CONSTRUCT VALIDITY OF TEACHER RATINGS OF ADHD-IN, ADHD-HI, ODD-

TOWARD ADULTS, ACADEMIC COMPETENCE, AND SOCIAL COMPETENCE

FACTORS WITH THAI MIDDLE AND HIGH SCHOOL STUDENTS

By

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CONSTRUCT VALIDITY OF TEACHER RATINGS OF ADHD-IN, ADHD-HI, ODD-TOWARD ADULTS, ACADEMIC COMPETENCE, AND SOCIAL COMPETENCE FACTORS WITH THAI MIDDLE AND HIGH SCHOOL STUDENTS

Abstract

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Confirmatory factor analysis was used to test the convergent and discriminate validity of an attention-deficit/hyperactivity disorder-inattention, attention-deficit/hyperactivity disorder-hyperactivity-impulsivity, oppositional defiant disorder-toward adults, academic competence, and social competence model with two years of teacher ratings of Thai middle and high school students with the Child and Adolescent Disruptive Behavior Inventory (CADBI) (G.L. Burns, T. Taylor, & J. Rusby, 2001a, 2001b). The results showed that the model provided a good fit for teachers' ratings at years one and two. Additionally, convergent and discriminate validity was also observed for teacher ratings both years, thus providing support for the construct validity of the CADBI.

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CHAPTER ONE

INTRODUCTION

Attention Deficit Hyperactivity Disorder (ADHD) accounts for 50% of all referrals to outpatient mental health clinics (Cantwell, 1996). ADHD is characterized by persistent patterns of inattention and/or hyperactivity-impulsivity that are frequently displayed and more severe than that of a typical individual at a comparable level of development (American Psychiatric Association, 2000). As defined by the Diagnostic and Statistical Manual of Mental Disorders (4th ed.; DSM-IV; American Psychiatric Association, 2000), ADHD comprises 3 subtypes: combined type (C), predominantly inattentive type (IN), and a predominantly hyperactivity-impulsivity type (HI). Combined type is defined as having six or more symptoms of IN and six or more symptoms of HI persisting for at least 6 months (APA, 2000). IN is characterized by 6 symptoms of IN but fewer than 6 symptoms of HI, while HI requires 6 symptoms of HI but fewer than 6 symptoms of IN. Both types require symptoms be present for at least 6 months (APA, 2000). Diagnosis of ADHD also requires that symptoms be present prior to age 7 and are present in two or more settings- e.g., school, work, home (APA, 2000).

The prevalence of ADHD is estimated at 3%-7% in school-age children and affects more boys than girls, with ratios ranging from 4:1 in community samples and 9:1 in clinical samples (APA 1994; Cantwell, 1996). Approximately half of clinic-referred children with ADHD also have Oppositional Defiant Disorder (ODD) or Conduct Disorder (APA, 2000). ODD is characterized by a recurrent pattern of negativistic, defiant, disobedient, and hostile behavior towards authority figures and has a prevalence rate of 2% to 16% (APA, 2000). ODD is more prevalent among males before puberty, but rates appear to be equal in both males and females

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after puberty (APA, 2000). The prevalence rates of ADHD and ODD are influenced by both the type of assessment used (interviews, rating scales, or observation) and by the informants who provide the information (teachers, parents, or both).

ADHD/ODD Rating Scales

Parent and teacher ratings scales of ADHD and ODD symptoms play an essential role in the diagnosis of these disorders. Additionally, these scales are used for a broad range of purposes including screening for and measuring the effectiveness of treatment. These scales also provide insight into the risk factors, associated features, causes, and outcomes associated with ADHD and ODD. Given that these scales have a vital role in research attempting to advance our knowledge of these two disorders, it is crucial that these scales have good psychometric properties (e.g., Achenbach, 2006; Achenbach & Rescorla, 2007; Burns & Haynes, 2006).

Good content validity is an important first step in the development of parent and teacher rating scales (e.g., Burns, Walsh, Gomez, & Moura, 2003; Haynes, Richard, & Kubany, 1995). As noted by Haynes et al. (1995), "content validity is the degree to which elements of an assessment instrument are relevant to and representative of the targeted construct for a particular assessment purpose" (p. 238). The term "elements" in the definition refers to the items on the rating scale (i.e., the description of the specific DSM symptoms of ADHD and ODD or how the symptoms are worded on the scale), the response formats (i.e., the scaling of each item or the rating anchors), and the instructions to parents and teachers. The "targeted construct" would be the definition of the disorder provided by the DSM (see above) with the symptoms being the referents to the construct. Although the guidance provided by the DSM is helpful in the development of parent and teacher rating scales with potentially good content validity, the

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creation of scales from the DSM structure is convoluted (e.g., Burns, Walsh, Patterson, Sommers-Flanagan, & Parker, 2001; Burns et al., 2003).

With the publication of the DSM-IV, a large number of parent and teacher rating scales were developed to measure the symptoms of ADHD and ODD (e.g., Burns, Walsh, Boe, and Teegarden, 2001; DuPaul, Power, Anastopoulos, Reid, McGoey, & Ikeda, 1997; DuPaul, Anastopoulos, Power, Reid, McGoey, & Ikeda, 1998; Gomez, Harvey, Quick, Scharer, & Harris, 1999). These scales have a great deal in common; however, there are significant differences that may influence their content validity. These differences include how the symptoms are defined on the scale, the rating anchors used to quantify symptoms, and the time interval for the ratings. There are two major problems associated with wording the symptoms of ADHD exactly as they appear in the DSM-IV. The first problem, as noted by Burns, Gomez and colleagues (2003), is that the content of items may not be appropriate to the situation of the rater. An additional problem occurs when symptoms on the scale fail to measure the clinical meaning of the symptoms (Burns, Gomez, Walsh & Moura, 2003).

Additional content validity problems are associated with the rating anchors used to quantify the symptoms of ADHD and ODD. The scales currently use a variety of rating anchors that have potential problems associated with them. The more subjective anchors (e.g., never or rarely; sometimes; often; very often) are problematic because raters are free to define anchors as they choose (Burns et al., 2001; Schwarz, 1999). Alternately, frequency count rating anchors (e.g., never in the past month, 1 to 2 times in the past month, 3 to 4 times in the past month, 2 to 6 times per week, 1 time per day, 2 to 5 times per day, 6 to 9 times per day, 10 or more times per day) with short time intervals, preferably the past month, provide consistency and direction when

rating symptoms. Additionally, rating intervals (e.g., the past month) should be the same across parent and teacher scales (Burns et al., 2003).

The time intervals for the ratings are also important in the content validity of the rating scales. Some scales do not use time intervals, while others span anywhere from one month to six months. Asking individuals to recall symptoms that occurred over a month ago is problematic in that raters may not accurately recall symptoms over this lengthy time period. Additionally, not specifying a time interval is problematic in that there is no consistency across raters as raters are free to define the interval in an unknown manner.

Adjustments have been made over the years to improve ADHD and ODD rating scales. As has been discussed, there are three major components that impact content validity of rating scales: how symptoms are defined, rating anchors, and time intervals. The current version of the Child and Adolescent Disruptive Behavior Inventory (CADBI; Burns, Taylor, & Rusby, 2001) takes all of these components into consideration and presents a scale that possesses content-appropriate situational questions appropriate to the rater, with wording to reflect the clinical meaning of symptoms, frequency count rating anchors, and an rating interval of one month for both parent and teacher raters. The psychometric properties of the CADBI will be reviewed shortly.

Because parent and teacher ratings scales were developed to measure specific DSM-IV symptoms of ADHD-IN, ADHD-HI, and ODD, confirmatory factor analysis (CFA) provides an ideal procedure to test the factorial or internal validity of the scales. This paper will now review the studies that have used CFA to examine ADHD and ODD rating scales for parents and teachers ratings. Findings from each study as well as parameters of the scales will be discussed.

