not generalizable across the entire youth population; however they retain reliability within specified subgroups. The Delinquent syndrome resulted in a retest stability of .91 and interobserver reliability coefficient of .70. The Lethargic-Hypoactive syndrome resulted in an interobserver reliability coefficient of .92. Watkins and Canivez (1997) replicated the McDermott (1994) interrater agreement findings for the

ASCA Ovractivity, Uderactivity, and core syndrome *T* scores. Results reported interrater reliability coefficients for core syndromes ranging from .55 to .80. Interrater reliability was higher for Overactivity and Underactivity equaling .83 and .85, respectively. Canivez, Watkins, and Schaefer (2002) reported interrater agreement for ASCA Discriminant Classifications at a level considered moderate to substantial.

Using the same data set used in Canivez and Watkins (1997); Canivez and Watkins (2002) conducted a study of interrater agreement of ASCA syndrome profile classifications. Participants were 71 students whose classroom behaviors were observed for at least one hour each day by two professionals or paraprofessionals who volunteered to participate in the study. The students and raters were from two school districts in two states: one in the Southwest and one in the Midwest and both were located in suburban areas of major cities. The sample consisted of 66% male students and 34% female students ranging in age from 7 through 17 years. All of the students received special services for students at risk or with disabilities. Forty-four percent of the sample received services for learning disabilities, 29% for emotional disabilities, 19% for severe language impairments, and 8% for mild mental

retardation. Interrater agreement for the 22 syndrome profile classifications resulted in a kappa coefficient of .39. Interrater agreement for the five broad categories, three broad categories, and two broad categories resulted in kappa coefficients of .53, .60, and .68, respectively. These results showed that the 22 syndromic profile classification and the five, three, and two level broad classifications all demonstrated statistically significant interrater agreement.

McDermott (1994) measured convergent and divergent validity using a sample of 274 youths ranging from kindergarten to grade 12, and representing 10 different special education categories across New Jersey and Pennsylvania. The students were assessed using both the ASCA and the revised Conners Teacher Rating Scale (CTRS; Trites, Blouin, & Laprade, 1982). Administration of these scales was counterbalanced with an interval of 16 days. The sample consisted of 185 males and 89 females of which 67.2% were White, 29.6% African American, and 3.2% other mixed minorities, with 66 diagnosed as emotionally disturbed, 66 as perceptually impaired, 63 learning disabled, 15 mentally retarded, and the remaining 23 as possessing various sensory or orthopedic handicaps. The students' teachers volunteered to complete the rating

scales after a two month period to observe the students. Convergent validity coefficients ranged from .65 to .91 when compared to the CTRS. All four of the ASCA overactive core syndromes were moderately to highly correlated with the CTRS Conduct Problem and Hyperactivity factors. The extremely low correlations between the Overactive and Underactive core syndromes of the ASCA supported the divergent validity for these two dimensions (McDermott, 1993; 1994).

A second analysis counterbalanced parent ratings on the Child Behavior Checklist (CBCL; Achenback & Edelbrock, 1983) and ASCA teacher ratings for 48 preadolescents in Maine ranging in age from 7 to 11. The sample included 17 males and 31 females of which 45 were White, 2 African American and 1 Native American. The ASCA forms were completed by the students' classroom teachers and the CBCL by their parents who had requested social services. The Overactivity syndromes and overall Adjustment scale correlated .75-.42 with CBCL's Aggressive, Hyperactive, and Delinquent factors. The correlations among similar psychological dimensions or constructs were statistically significant (McDermott, 1993).

Canivez and Rains (2002) found support for convergent and divergent validity of the ASCA when compared to the

Preschool and Kindergarten Behavior Scales (PKBS; Merell, 1994b). The sample, which was randomly selected, included 90 Kindergarten students and 29 first grade students of which 59 were male and 64 were female, 60 were White, 1 Hispanic/Latino, 1 African American and 1 Asian American. Of the 119 students, 16 were disabled or at-risk. Classroom teachers volunteered to observe randomly selected students for at least 40 days, then completed the ASCA and the PKBS rating forms. Results provided strong evidence of convergent validity. Specifically, the ASCA Overactivity syndrome was significantly correlated with the PKBS Externalizing Problem scale with a coefficient of .84. Divergent validity was observed with low to near-zero correlations between the PKBS Externalizing Problems scale and the ASCA Underactivity syndrome with a coefficient of .06. Low correlations were also observed between ASCA Overactivity and PKBS Internalizing scales.

