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Convergent and Discriminant Validity of the Conners 3 Teacher Rating Scale:
Comparisons with the Adjustment Scales for Children and Adolescents

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Abstract

The Conners 3-Teacher Rating Scale (Conners 3-T) and the Adjustment Scales for Children and Adolescents (ASCA) are both teacher report rating scales used for school system evaluations to assess youth and adolescent psychopathology. The Conners 3-T has limited research available independent from the Conners 3 Manual assessing its validity and diagnostic utility. The purpose of the present study was to compare correlations between the Conners 3-T and the ASCA to determine convergent and discriminant validity in support of the Conners 3-T. The present study included 118 students either randomly selected by teachers ($n = 111$) or referred for a special education evaluation ($n = 7$). Teachers ($n = 32$) rated students using the Conners 3-Teacher rating form and the Adjustment Scales for Children and Adolescents. Pearson product moment correlations were used to assess the convergent and discriminant validity of the Conners 3-T and the ASCA. Statistically significant and moderate convergent validity correlations were identified (i.e., Conners 3-T Hyperactivity/Impulsivity scale and ASCA Attention Deficit Hyperactive syndrome). Likewise, appropriate discriminant validity correlations were identified (i.e., Conners 3-T Peer Relations scale and ASCA Oppositional Defiant syndrome).

Convergent and Discriminant Validity of the Conners 3 Teacher Rating Scale:
Comparisons with the Adjustment Scales for Children and Adolescents

Introduction

Controversy surrounding the diagnosis of Attention Deficit Hyperactivity Disorder (ADHD) is not new. The rates of diagnosis have been steadily increasing. When the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5; American Psychiatric Association, 2013) was published, numerous changes were made to the ADHD diagnosis. These changes included moving ADHD to the category of neurodevelopmental disorders, the threshold of criteria to be met was decreased for those 17 and older, more descriptors were added to symptom criteria, and the different ADHD subtypes were discontinued (Gintner & Mooney, 2015). The DSM-5 reported that roughly 5% of children have been diagnosed with ADHD (American Psychiatric Association, 2013), while the Centers for Disease Control (CDC) reported that by the year 2011, 11% of children received a medical diagnosis of ADHD. This illustrated an increase from 4.4 million children being diagnosed with ADHD in 2003 to almost 6.4 million children having the diagnosis. The increase in instances of a diagnosis also showed an increase in the use of stimulant medication as a treatment (Visser et al., 2014).

In the medical field, the American Academy of Pediatrics (2011) offered guidelines and recommendations for diagnosing ADHD in children and adolescents ages 4 to 18. They recommend that a physician should gather information from parents/guardians, teachers, and other school or mental health professionals to document impairment in more than one setting, and rule out other comorbid conditions such as Conduct Disorder, Oppositional Defiant Disorder, or learning difficulties. The present

study examined two tools with teacher informant forms that are frequently used to gather information regarding ADHD symptoms and symptoms of frequently comorbid disorders with the purpose of determining the convergent and discriminant validity. Research like this is important to ensure that the tools used to assess children contain reliable and valid scores, and can provide helpful information for diagnosing children.

In terms of using medication as a treatment, the American Academy of Pediatrics suggests that in children ages 4 to 5, only evidence-based behavior therapy should be used. For children ages 6-11, physicians should prescribe Food and Drug Administration (FDA) approved medication and evidence-based behavior therapy as well. For adolescents ages 12-18, the physician should prescribe FDA approved medication and can suggest that evidence-based behavior therapy be utilized (American Academy of Pediatrics, 2011).

Within the school system, diagnosis of ADHD is treated differently than in the medical field. ADHD can be addressed by either a physician or school system as a diagnosis, and is assessed using methods such as rating scales and observations. Information should be collected from parents, teachers, and the child when possible, to gain better understanding of the child in multiple settings. Howard and Landau (2010) stated that a comprehensive evaluation of ADHD includes diagnostic assessments matching the DSM-IV-TR criteria and interviews from multiple sources (i.e., teacher and parent), rating scales that address the child's behaviors, direct behavior observations, and a thorough examination of the child's academic performance. They also suggested that due to the varying manifestations of the symptoms of ADHD, the instruments chosen should not only be valid and reliable, but should offer insights into the unique nature of

each child. This will aid in linking the assessment to appropriate interventions. These interventions should be targeted across settings, established early, and include support to those implementing interventions to ensure fidelity (Tobin, Schneider, Reck, Landau, 2008). Classroom observations and Functional Behavior Assessments (FBA) can be useful tools for obtaining specific information about the child to guide interventions (Howard & Landau, 2010).

It is often the case that students first receive a diagnosis of ADHD from their primary care physician or pediatrician, but a diagnosis does not guarantee special education services. Most would qualify for accommodations of their instructional program under a Section 504 Plan (Howard & Landau, 2010). To receive special education services, a comprehensive assessment must be done to ensure that their diagnosis of ADHD has a significant impact on their educational progress. This is typically determined by examining data from academic achievement tests and progress monitoring from academic interventions previously in place.

By law, school psychologists and other school professionals are required to use assessment tools that are shown to be both reliable and valid through research (IDEA, 2004). This notion of using reliable and valid assessment tools is also echoed in ethical standards for school psychologists thought organizations like the National Association of School Psychologists (NASP) and the American Psychological Association. The Conners 3 (Conners, 2008) is a well-known and commonly used tool for assessing ADHD-like symptoms in students. The Conners 3 was published in 2008 as an updated version of the Conners Rating Scales-Revised (CRS-R; Conners, 1997). The Conners 3 Teacher rating scale is completed by the child's teacher and includes five Content scales: Inattention,

Hyperactivity/Impulsivity, Learning Problems/Executive Functioning, Aggression, and Peer Relations.

There are few published studies of the Conners 3 that examine its validity. This is disappointing because the assumption that even minor changes to an instrument do not change its reliability, validity, or diagnostic utility is a faulty one. The present research evaluated the construct validity of the Conners 3 Teacher rating scale by comparing it to the Adjustment Scales for Children and Adolescents (ASCA; McDermott, Marston, and Scott, 1993), an assessment tool with a large amount of research support. The ASCA is a behavior rating scale developed to identify behavioral pathology in children and adolescents. It utilizes two Global Syndromes, Overactivity and Underactivity, and well as six Core Syndromes and two Supplemental Syndromes.

The purpose of this research study was to address the convergent and discriminant validity of the full-length Conners 3 Teacher rating scale (Conners 3-T) compared to the Adjustment Scales for Children and Adolescents (ASCA) (McDermott, 1994). A brief overview of each tool is provided, followed by a review of existing research on the validity of the Conners 3-T and the ASCA.

Literature Review

Conners 3

Introduction to the Conners 3. The Conners 3rd Edition (Conners 3; Conners, 2008) is an updated and revised version of the Conners Rating Scales – Revised (CRS-R; Conners, 1997). The Conners 3 is an evaluation tool that was designed for use in assessing ADHD in children and adolescents, and ADHD’s most common comorbid disorders (e.g. Oppositional Defiant Disorder and Conduct Disorder). The Conners 3

utilizes a multi-informant method of collecting information through parent-form, teacher-form, and self-report form. The parent- and teacher-report can be used with children and adolescents ages 6 through 18, while the self-report can be used for ages 8 through 18 (Conners, 2008).

One of the main features of the Conners 3 is that its identification of ADHD-like symptoms is linked to the diagnostic criteria for ADHD in the DSM-IV (which at the time was the most recent version of the DSM). This is accomplished by including the DSM-IV-TR Symptom Scales in the Full-length form. The Conners 3 offers newer impairment items, which purportedly allow raters to identify the level of impairment, which is critical for determining more accurate levels of functioning (Conners, 2008). The Conners 3 also includes Validity Scales and Index Scores. The Validity Scales measure overly positive, overly negative, and inconsistent responses on all three report forms. There are two Index Scales: the Conners 3 ADHD Index (Conners 3 AI) and the Conners 3 Global Index (Conners 3 GI). The Conners 3 AI consists of ten items targeted at discriminating between youth with ADHD and the general population. The Conners 3 GI consists of 10 items and is used as a short measure for monitoring the effectiveness of treatment and change over time (Conners, 2008).

There are three different groups of forms. The Full-length forms are the most detailed and include parent-form, teacher-form, and self-report form. They include the Content Scales, Validity Scales, and both Indices. The Full-length forms are also the only forms that include the DSM-IV-TR Symptom Scales, screener items regarding anxiety and depression, critical items regarding severe conduct, and impairment items regarding schoolwork/grades, friendships/relationships, and home life. The Short-forms are also

available in parent-form, teacher-form, and self-report form. There are fewer Content Scales, and they also only contain 2 of the 3 validity scales (overly positive and overly negative). The 10-item Conners 3 AI comes in parent-form, teacher-form, and self-report form, while the 10-item Conners 3 GI only comes in parent-form and teacher-form (Conners, 2008).

Many important changes were made from the CRS-R to the Conners 3, including a new normative sample and modified age ranges. Previously, the CRS-R included ages 3 through 17 and the self-report form (previously called the Conners-Wells Adolescent Self-Report Scale [CASS]) included only ages 12 through 18. The Validity scales, Screener items, Severe Conduct Critical items, and Impairment items were new additions. Scales more related to emotion were removed from this scale and were used to create a new, but separate instrument, the Conners Comprehensive Behavior Rating Scales (CBRS; Conners, 2008).