CFA Studies on Parent and Teacher ADHD/ODD Rating Scales

In 1997 DuPaul et al. examined 4,009 children and adolescents (kindergarten to 12th grade) using the ADHD Rating Scale-IV (ARS-IV school version; DuPaul, Anastopoulos, Power, Murphy, & Barkley, 1994). The ARS-IV encompasses all 18 symptoms of ADHD listed by the DSM-IV (9 inattention symptoms and 9 hyperactivity/impulsivity symptoms), uses a 6-month time interval and four point Likert anchors (i.e., 0 = never or rarely to 3 = very often). Children were evaluated by teachers and were from 31 United States school districts. The Root Mean Square Error of Approximation (RMSEA) was less then .05 for the two-factor model, thus indicating a good fit. While DuPaul reported that the change in Chi Square for the two-factor model resulted in a significant improvement in fit over the one-factor model ($X^2(1) = 191$, $p < .01$), the two factors were highly correlated (.94), thus indicating poor discriminate validity.

In 1998 DuPaul et al. examined 4,666 children ages 4 to 20 (kindergarten to 12th grade) in the United States using ARS IV- Home Version parent rating scales (same time interval and rating anchors as the school version). The two-factor model (ADHD-IN and ADHD-HI) resulted in an RMSEA less than .05, indicating that the two-factor model provided a good fit (DuPaul et al, 1998). While the two-factor model resulted in a significant improvement in fit over the one-factor model ($X^2(1) = 178$, $p < .01$), the two factors were so highly correlated (.92) that there was no discriminate validity for the ADHD-HI and ADHD-IN factors.

Gomez et al. (1999) conducted a CFA study in Australia with 1275 children using the DSM-IV ADHD Rating Scale (ARS). Here the RMSEA was .038 for the two-factor model (ADHD-HI and ADHD-IN) for parent ratings of ADHD. Teacher ratings also showed strong support for a two-factor model of ADHD (RMSEA= .040). The two-factor model provided a significantly better fit than the one-factor model for both parent and teacher ratings. The two-

factor model yielded a correlation between ADHD-IN and ADHD-HI of .75 for parents' ratings and .68 for teachers' ratings. The ARS ratings used in this study was similar to the one used in the DuPaul studies (all 18 ADHD symptoms, four point anchors 0 = not at all, 1 = just a little, 2 = pretty much 3 = very much), however, no time interval was specified. This study, nevertheless, did find support for the discrimination of the two factors, perhaps because the IN symptoms were listed together in one set and the HI symptoms listed separately in a second set (the DuPaul ADHD scales alternated the symptoms—IN, HI, IN, HI, and so on).

In 2000 Beiser and colleagues used the Flower of Two Soils measure which is comprised of questions drawn from 3 rating scales (Child Behavioral Checklist, Conner's Parent and Teacher Rating Scale, and the Diagnostic Interview Schedule for Children) to evaluate parent and teacher ratings of Native (N = 1555) and non-Native (N = 489) samples of children in the United States. Parent and teacher ratings of ADHD symptoms were made on a four point rating scale (i.e., 1= not at all, 2 = a little, 3 = somewhat, 4 = very much) with no time interval specified. The two-factor model (ADHD-IN and ADHD-HI) resulted in RMSEA values of .12 for teacher ratings of Native and non-Native children. This RMSEA value is too poor to indicate a good fit for the two-factor model. The CFI values, however, were acceptable for both groups (non-Natives CFI = .93 Natives CFI = .92). Fit values for parent ratings of Natives and non-Natives, with the exception of CFI for Natives, also resulted in fit values that did not indicate a good fit for the two-factor model (non-Natives RMSEA = .15, CFI = .82, Natives RMSEA = .10, and CFI = .92). Correlations between the two factors were .75 and .68 for teacher ratings of non-Native and Natives and .89 and .87 for parent ratings of non-Native and Native children. When the two-factor model was adjusted to consider correlated residuals for teachers ratings (i.e., "interrupts when others are talking" and "has difficulty waiting his/her turn"; "interrupts when

others are talking" and "talks too much"; "can't sit still, restless" and "runs about excessively")

and parent ratings (i.e., "interrupts when others are talking" and "has difficulty waiting his/her

turn"), fit values improved (teacher: non-Natives RMSEA = .06, CFI = .99 and Natives RMSEA

= .08, CFI = .97, parent: non-Natives RMSEA = .13, CFI = .88 and Natives RMSEA = .10, CFI

= .92).

Collett et al. (2000) found similar results for a two-factor model of ADHD in a sample of

624 children (kindergarten to 12th grade) in the United States. Parent ratings were gathered using

the ADHD Symptom Rating Scale (ADHD-SRS; Holland, Gimpel, & Merrell find date) Parent

Version. ADHD-SRS has 56 items describing hyperactivity/impulsivity and inattention

symptoms based on the DSM-IV criteria for ADHD. Ratings were made on a 5-point rating

scale (i.e., 0 = behavior doesn't occur/ no knowledge to 4 = behavior occurs one to several times

per hour). Despite somewhat poor fit values the two-factor model (ADHD-IN and ADHD-HI)

provided the best fit for the data over the one and three-factor models (RMSEA = .099 and CFI =

.940). The two factors had a correlation of .84, again suggesting poor discriminate validity.

In 2001 Molina and colleagues conducted two CFA studies examining teacher ratings of

ADHD and ODD in adolescents in the United States. The first study included 247 participants,

118 of which had been in the principal's office 3 or more times for discipline (high-risk group)

and the remaining 129 were randomly selected (control group). Teachers' ratings were blind and

made using a 25 item questionnaire adapted from the DSM-IV criteria for ADHD and ODD.

Symptoms were rated on a 4-point rating scale (i.e., 0 = not at all, 1 = mild problem, 2 =

moderate problem, and 3 = severe problem) with no time interval specified. Results indicated

that a three-factor model (ADHD-IN, ADHD-HI, and ODD) had the best fit for teachers' ratings

of ADHD and ODD (CFI = .91 and SRMR = .06). Inattention and hyperactivity/ impulsivity

factors were correlated .85, while hyperactivity/impulsivity and ODD factors were correlated .87; both of which suggest poor discriminate validity. Inattention and ODD were correlated .77.

The second study Molina and colleagues conducted examined teacher ratings of 224 adolescents between the ages of 13 and 18. One hundred and thirty-two participants had a history of ADHD while the remaining 92 did not. Teachers' ratings were made using the Disruptive Behavior Disorder Scale (DBD; Pelham et al., 1992). The DBD encompasses 45 items intended to reflect the DSM-III-R and the DSM-IV symptoms for ADHD, ODD, and Conduct Disorder. Teacher ratings were made on a four-point rating scale (i.e., 0 = not at all to 3 = very much) with no time interval specified. The three-factor model (ADHD-IN, ADHD-HI, and ODD) resulted in fit values of CFI = .88 and SRMR = .07 which did not indicate a strong fit for teacher ratings. The two-factor model however resulted in a decrease in fit with CFI = .75 and SRMR = .09. As expected the three factors in the three-factor model were correlated (IN w/ HI = .77, IN w/ ODD = .75, and HI w/ ODD = .87), with only the factors hyperactivity/impulsivity and ODD having poor discriminate validity.

Gomez et al. (2003) again found support for a two-factor model of ADHD (ADHD-IN and ADHD-HI) using the DSM-IV ARS in a sample of 1475 Australian elementary school children. Parents' ratings resulted in a CFI of .89 and a RMSEA of .061, while teachers' ratings were similar (CFI = .89 and RMSEA = .063). The correlations between the two factors were .76 for parents and .69 for teachers.

In 2003 Wolraich et al. evaluated elementary school teacher ratings of 19,542 children in Spain, Germany, urban United States, and suburban United States. Teachers' ratings of ADHD were assessed with the Vanderbilt ADHD Teacher Rating Scale (VADTRS; Wolraich, Heurer et al., 1998). The VADTRS encompasses 35 symptoms items (9 inattention, 9

hyperactivity/impulsivity, 10 ODD and conduct disorder, and 7 anxiety/depression) to assess DSM-IV symptoms of ADHD and comorbid complications and 8 performance items to assess functioning in the classroom. Teacher ratings of symptoms were made with 4 subjective anchors (i.e., 0= never, 1 = occasionally, 2 = often, and 3 = very often) with no time interval specified. While analysis occurred with dichotomization of the 4 point scale (i.e., 0 = 0 or 1; 1 = 2 or 3) the results indicated that a three-factor model (ADHD-IN, ADHD-HI, and ODD) best represented all the data from the 4 different testing areas.