Canivez and Bordenkircher (2002) also found evidence for convergent and divergent validity of the ASCA and the PKBS using a random sample of 154 five and six year old students. Two preschool and first-grade teachers and twelve kindergarten teachers volunteered to rate five males and five females on both the ASCA and the PKBS. The sample consisted of 154 students, 17 of which were disabled

students, all attending elementary schools in rural areas of the Midwest. Convergent validity was supported by the significant correlation between the PKBS Externalizing Problems scale and the ASCA Overactivity syndrome, which had a correlation of .84. The significant correlation between the ASCA Underactivity syndrome and PKBS Internalizing Problems scale also supported convergent validity.

At the subscale level, convergent validity was supported by moderate to high correlations between all PKBS Externalizing Problems subscales and all ASCA Overactivity core syndromes. Divergent validity was also supported at the subscale level by much lower to near zero correlations between the PKBS Externalizing subscales and the ASCA Underactivity core syndromes.

Evidence of divergent validity for the ASCA has also been reported in the ASCA manual. McDermott (1994) found low, negative correlations between the ASCA and the Differential Abilities Scale (DAS; Elliott, 1990). A cross-standardized sample, which comprised the overlapping portions of the DAS and ASCA and equaled 1,200 students, was used. The cross-sample was designed to represent the population of all noninstitutionalized 5 through 17 year-old children residing in the United States and was obtained

from 154 public school districts and 47 private schools. The cross-sample, which conformed to the parameters of the U.S. Census included representative proportions of youths classified as handicapped, gifted and talented. Correlations were produced between the DAS indices of intellectual ability, which include General Conceptual Ability, Verbal Ability, Nonverbal Reasoning Ability, and Spatial Ability; and academic achievement, including Word Reading, Basic Number Skills, and Spelling and ASCA's dimensions. Low correlations were found between various achievement and adjustment dimensions. The correlations ranged from -.24 between ASCA ADH and DAS Spelling to .10 between ASCA OPD and DAS Nonverbal Reasoning Ability.

These results indicated that psychological adjustment as measured by the ASCA accounted for no more than 6% of the variability in ability or achievement as measured by the DAS. The strongest correlations were found between DAS's achievement measures and ASCA's Attention Deficit Hyperactive syndrome and Overactivity scale. This may reflect the attentive or compliant behavioral component of successful school achievement. These results were replicated by Canivez, Nietzel, and Martin (in press).

McDermott (1994) and McDermott et. al. (1995) reported on the ASCA's discriminant validity and diagnostic

efficiency using 150 students ranging in age from 5 to 17 years who had been diagnosed as emotionally disturbed by interdisciplinary teams of school psychologists and educators. These students were matched individually to 150 non-handicapped youths in terms of age, grade level, gender, and ethnicity.

Using within covariance matrices, discriminant analysis produced a significant effect for group separation on the basis of ASCA core syndromes. Classification analysis established overall accuracy at 80.7%. Furthermore, when classification was performed separately for subsamples by age, gender, and ethnicity, accuracy remained significant at 81.1% for the 144 preadolescents, 80.3% for the 156 adolescents, 81.1% for the 228 males, 79.2% for the 72 females, 91.1% for the 244 Whites, and 82.0% for the 50 African Americans. The ASCA also distinguished 150 emotionally disturbed from the other 2,668 youths in the combined standardization and supplementary samples (including 596 with competing handicaps) at 79.2% accuracy. Overall, accuracy for differentiating emotionally disturbed from learning disabled youths equaled 76.9%, from speech impaired youths, 85.2%, and from gifted and talented youths, 86.2%.