The full-length Conners 3-T is a 115-item teacher report behavior rating scale that includes 7 total scales: Inattention, Hyperactivity/Impulsivity, Learning Problems/Executive Functioning, Learning Problems (subscale), Executive Functioning (subscale), Aggression, and Peer Relations. Elevated scores on the Inattention scale indicate a child who may have poor concentration, makes careless mistakes, gives up easily, difficulty starting and finishing tasks, and keeping his/her mind on a task. Elevated scores on the Hyperactivity/Impulsivity scale indicate a child who has high activity levels, is easily excited, and may have difficulty remaining quiet. Elevated scores on the Learning Problems/Executive Functioning scale indicate a child who faces academic struggles, has difficulty remembering concepts, and needs extra instruction. Elevated

scores on the Aggression scale indicate a child who may be physically or verbally aggressive, has the tendency to be destructive, might be argumentative, and has poor control of their anger. Elevated scores on the Peer Relations scale might indicate a child who has difficulty maintaining friendships and has poor social skills.

Table 1

Description of Conners 3-T Scales

Scale	Characteristics Measured
Inattention	Ability to concentrate on tasks, making careless mistakes, task persistence, difficulty starting and/or finishing tasks.
Hyperactivity/Impulsivity	Higher activity levels, feelings of restlessness, becoming easily aroused or excited, difficulty being quiet or waiting their turn.
Learning Problems/ Executive Functioning	Academic difficulties, ability to learn and remember concepts, need for extra or repeated instructions, executive functioning skills.
Learning Problems ¹	Struggles in reading, spelling, and/or math, ability to remember concepts, need for extra explanations or guidance.
Executive Functioning ¹	Planning, organizational, and prioritizing skills, ability to start and/or finish tasks on time.
Defiance/Aggression	Physical and or verbal aggression, violent or destructive tendencies, argumentative or manipulative attitude, ability to control anger, following rules, or laws.
Peer Relations	Social skills, ability to make and/or maintain friendships, social connections.

Note. ¹The Learning Problems and Executive Functioning scales are both subscales of Learning Problems/Executive Functioning on the Conners 3-T.

In addition to these Scales, the Conners 3-T also provides an Index score and a number of DSM-IV-TR Symptom scores. The first is the Conners 3 Global Index, which includes only 10 questions that had the highest loading on the original Conners Parent and Conners Teacher rating forms. These items are available on the Conners 3-T full

length, as well as one 10-item rating scale on its own. Conners (2008) explained that these items are sensitive to change and can therefore be utilized more frequently on their own to track change after intervention. The Conners 3-T also includes four DSM-IV-TR symptom scales, all of which have items related to symptomology used for a DSM-IV-TR diagnosis. They are the DSM-IV-TR ADHD Inattentive Scale, DSM-IV-TR ADHD Hyperactivity/Impulsivity Scale, DSM-IV-TR Conduct Disorder Scale, and the DSM-IV-TR Oppositional Defiant Disorder Scale (Conners, 2008).

On the Conners 3-T, a *T* score of 39 or less is considered Low, showing fewer concerns than are typically reported. A *T* score between 40 and 59 indicates an Average score. A *T* score between 60 and 69 indicates an Elevated score. Finally, a *T* score of 70 or above indicates a Very Elevated score (Conners, 2008).

To create the normative sample, a total of 7,713 assessments were collected from both Canada and the United States, 6,825 of which were Conners 3 assessments and the rest were collected for the use in construct validity studies (Conners, 2008). In total, 3,400 assessments collected from the United States were used for the normative sample, of which 1,200 were used for the normative sample of the Conners 3-T. For each age level, there were 100 total participants, 50 male and 50 female (ages 17 and 18 were combined as one group). The Race/Ethnicity distribution of individuals in the normative sample for the Conners 3-T was mostly consistent with the representations in the U.S. Census. Of the Conners 3-T normative sample, 57.50% were Caucasian, 17.50% were Hispanic, 15.58% were African American, 6.00% were Asian, 3.33% were other, and .08% were missing (Conners, 2008).

Conners Rating Scales – Revised Psychometric Properties. Epstein, March, Conners, and Jackson (1998) assessed the factor congruence and mean differences of the original Conner Teacher Rating Scale (TRS) across race and sex. Using a principal-axis solution and a varimax criterion for rotation, factor analyses were conducted for the 39-item TRS for four different groups: White males, Black males, White females, and Black females. Factors that produced Eigenvalue's greater than 1 were maintained for rotation. This type of rotation has been questioned in research, due to the tendency to make high loadings higher and low loadings lower which can dissipate a general factor (Tabachnick & Fidell, 2007). The resulting factor structures were then compared across race and across gender using congruence coefficients and the salient variable similarity index s . A factor loading criterion of $> .40$ was used to measure item overlap across races. Factors that demonstrated significant congruence and factor loadings for both races were then summed and compared using t -tests. The factor structure for White males produced four factors: Conduct Problems, Hyperactivity, Anxious/Passive, and Social Problems. The factor structure for Black males produced one additional factor, Antisocial, which included items that loaded onto Conduct Problems for White males. The congruence coefficients between factors that shared common names across the different races were relatively high, especially for Hyperactivity ($r_c = .94$) and Conduct Problems ($r_c = .93$). Using the salient variable similarity index (s), all coefficients between factors with common names were statistically significant. Notably, Anxious/Passive and Social Problems demonstrated similar factor structures and a high congruence between Conduct Problems and Hyperactivity suggested high interrelatedness of those factors. Results from the t -tests indicated Black males scored significantly higher on Conduct Problems

and Hyperactivity factors. Also, White males were rated higher on the Anxious/Passive Factor than Black males. This indicated that teachers rated Black children higher on the externalizing factors.

For White females, the factor structure included 5 factors: Conduct Problems, Hyperactivity, Social Problems, Anxious/Passive, and Inattentive/Passive. For Black females, the factor structure was very different. Both the Social Problems and Anxious/Passive factors emerged. However, the first factor of Conduct Problems seemed to incorporate both Hyperactivity *and* Conduct Problems. Then another factor emerged that was highly redundant with the first Conduct Problems. Across races, only Conduct Problems and Social Problems showed significant congruence. The Anxious/Passive factor showed less congruence. The most notable difference in congruence between White and Black females was that for Black females, one Conduct Problems/Hyperactivity factor was obtained but no Inattention factor emerged, while for White females, Conduct Problems, Hyperactivity, and Inattention were all separate factors. Comparing the means through *t*-tests was more difficult because of the differences among the factors, but Black females were rated significantly higher on Conduct Problems and Anxious/Passive factors (Epstein, et al., 1998).

Charach, Chen, Hogg-Johnson, and Schachar (2009) examined the predictive validity of the Conners Teacher Rating Scale-Revised (TRS-R) when compared to a semi-structured clinical teacher interview using the Telephone Teacher Interview for DSM-IV (TTI-IV) ADHD symptom thresholds. There were two objectives of the data analysis: to quantify the diagnostic precision for the more extreme values of the TRS-R and to detect any comorbid conditions that were associated with diagnostic errors. There

were three DSM-IV subscales on the TRS-R for which scores were divided into the following levels: $T < 60$, $T = 60-69$, $T = 70-79$, and $T \geq 80$. The three subscales were subscale L (inattentive symptoms), subscale M (hyperactive/impulsive symptoms), and subscale N (both inattentive and hyperactive impulsive symptoms). The thresholds for meeting DSM-IV criteria were 6/9 for subscale L, 6/9 for subscale M, and 6/9 for both symptoms on subscale N. To determine the posttest probabilities that a child would meet the diagnostic criteria, the researchers multiplied the pretest odds with the likelihood ratio to obtain posttest odds. To address objective two, Charach et al. (2009) compared those who were correctly identified as meeting criteria with those participants that were classified incorrectly by teacher-reported instances of Oppositional Defiant Disorder (ODD), Conduct Disorder (CD), and learning problems. Comparisons of false positives and true positives, and false negatives and true negatives were assessed using chi square. Results regarding the first objective showed that children with a T score of less than 60 were least likely to meet DSM-IV symptom criteria. The probability of these children scoring less than 60 on subscale M and subscale N was less than 10%. If a child scored lower than 60 on subscale M (6.3%) or subscale N (3.8%), the posttest probability of meeting the DSM-IV criteria was low. The highest specificity rate discovered was the likelihood of meeting the DSM-IV criteria if the T score was above 80, subscale L and M were both 88%. Overall, the T score of 60 or more resulted in a sensitivity that was greater than 90% and if the T score was less than 60, there was a low posttest probability.

Conners 3 Psychometric Properties. Gallant et al. (2007) conducted an Exploratory Factor Analysis (EFA) on the Conners 3-T. The EFA revealed a four-factor solution with two subscales. The four factors were Learning Problems/Executive

Functioning, Aggression, Hyperactivity/Impulsivity, and Peer Relations. The two subscales were Learning Problems and Executive Functioning. These four factors were rotated using the oblique method and accounted for 63.8% of the total variance. The Learning Problems/Executive Functioning factor included 16 items whose loadings ranged from .51 to .85. Its eigenvalue was 25.0. The Aggression factor included 18 items and the factor loadings ranged from .38 to .83. Its eigenvalue was 5.8. The Hyperactivity/Impulsivity factor included 18 items and the factor loadings ranged from .61 to .84. Its eigenvalue was 4.4. The Peer Relations factor included 7 items and the factor loadings ranged from .42 to .84. Its eigenvalue was 2.3. Two subscales were identified. The Learning Problems subscale factor included 6 items for which factor loadings ranged from .62 to .89 and had an Eigenvalue of 7.5. The Executive Functioning subscale factor included 7 items whose factor loadings ranged from .58 to .86 and had an Eigenvalue of 1.4. The Conners 3-T Intercorrelations were as follows:

Hyperactivity/Impulsivity and Learning Problems/Executive Functioning (.56), Aggression (.64), and Peer Relations (.45). The intercorrelation between Learning Problems/Executive Functioning and Aggression was .46, Learning Problems/Executive Functioning and Peer Relations (.46), Aggression and Peer Relations (.55) (Conners, 2008).