In 2005 Amador-Campos used teacher and parent ratings on a bilingual Spanish-Catalan questionnaire consisting of the 18 DSM-IV ADHD symptoms to test the two-factor model with a Spanish sample. The questionnaire utilized a 4-point Likert scale (i.e., 0 = not at all, 1 = never, 2 = seldom, and 3 = very much true, very often, very frequent) with no time interval specified. Parents and teachers rated 1,018 Spanish school children ages 4 to 12. Results indicated a two-factor model (ADHD-IN and ADHD-HI) had the best fit for both parent and teacher ratings (parents: CFI= .961 and RMR= .038, teachers: CFI= .958 and RMR= .044). Correlations for the two factors were .61 for teacher ratings and .59 for parent ratings.

Gomez, Burns and colleagues (2005) examined the utility of a three-factor model (ADHD-IN, ADHD-HI, and ODD) in Malaysia children using the Disruptive Behavior Questionnaire (DBQ; Barkley & Murphy, 1998). The DBQ includes 26 questions directly linked to the DSM-IV ADHD and ODD symptoms (9 inattention, 9 hyperactivity/impulsivity, 8 ODD), employs a 4-point rating scale (i.e., never or rarely, sometimes, often, very often), and a time interval of 6 months. Results indicated that the three-factor model for parents and teachers provided a good fit in an absolute sense for 917 Malaysian elementary school children. The three-factor model obtained CFI, RMSEA, and SRMR values of .92, .047, and .043 for parents'

ratings and .92, .066, .046 for teachers' ratings. Correlations for the three-factor model were

acceptable for parent ratings while 2 of 3 correlations were acceptable for teacher ratings.

(parents: IN correlated w/ HI = .77, IN w/ ODD = .65, HI w/ ODD = .74 teachers: IN w/ HI =

.74, IN w/ ODD = .65, HI w/ ODD = .85).

CFA studies with the CADBI

In 2001 the Child and Adolescent Disruptive Behavior Inventory- Parent Rating Scale

Version 1a (CADBI; Burns, 1995) was used to evaluate 5 models of ADHD and ODD symptoms

(Burns, Boe, Walsh, Flanagan, Teegarden, 2001). This earlier version of the CADBI contains

the DSM-IV ADHD and ODD symptoms and used subjective rating anchors with a time interval

of 6 months. The items were rated on a 5-point scale (i.e., 0 = never 1 = seldom, 2 = sometimes,

3 = often, and 4 = very often). This study examined 742 children not in treatment for ADHD in

the United States from various pediatric clinics. Ratings were obtained from mothers. Results

indicate that the three-factor model (ADHD-IN, ADHD-HI, and ODD) provided a good fit in

absolute sense (CFI= .90, SRMR= .057, RMSEA= .077). The correlations between the three

factors were acceptable (IN w/ HI = .68, IN w/ ODD = .68, and HI w/ ODD = .72).

This same version of the CADBI was used in 2006 to evaluate the organization of parent

ratings of ADHD and ODD symptoms as described by the DSM-IV across gender (Burns,

Walsh, Gomez, Hafetz, 2006). In an American pediatric sample of 1,015 elementary school-age

children, results found support of the measurement and structural invariance of the three-factor

model (ADHD-IN, ADHD-HI, and ODD) for parent ratings across gender.

Gomez et al. (2003) used the CADBI 2.3 (Burns, Taylor & Rusby, 2001a, 2001b) parent

and teacher rating scales in a Brazilian sample of 283 children and adolescents. This version of

the CADBI uses 8 point frequency count ratings (1= never in the past month, 2= 1 to 3 times in

the past month, 3 = 3 to 4 times in the past month, 4 = 2 to 6 time per week, 5 = 1 time per day, 6 = 2 to 5 times per day, 7 = 6 to 9 times per day, and 8 = 10 or more times per day) and a time interval of the last month assessing for ADHD and ODD symptoms as well as an evaluation of academic competence. This is the most current version of the scale. Gomez and colleagues reported that the two-factor model (ADHD-IN and AHDH-HI) provided a good fit with CFI and RMSEA values of .92 and .070 for teacher rating and .94 and .053 for parent rating. The correlations between the two factors were .73 for parents and .67 for teachers.

Taylor et al. (2006) used the CADBI to evaluate teacher ratings of an initial sample of 824 kindergarten children and then replicated the findings on a sample of 534 kindergarten children in Oregon. Here 25 items were selected to measure ODD toward Adults (8), ODD toward other children (8), and ADHD-HI (9). Although ratings were made on an 8-point frequency of occurrence scale for the past month, anchors 7 and 8 were collapsed into anchor 6 due to high levels of kurtosis (see Taylor et al., 2006). Findings for sample 1 (824 kindergarten children) resulted in RMSEA and SRMR fit values that were adequate while the CFI was too low to indicate a good fit for the three-factor model (ADHD-HI, ODD-teachers, and ODD-peers; CFI = .88, RMSEA = .068, and SRMR = .061). Teacher ratings with a second sample of 534 children resulted in fit values similar to the previous findings (CFI = .87, RMSEA = .062, and SRMR = .068). The fit for the combined sample was CFI = .923, RMSEA = .047, and SRMR = .053, indicating a good fit. Correlations among these factor for the combined sample were ODD-A w/ ODD-P = .79, ODD-A w/HI = .67, and ODD-P w/HI = .75.

Burns and colleagues (Burns et al.,2008) used the CADBI-P to explore the invariance of an ODD-Adults, ADHD-HI, ADHD-IN, and Academic Competence factor model across mothers' and fathers' ratings with samples of elementary school children from Brazil, Thailand

and America. Parents rated the occurrence of the 8 ODD-Adult, 9 ADHD-HI, and 9 ADHD-IN

symptoms on an 8-point frequency of occurrence scale for the past month (same as Gomez et al.

2003). Academic Competence was measured by four items and rated on a 7-point scale (i.e., 1 =

never difficulty, 2 = moderate difficulty, 3 = slight difficulty, 4 = average performance for grade

level, 5 = slightly above average, 6 = moderately above average, and 7 = excellent performance).

Result indicated that the 4 factor model provided a good fit for mothers' (N=1,825) and fathers'

(N=1,334) ratings of 2,075 elementary school children in Thailand (mothers: CFI= .942, SRMR=

.038, and RMSEA= .041, fathers: CFI= .941, SRMR= .042, and RMSEA= .041), and mothers (N

= 868) and fathers (N=698) ratings of 894 children in Brazil (mothers: CFI = .927, SRMR =

.043, and RMSEA = .048 fathers: CFI = .944, SRMR = .043, and RMSEA = .042).

Additionally, the American sample of 817 children rated by mother (N= 778) and fathers (N=

506) reported fit values that supported the four-factor model (mothers: CFI = .934, SRMR =

.047, and RMSEA = .053 fathers: CFI = .935, SRMR = .050, and RMSEA = .049).   The

correlations among the factors for mother and father ratings showed good discriminate validity

for all samples. Convergent and discriminate validity for the four-factor model was also found

between parents within each culture. Additionally the four-factor model was invariant (i.e., like

item loadings, intercepts and residuals as well as like factor variances, covariance, and means)

between mothers' and fathers' ratings within each sample.

Summary of CFA Studies

There are several limitations to the findings of the CFA studies reviewed in the previous

section. This paper will now summarize the findings of the four and five point subjective rating

scales and the 8-point frequency count rating scale CFA studies.

4-point subjective scales. Only two studies conducted using a four point rating scale yielded results with good discriminate validity between all factors and adequate fit values (i.e., Amador-Campos et al. 2005; Gomez et al. 1999). As can be seen in Table 1, four studies resulted in poor discriminate validity between ADHD-IN and ADHD-HI factors (i.e., DuPaul et al. 1997; DuPaul et al. 1998; Beiser et al. 2000; & Molina et al. 2001), while two resulted in poor discriminate validity between ADHD-HI and ODD factors (i.e., Molina et al 2001; & Gomez et al. 2005). Additionally three studies produced fit values that were unacceptable by current standards, particularly the CFI (i.e., Molina et al. 2001; Gomez et al. 2003; & Beiser et al. 2000).