Canivez & Sprouls (in press) assessed the construct validity of the ASCA by differentiating students with ADHD from a randomly selected, matched control (RMC) group. The ADHD group and the control group were identical on variables of age, gender, and race. The students in the ADHD group met the National Institute of Mental Health (NIMH) Diagnostic Interview Schedule for Children (DISC-IV; Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000)/DSM-IV criteria for ADHD. The students in this group were referred by their teacher through a school based pre-referral intervention team. The parent or primary caregiver was then asked to complete the DISC-IV. The ADHD group was comprised of 53 students identified as meeting the DISC-IV criteria for ADHD. A second group of 53 students was selected at random from the same classrooms and matched to the ADHD group. The classroom teachers then completed the ASCA rating form on both the referred student and the control group student.

A one-way multivariate analysis of variance produced statistically significant results for differences between the ADHD group and the RMC group with the six ASCA core syndromes (Canivez & Sprouls, in press). The direct discriminant function analysis and Fisher's linear discriminant function coefficients were reported to be

statistically significant (Canivez & Sprouls, in press). Near perfect differentiation of the ADHD group and the RMC group based on the six ASCA core syndromes was reported (Canivez & Sprouls, in press). A high degree of diagnostic accuracy was illustrated by the overall correct classification of 96% (Canivez & Sprouls, in press). Canivez & Sprouls (in press) reported an almost perfect level of agreement between the ASCA and DISC-IV results. Very high levels of sensitivity, specificity, positive predictive power, and negative predictive power and very low proportions of false positive and false negative classifications were indicated by diagnostic efficiency statistics (Canivez & Sprouls, in press).

Canivez & Sprouls (in press) found the ASCA to be very accurate in differentiating students meeting the DISC-IV criteria for ADHD from the students in the 'normal' control group. However, there have been no studies to date that require the ASCA to differentiate different behavior disorders. Further, there appears to be only two discriminant validity studies of the ASCA. In order to use the ASCA for diagnostic purposes it is crucial to further investigate its discriminant validity and diagnostic utility.

Canivez and Sprouls (in press) stated that future studies should examine the ability of the ASCA to differentiate ADHD from other externalizing disorders such as oppositional-defiant and conduct disorders. This would be a more stringent test of the discriminant validity of the ASCA. If the results of such a comparison produced results similar to Canivez & Sprouls (in press) the ASCA would be advocated for actuarial classification. This could then result in eliminating more costly methods of psychological assessment which have not shown strong support of discriminant validity (Doyle et al., 2002).

To date, no studies have examined the group differences of different externalizing disorders. The present study further examined discriminant evidence of construct validity of the ASCA by investigating its ability to differentiate ADHD from Oppositional Defiant Disorder (ODD).

> According to the DSM-IV-TR (2000) "ODD is a pattern of negativistic, hostile and defiant behavior lasting at least six months, during which at least four of the following symptoms are present. Symptoms of ODD include the following behaviors when they occur more often than normal for your age group: losing your

> temper; arguing with adults; defying adults or refusing adult requests or rules; deliberately annoying others; blaming others for their own mistakes or misbehavior; being touchy or easily annoyed; being angry and resentful; being spiteful or vindictive; swearing or using obscene language; or having a low opinion of themselves. The person with ODD is moody and easily frustrated, has a low opinion of themselves, and may abuse drugs. Criteria for ODD also include; (1) the disturbance causes clinically significant impairment in social, academic, or occupational functioning, (2) the behaviors do not occur exclusively during the course of a psychotic or mood disorder, and (3) criteria are not met for Conduct Disorder, and, if the individual is age 18 or older, criteria are not met for Antisocial Personality Disorder" (DSM-IV-TR, 2000, p. 102).

According to the DSM-IV-TR, (2000) the essential feature of ADHD is a persistent pattern of inattention and/or hyperactivity-impulsivity. These behaviors must be more frequently displayed and more severe than what is typical of individuals at a comparable level of development (DSM-IV-TR, 2000).