Gallant (2008) conducted a Confirmatory Factor Analysis (CFA) to determine if the four-factor model could be replicated. Goodness-of-fit was measured using four indicators: the Bentler-Bonett Normed Fit Index (NFI), the Bentler-Bonett Non-Normed Fit Index (NNFI), the Bentler Comparative Fit Index (CFI), and the Root Mean Squared Error of Approximation (RMSEA). For the Conners 3-T, the NFI was .87, the NNFI was

.86, the CFI was .88, and the RMSEA was .13, which indicated a poor fit to data. Intercorrelation estimates were also provided. Notably, most correlations were moderate or low. Learning Problems (.90) and Executive Functioning (.91) were both highly correlated with the Learning Problems/Executive Functioning Scale. Certain DSM-IV-TR Symptom scales shared higher correlation with corresponding Content scales. For example, the ADHD Hyperactive Impulsive scale was highly correlated with the Hyperactivity/Impulsivity Content scale (.99) (Conners, 2008).

There are noticeable omissions and analysis problems in the Conners Manual (Conners, 2008) regarding factor structure and creation process. Extraction methods for both EFA and CFA are missing. Likewise, the specific intercorrelations of CFA are not present, though listed for EFA. This is especially important because the EFA correlations only supported a 4 factor structure, yet a 5 factor structure was ultimately used. Minimal information was provided and this is a major limitation. Without adequate research to support the factor structure, it is difficult to assume that the Conners 3 is really measuring what it claims to measure. The information provided does not meet the expectations outlined in the *Standards for Educational and Psychological Testing* (American Educational Research Association., American Psychological Association, National Council on Measurement in Education, 2014).

Cross-informant correlations were calculated using Pearson r . The correlation between teachers and parents on the Content scales ranged from .54 to .67, while they ranged from .52 to .63 on the DSM-IV-TR scales. The correlation between teachers and youth on the Content scales ranged from .46 to .56 and from .43 to .50 on the DSM-IV-TR scales (Conners, 2008). A meta-analysis by Achenbach, McConaughy, and Howell

(1987) revealed an average correlation of .22 between adult informants and a child's self-rating of behavioral and emotional problems. This meta-analysis also revealed an average correlation of .28 between different adult informants (i.e., teachers and parents). The cross-informant correlations reported in the *Conners 3 Manual* are higher than those reported in the meta-analysis.

To demonstrate both convergent and discriminant validity, the Conners 3 was compared to the Behavior Assessment System for Children, Second Edition (BASC-2; Reynolds & Kamphaus, 1992). Compared to the BASC-2 Attention Problems scale, correlations with the Conners 3 Inattention scale ranged from .52 to .89. The correlation between the BASC-2 Hyperactivity Scale and the Conners 3-T Hyperactivity/Impulsivity and Inattentive scales were .68 and .89 respectively. The BASC-2 Conduct Problems scale and the Conners 3-T Aggression scale correlated .89, while both measure's Aggression scale correlated .95. The BASC-2 Learning Problems scale and the Conners 3-T Learning Problems subscale were highly correlated ($r = .93$). The Conners 3-T Executive Functioning scale was moderately correlated ($r = .43$) with the BASC-2 Executive Functioning Scale, but more highly correlated with the BASC-2 Study Skills Scale ($r = .79$). Lower correlations were obtained for scales that did not measure similar constructs (divergent/discriminant validity). For example, the Conners 3 Inattention subscale had a low correlation with the BASC-2 Withdrawal scale ($r = .27$) and Somatization scale ($r = .16$) (Conners, 2008).

The discriminative validity of the Conners 3-T was assessed using Analyses of Covariance (ANCOVAs) and Discriminant Function Analyses (DFAs). In analyzing group membership, the following groups were compared: the general population sample,

Disruptive Behavior Disorders (such as ODD and CD), Learning Disorders, ADHD Inattentive, ADHD Hyperactive-Impulsive, and ADHD Combined. Group membership and gender were the two dependent variables for the ANCOVA and age was the continuous predictor. Gender was found to be a statistically significant control variable while age was not. Group membership had a significant main effect on each scale with effect sizes moderate to large (11.6% to 25.3% variance explained). The DFAs were conducted to determine if the Conners 3 could accurately predict group membership. Predictors for the DFAs were age, gender, and race/ethnicity. Results indicated that none of the control variables were statistically significant predictors of group membership. On average, the Conners 3-T scales accurately predicted group membership roughly 76% of the time. The Overall Correct Classification Rate for ADHD combined was 76% of the time for Inattention, 78% of the time for Hyperactivity/Impulsivity, Learning Problems/Executive Functioning 74%, Aggression 63%, and Peer Relations 64% (Conners, 2008). For the Positive Predictive Power, Negative Predictive Power, False Positive Rate, and False Negative Rate of ADHD for the Conners s, see Table 2 (Conners, 2008).

Table 2.
Positive Predictive Power, Negative Predictive Power, False Positive Rate, and False Negative Rate of ADHD for the Conners 3

	Inattention	Hyperactivity/ Impulsivity	Learning Problems/ Executive Functioning
Positive Predictive Power	60%	69%	60%
Negative Predictive Power	87%	83%	83%
False Positive Rate	24%	17%	26%
False Negative Rate	24%	31%	27%

Willard, Conklin, Huang, Zang, and Kahalley (2016) used the Conners 3 rating scales to assess attention problems in adolescents who were cancer survivors. The

purpose of this study was to evaluate the concordance between self-report, teacher-report, and parent-report ratings of the Conners 3 (Conners, 2008) with the Conners Continuous Performance Test, 2nd Edition (CPT-II; Conners, 2000). Cancer survivors are at an increased risk for attention difficulties due to treatment methods. The sample included 80 survivors of pediatric cancer, 39 who recovered from a brain tumor and 41 who recovered from acute lymphoblastic leukemia. There were 39 females and 41 males. Eighty-five percent of the participants were White and the other 15 % were identified as Non-White. The Conners 3 parent-report, teacher-report, and self-report forms were completed and were then compared to the CPT-II. The CPT-II is a 14-minute computer task where the participant must press the space bar for every letter presented except for "X." Four measurement methods were used to evaluate concordance between the two measurement tools: interclass correlation coefficients (ICC), Pearson correlations, paired sample *t*-tests, and additional Pearson correlations targeted at the associations between the parent-report, teacher-report, and self-report in relation to the Inattention and Hyperactivity/Impulsivity scores and performance on the CPT-II. ICCs are measured on a scale of 0 to 1, with 0 demonstrating no agreement and 1 demonstrating perfect agreement. Utilizing ICC, the agreement demonstrated between the parent and teacher scores were all moderate to low. The highest ICC was .63 (learning problems) and the lowest was .29 (executive functioning). Comparisons between parents and self-report scores and between teacher and self-report scales were more variable, demonstrating much lower ICC. The parent-report and self-report mean *T* scores ranged from .04 (hyperactivity/impulsivity) and .43 (learning problems). The teacher-and self-report mean

T scores ranged from .04 (hyperactivity/impulsivity) to .32 (learning problems). Notably, the Learning Problems mean *T* scores showed to have the highest agreement.

Further, Pearson correlations were calculated between each subtest score for parent-report, teacher-report, and self-report measures. These correlations were then compared to what was found in the Conners 3 Manual (Conners, 2008) from the normative sample. Overall, there were moderate positive correlations between the parent-teacher, teacher-self, and parent-self scales. Parent-teacher correlations for Inattention (.39 versus .64 [Manual]), Hyperactivity/Impulsivity (.39 versus .62 [Manual]), and Executive Functioning (.29 versus .61 [Manual]) were all weaker than what was reported in the Conners 3 manual. However, correlations between the self-report with the teacher-report and the self-report with the parent-report demonstrated more similar correlations, specifically Learning Problems (.43 versus .62 [Manual]) and Aggression (.30 versus .46 [Manual]). An examination of the means via paired sample *t*-tests indicated that parents tended to report more difficulties than teachers or the self-report, though not all differences were statistically significant. Also, adolescents reported significantly more difficulties with hyperactivity than did their teachers. When comparing the three Conners 3 report forms with the CPT-II, all correlations for the teacher and parent reports were not statistically significant and two were negative. In the case of self-report, correlation between Inattention was stronger and statistically significant ($r = .34, p = .002$). This suggested only moderate agreement between subjective and objective measures of inattention (Willard et al., 2016).

Summary. There are noticeable gaps in the research available supporting the validity of the Conners 3 rating scales. Most existing research was conducted on previous

versions of the Conners. Based upon the provided information, the Conners 3-T appears to have moderate validity at best. Information regarding the validity based on the factor structure in the manual is incomplete and the reported information does not support the reported factorial structure of Conners 3-T, but the Conners 3-T has demonstrated discriminant validity.

The Adjustment Scales for Children and Adolescents

Introduction to the ASCA. The Adjustment Scales for Children and Adolescents (ASCA) is a teacher report behavior rating scale for youths ages five through seventeen. It is completed by a child's teacher (or multiple teachers in different settings) who have had adequate time (at least 40 - 50 school days) to become familiar with the child. The ASCA has two forms, female and male, but they differ only in gender referents (i.e., "she" versus "he"). The ASCA is a revision and U.S. standardization of the Bristol Social Adjustment Guides (BSAG; Stott, 1966), and it provides a measurement of specific behaviors across multiple situations. This multisituational assessment tool provides a way to distinguish behaviors by their function, and by extension, to be more accurate in differentiating diagnoses. Being able to understand the specific situations in which behaviors occur makes it much easier to guide corrective action (McDermott, 1994).