5-point subjective scales. Of the three studies conducted using 5 point rating scales only one displayed poor discriminate validity between ADHD-IN and ADHD-HI factors (i.e., Collett et al. 2000). The remaining two studies which used an earlier version of the CADBI resulted in adequate fit values and good discriminate validity between factors (i.e., Burns et al. 2001; Burns et al. 2006). It should be noted, however, that the two studies by Burns & colleagues were on the same data set (i.e., the first tested the ADHD-IN, ADHD-HI, and ODD model for the total sample and the second the invariance of the model across gender).

8-point frequency count scales. All of the studies conducted utilizing the 8-point frequency count ratings resulted in adequate fit values and good discriminate validity between factors. It is unknown, however, if the eight point rating scale is superior to the four point rating scales because of eight versus four anchors or if the improvements in fit values are being seen because of the use of frequency count ratings as opposed to subjective ratings (i.e., there are two differences here: (1) eight anchors versus four anchors; and (2) frequency count anchors versus subjective anchors). It is clear nevertheless that the newest version of the CADBI has produced adequate fit values in samples from the United States, Brazil and Thailand.

Purpose of the Study

While the previous studies have indicated that the CADBI has demonstrated good construct validity with mothers' and fathers' ratings of children from multiple countries (i.e., Brazil, Thailand, and the United States), all of these studies, however, have involved only parent ratings of elementary school children. In addition, there are only two published studies with the DSM-IV teacher version of the CADBI, one with teacher ratings of kindergarten children from Oregon (Taylor et al., 2006) and one with teacher ratings of elementary school children from Brazil (Gomez et al., 2003, study 1). There is thus a need for additional research on the teacher version of the CADBI, especially with middle and high school students.

The purpose of this study was to examine the construct validity of the teacher version of the CADBI with middle and high school students from Thailand. This version of the CADBI measures the ADHD-IN, ADHD-HI, ODD toward teachers, academic competence, and social competence factors. In the first year of the study, teachers completed the CADBI on middle and high school students (grades 7 to 11, approximately 700 students). In the second year of the study, the teachers again completed the CADBI on the middle and high school students (grades 7 to 12, approximately 900 students). CFA was used to test the construct (factorial) validity of the ADHD-IN, ADHD-HI, ODD-toward teachers, Academic Competence, and Social Competence five factor model in year one and year two. It was expected that the five-factor model would provide a good fit in year one and year two.

Table 1   Summary of CFA Studies

Parents (Teacher) 4 Point Scales

Study	N	Factors	CFI	SRMR	RMSEA	Correlation		Time Interval	Rater
1. DuPaul et al. 1997	4,009	IN and HI	-	-	<.05		.94	6 months	T
2. DuPaul et al. 1998	4,666	IN and HI	-	-	<. 05		.92	6 months	P
3. Gomez et al. 1999	1,275	IN and HI	-	-	.038 (.040)		.75 (.68)	not specified	P(T)
4. Beiser et al. 2000	1,555 Native	IN and HI	.92 (.92)	-	.10 (.12)		.87 (.68)	not specified	P(T)
	489 non-Native		.82 (.93)	-	.15 (.12)		.89 (.75)		
Subsample	512 Native	IN and HI	.97 (95)	-	.06 (.10)		-*		
	198 non-Native		.98(.96)	-	.05 (10)		-*		
5. Molina et al. 2001	247	IN, HI and ODD	.91	.06	-	HI w/IN	.85	not specified	T
						IN w/ODD	.77		
						HI w/ODD	.87		
Second study-	224	IN, HI and ODD	.88	.07	-	HI w/IN	.77	not specified	T
						IN w/ODD	.75		
						HI w/ODD	.87		
6. Gomez et al. 2003	1475	IN and HI	.89 (.89)	-	.061 (.063)		.76 (.69)	6 months	P (T)
7. Wolraich et al. 2003									
8. Amador-Campos et al. 2005	1,018	IN and HI	.961 (.958)	.038 (.044)	-		.59 (.61)	not specified	P(T)
9. Gomez et al. 2005	917	IN, HI and ODD	.92 (.92)	.043 (.046)	.047 (.066)	HI w/IN	.77 (.74)	6months	P(T)
						IN w/ODD	.65 (.74)		
						HI w/ODD	.74 (.85)		

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Table 1 Summary of CFA Studies

Parents (Teacher) 5 Point Scale

Study	N	Factors	CFI	SRMR	RMSEA	Correlation		Time Interval	Rater
1. Collett et al. 2000	624	IN and HI	.940	-	.099		.84	not specified*	P
2. Burns et al. 2001	742	IN, HI and ODD	.90	.057	.077	HI w/IN	.68	6 months	M
						IN w/ODD	.68		
						HI w/ODD	.72		
3. Burns et al. 2006	1,015	IN, HI and ODD	.92	.052	.065	HI w/IN	.72	6 months	M
						IN w/ODD	.71		
						HI w/ODD	.73		

Parent (Teacher) 8 Point Scale

Study	N	Factors	CFI	SRMR	RMSEA	Correlation		Time Interval	Rater
1. Gomez et al. 2003	283	IN and HI	.94 (.92)	-	.053 (.070)		.73 (.67)	Past month	P (T)
2. Taylor et al. 2006	1,163	HI, ODD-P and ODD-A	.92	.053	.047	ODD-A w/ ODD-P	.79	Past month	T
						ODD-P w/HI	.75		
						ODD-A w/HI	.67		
3. Burns et al. 2007		IN, HI, ODD-A, & Academic Competence						Past month	M(F)
	2,075 Thai		.942 (.941)	.038 (.042)	.041 (.041)	HI w/IN	.75 (.76)		
						IN w/ODD-A	.66(64)		
						HI w/ODD-A	.72(70)		
	894 Brazil		.927 (.944)	.043 (.043)	.048(.042)	HI w/IN	.69 (.68)		
						IN w/ODD-A	.59 (57)		
						HI w/ODD-A	.67 (.68)		
	817 America		.934 (.935)	.047 (.050)	.053 (.049)	HI w/IN	.76 (.71)		
						IN w/ODD-A	.62 (.62)		
						HI w/ODD-A	.68 (.65)		

Figure 1

Figure 1
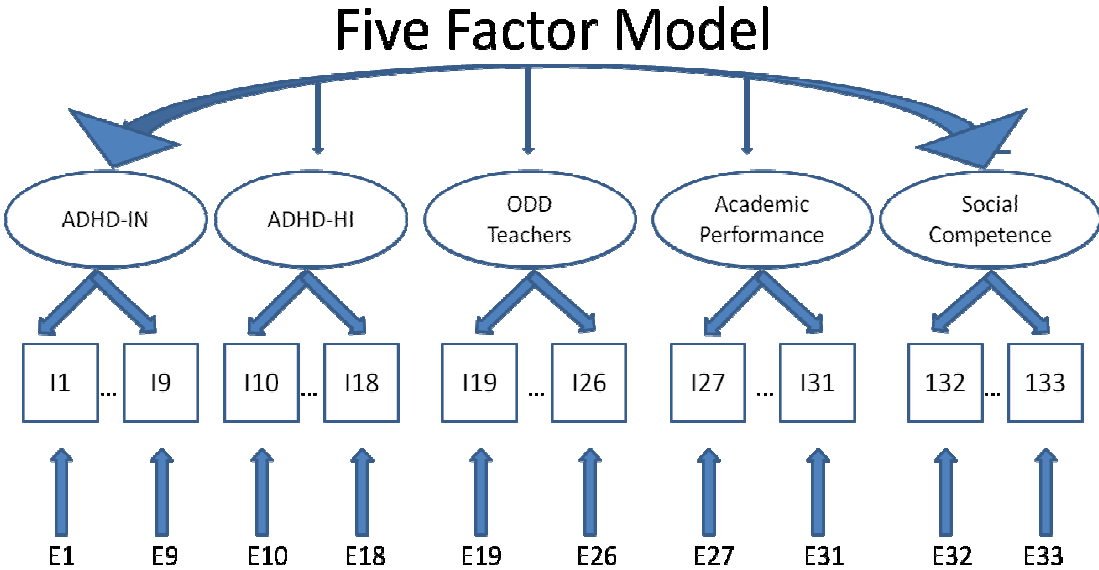
CHAPTER TWO

METHOD

Participants

In year one, the participants were the teachers of 690 middle and high school students (seventh to eleventh grades) and in the second year the teachers 872 middle and high school students (seventh to twelfth grades) from the Demonstration School in the city of Mahasarakham (population approximately 117,600) in Mahasarakham Providence, northeastern Thailand. In year one, 21 of 22 teachers participated in the study and 29 of 29 teachers participated in year two. The average number of students rated by each teacher was 32.86 (SD = 4.91, range = 19 to 39) in year one and in year two the average number of students rated by each teacher was 30.07 (SD = 8.23, range 13 to 41).