> "Symptoms of ADHD include; lack of close attention to detail, makes careless mistakes, difficulty sustaining attention in tasks or play activities, does not seem to listen when spoken to, does not follow through on instructions, fails to finish schoolwork or chores, is easily distracted, is often forgetful, often fidgets with hands or feet, runs about or climbs excessively, talks excessively, often blurts out answers before questions have been completed, and often interrupts or intrudes on others. Criteria for ADHD require some hyperactive-impulsive or inattentive symptoms that caused impairment to be present before the age of 7, and the symptoms must be present in two or more settings" (DSM-IV-TR, 2000, p.92-93).

The greater independence of syndromes of the ASCA allows more unique variance to be measured and accounted for. Furthermore, the lower correlations reported between the ADH and OPD syndromes should allow the ASCA to successfully differentiate between hyperactivity and oppositional defiance (Canivez, 2004; Canivez & Bordenkircher, 2002; Canivez & Rains, 2002). Other rating scales, such as the BASC, and the PKBS have shown higher correlations between hyperactivity and oppositional defiance / aggression scales, producing more overlap in the

variance measured. It was hypothesized that those meeting DISC-IV/DSM-IV criteria for ADHD would score higher on the ADH syndrome of the ASCA, whereas those who met criteria for ODD would score higher on the OPD syndrome.

The purpose of the present study was to examine distinct group differences between students meeting criteria for ADHD and students meeting criteria for ODD and to examine discriminant evidence of construct validity of the ASCA. The ASCA's diagnostic accuracy or efficiency in differentiating students meeting DISC-IV/DSM-IV criteria for ADHD from those meeting the criteria for ODD was also examined.

Method

Participants

The participants in this study were 36 students ranging from Kindergarten through eleventh grade from rural east central Illinois school districts and suburban school districts in northern Illinois. Twenty-three (63.9%) of the participants of the study were male and 13 (36.1%) were female. The demographic characteristics for each group are presented in Table 1. The total sample included twenty-seven (75%) children classified as ADHD and 9 (25%) classified as ODD based on DISC-IV / DSM-IV criteria.

Thirty-three (91.7%) of the participants were Caucasian, 2 (5.6%) were Hispanic/Latino, and 1 (2.8%) was Biracial. Twenty-seven (75%) of the participants were not identified as special education students under any category, 7 (19.4%) were classified as Specific Learning Disability, and 2 (5.6%) were classified as Speech/Language Impaired.

Instruments

Adjustment Scales for Children and Adolescents (ASCA). The ASCA is a standardized behavior rating instrument designed to assess psychopathology in youths ages 5 through 17 that is completed by the student's teacher and then scored and interpreted by a qualified specialist, such as a school psychologist. Through standardized teacher observation, the ASCA assesses psychopathology in students on specific, multisituational, syndromes of behavior pathology that are found to be generalizable across age, gender, and ethnicity. The ASCA Contains 156 behavioral descriptions, which are based on 29 social, recreational, and learning situations. The ASCA's reliability and validity is moderate to high and found to be acceptable for diagnostic use (Canivez, 2001)

NIMH Diagnostic Interview Schedule for Children-Version IV. The NIMH Diagnostic Interview Schedule for

Children Version IV (DISC-IV; Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000) is a structured interview that includes 36 mental health disorders for children and adolescents. The DISC-IV is very comprehensive and parallels DSM-IV criteria for all 36 disorders. The DISC-IV is adequately developed and research has shown the instrument capable of independent diagnostic use for ADHD (Shaffer, Fisher, Lucas, Dulcan, Schwab-Stone, 2000). Shaffer et al. (2000) found test-retest Kappa coefficients equaling .79 for ADHD and .54 for ODD. The DISC-IV interview is widely used and studied and has also been tested in both clinical and general populations. The DISC-IV was designed to assess psychiatric disorders that occur in children and adolescents by administering an interview with the parents or primary caregiver. The questions are short and simple focusing on the symptoms and time spans of the symptoms. The responses are generally limited to yes or no, with some open-ended responses addressing duration (Johnson, Barrett, Dadds, Fox, & Shortt, 1999; Shaffer, Fisher, Lucas, Dulcan, Schwab-Stone, 2000).