The normative sample included 1,400 children and adolescents ages 5 through 17, and standardization data were collected from 1988-1990 (McDermott, 1993; McDermott, 1994). After obtaining the standardization sample data, multiple psychometric analyses were performed to provide support for interpretation and scoring. Of the 156 items included on the scale, item difficulty was computed and showed that 26 items were identified as positive behaviors while 129 were identified as negative, or problem,

behaviors. In this analysis, one item was excluded because it was identified as neutral. Using exploratory factor analysis, Bartlett's chi square criterion was used to assess the 129 problem behaviors and indicated that up to eleven factors could be extracted. Further analyses were conducted, including the interpretation of a scree plot (Cattell, 1996), and a final model was created with eight factors. Of the 129 items, 26 did not produce salient loadings ($>.30$) on any of the factors and were dismissed, leaving 103 items. Another 6 were dismissed due to small item-total correlation (McDermott, 1993). In total, after a factor analytic analysis, the ASCA includes 97 problem behaviors linked to 8 syndromes and 26 positive behaviors (McDermott, 1994).

The eight extracted factors included six core syndromes and two supplementary syndromes. The six core syndromes are: Attention-Deficit Hyperactive (ADH), Solitary Aggressive (Provocative) (SAP), Solitary Aggressive (Impulsive) (SAI), Oppositional Defiant (OPD), Diffident (DIF), and Avoidant (AVO). The two supplementary syndromes are Delinquent (DEL) and Lethargic (Hypoactive) (LEH). The 6 core syndromes are applicable to all youth, but the two supplementary syndromes are specified for certain age groups and genders. Overactivity and Underactivity are referred to as overall adjustment scales, which are similar to, but not entirely the same as, the well-known dichotomy of internalizing and externalizing behaviors. These two overall adjustment scales emerged from second-order factor analysis of the 6 core syndromes. Overactivity is made up of the Attention Deficit Hyperactive, Solitary Aggressive Provocative, Solitary Aggressive Impulsive, and Oppositional Defiant core syndromes, while Underactivity is made up of Diffident and Avoidant (McDermott, 1994).

Table 3*Description of the ASCA Syndromes*

Scale	Characteristics Measured
<i>Core Syndrome</i>	
Attention-Deficit Hyperactive	Inattention, attention-seeking behaviors, restlessness
Solitary Aggressive (Provocative)	Intimidating behavior, overly confrontative actions
Solitary Aggressive (Impulsive)	Habit-driven behaviors, inability to control actions, impulsivity.
Oppositional Defiant	Defiance, manipulation, or irascible, often covert.
Diffident	Shyness, timid or fearful behavior.
Avoidant	Aloof behavior, uncommunicative, or unusually withdrawn.
<i>Supplemental Syndromes</i>	
Delinquent	Overt illicit activities (individual or group), including involvement with alcohol, drugs, or weapons.
Lethargic (Hypoactive)	Lack of physical energy or motivation, apathy, and slowness or sluggishness.

The ASCA is completed by a teacher who has known the child for 40 to 50 school days. The teacher marks as many behaviors as applies to the child being rated. The ASCA should then be scored by someone trained in how to use the scale, preferably a school psychologist. The ASCA rating form is double layered and made of carbonless copy paper. The teacher's marks appear on the bottom layer of paper that includes the scoring key. Raw scores are converted to normalized *T* scores. All of the core syndromes are scored for each child, but Delinquent is scored for everyone except females under 12 and Lethargic/Hypoactive is scored for only males and females under 12 (McDermott, 1994).

There are three ways to interpret the results of the ASCA: Cut-Score Interpretation, Syndromic Profile Interpretation, and Discriminant Classification. In Cut-Score Interpretation, *T* scores below 60 are interpreted to be Adjusted, *T* scores between 60 and 66 are interpreted to be At Risk, and *T* scores of 67 or higher are interpreted to be Maladjusted; meaning the child scored higher than 95% of youths. For Overactivity and Underactivity, if all core syndrome *T* scores are ≥ 60 , it is best to interpret the scale at the global level. If only some of the core syndrome *T* scores are ≥ 60 , it is best to interpret those separate core syndromes as meaningful (McDermott, 1994).

The Syndromic Profile interpretation method utilizes the 6 core syndromes to produce generalized distance scores compared to 22 possible normative profiles identified through clutter analysis. The smallest generalized distance score indicates the Syndromic Profile most similar to the child's core syndrome pattern. An excel spreadsheet that automatically calculates generalized distance scores is available (Canivez, 1996). The last method of interpretation is Discriminant Classification, which uses either a linear or quadratic equation based on discriminant function analysis to produce a score which can either identify the child's profile as most similar normal or socially/emotionally disturbed youths (McDermott, 1994).

Psychometric Properties of the ASCA: Manual. The *ASCA Manual* reported that Exploratory Factor Analysis (EFA) was used to evaluate 2 through 11 factor models. Each possibility was rotated using varimax, equamax, and promax criteria. Other criteria included the scree test, each factor must retain 5 or more items with salient loadings, produce acceptable internal consistency, remain variant across models, and the assignment of items to factors must make psychological sense. The model that met all of

these requirements was the model containing 8 orthogonal components that was rotated to the equamax simple structure. All of the items that loaded at .30 or above were maintained in the preliminary syndromes for further analysis (McDermott, 1994). The Confirmatory Factor Analysis (CFA) assessed the remaining 97 items with oblique, multiple-group, and principal components cluster analysis strategies. Overall, the CFA supported the eight first-order factor structure and supported the two overall adjustment scales. Second-order principal factors solution was also assessed. The highest correlation between first-order factors was Attention Deficit Hyperactive and Solitary Aggressive Provocative at .49, but this is considerably smaller than what is usually reported for similar factors in other scales. There is a near zero correlation between the ASCA's Underactive and Overactive syndromes, indicating independence of global syndromes (McDermott, 1994).

The *ASCA Manual* (McDermott, 1994) provided preliminary evidence of convergent and divergent validity with comparisons to the Conners Teacher Rating Scale (CTRS; Conners 1989, 1990), the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001), and the Differential Ability Scales (DAS; Elliott, 1990). The CTRS and CBCL are both measures of problem behavior. Using a sample of 274 youths in grades kindergarten through 12, the ASCA and the CTRS were administered and compared. Notably, the ASCA Attention Deficit Hyperactive, Solitary Aggressive Provocative, Solitary Aggressive Impulsive, and Oppositional Defiant all correlated highly with two of the CTRS factors: Hyperactive (.56 to .75) and Conduct Problems (.58 to .72). Comparing the ASCA and the CBCL, teacher ratings were collected for 48 students, ages 7 through 11, in the state of Maine. The ASCA was completed by the teacher and the

CBCL was completed by the parent. Most all of the expected correlations were statistically significant. For example, the ASCA Solitary Aggressive Impulsive was significantly correlated with the CBCL Delinquent for boys (.75) and Externalizing for boys (.61). The ASCA Diffident was not significantly correlated with the CBCL Obsessive Compulsive for boys (.46) (McDermott, 1994).

While social and emotional functioning can have an impact on academic achievement, it would not be expected that measures of these two constructs should overlap greatly. The ASCA was compared with the Differential Ability Scales (DAS; Elliot, 1990) using a sample of 1,200 children ages 5 through 17, 600 boys and 600 girls. All correlations were low ($\leq .20$). For example, the ASCA Attention Deficit Hyperactive correlated $-.16$ with the DAS Verbal Ability and the ASCA Avoidant correlated $-.05$ with the DAS General Conceptual Ability. McDermott (1994) also reported that a partial canonical redundancy and regression analysis revealed that the ASCA accounted for only 4.8% of children's ability and achievement, and ability and achievement accounted for only 3% of variation in children's adjustment (McDermott, 1994).

Independent Research: Factor Structure. Though the ASCA may not be as well-known as other behavior rating scales, there have been many studies published that provide empirical support of its use as an effective diagnostic tool. Canivez (2004) used a sample to 1,020 children to replicate the ASCA core syndrome factor structure. Exploratory factor analysis and confirmatory analysis of the standardization sample suggested an eight-factor model containing six factors (the 6 core syndromes) that were invariant across gender, race/ethnicity and age, while there were 2 factors (the 2 supplementary scales) that were appropriate for only certain subgroups within the

standardization sample. The sample in the study included 51.8% male students and 48.2% female students. Some teachers failed to report the race/ethnicity of the students they rated, but of the demographics that were reported, 57.5% Caucasian, 27% African American, 4% Hispanic/Latino, 0.4% Asian, 1% Native American, and 0.5% biracial participants. A principal axis exploratory factor analysis with varimax rotation was completed to examine the orthogonal solution, while direct oblimin and promax rotations were used to examine oblique solutions. Utilizing eigenvalues > 1 , the scree test, and parallel analysis as guidelines, two factors were suggested and extracted; the Attention Deficit Hyperactive, Solitary Aggressive Provocative, Solitary Aggressive Impulsive, and Oppositional Defiant core syndromes were powerfully associated to Overactivity, while Diffident and Avoidant were powerfully associated with Underactivity. These findings were the same for varimax, oblimin, and promax rotation, and were consistent with the findings in the ASCA Manual. The correlation between Overactivity and Underactivity based upon promax rotation was .08 and .04 based upon global syndromes T scores, suggesting independence of the global syndromes and appropriate use of varimax rotation. Internal consistency estimates for the Overactivity ($r_\alpha = .93$) and the Underactivity ($r_\alpha = .83$) were very similar to what were reported in the ASCA standardization sample, as were the r_α coefficients for the 6 core syndromes (.66 to .88). This study replicated the near zero correlation between Overactivity and Underactivity indicating independence. Such strong discriminant validity is not usually observed in other behavior rating scales, such as the BASC-2 or BASC-3. This means the ASCA is successful in actually discriminating between the two overall syndromes (McDermott, 1994).