The average age of the 690 students in year one was 14.67 years (SD = 1.58, range = 11 to 19 years) with the average age of the 872 students in year two being 14.99 years (SD = 1.77, range = 11 to 19 years). For the first year, 25.94% of the students were in the seventh grade; 23.04% the eighth grade; 13.91% the ninth grade; 24.64% the tenth grade; and 12.47% the eleventh grade. In the second year, 21.56% of the students were in the seventh grade; 19.61% the eighth grade; 17.66% the ninth grade; 17.89% the tenth grade; 14.56% the eleventh grade; and 8.72% the twelfth grade.

Procedure

With the approval of the schools, the seventh through twelfth grade teachers were asked to participate in the study (in year one only the seventh through eleventh grade teachers were asked because the 12 grade class had mostly departed due to graduation). Each teacher who volunteered was given the appropriate number of rating scales for the number of students in his

or her class. As noted above, in year one 21 of 22 teachers volunteered to participate in the study and in year two 29 of 29 teachers volunteered to participate.

Measure

Child and Adolescent Disruptive Behavior Inventory–Teacher Version (CADBI-T; Burns, Taylor, & Rusby, 2001). Teachers rated the occurrence of the eight ODD-toward Adults, nine ADHD-HI, and nine ADHD-IN symptoms on an 8-point frequency of occurrence scale for the past month (i.e., 1 = never in the past month, 2 = 1 to 2 times in the past month, 3 = 3 to 4 times in the past month, 4 = 2 to 4 times per week, 5 = 1 time per day, 6 = 2 to 5 times per day, 7 = 6 to 9 times per day, and 8 = 10 or more times per day). Teachers were instructed to make the symptom ratings on the basis of the child's behavior only in the school setting.

The Academic Competence factor was measured by four items (i.e., quality of homework, quality of class work, quality of reading skills, quality of arithmetic, and quality of writing skills). The Social Competence factor was measured by two items (i.e., quality of interactions with teachers and quality of interactions with peers at school). These items were rated on a 7-point scale (i.e., 1 = severe difficulty, 2 = moderate difficulty, 3 = slight difficulty, 4 = average performance for grade level (average interactions for grade level for the Social Competence factor), 5 = slightly above average, 6 = moderately above average, and 7 = excellent performance for academic items or excellent interactions for the Social Competence factor). Here the instructions are to "please circle the answer that best describes the child's current academic and social behavior in the following areas." The Academic and Social Competence scales are included on the CADBI to provide a global measure of teacher perception of academic and social competence.

Psychometric Properties of the DSM-IV Parent CADBI

Gomez et al. (2003) reported Cronbach's alphas of .87, .90, .93, and .84 for the ODD-Adults, ADHD-HI, ADHD-IN, and Academic Competence scales using the Portuguese version of the CABDI-P with Brazilian parents. A recent study using the Thai parent version of the CADBI with elementary school children reported Cronbach's alphas of 90(.91), .89(.89), .91(.92), .87(.87) for mother (father) ratings of the ODD-Adults, ADHD-HI, ADHD-IN, and Academic Competence factors (Burns et al. 2008). This same study reported similar alphas for these factors in a Brazilian sample (mothers: .89, .90, .93, .89 fathers: .89, .89, .94, .88) and in an American sample (mothers: .93, .92, .95, .91 fathers: .92, .90, .94, .93). Burns et al. (2008) also reported complete measurement and structural variance of the four-factor model between mothers' and fathers' ratings as well as convergent/discriminant validity for the four factors between mothers' and fathers' ratings within each country. Furthermore mothers' ratings of 42 American children resulted in one-month test-retest reliabilities of 90, .84, .92, and .86, respectively, for factors ODD-Adults, ADHD-HI, ADHD-IN, and Academic Competence.

Psychometric Properties of the DSM-IV Teacher CADBI

Taylor et al. (2006) with teacher ratings of a sample of 1,163 kindergarten children from Oregon found good construct (factorial) validity for the CADBI ADHD-HI, ODD-toward teachers, and ODD- towards peers scales (the ODD-toward peers CADBI subscale was not used in this thesis). This study also reported high levels of internal consistency for the three scales (values in the high 90's). Eleven-week test-retest reliabilities for the ADHD-IN, ADHD-HI, and ODD-toward adult scales were .86, .94, and .93, respectively, for teacher ratings of kindergarten children (Skansgaard & Burns, 1998). This study also found that teacher ratings on the three scales predicted direct observations of the children's classroom behavior in a scale specific

manner. Another study with children and adolescents in a residential school due to aggressive behavior reported teacher-aide correlations of .78, .77, .75, .65 and .46 for the ODD-toward adults, ADHD-HI, ADHD-IN, Academic Competence, and Social Competence factors (Fitzgerald, 2002). This study also reported test-retest correlation for the five factors of .70, .75, .72, .83 and .74, respectively, for a 2-month interval. Here the Cronbach's alpha were .96, .94, .96, .88 and .79 in one sample of teachers and .97, .97, .96, .93 and .86, respectively, in a second sample of teachers.

The various studies with mostly American children indicate the five scales have shown good internal consistency, test-retest reliability, and inter-rater reliability with the exception of the Social Competence scale. The value for the Social Competence factor is probably lower because the scale contains only two items for teachers. The Taylor et al. study (2006) also provided support for the construct (factorial) validity of three CADBI scales (ADHD-IN, ADHD-HI, and ODD-toward adults) used in the screening version of the CADBI with kindergarten children. No study, however, has evaluated the teacher version of the CADBI with a middle and high school students from the community and, to the best of my knowledge, no teacher rating scale study has tested the factorial validity of the ADHD-IN, ADHD-HI, and ODD factors with Thai middle and high school students.

CHAPTER THREE

RESULTS

Preliminary Item Analysis

Table 1 shows the means, standard deviations, skew, and kurtosis values for the CADBI items for years one and two. As was expected from earlier teacher rating studies with the CADBI (e.g, Taylor et al., 2006), many of the symptom ratings had high levels of skew and kurtosis. These values were too high for the appropriate use of robust maximum likelihood estimation. Robust maximum likelihood estimation treats the item ratings as continuous and, given the level of the skew and kurtosis, it was necessary to treat the item ratings as ordered categories (Brown, 2006, chap. 9).

Table 3 shows the frequency of occurrence of the item ratings for each of the 8 categories for the symptom ratings and for each of the 7 categories for the academic competence and social competence items. Given the low rate of occurrence of ratings in categories 7 (6 to 9 times per day) and 8 (10 or more times per day), these two categories were collapsed into category 6 (2 to 5 times per day). For the analyses, the symptom ratings were thus treated as a 6-point scale (1 = never; 2 = 1 to 2 times in the past month, 3 = 3 to 4 times in the past month, 4 = 2 to 4 times per week, 5 = 1 time per day, 6 = **2 or more times per day**). This was the same procedure used in the Taylor et al. (2006) teacher rating study with the CADBI with American kindergarten children. It should be noted, however, that all the analyses reported in the paper were repeated with the 8-point anchors with the same conclusions.