Procedure

The principal of each school was contacted in order to receive permission to carry out the study in his/her

school. All teachers were informed of the opportunity to refer children, who displayed problem behaviors similar to those associated with behavior disorders such as ADHD, ODD, and Conduct Disorder (CD) to pre-referral intervention teams, which is a group of professionals designated to assess and address behavior and learning issues in the classroom. The essential feature in CD according to DSM-IV-TR (2000) is a "repetitive and persistent pattern of behavior in which the basic rights of others or major age-appropriate societal norms or rules are violated." Once the student was referred his/her parent(s) were contacted and a meeting was arranged. The parent(s) were then informed of the screening process and informed consent was obtained. The parent(s) or primary caregiver then completed the interview format of the DISC-IV, which was conducted by a school psychologist intern. The parents were only asked questions pertaining to ADHD and ODD for students in grades K-6. Parents of students in grades 6-11 were asked questions pertaining to ADHD, ODD and CD. Data from the responses were then analyzed to determine if the child met the criteria for ADHD, ODD or CD based on the DSM-IV criteria. The referring teacher was then asked to complete the ASCA for data collection. The school psychologist intern then collected the completed scales from the

teachers. Due to a lack of participation in some schools a slightly different procedure was used in which a letter was sent home with the students, asking the parent or guardian to contact the researcher if they had concerns regarding their child's behavior and/or attention and would be willing to participate in a research study. Approximately half of the sample was gathered in this manner. After the parent or guardian contacted the researcher a meeting was arranged and the procedure stated above was continued.

Data Analysis

A multivariate analysis of variance (MANOVA) was conducted in order to assess the group differences (ODD vs. ADHD) on ASCA core syndromes. Effect sizes were estimated with Glass' Δ (Glass & Hopkins, 1996). Due to non-significant results further discriminant function analysis and diagnostic efficiency statistics were not necessary.

Results

Distinct Group Differences

A one-way multivariate analysis of variance for differences between the ADHD group and the ODD group was performed with the six ASCA core syndromes serving as dependent variables was not significant, Wilks $\Lambda = .916$, F

(6, 29) = .445, p > .05. Students in the ADHD group had slightly higher scores on the ADH syndrome of the ASCA, while students in the ODD group had slightly higher scores on the OPD syndrome of the ASCA. However these results were not significant. Results of the univariate ANOVAs are presented in Table 2. Descriptive statistics, *F* values, and effect sizes by group for each comparison are presented in Table 3. Due to the non-significant results of the MANOVA and ANOVAs the discriminant function analysis and diagnostic efficiency statistics were not necessary.

Discussion

The purpose of the present study was to examine distinct group differences on the ASCA between students meeting criteria for ADHD and students meeting criteria for ODD and discriminant evidence of construct validity of the ASCA. The ASCA has been shown to successfully discriminate students meeting DSM-IV criteria for ADHD from a random and matched control group of non-disabled students (Canivez & Sprouls, in press). The ASCA's diagnostic accuracy or efficiency in differentiating students meeting DISC-IV/DSM-IV criteria for ADHD from those meeting the criteria for ODD was examined in the current study. Establishment of discriminant validity is essential in the validation of a

rating scale used to assess behavior disorders as well as other pathologies. Correct diagnosis is needed for effective intervention strategies to be implemented.

Results of the present study did not support the distinct group differences or discriminant validity of the ASCA. The results of the MANOVA did not identify distinct group differences between the ADHD and the ODD groups. There are several possible explanations for the non-significant results of the current study. The first is the very small sample size, consisting of only 9 students meeting the criteria for ODD. Small sample size effected power in this study. Given the small effect sizes in this study, power was not sufficient to detect the small effect sizes as significant. However, it is worth noting that, although they were not analyzed for this study, seven students met criteria for both ODD and ADHD, which raises the questions of whether the two disorders are in fact two distinct groups.