Canivez (2006) also replicated the ASCA factorial validity for Native American children with a sample of 183 Ojibwe tribe children located in the north central region of Minnesota. In the sample, there were 49.2% male and 50.8% female students in grades kindergarten through 12th grade. Roughly two thirds of the students received free lunch. This sample contained a larger number of students with disabilities than the ASCA standardization sample, 19% and 6.9% respectively. Identical data analyses were used as with the Canivez (2004) study and identical findings were obtained. Two factors were identified for each rotation (varimax, oblimin, and promax): Underactivity and Overactivity. Attention Deficit Hyperactive, Solitary Aggressive Provocative, Solitary Aggressive Impulsive, and Oppositional Defiant were strongly associated with Overactivity while Diffident and Avoidant were associated with Underactivity. Internal consistency estimates for this study were very similar to the standardization sample, Overactivity ($r_{\alpha} = .90$) and Underactivity ($r_{\alpha} = .84$). Internal consistency for the 6 core syndromes ranged from .44 to .86. Canivez and Bohan (2006) found the same with Yavapai Apache youth in Arizona.

Canivez and Sprouls (2010) assessed the factorial validity generalization of the ASCA with a group of Hispanic/Latino youths with comparison to the standardization sample. The Hispanic/Latino sample included 124 students, 53.2% male and 46.8% female, ages 5 through 16 and were compared to the Hispanic sample from the ASCA standardization sample. Principal factor analysis was used to assess the ASCA core syndrome *T* score correlation matrix and investigated oblique and orthogonal solutions. The scree test, Horn's Parallel Analysis, and Minimum Average Partial were used to determine the number of factors to retain. Exploratory factor analysis with this sample of

Hispanic youths produced consistent results with what was found using the standardization sample. Results indicated that there were no statistically significant differences in core syndrome raw scores, overall adjustment scale raw scores, or lethargic (hypoactive) scale raw scores between the Canivez and Sprouls (2010) Hispanic/Latino sample participants and the standardized norm sample. Results supported two overall global factors: Attention Deficit Hyperactive, Solitary Aggressive Provocative, Solitary Aggressive Impulsive, and Oppositional Defiant were strongly associated with Overactivity while Diffident and Avoidant were strongly with Underactivity (Canivez & Sprouls, 2010).

Short-Term Stability. Canivez, Perry, and Weller (2001) investigated the short-term stability of the ASCA. Compared to the short-term stability reported in the ASCA Manual (a sample of 40 subjects tested after 30 school days), Canivez et al. (2001) examined the short-term stability for 124 school age children with a 90 school day interval. Participating teachers were chosen from two rural school districts in Illinois and the grade levels ranged from kindergarten through 12th grade. Teachers were instructed to randomly select 5 male students and 5 female students each to rate. Stability was assessed for all ASCA scores, Syndrome Profiles, and Discriminant Classifications. Pearson product-moment correlation coefficients were used to assess stability of raw scores and *T* scores for the first and second ratings. Dependent *t*-tests and effect strengths of mean ratings were also used to detect changes in ratings. Kappa coefficients and z tests were used to examine the stability of the Syndromic Profile Classifications and Discriminant Classifications. All of the stability coefficients were statistically significant ($p < .0001$). Most of the raw scores and *T* scores did not demonstrate statistically

significant changes across the retest interval and the scores that did show significant change demonstrated small effect sizes and were not meaningful. Likewise, the kappa coefficients for the Syndromic Profile Classifications were statistically significant. However, the clinical significance of agreement across ratings ranged from poor to moderate. Similar information was provided for the stability of Discriminant Classifications. There was significant agreement across ratings, yet clinical significance of agreement was rated poor to fair. (Canivez et al., 2001).

Interrater Agreement. Canivez, Watkins, and Schaefer (2002) assessed the interrater agreement for ASCA Discriminant Classifications with a sample of 45 teachers who rated a total of 119 students. Each student was rated by their primary teacher and another rater (i.e., special education assistant, resource teacher). Independent ratings of the 119 students were collected where the student's primary teacher was Rater 1 and the secondary rater was Rater 2. Data analysis utilized kappa coefficients due to the nominal nature of the variables. Significant results for interrater agreement were obtained for Discriminant Classifications with a kappa coefficient of .51, which was considered moderate to substantial. This was the first study of its kind to test the interrater agreement for the Discriminant Classification scoring method.

Divergent/Discriminant Validity. The discriminant validity of the ASCA was assessed in a study done by Canivez, Neitzel, and Martin (2005) with a sample of 207 children who were evaluated to assess special education needs. The ASCA was compared to the Wechsler Intelligence Scale for Children – 3rd Edition (WISC-III; Wechsler, 1991) and the Kaufman Brief Intelligence Test (KBIT; Kaufman & Kaufman, 1990), both intelligence measures. The correlation matrices were examined and results showed very

low correlation coefficients between the ASCA core, supplemental, and global syndromes and WISC-III scores, ranging from $-.18$ to $.07$, accounting for at most 3.2% shared variance. Likewise, the ASCA and the KBIT correlations ranged from $-.17$ to $.04$ and at most 2.9% shared variance, again indicating strong divergent/discriminant validity (Canivez et al., 2005).

Convergent and Discriminant Validity. Canivez and Rains (2002) compared the ASCA with the Preschool and Kindergarten Behavior Scales (PKBS; Merrell, 1994) to assess convergent and divergent/discriminant validity. The PKBS is a nationally normed behavior rating scale for preschool and kindergarten ages students. It measures two domains, social skills and problem behaviors, as well as internalizing and externalizing problems. While the PKBS was developed for children ages 3 through 6, it overlaps with the ASCA for ages 5 and 6. Canivez and Rains (2002) had 38 teachers in rural Midwest schools rate children on the ASCA and PKBS. There were 90 kindergarten students and 29 first grade students, and of those students, 59 were boys and 64 were girls. A large majority of the students were Caucasian, and 16 were disabled or at-risk. Subtest and composite raw scores for the PKBS were converted to *T* scores for comparison to put the PKBS scores in the same metric as the ASCA. Pearson product-moment correlations were calculated to assess convergent and divergent/discriminant validity. Dependent *t*-tests and effect sizes were also utilized to assess mean differences in the scores between the two tests. Convergent validity was demonstrated between the ASCA Overactivity syndrome and PKBS Externalizing Problems scale ($r = .84$). Divergent Validity was demonstrated between the ASCA Underactivity syndrome and the PKBS Externalizing Problems scale ($r = -.06$). However, the PKBS Internalizing Problems scale was

significantly correlated with both of the ASCA Underactivity ($r = .42$) and Overactivity ($r = .51$) Syndrome Scales. Also, the PKBS Social Skills correlated significantly with both the ASCA Overactivity syndrome ($r = -.59$) and Underactivity syndrome ($r = -.38$). Of the subscale and syndrome comparisons, The PKBS Self-Centered/Explosive (SC/E), Attention Problems/Overactive (AP/O), and Antisocial/Aggressive (A/A) were correlated significantly with the ASCA's Attention Deficit Hyperactive, Solitary Aggressive Provocative, Solitary Aggressive Impulsive, and Oppositional Defiant, while those same PKBS scales correlated negatively with the ASCA's Diffident and Avoidant.

Diagnostic Utility. Canivez and Sprouls (2005) assessed the diagnostic utility of the ASCA for ADHD using discriminant function analysis. The sample included 106 students, ages 6 through 11 years-old. The ADHD group included 53 students, 38 male and 15 female and the randomized and matched control (RMC) group included 53 students, 38 males and 15 females. Two instruments were used in this study, The ASCA and the NIMH Diagnostic Interview Schedule for Children-Version IV (DISC-IV; Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000). The DISC-IV is a comprehensive, structured interview which addresses 26 different mental health disorders that can occur in childhood. The 53 participants in the ADHD group were children who were referred for behavioral concerns related to ADHD and whose parent(s)/primary caregiver(s) completed the DISC-IV and met the criteria for ADHD. The data analyses included a one-way MANOVA and ensuing univariate one-way ANOVAs. The one-way MANOVA, using the 6 core syndromes of the ASCA, demonstrated that all distinct group differences were statistically significant. The children in the ADHD group obtained significantly higher scores on Attention Deficit Hyperactive, Solitary Aggressive

Provocative, Solitary Aggressive Impulsive, and Oppositional Defiant, and Avoidant than children in the RMC group. Effect sizes were large for Attention Deficit Hyperactive, Solitary Aggressive Provocative, Solitary Aggressive Impulsive, and Oppositional Defiant, while the effect size was moderate for Avoidant. The discriminant function analysis was statistically significant ($p < .0001$). The overall correct classification rate was very high at 96%. Likewise, sensitivity (98%), specificity (95%), positive predictive power (94%), and negative predictive power (98%) were all very high. The false positive rate (5%) and false negative rate (2%) were both very low. This indicated that the ability of the ASCA to correctly identify a student with ADHD was very high. Likewise, the possibility of diagnosing a child with ADHD who does not have it is very low (Canivez & Sprouls, 2005).

Summary. The research provided demonstrated strong structural validity, convergent and divergent/discriminant validity, stability, and interrater agreement for the ASCA. Due to its strength in validity, the ASCA is a well-established, research-based criterion measure for comparing other tests of psychopathology.

Conclusion

Very little independent research is available for the Conners 3, especially regarding its psychometric properties. Most information comes from the manual, which provided limited information and details regarding how psychometric information was obtained. The ASCA, however, has extensive research, independent from the manual, supporting its psychometric properties. More research must be done regarding the Conners 3 to ensure that the tools being used to assess children in schools have scores that are sufficiently reliable and valid.

There are many dangers to using assessment methods that are not valid or reliable, which is what makes research like the present study so important. In a medical and school setting, high-stakes decisions are often made upon assessment results, such as the prescription of medication, restrictive educational placements, and an altered delivery of education (NASP, 2016). If assessments are not determined as valid or reliable, they should not be used to make such high-stakes decisions. It is a disservice to the child and could be more harmful than helpful. For this reason, assessment tools and measurements should always be evaluated by researchers to determine validity and reliability.