Analytic Strategy

Mplus (version 5.0, Muthén & Muthén, 1998-2007) was used to perform two confirmatory factor analyses (CFA). All the items were treated as categorical (ordered-

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categories) and the Mplus WLSMV estimator was used for both analyses. The five-factor model was evaluated with the comparative fit index (CFI, study criterion of .90 with closer to .95 being ideal), root mean square error of approximation (RMSEA, study criterion being less than .08), and the Tucker Lewis Index (TLI, study criterion .90 with closer to .95 being idea). Also because students were nested within teachers, the multilevel modeling aspect of Mplus was used to calculate the correct standard errors (i.e., standard errors that take into account the amount of dependence in the ratings).

Model Fit

The five-factor model provided a good fit in year one. Here the global fit measures were: $\chi^2 (12) = 66.48$, p < .0001, CFI = .954, TLI = .977 and RMSEA = .081. Similar global fit measures occurred in year 2: $\chi^2 (15) = 73.71$, p < .0001, CFI = .958, TLI = .983 and RMSEA = .067. These global measures of fit indicate that the ADHD-IN, ADHD-HI, ODD-toward adults, Academic and Social Competence factor model provide a good fit in a global sense for the two years of teacher ratings.

Item-Factor Loading

Table 4 shows the item-factor loadings for the year one and year two teacher ratings. Given the item ratings were treated as ordered-categories and the WLSMV estimation procedure was used to estimate the model, the values in Table 4 are probit coefficients (Brown, 2006, chap. 9). Each item has a significant and substantial loading on its assigned factor.

Factor Correlations

Table 5 shows the factor correlations for the teacher ratings for years one and two. Factor correlations greater than .85 are considered to show poor discriminate validity (Brown, 2006). The correlation between the ADHD-HI and ODD factors in year 2 was .82. The high

correlation between the HI and ODD factors, especially for teacher ratings, has occurred in several studies (e.g., Molina et al. 2001, Gomez et al. 2003, and Gomez et al. 2005). All other factor correlations in year 1 and year 2 displayed good discriminate validity. Additionally, similar to earlier research with the CADBI (Gomez, et al,. 2003, Burns, et al,. 2008.) the Academic Competence factor was more strongly related to the ADHD-IN factor than to ADHD-HI and ODD Toward Adults factors at year 1 and year 2.

CHAPTER FOUR

DISCUSSION

The results indicated that the ADHD-IN, ADHD-HI, ODD-toward adults, Academic and Social Competence factor model provided a good fit in a global sense for the two years of teacher ratings of Thai middle and high school students. The correlations between factors displayed good discriminate and convergent validity for year one and year two ratings while the factors loadings of each item were substantial. Taken together these findings further extend the construct validity of the teacher version of the CADBI.

These finding are consistent with two other studies including Burns and colleagues 2008, which found support for a 4 factor model (ADHD-IN, ADHD-HI, ODD, and Academic Competence) using the CADBI-P with mothers and fathers ratings of elementary school children from Brazil, America, and Thailand samples. Additionally, unpublished results by Burns with the elementary Thai sample from the above study also provided support for a five-factor model (ADHD-IN, ADHD-HI, ODD toward adults, Academic Competence, and Social Competence) and invariance of the five factor model across mother and father ratings on the CADBI-P. Burns et al. 2009 also found similar results with 4 samples of mothers and fathers ratings of middle and

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high school Thai adolescents. In addition, all four samples showed good convergent and discriminate validity between mothers and fathers ratings and provided support for the five-factor model (ADHD-IN, ADHD-HI, ODD toward adults, Academic Competence, and Social Competence). These various studies with mothers and fathers ratings of Thai, Brazilian, and American children and Thai adolescents as well as the current study with teacher ratings of Thai adolescents indicate that the factor structure of the CADBI is robust.

Additional Research

Although the findings suggest the CADBI-T has good construct validity with Thai middle and high school students future research should examine the invariance, construct and discriminate validity between teacher's ratings (e.g. 2 teachers rate each child) as this study only included the ratings of a single teacher for each child. Additionally, there is a need for a short-term test-retest (one month) reliability study of the CADBI to examine the consistency of the measure. Likewise, longitudinal studies examining the growth or stability of the factors across time should be another aim of future examination. Lastly, while several studies have examined parent and teacher rating separately further research should test the convergent and discriminate validity of the CADBI across the home and school settings. For example, having two parent and two teachers rate each child and then testing the construct validity of the five factors.

Limitations

It should be noted that the Thai sample used in this study represent a sample of convenience rather than a random sample from a specified population. However, the findings with teacher rating in this study appear robust, as similar results have been found with samples from America, Thailand, and Brazil using parent ratings of elementary children as well as teacher ratings from Brazil and America.

Conclusion

The findings of this study indicate that the five factor model (ADHD-IN, ADHD-HI, ODD, Academic Competence, and Social Competence) provided a good fit in an absolute sense. The items all loaded appropriately on their intended construct suggesting good convergent validity. And the correlations between factors were within the appropriate limits displaying good discriminate validity. Taken together these findings overall provide support for the construct validity of the CADBI.

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Table 2

Descriptive Information for CADBI Items

	Year 1 (N = 690)					Year 2 (N = 872)			
	SD	S	K	M		SD	S	K	M
1. Argues	1.38	.81	3.22	13.89		1.44	.91	2.85	10.00
2. Temper	1.33	.70	3.17	13.71		1.35	.80	3.22	12.64
3. Refuses to obey	1.43	.87	3.11	12.38		1.49	.90	2.69	9.78
4. Annoys adults	1.17	.56	5.73	39.06		1.31	.84	3.52	13.92
5. Blames adults	1.26	.63	3.52	16.45		1.34	.86	3.44	13.67
6. Becomes annoyed	1.34	.72	3.61	19.31		1.40	.85	3.08	11.48
7. Anger towards-A	1.27	.69	4.14	24.12		1.37	.90	3.50	14.31
8. Vindictive	1.05	.30	9.29	124.41		1.16	.65	5.97	42.32
9. Fidgets	1.46	1.07	3.29	11.82		1.74	1.38	2.74	7.87
10. Leaves seat	1.33	.80	3.51	14.56		1.66	1.34	2.80	7.88
11. Runs about	1.08	.36	5.70	39.44		1.40	1.11	3.57	13.30
12. Trouble playing	1.41	.89	3.18	11.75		1.56	1.10	2.82	8.99
13. Talks to much	1.58	1.14	2.71	7.99		1.72	1.31	2.55	6.88
14. On the go	1.25	.73	4.39	23.58		1.38	.95	3.57	14.79
15. Blurts out	1.27	.65	3.34	14.76		1.44	1.05	3.41	13.32
16. Doesn't wait turn	1.22	.53	2.98	11.53		1.34	.90	3.97	18.97
17. Interrupts	1.37	.72	3.02	13.07		1.46	.93	3.19	13.09
18. Attention detail	1.99	1.20	1.87	4.84		2.12	1.23	1.51	2.41
19. Attention work	1.95	1.26	2.10	5.64		2.07	1.32	1.65	2.76
20. Doesn't listen	1.69	1.16	2.81	9.99		1.70	1.12	2.26	6.25
21. Follow through	1.63	1.11	2.95	11.24		1.83	1.16	1.70	3.03
22. Organization	1.85	1.17	2.23	6.52		2.00	1.29	1.60	2.61
23. Avoids tasks	1.77	1.17	2.34	6.63		1.89	1.32	1.95	3.72
24. Loses things	1.52	.81	2.25	7.00		1.73	1.19	2.32	5.93
25. Distracted	1.72	1.08	2.32	6.35		1.81	1.17	2.22	5.87
26. Forgets daily	1.57	.87	2.45	8.68		1.83	1.11	2.05	5.07
27. Completes home	4.96	1.80	-.57	-.87		4.56	1.80	-.29	-1.15
28. Completes class	5.07	1.79	-.77	-.53		4.69	1.74	-.38	-1.00
29. Reading	5.10	1.55	-.71	-.34		4.84	1.61	-.65	-.42
30. Arithmetic	4.68	1.87	-.61	-.78		4.71	1.72	-.44	-.84
31. Writing	5.03	1.62	-.73	-.47		4.81	1.68	-.71	-.40
32. Interaction-Peers	5.76	1.32	-1.12	.73		5.76	1.28	-.95	.14
33. Interaction-Teacher	5.79	1.27	-1.14	.85		5.79	1.21.	-.97	.33