The high degree of overlap among behavior disorders has resulted in debate about their distinctive properties (Kuhne, Schachar, & Tannock, 1997). ODD has been found to coexist in as many as 35% of children with ADHD (Bird et al., 1988). Reeves et al. (1987) noted that ODD seldom

occurred in the absence of ADHD. Studies conducted by Burns and Walsh have resulted in correlations between ADHD-hyperactivity/impulsivity and ODD from .69 to .80 (Burns & Walsh, 2002). Burns & Walsh (2002) examined the structural relations among ADHD-inattention (IN), ADHD-hyperactivity/impulsivity (H/I), and ODD in a 2-year longitudinal study with 752 children. Rating scales used in the study included Sutter-Eyberg Student Behavior Inventory (SESBI) and the Child and Adolescent Disruptive Behavior Inventory-Teacher Scale (CADBI-TS). Burns & Walsh (2002) reported high levels of internal consistency, test-retest reliability, predictive, and structural validity of these scales. Results showed that higher scores in the H/I factor in year 1 were associated with higher scores on ODD factor in years 2 and 3. Higher scores on the H/I factor in year 2 were also associated with higher scores on ODD factor in years 2 and 3. These results suggest that the H/I aspect of ADHD influences the development of ODD behavior. Beiser, Dion, & Gotowiec (2000) found confirmatory factor analysis to indicate that ADHD and ODD factors are highly correlated with each other. August, Realmuto, Joyce and Hektner (1999) found that of a group of 79 ADHD children without ODD comorbidity at baseline, 21 (27%) met the criteria for ODD at a four-year follow-up.

The fact that ADHD and ODD have been shown to be moderately to highly correlated may suggest that professionals who do not have extensive education in the area of behavior disorders, such as regular education teachers, may have a difficult time rating the behaviors. Research studies that rely on teachers' rating for classification have typically reported a high rate of comorbidity of ADHD in children identified as having ODD, relatively high rates of ADHD alone, and quite low rates of children classified as pure ODD (Pelham, Gnagy, Greensdlade, & Milich, 1992). These findings may suggest the inability of the scale to differentiate adequately or the actual co-existence of ADHD and ODD; however, consideration should also be given to the possible influence of inaccurate ratings by the teacher. For example, Blunden, Spring, and Greenberg (1974) reported that children who behaved impulsively were rated by teachers as showing restlessness, poor concentration, and poor sociability, which were not supported through direct observation by a trained professional.

Relatively poor agreement between teachers' ratings and direct observations of normal and hyperactive children was also reported by Vincent, Williams, Harris, and Duval

(1981). Vincent et al. suggested that the lack of correspondence was related to the influence of negative halo effects on teachers' ratings. Abikoff, Courtney, Pelham, and Koplewicz (1993) conducted a study on 139 elementary school teachers, who observed video tapes of child actors displaying normal and disruptive behavior while rating the behaviors. Results indicated that both regular and special education teachers tended to rate ADHD behaviors accurately when the child behaved like a child with pure ADHD. However, ratings of hyperactivity and of ADHD symptomatic behaviors were highly inflated when a child engaged in behaviors associated with ODD. Shchachar et al. (1986) found a halo effect operating in which teachers' ratings of children with ODD also resulted in elevated ratings of ADHD symptomatic behaviors.

In the current study the teacher completed the rating scale while the parent or guardian completed the DISC-IV interview as an independent criterion. The participants were classified based on the results of DISC-IV interview completed by the parents. The teachers then completed the rating scale, which was expected to be consistent with the DISC-IV results. However, children often engage in different behaviors in different settings such as home and school. Stormshak et al. (1998) reported that children who

show oppositional behaviors at home are less likely to generalize these behaviors to school. Oppositional behaviors may be more situational and less neurological where ADHD is presumably neurological and more likely to generalize to multiple environments. In order to diagnose a child with ADHD or ODD the behaviors must be present across settings. The ideal procedure for this study would be to have both the parent and the teacher complete the DISC-IV interview and then have both parent and teacher complete the rating scale; however, this would be very time consuming and costly for the teacher, parent and researcher.