Research Question

The purpose of this research was to answer the following broad question: does the Conners 3 Teacher Rating Scale (Conners 3-T) demonstrate convergent and discriminant validity with the Adjustment Scales for Children and Adolescents? Answering this question about the convergent and discriminant psychometric properties of the Conners 3-T can provide evidence that the Conners 3-T is a valid measure to be used ethically in the school setting.

Methods

Participants

Classroom teachers ($n = 32$) volunteered to complete Conners 3-T and ASCA rating scales on randomly selected students ($n = 111$) from their classrooms, as well as students who were in the process of a special education evaluation ($n = 7$). The total number of students assessed was 118. Each student who was evaluated for special education eligibility was found to be eligible and were counted as participants in special education. Data were collected on students attending elementary school, junior high

school, and high school in a medium size city in the Midwest. The sample included students who were receiving special education services ($n = 37$) as well as general education students ($n = 81$). The sample consisted of 59 males and 59 females.

Race/ethnicity was recorded for each student participant, and the following distribution was observed: 57 White, 20 African American, 27 Hispanic, and 14 Mixed Race.

Students ranged in grade from kindergarten through 12th grade. Demographic information for students are presented in Table 3.

Teacher ($n = 32$) demographics are presented in Table 4. Of the teacher volunteers, 27 teachers rated 4 students each from their class, and 5 teachers chose to rate only 2 students each. Years of teaching experienced ranged from 1 to 31 years.

Table 4
Student Demographic Information (N = 118)

Variable	<i>n</i>	%	Variable	<i>n</i>	%
Sex			Race		
Female	59	50.0	White	57	48.3
Male	59	50.0	African American	20	16.9
			Hispanic	27	22.9
			Multiracial	14	11.9
Grade			Evaluation		
K	4	3.4	Yes	7	5.9
1	6	5.1	No	111	94.1
2	10	8.5			
3	10	8.5	Special Education		
4	8	6.8	Yes	37	31.4
5	14	11.9	No	81	68.6
6	16	13.6			
7	16	13.6			
8	14	11.9			
9	6	5.1			
10	6	5.1			
11	4	3.4			
12	4	3.4			

Note. Percentages are rounded to the nearest tenth.

Table 5
Teacher Demographic Information (N = 32)

Variable	<i>n</i>	%	Variable	<i>n</i>	%
Sex			Grade Taught		
Female	21	65.6	K	1	3.1
Male	11	34.4	1	2	6.3
			2	4	12.5
			3	3	9.4
Age			4	2	6.3
20-29	8	25.0	5	3	9.4
30-39	12	37.5	6	4	12.5
40-49	7	21.9	7	3	9.4
50+	5	15.6	8	4	12.5
			9	1	3.1
			10	3	9.4
			11	1	3.1
			12	1	3.1

Note. Percentages are rounded to the nearest tenth.

Instruments

Conners 3-T. The Conner 3-T (Conners, 2008) is a 115-item form that takes approximately 20 minutes to complete. This form is completed by a student’s classroom teacher. There are 6 Content Scales : Inattention, Hyperactivity/Impulsivity, Aggression, Peer/Family Relations, and Learning Problems/Executive Functioning (including both separate subscales Learning Problems, and Executive Functioning). In addition to the Content Scales, the following scales were included: Global Index Scale, DSM-IV-TR ADHD Inattentive, DSM-IV-TR ADHD Hyperactivity/Impulsivity, DSM-IV-TR Conduct Disorder, and DSM-IV-TR Oppositional Defiant Disorder. Detailed descriptions regarding the psychometric properties of the Conners 3-T are presented in the literature review. There are noticeable gaps in the research available supporting the validity of the Conners 3 rating scales. Based upon the information provided in the manual, the Conners 3-T appears to have moderate validity at best. Validity information based on the internal factor structure presented in the manual is incomplete and the reported information does

not support the Conners 3-T's current factorial structure, but the Conners 3-T has demonstrated discriminant validity.

Adjustment Scales for Children and Adolescents. The ASCA (McDermott, 1994) is a rating scale that takes approximately 15-20 minutes to complete. It is completed by a student's classroom teacher. There are 6 core syndromes (Attention-Deficit Hyperactive, Solitary Aggressive (Provocative), Solitary Aggressive (Impulsive), Oppositional Defiant, Diffident, and Avoidant) and 2 supplementary syndromes (Delinquent and Lethargic/Hypoactive). There are also 2 composite syndromes: Overactivity and Underactivity. Research studies demonstrated strong structural validity, convergent and divergent/discriminant validity, stability, and interrater agreement for the ASCA. Due to its strength in validity, the ASCA is a well-established, research-based criterion measure for comparing other tests of psychopathology.

Procedure

Teachers were recruited to participate in this research through certified staff emails. The purpose, importance, and details of data collection were described in emails (see Appendix A). Teachers were offered the chance to enter a drawing for a gift card upon participation in the study. For each participant, a teacher who had known the student for at least 2 months completed the Conners Teacher Rating Scale (Conners 3-T; Conners, 2008) and the Adjustment Scales for Children and Adolescents (ASCA; McDermott, 1994). Teachers were instructed to randomly select 2 male and 2 female students in their classroom. Teachers were also instructed to complete the rating scales in different orders to control for order effects. Data were also collected on students who were actively in a special education evaluation or re-evaluation process. Rating scale

results were utilized for eligibility determination only in these cases, but for the purpose of this study, student information was de-identified to keep data anonymous. The Eastern Illinois University Institutional Review Board reviewed the procedures and determined the present study met criteria for exemption of waiving of documentation of informed consent (IRB number 18-024). Teachers recorded demographic information on an information sheet provided with the rating scales. (See Appendix B.)

Analysis

Pearson product moment correlations were used to assess the convergent and discriminant validity of the Conners 3-T and the ASCA. It was hypothesized that there would be convergent validity demonstrated between the Conners 3-T Hyperactivity/Impulsivity scale and the ASCA Attention Deficit Hyperactive scale. Convergent validity was also hypothesized between the Conners 3-T DSM-4 Oppositional Defiant scale and the ASCA Oppositional Defiant scale. Likewise, convergent validity was hypothesized between the Conners 3-T Defiance/Aggression scale and the ASCA Solitary Aggressive Provocative scale. Discriminant validity was hypothesized between the Conners 3-T Hyperactivity/Impulsivity scale and the ASCA Solitary Aggressive Provocative, Solitary Aggressive Impulsive, Oppositional Defiant, Diffident, and Avoidant Scales. Discriminant validity was hypothesized between the Conners 3-T Inattention Scale and the ASCA Attention Deficit Hyperactive scale. Discriminant validity was hypothesized between the Conners 3-T Peer Relations scale and the ASCA Attention Deficit Hyperactive, Solitary Aggressive Provocative, Solitary Aggressive Impulsive, and Oppositional Defiant scales. Discriminant validity was also hypothesized between the Conners 3-T Defiance/Aggression scale and the ASCA

Solitary Aggressive Impulsive scale. Lastly, discriminant validity was hypothesized between the Conners 3-T Learning Problems/Executive Functioning scale and the ASCA Attention Deficit Hyperactive scale. See Table 6 for a summary of hypothesized convergent and discriminant validity comparisons.

Table 6.
Hypothesized Convergent and Discriminant Correlations

	Conners 3-T	ASCA
Convergent	Hyperactivity/Impulsivity	Attention Deficit Hyperactive
	DSM-4 Oppositional Defiant	Oppositional Defiant
	Defiance/Aggression	Solitary Aggressive Provocative
Discriminant	Hyperactivity/Impulsivity	Solitary Aggressive Provocative Solitary Aggressive Impulsive Oppositional Defiant Diffident Avoidant
	Inattention	Attention Deficit Hyperactive
	Peer Relations	Attention Deficit Hyperactive Solitary Aggressive Provocative Solitary Aggressive Impulsive Oppositional Defiant
	Defiance/Aggression	Solitary Aggressive Impulsive
	Learning Problems/Executive Functioning	Attention Deficit Hyperactive

Results

Pearson product moment correlation coefficients were analyzed to determine convergent and discriminant validity between the Conners 3-Teacher scales and ASCA scales. Convergent validity is demonstrated by high correlations between scales purporting to measure the same construct, whereas discriminant validity is demonstrated by lower correlations between scales measuring different constructs but that may still be somewhat associated. Pearson product moment correlation coefficients between the Conners 3-T scales and ASCA scales are reported in Appendix C.

Convergent Validity

The Conners 3-T Hyperactivity/Impulsivity scale demonstrated statistically significant and moderate convergent validity with the ASCA Attention Deficit/Hyperactivity syndrome ($r = .56$) with 31% shared variance. The Conners 3-T DSM-4 Oppositional Defiant Disorder scale also demonstrated statistically significant and moderate convergent validity with the ASCA Oppositional Defiant syndrome ($r = .67$) with 45% shared variance. The Conners 3-T Defiance/Aggression scale demonstrated statistically significant and moderate convergent validity with the ASCA Solitary Aggressive Provocative syndrome ($r = .64$) with 41% shared variance. See Table 7.