Table 3 Data distribution Properties for ADHD-IN, ADHD-HI, ODD- toward adults, Academic Competence, and Social Competence Factors

Argues	Year 1	Year 2
CATEGORY 1	0.738	0.733
CATEGORY 2	0.194	0.165
CATEGORY 3	0.041	0.063
CATEGORY 4	0.016	0.021
CATEGORY 5	0.003	0.007
CATEGORY 6	0.006	0.010
CATEGORY 7	0.003	0.001
CATEGORY 8	0.000	0.000

Temper	Year 1	Year 2
CATEGORY 1	0.759	0.771
CATEGORY 2	0.187	0.161
CATEGORY 3	0.036	0.042
CATEGORY 4	0.009	0.011
CATEGORY 5	0.003	0.006
CATEGORY 6	0.006	0.009
CATEGORY 7	0.000	0.000
CATEGORY 8	0.000	0.000

Refuses to obey	Year 1	Year 2
CAREGORY 1	0.707	0.678
CATEGORY 2	0.213	0.218
CATEGORY 3	0.055	0.069
CATEGORY 4	0.006	0.019
CATEGORY 5	0.003	0.006
CATEGORY 6	0.014	0.008
CATEGORY 7	0.001	0.001
CATEGORY 8	0.000	0.001

Annoys adults	Year 1	Year 2
CATEGORY 1	0.870	0.827
CATEGORY 2	0.110	0.100
CATEGORY 3	0.010	0.039
CATEGORY 4	0.003	0.016
CATEGORY 5	0.003	0.008
CATEGORY 6	0.003	0.009
CATEGORY 7	0.001	0.001
CATEGORY 8	0.000	0.000

Blames adults	Year 1	Year 2
CATEGORY 1	0.810	0.798
CATEGORY 2	0.149	0.132
CATEGORY 3	0.026	0.033
CATEGORY 4	0.007	0.017
CATEGORY 5	0.004	0.009
CATEGORY 6	0.003	0.008
CATEGORY 7	0.000	0.002
CATEGORY 8	0.000	0.000

B/C annoyed	Year 1	Year 2
CATEGORY 1	0.745	0.736
CATEGORY 2	0.207	0.193
CATEGORY 3	0.033	0.036
CATEGORY 4	0.006	0.017
CATEGORY 5	0.001	0.008
CATEGORY 6	0.004	0.009
CATEGORY 7	0.003	0.001
CATEGORY 8	0.000	0.000

Anger toward-A	Year 1	Year 2
CATEGORY 1	0.804	0.775
CATEGORY 2	0.151	0.155
CATEGORY 3	0.032	0.036
CATEGORY 4	0.006	0.013
CATEGORY 5	0.004	0.006
CATEGORY 6	0.003	0.013
CATEGORY 7	0.000	0.003
CATEGORY 8	0.000	0.000

Vindictive	Year 1	Year 2
CATEGORY 1	0.958	0.914
CATEGORY 2	0.036	0.055
CATEGORY 3	0.004	0.014
CATEGORY 4	0.001	0.007
CATEGORY 5	0.000	0.002
CATEGORY 6	0.000	0.006
CATEGORY 7	0.000	0.001
CATEGORY 8	00000	0.001

Fidgets	Year 1	Year 2
CATEGORY 1	0.735	0.612
CATEGORY 2	0.193	0.255
CATEGORY 3	0.020	0.056
CATEGORY 4	0.013	0.022
CATEGORY 5	0.012	0.008
CATEGORY 6	0.023	0.021
CATEGORY 7	0.001	0.014
CATEGORY 8	0.003	0.013

Leaves seat	Year 1	Year 2
CATEGORY 1	0.775	0.662
CATEGORY 2	0.175	0.226
CATEGORY 3	0.017	0.034
CATEGORY 4	0.013	0.021
CATEGORY 5	0.009	0.010
CATEGORY 6	0.010	0.024
CATEGORY 7	0.000	0.016
CATEGORY 8	0.000	0.007

Runs about	Year 1	Year 2
CATEGORY 1	0.941	0.811
CATEGORY 2	0.043	0.111
CATEGORY 3	0.012	0.022
CATEGORY 4	0.003	0.021
CATEGORY 5	0.001	0.007
CATEGORY 6	0.000	0.015
CATEGORY 7	0.000	0.011
CATEGORY 8	0.000	0.002

Trouble playing	Year 1	Year 2
CATEGORY 1	0.738	0.677
CATEGORY 2	0.196	0.214
CATEGORY 3	0.026	0.048
CATEGORY 4	0.017	0.028
CATEGORY 5	0.010	0.009
CATEGORY 6	0.012	0.015
CATEGORY 7	0.001	0.008
CATEGORY 8	0.000	0.001

Table 3 Data distribution Properties for ADHD-IN, ADHD-HI, ODD- toward adults, Academic Competence, and Social Competence Factors

Talks to much	Year 1	Year 2
CATEGORY 1	0.688	0.630
CATEGORY 2	0.181	0.218
CATEGORY 3	0.071	0.076
CATEGORY 4	0.025	0.025
CATEGORY 5	0.004	0.009
CATEGORY 6	0.020	0.024
CATEGORY 7	0.010	0.013
CATEGORY 8	0.000	0.006

On the go	Year 1	Year 2
CATEGORY 1	0.833	0.781
CATEGORY 2	0.126	0.150
CATEGORY 3	0.022	0.025
CATEGORY 4	0.004	0.018
CATEGORY 5	0.004	0.008
CATEGORY 6	0.009	0.014
CATEGORY 7	0.001	0.001
CATEGORY 8	0.000	0.002

Blurts out	Year 1	Year 2
CATEGORY 1	0.796	0.757
CATEGORY 2	0.161	0.154
CATEGORY 3	0.028	0.041
CATEGORY 4	0.009	0.021
CATEGORY 5	0.004	0.005
CATEGORY 6	0.003	0.014
CATEGORY 7	0.000	0.006
CATEGORY 8	0.000	0.003

Doesn't wait	Year 1	Year 2
CATEGORY 1	0.817	0.802
CATEGORY 2	0.152	0.133
CATEGORY 3	0.023	0.033
CATEGORY 4	0.004	0.013
CATEGORY 5	0.003	0.005
CATEGORY 6	0.000	0.009
CATEGORY 7	0.000	0.003
CATEGORY 8	0.000	0.002

Interrupts	Year 1	Year 2
CATEGORY 1	0.719	0.698
CATEGORY 2	0.228	0.221
CATEGORY 3	0.036	0.041
CATEGORY 4	0.009	0.021
CATEGORY 5	0.001	0.003
CATEGORY 6	0.007	0.009
CATEGORY 7	0.000	0.005
CATEGORY 8	0.000	0.001

Attention detail	Year 1	Year 2
CATEGORY 1	0.422	0.351
CATEGORY 2	0.332	0.397
CATEGORY 3	0.159	0.125
CATEGORY 4	0.051	0.073
CATEGORY 5	0.014	0.021
CATEGORY 6	0.006	0.030
CATEGORY 7	0.013	0.002
CATEGORY 8	0.003	0.001

Attention work	Year 1	Year 2
CATEGORY 1	0.451	0.416
CATEGORY 2	0.333	0.333
CATEGORY 3	0.129	0.130
CATEGORY 4	0.042	0.060
CATEGORY 5	0.014	0.021
CATEGORY 6	0.016	0.031
CATEGORY 7	0.007	0.009
CATEGORY 8	0.007	0.001

Doesn't listen	Year 1	Year 2
CATEGORY 1	0.575	0.585
CATEGORY 2	0.288	0.263
CATEGORY 3	0.083	0.076
CATEGORY 4	0.022	0.046
CATEGORY 5	0.006	0.011
CATEGORY 6	0.012	0.015
CATEGORY 7	0.007	0.001
CATEGORY 8	0.007	0.003

Follow through	Year 1	Year 2
CATEGORY 1	0.614	0.529
CATEGORY 2	0.257	0.267
CATEGORY 3	0.083	0.104
CATEGORY 4	0.022	0.064
CATEGORY 5	0.001	0.018
CATEGORY 6	0.009	0.015
CATEGORY 7	0.009	0.001
CATEGORY 8	0.006	0.001