Limitations of the present study include small sample size (n = 36), particularly the small number of students classified as pure ODD (n = 9), and the population of the sample. The sample in the present study was comprised predominately of Caucasian children. This sample was not representative of the entire population for which the ASCA may be used. Power was limited due to the small sample size, which limits the ability to detect small effect sizes.

Future research should focus on replicating the current study with a larger sample of students classified as only ADHD and only ODD. A better procedure may be to

have the teacher complete the DISC-IV interview after completing the ASCA ratings, eliminating the weakness of having different raters. The ASCA has been the subject of several supporting validity studies. As stated above the ASCA has been shown to be successful in discriminating students meeting DSM-IV criteria for ADHD from a random and matched control group of non-disabled students (Canivez & Sprouls, in press). McDermott (1994), Canivez & Rains (2002) and Canivez & Bordenkircher (2002) provided support for the convergent and divergent validity of the ASCA. Canivez, Perry, and Weller (2001) reported significant test-retest stability for the ASCA. McDermott (1994) and Watkins & Canivez (1997) reported significant interrater reliability.

Further research should be conducted on the ASCA's ability to discriminate behavior disorders such as ADHD and ODD. Additional exploratory and confirmatory research is needed to establish more definite conclusions about the symptomolgy of both ADHD and ODD and to further explore the overlap of the two disorders. Improved understanding of these disorders would be advantageous in the identification, intervention development, and monitoring of medication of students with ADHD and ODD.

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Table 1

Demographic Characteristics of the samples

	ADHD		ODD	
	N	%	*N*	%
Gender				
Male	19	70.4	4	44.4
Female	8	29.6	5	55.6
Ethnicity				
Caucasian	24	88.9	9	100
Hispanic/Latino	2	7.4	0	0
Bi-racial	1	3.7	0	0
Grade				
K	2	7.4	2	22.2
1	1	3.7	3	33.3
2	1	3.7	1	11.1
3	3	11.1	0	0
4	3	11.1	1	11.1
5	3	11.1	1	11.1
6	6	22.2	0	0
7	1	3.7	0	0
8	0	0	1	11.1
9	3	11.1	0	0
10	5	18.5	0	0
11	4	14.8	0	0
Disability				
None	18	66.7	9	100
SLD	7	25.9	0	0
SLI	2	7.4	0	0

Table 2

Univariate ANOVAs for Adjustment Scales for Children and Adolescents Core Syndromes.

Core Syndrome	*SS*	*df*	*MS*	*F*	*P*	η^2
ADH	12.00	1	12.00	.14	.712	.004
SAP	48.00	1	48.00	.34	.562	.010
SAI	32.23	1	32.23	.36	.550	.011
OPD	73.34	1	73.34	.57	.457	.016
DIF	17.12	1	17.12	.14	.713	.004
AVO	231.15	1	231.15	1.35	.254	.038

Note: MANOVA for ASCA: Wilks Λ = .916, F (6, 29) = .445, p > .05, Multivariate Effect Size = .08, Power = .16. ADH = Attention-Deficit Hyperactive, SAP = Solitary Aggressive (Provocative), SAI = Solitary Aggressive (Impulsive), OPD = Oppositional Defiant, DIF = Diffident, AVO = Avoidant.

Table 3

Descriptive statistics, F values, and effect sizes by group

	ODD		ADHD		*F*	Δ
Syndrome	*M*	*SD*	*M*	*SD*		
ADH	57.56	3.84	58.89	10.42	.14	.133
SA (P)	57.89	12.29	55.22	11.67	.34	.267
SA (I)	49.44	7.33	51.63	9.97	.36	.219
OPD	59.89	13.38	56.59	10.70	.57	.330
DIF	48.22	7.90	49.81	11.97	.12	.159
AVO	59.33	11.72	53.48	13.45	1.35	.585

Note: ADH = Attention-Deficit Hyperactive, SAP = Solitary Aggressive (Provocative), SAI = Solitary Aggressive (Impulsive), OPD = Oppositional Defiant, DIF = Diffident, AVO = Avoidant. Δ = Glass' Delta (Glass & Hopkins, 1996).

$p > .05$.