Table 7.
Correlation Coefficients of Hypothesized Convergent Validity Comparisons

	Conners 3-T	ASCA	<i>r</i>
Convergent	Hyperactivity/Impulsivity	Attention Deficit Hyperactive	.56
	DSM-4 Oppositional Defiant	Oppositional Defiant	.67
	Defiance/Aggression	Solitary Aggressive Provocative	.64

Discriminant Validity

The Conners 3-T Learning Problems/Executive Functioning scale demonstrated discriminant validity with the ASCA Attention Deficit Hyperactivity syndrome ($r = .26$) with only 7% shared variance. The Conners 3-T Peer Relations scale demonstrated discriminant validity with the ASCA Solitary Aggressive Provocative syndrome ($r = .32$, 10% shared variance), Solitary Aggressive Impulsive syndrome ($r = .28$, 8% shared variance), and Oppositional Defiant syndrome ($r = .38$, 14% shared variance). The Conners 3-T Hyperactivity/Impulsivity scale demonstrated divergent validity with the ASCA Diffident syndrome ($r = -.18$, 3% shared variance) and Avoidant syndrome ($r =$

.19, 4% shared variance). The Conners 3-T Peer Relations scale demonstrated divergent validity with the ASCA Attention Deficit Hyperactivity syndrome ($r = .05$) with almost no shared variance. The Conners 3-T Defiance/Aggression scale demonstrated discriminant validity with the Solitary Aggressive Impulsive syndrome ($r = .54$) with 29% shared variance. The Conners 3-T Inattention scale demonstrated discriminant validity with the ASCA Attention Deficit Hyperactivity syndrome ($r = .39$) with 15% shared variance. The Conners 3-T Hyperactivity/Impulsivity scale demonstrated discriminant validity with the ASCA Solitary Aggressive Provocative syndrome ($r = .48$, 23% shared variance), Solitary Aggressive Impulsive syndrome ($r = .40$, 16% shared variance), and Oppositional Defiant syndrome ($r = .49$, 24% shared variance). See Table 8.

Table 8.
Correlation Coefficients of Hypothesized Discriminant Validity Comparisons

	Conners 3-T	ASCA	<i>r</i>
Discriminant	Hyperactivity/Impulsivity	Solitary Aggressive Provocative	.48
		Solitary Aggressive Impulsive	.40
		Oppositional Defiant	.49
		Diffident	-.18
		Avoidant	.19
	Inattention	Attention Deficit Hyperactive	.39
Peer Relations		Attention Deficit Hyperactive	.05
		Solitary Aggressive Provocative	.32
		Solitary Aggressive Impulsive	.28
		Oppositional Defiant	.38
	Defiance/Aggression	Solitary Aggressive Impulsive	.54
	Learning Problems/Executive Functioning	Attention Deficit Hyperactive	.26

Convergent validity coefficients between the Conners 3-T scales (Hyperactivity/Impulsivity, Oppositional Defiant Disorder, Defiance/Aggression) with similar ASCA syndromes (Attention Deficit Hyperactive, Oppositional Defiant, Solitary Aggressive Provocative) were higher than discriminant correlations.

Discussion

The purpose of this study was to examine the convergent and discriminant validity of the Conners 3-Teacher (Conners 3-T; Conners, 2008) rating scale compared with the Adjustment Scales for Children and Adolescents (ASCA; McDermott, 1994). Very little independent research has been completed for the Conners 3 to support its validity or diagnostic utility. The ASCA, however, has ample independent research available supporting its reliability, validity, and diagnostic utility. Comparing the Conners 3-T to an empirically supported measure such as the ASCA helps assess the validity of the Conners 3-T.

The ASCA Manual (McDermott, 1994) presented a study conducted to assess convergent and divergent validity of the ASCA compared with the first edition of the Conners Teacher Rating Scale (CTRS; Trites, Blouin, and Laprade, 1973). This is the only research found comparing these two rating scales. The ASCA Manual also presents convergent and divergent validity studies compared to the Child Behavior Checklist (CBL; Achenbach and Edelbrock, 1983). In the Conners 3 Manual (Conners, 2008), convergent and divergent validity comparisons are reported for the Conners 3-T with the Behavior Assessment System for Children, 2nd Edition (BASC-2; Reynolds and Kamphaus, 2004) and the Child Behavior Checklist.

The Conners 3-T has several scales that purport to measure the same or very similar constructs as several syndromes on the ASCA, thus an opportunity to assess convergent validity (i.e., the Conners 3-T Hyperactivity Impulsivity scale and the ASCA Attention Deficit Hyperactive syndrome, the Conners 3-T DSM-4 Oppositional Defiant Disorder scale and the ASCA Oppositional Defiant syndrome). Several scales or syndromes on each rating scale measure different constructs that provides an opportunity to assess the Conners 3-T discriminant validity (i.e., Conners 3-T Learning Problems/Executive Functioning scale and the ASCA Attention Deficit Hyperactive syndrome).

The present study included 118 students either randomly selected by teachers ($n = 111$) or referred for a special education evaluation ($n = 7$). Teachers ($n = 32$) rated students using the Conners 3-Teacher rating form and the Adjustment Scales for Children and Adolescents. Pearson product moment correlations were used to assess the convergent and discriminant validity of the Conners 3-T and the ASCA.

Convergent Validity

Results provided statistically significant and moderate evidence of convergent validity of the Conners 3-T for the following comparisons with the ASCA: the Conners 3-T Hyperactivity/Impulsivity scale and the ASCA Attention Deficit/Hyperactivity syndrome ($r = .56$), the Conners 3-T DSM-4 Oppositional Defiant Disorder scale and the ASCA Oppositional Defiant syndrome ($r = .67$), and the Conners 3-T Defiance/Aggression scale and the ASCA Solitary Aggressive Provocative syndrome ($r = .64$).

The highest correlation found demonstrating convergent validity was between the Conners 3-T DSM-4 Oppositional Defiant Disorder scale and the ASCA Oppositional Defiant syndrome ($r = .67$), demonstrating 45% shared variance. Similar findings were reported in the ASCA Manual comparing the ASCA Oppositional Defiant syndrome with the Conduct Problem scale of the CTRS ($r = .70$) (McDermott, 1994). The Conners 3-T Hyperactivity/Impulsivity scale demonstrated statistically significant and moderate convergent validity with the ASCA Attention Deficit/Hyperactivity syndrome ($r = .56$). This correlation is lower than what was observed in the comparison of the ASCA ADH syndrome and the CTRS Hyperactivity scale ($r = .75$) (McDermott, 1994). Likewise, the correlation of the ASCA ADH syndrome and the Conners 3-T Hyperactivity Impulsivity, which are purportedly measuring the same constructs, was lower than comparisons of similar scales reported in the Conners 3 Manual. The Conners 3 Manual reported a strong correlation between the Conners 3-T Hyperactivity/Impulsivity scale and the BASC-2 Hyperactivity scale ($r = .91$) (Conners, 2008). The Conners 3-T Defiance/Aggression scale demonstrated statistically significant and moderate convergent validity with the ASCA Solitary Aggressive Provocative syndrome ($r = .64$). This is similar to findings reported in the ASCA Manual comparing the ASCA SAP syndrome and the CTRS Conduct Problem ($r = .60$) (McDermott, 1994), as well as comparisons between the Conners 3-T Defiance/Aggression and the CBCL Aggressive Behavior ($r = .76$) reported in the Conners 3 Manual (Conners, 2008).

Discriminant Validity

Results provided evidence of discriminant validity of the Conners 3-T and the ASCA. The Conners 3-T Learning Problems/Executive Functioning scale demonstrated

discriminant validity with the ASCA Attention Deficit Hyperactivity syndrome ($r = .26$). This is significantly lower than the similar comparison of the Conners 3-T with the BASC-2 Hyperactivity scale ($r = .51$) reported in the Conners 3 Manual (Conners, 2008). The Conners 3-T Peer Relations scale demonstrated discriminant validity with the ASCA Solitary Aggressive Provocative syndrome ($r = .32$), Solitary Aggressive Impulsive syndrome ($r = .28$), and Oppositional Defiant syndrome ($r = .38$). These are similar to comparisons reported in the ASCA Manual between the CTRS Asocial scale and the ASCA SAP syndrome ($r = .36$), SAI syndrome ($r = .33$), and OPD syndrome ($r = .30$) (McDermott, 1994). The Conners 3-T Hyperactivity/Impulsivity scale demonstrated divergent validity with the ASCA Diffident syndrome ($r = -.18$) and Avoidant syndrome ($r = .19$). These comparisons are similar to those reported in the ASCA Manual between the CTRS Hyperactive scale and the ASCA DIF syndrome ($r = -.17$) and the AVO syndrome ($r = .09$) (McDermott, 1994). The Conners 3-T Peer Relations scale demonstrated divergent validity with the ASCA Attention Deficit Hyperactivity syndrome ($r = .05$). This comparison was somewhat lower than what was reported in the ASCA Manual comparing the ASCA ADH syndrome and the CTRS Asocial scale ($r = .21$) (McDermott, 1994). The Conners 3-T Defiance/Aggression scale demonstrated discriminant validity with the Solitary Aggressive Impulsive syndrome ($r = .54$). Similar findings were reported in the ASCA Manual between the ASCA SAI syndrome and the CTRS Conduct Problem scale ($r = .60$) (McDermott, 1994). The Conners 3-T Inattention scale demonstrated discriminant validity with the ASCA Attention Deficit Hyperactivity syndrome ($r = .39$). Again, a similar finding was reported in the ASCA Manual between the ASCA ADH and the CTRS Daydreams/Attendance Problem Scale ($r = .36$)

(McDermott, 1994). Finally, the Conners 3-T Hyperactivity/Impulsivity scale demonstrated discriminant validity with the ASCA Solitary Aggressive Provocative syndrome ($r = .48$), Solitary Aggressive Impulsive syndrome ($r = .40$), and Oppositional Defiant syndrome ($r = .46$). This is somewhat lower than similar comparisons reported in the ASCA Manual between the CTRS Hyperactive scale and the ASCA SAP syndrome ($r = .65$), SAI syndrome ($r = .62$), and OPD syndrome ($r = .56$) (McDermott, 1994).

Scale Intercorrelation

In order to further explore and explain the present results, correlations within the Conners 3-T and ASCA were calculated to examine the shared variance among the scales/syndrome scales within each measure. Appendix D presents the intercorrelation matrix for the ASCA. Appendix E presents the intercorrelation matrix for the Conners 3-T.

As can be seen in Table 6, the ASCA Overactivity and Underactivity syndrome correlations ($r = .14$) demonstrate that the global syndromes measure independent constructs, sharing only 2% variance. This is slightly higher but similar to what has been found in other studies (Canivez and Bordenkircher, 2002; Canivez and Rains, 2002). The Conners 3-T does not contain composite scores for this kind of comparison.