Organization	Year 1	Year 2
CATEGORY 1	0.480	0.464
CATEGORY 2	0.336	0.290
CATEGORY 3	0.113	0.115
CATEGORY 4	0.038	0.083
CATEGORY 5	0.007	0.015
CATEGORY 6	0.012	0.028
CATEGORY 7	0.012	0.003
CATEGORY 8	0.003	0.002

Avoids tasks	Year 1	Year 2
CATEGORY 1	0.541	0.531
CATEGORY 2	0.296	0.276
CATEGORY 3	0.097	0.079
CATEGORY 4	0.030	0.055
CATEGORY 5	0.007	0.017
CATEGORY 6	0.016	0.032
CATEGORY 7	0.012	0.007
CATEGORY 8	0.001	0.002

Loses things	Year 1	Year 2
CATEGORY 1	0.606	0.580
CATEGORY 2	0.312	0.276
CATEGORY 3	0.057	0.060
CATEGORY 4	0.009	0.039
CATEGORY 5	0.013	0.016
CATEGORY 6	0.004	0.021
CATEGORY 7	0.000	0.006
CATEGORY 8	0.000	0.002

Table 3 Data distribution Properties for ADHD-IN, ADHD-HI, ODD- toward adults,
Academic Competence, and Social Competence Factors

Distracted	Year 1	Year 2
CATEGORY 1	0.541	0.507
CATEGORY 2	0.325	0.342
CATEGORY 3	0.083	0.068
CATEGORY 4	0.013	0.044
CATEGORY 5	0.012	0.010
CATEGORY 6	0.025	0.024
CATEGORY 7	0.003	0.002
CATEGORY 8	0.000	0.003

Forgets daily	Year 1	Year 2
CATEGORY 1	0.583	0.469
CATEGORY 2	0.326	0.377
CATEGORY 3	0.064	0.078
CATEGORY 4	0.009	0.038
CATEGORY 5	0.009	0.013
CATEGORY 6	0.009	0.023
CATEGORY 7	0.001	0.001
CATEGORY 8	0.000	0.001

Homework	Year 1	Year 2
CATEGORY 1	0.035	0.045
CATEGORY 2	0.094	0.111
CATEGORY 3	0.123	0.180
CATEGORY 4	0.110	0.135
CATEGORY 5	0.143	0.104
CATEGORY 6	0.255	0.282
CATEGORY 7	0.239	0.142

Class work	Year 1	Year 2
CATEGORY 1	0.048	0.036
CATEGORY 2	0.075	0.099
CATEGORY 3	0.097	0.153
CATEGORY 4	0.106	0.150
CATEGORY 5	0.130	0.132
CATEGORY 6	0.304	0.274
CATEGORY 7	0.239	0.157

Reading	Year 1	Year 2
CATEGORY 1	0.017	0.038
CATEGORY 2	0.061	0.069
CATEGORY 3	0.096	0.097
CATEGORY 4	0.143	0.178
CATEGORY 5	0.174	0.167
CATEGORY 6	0.329	0.329
CATEGORY 7	0.180	0.122

Arithmetic	Year 1	Year 2
CATEGORY 1	0.087	0.042
CATEGORY 2	0.091	0.088
CATEGORY 3	0.084	0.131
CATEGORY 4	0.119	0.166
CATEGORY 5	0.187	0.154
CATEGORY 6	0.272	0.264
CATEGORY 7	0.159	0.155

Writing	Year 1	Year 2
CATEGORY 1	0.026	0.057
CATEGORY 2	0.067	0.067
CATEGORY 3	0.116	0.087
CATEGORY 4	0.123	0.170
CATEGORY 5	0.142	0.163
CATEGORY 6	0.359	0.333
CATEGORY 7	0.167	0.124

Interaction-P	Year 1	Year 2
CATEGORY 1	0.006	0.002
CATEGORY 2	0.017	0.010
CATEGORY 3	0.043	0.049
CATEGORY 4	0.125	0.140
CATEGORY 5	0.114	0.110
CATEGORY 6	0.338	0.336
CATEGORY 7	0.357	0.352

Interaction-T	Year 1	Year 2
CATEGORY 1	0.004	0.001
CATEGORY 2	0.016	0.010
CATEGORY 3	0.039	0.038
CATEGORY 4	0.122	0.126
CATEGORY 5	0.109	0.132
CATEGORY 6	0.362	0.359
CATEGORY 7	0.348	0.334

Table 4

Completely Standardized Loadings and Standard Errors for the ADHD-IN, ADHD-HI, ODD-toward Adults, Academic Competence, and Social Competence Symptoms

Standardized Loadings and Standard Errors for ODD Symptoms

	Year 1		Year 2	
	Standard Loadings	Standard Error	Standard Loadings	Standard Error
1. Argues	.89	.02	.79	.04
2. Temper	.94	.01	.89	.02
3. Refuses to obey	.94	.03	.89	.02
4. Annoys adults	.83	.04	.94	.02
5. Blames adults	.93	.01	.91	.02
6. Becomes annoyed	.94	.01	.90	.02
7. Anger towards-A	.94	.01	.91	.01
8. Vindictive	.78	.04	.90	.02

Standardized Loadings and Standard Errors for HI Symptoms

	Year 1		Year 2	
	Standard Loadings	Standard Error	Standard Loadings	Standard Error
9. Fidgets	.88	.03	.84	.04
10. Leaves seat	.84	.02	.90	.03
11. Runs about	.67	.06	.89	.03
12. Trouble playing	86	.03	.88	.03
13. Talks to much	.84	.02	.90	.02
14. On the go	.83	.04	.83	.03
15. Blurts out	.85	.02	.90	.02
16. Doesn't wait turn	.77	.05	.87	.02
17. Interrupts	.82	.02	.87	.02

Standardized Loadings and Standard Errors for IN Symptoms

	Year 1		Year 2	
	Standard Loadings	Standard Error	Standard Loadings	Standard Error
18. Attention detail	.93	.01	.88	.02
19. Attention work	.96	.01	.91	.01
20. Doesn't listen	.91	.03	.88	.02
21. Follow through	.94	.01	.90	.02
22. Organization	.93	.02	.90	.01
23. Avoids tasks	.92	.02	.93	.02
24. Loses things	.87	.02	.89	.02
25. Distracted	.89	.03	.88	.02
26. Forgets	.89	.02	.88	.02

Table 4

Completely Standardized Loadings and Standard Errors for the ADHD-IN, ADHD-HI, ODD-toward Adults, Academic Competence, and Social Competence Symptoms

Standardized Loading and Standard Errors for AC Symptoms

	Year 1		Year 2	
	Standard Loadings	Standard Error	Standard Loadings	Standard Error
27. Completes home	.97	.01	.93	.01
28. Completes class	.97	.01	.98	.01
29. Reading	.94	.01	.93	.01
30. Arithmetic	.90	.02	.86	.02
31. Writing	.93	.02	.92	.02

Standardized Loading and Standard Errors for SC symptoms

	Year 1		Year 2	
	Standard Loadings	Standard Error	Standard Loadings	Standard Error
32. Interaction-Teach	.90	.03	.98	.03
33. Interaction-Peers	.97	.02	.90	.03

Table 5

Correlations (Standard Errors) among the ADHD-IN, ADHD-HI, ODD- toward Adults, Academic Competence and Social Competence Factors

Factor Correlations Year 1 ($n = 690$)

	ODD	HI	IN	AC	SC
ODD	-				
HI	.77 (.04)	-			
IN	.57 (.06)	.71 (.04)	-		
AC	-.45 (.07)	-.45 (.07)	-.77 (.04)	-	
SC	-.39 (.06)	-.23 (.07)	-.44 (.10)	.67 (.06)	-

Factor Correlations Year 2 ($n = 872$)

	ODD	HI	IN	AC	SC
ODD	-				
HI	.82 (.03)	-			
IN	.73 (.04)	.71 (.04)	-		
AC	-.33 (.08)	-.29 (.07)	-.64 (.05)	-	
SC	-.24 (.08)	-.11 (.06)*	-.41 (.07)	.54 (.05)	-

Note. All correlations are significant at $p < .001$ unless noted with an *.