At the subtest level, correlations between the four ASCA Overactivity syndromes were moderate ($Mdn_r = .51$). These correlations were somewhat lower than what was found in Canivez and Bordenkircher (2002) ($Mdn_r = .62$) but higher than what was reported in the ASCA Manual ($Mdn_r = .46$) (McDermott, 1994). The correlation between the ASCA SAP and SAI ($r = .63$) was moderately high, and was higher than what was reported in the ASCA Manual ($r = .45$) (McDermott, 1994) and a large independent

study ($r = .56$) (Canivez, 2004). Likewise, the correlation between the ASCA SAP and OPD ($r = .77$) was also moderately high, and higher than what was reported in the ASCA Manual ($r = .49$) (McDermott, 1994) and Canivez (2004) ($r = .56$). On the Conners 3-T, subscales and DSM-4 symptom scales that purportedly measure similar constructs demonstrated overall high correlations. The Conners 3-T Inattention scale and DSM-4 ADHD Inattentive scale were significantly and highly correlated ($r = .91$), which was similar to what was reported in the Conners 3 Manual ($r = .95$) (Conners, 2008). The Conners 3-T Hyperactivity/Impulsivity scale and DSM-4 ADHD Hyperactivity/Impulsivity scale were significantly and highly correlated ($r = .96$), which was similar to what was reported in the Conners 3 Manual ($r = .99$) (Conners, 2008). The Conners 3-T Defiance/Aggression scale was significantly and highly correlated with both the DSM-4 Oppositional Defiant Disorder scale ($r = .96$) and the DSM-4 Conduct Disorder scale ($r = .81$), which were both similar to what was reported in the Conners 3 Manual ($r = .95$ and $r = .88$ respectively) (Conners, 2008). The Conners 3-T Learning Problems and Executive Functioning subscales demonstrated a high correlation with the Learning Problems/Executive Functioning scale ($Mdn_r = .79$), which was somewhat lower than what was reported in the Conners 3 Manual ($Mdn_r = .91$) (Conners, 2008). These comparisons indicate poor discriminant validity within the Conners 3-T.

Intercorrelation tables in this study and in the respective standardization samples indicate that the ASCA syndrome demonstrated less shared variance and thus greater independence among syndromes than the Conners 3-T scales. Thus, the only moderate levels of convergent validity could be due to the fact that there is higher shared variance among the individual Conners 3-T scales.

Limitations

Several limitations need to be considered when evaluating the results of the present study. One limitation is the relatively smaller sample size of only 118 students, all of whom attended school in the same district in central Illinois. Likewise, only 32 teachers participated, who were primarily female and all were general education teachers. While the overall sample of students in the study was relatively diverse, the aforementioned factors indicate that the study sample cannot be considered representative of the general population. Thus broad generalizability of results cannot be done. Another limitation is that teachers were not provided rating scales in a counterbalanced order, nor told to alter the order in which they completed them for multiple students, meaning that order effects could not be accounted for. Convergent and discriminant comparisons could not be made for the Conners3-T with the ASCA Overactivity and Underactivity because none of the Conners 3-T scales are produced by a combination of multiple other scales to form composite scores.

Further research comparing the Conners 3-T and ASCA rating scales should utilize a larger sample size across a wider geographical area in order to increase generalizability of results. Likewise, further independent validity research is needed in general to support the diagnostic utility of the Conners 3-T. Research regarding exploratory and confirmatory factor analyses would be beneficial considering studies reported in the manual supported a 4 factor structure, yet the published Conners 3-T rating scales include 5 factors. Likewise, further independent research analyzing the diagnostic utility of the Conners 3-T is recommended to ensure it is correctly identifying symptoms of ADHD.

Conclusion

In summary, the present study provided statistically significant and moderate evidence of convergent validity for the Conners 3-T. The Conners 3-T does not offer composite scores, so no global level comparisons were completed. Convergent validity coefficients between the Conners 3-T scales (Hyperactivity/Impulsivity, Oppositional Defiant Disorder, Defiance/Aggression) with similar ASCA syndromes (Attention Deficit Hyperactive, Oppositional Defiant, Solitary Aggressive Provocative) were higher than discriminant correlations. Both scales are useful tools measuring child and adolescent psychopathology, however, more research regarding the validity as well as diagnostic utility of the Conners 3-T is needed to provide support for use in school system evaluations.

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Appendix A

Email to Teachers

Teachers & LBS1s,

My name is Stephanie Buhrow, and I am the school psychologist intern working with Unit 5 for this school year. To attain my Specialist degree in School Psychology, I must complete a thesis research project. I am looking at the validity of the Conners 3-Teacher, a report form used frequently by Unit 5 schools to assess for ADHD symptoms in students. There is limited research available for this measure. I will be comparing the Conners 3-Teacher to a well researched assessment tool, the Adjustment Scales for Children and Adolescents (ASCA).

I am looking for volunteers to complete these two measures for randomly selected students in their classroom, 2 boys and 2 girls (maximum). The Conners 3-T takes about 20 minutes to complete and the ASCA takes about 10 minutes. Basic demographic information will be collected to use for descriptive statistics, but no identifying information will be recorded so as to maintain confidentiality.

Teachers who participate will be offered the chance to enter a raffle drawing. For each student (up to 4) that they complete both the ASCA and the Conners 3-T for, their name will be put in a basket. At the end of data collection, one name will be drawn and that teacher will receive a \$50 gift card to Amazon.

If you are interested in participating in this research project or have any questions, please contact me at buhrows@myunit5.org.

Thank you for your consideration,

Stephanie Buhrow, M.S.

Appendix B

Teacher and Student Information

Thank you for participating in the present research study. Please randomly choose 4 students in your classroom, 2 boys and 2 girls. Do not provide the name of the student. Rather, fill out the demographic information. Each student will correspond with an already provided ID number. Once this information form and the rating forms have been completed, please place them back in the school psychologist's mailbox at your school. Again, thank you for your participation, it is greatly appreciated!

Please complete the following information about yourself:

Age (please check): 20-29____ 30-39____ 40-49____ 50+____

Sex:_____ Grade Level:_____ Years of Teaching Experience:_____

Please complete the following information about the randomly selected students:

Male Student #1 ID Code:_____

Age:____ Grade:____ Ethnicity:_____ SpEd: Yes No

Male Student #2 ID Code:_____

Age:____ Grade:____ Ethnicity:_____ SpEd: Yes No

Female Student #1 ID Code:_____

Age:____ Grade:____ Ethnicity:_____ SpEd: Yes No

Female Student #2 ID Code:_____

Age:____ Grade:____ Ethnicity:_____ SpEd: Yes No

If you have any questions, please contact me via email at buhrows@myunit5.org or via phone at (309)212-5411.

Stephanie G. Buhrow, M.S.

Eastern Illinois University

Appendix C

Pearson Product-Moment Correlation Coefficients Between the Conners 3-Teacher (Conners 3-T) and the Adjustment Scales for Children and Adolescents (ASCA)

Conners 3-T	Adjustment Scales for Children and Adolescents (ASCA)											
	<i>M</i>	<i>SD</i>	ADH	SAP	SAI	OPD	DIF	AVO	DEL	LEH	OVR	UNR
IN	58.53	10.51	.39**	.14	.15	.19*	.11	.36**	.13	.44**	.34**	.29**
HY/IM	62.90	14.62	.56**	.48**	.40**	.49**	-.18*	.19*	.30**	.13	.60**	.00
LP/EF	56.58	10.36	.26**	.03	.14	.04	.19*	.29**	.06	.46**	.20*	.32**
LP	56.05	11.46	.03	-.19*	-.05	-.19*	.23*	.14	-.09	.28*	-.06	.22*
EF	56.99	11.85	.40**	.22*	.25**	.20*	.11	.34**	.21*	.42**	.38**	.30**
D/A	61.65	16.90	.33**	.64**	.54**	.63**	-.07	.42**	.56**	.25*	.53**	.21*
PR	58.08	15.46	.05	.32**	.28**	.38**	.39**	.34**	.21*	.54**	.22*	.49**
CGI	61.69	12.39	.52**	.47**	.41**	.48**	-.04	.36**	.28**	.35**	.58**	.19*
ADHD IN	56.99	10.90	.34**	.19*	.21*	.18*	.17	.41**	.18	.50**	.32**	.36**
ADHD HY/IM	62.28	14.69	.56**	.49**	.40**	.48**	-.16	.22*	.31**	.13	.60**	.03
CD	55.94	14.30	.23*	.52**	.52**	.54**	.01	.43**	.50**	.33**	.43**	.28**
ODD	61.65	17.41	.30**	.68**	.52**	.67**	-.06	.40*	.56**	.24**	.53**	.21*
<i>M</i>			59.34	54.37	54.26	54.96	47.75	52.00	53.85	54.96	59.44	51.97
<i>SD</i>			9.95	12.42	11.86	14.16	10.68	11.60	13.12	11.31	10.72	9.40

Note.- ADH = Attention Deficit/Hyperactive; SAP = Solitary Aggressive (Provocative); SAI = Solitary Aggressive (Impulsive); OPD = Oppositional Defiant; DIF = Diffident; AVO = Avoidant; DEL = Delinquent; LEH = Lethargic (Hypoactive); OVR = Overactivity; UNR = Underactivity; IN = Inattention; HY/IM = Hyperactivity/Impulsivity; LP/EF = Learning Problems/Executive Functioning; LP = Learning Problems; EF = Executive Functioning; D/A = Defiance/Aggression; PR = Peer Relations; CGI = Conners Global Index; ADHD IN = DSM-IV-TR ADHD Inattention; ADHD HY/IM = DSM-IV-TR Hyperactivity/Impulsivity; CD = DSM-IV-TR Conduct Disorder; ODD = DSM-IV-TR Oppositional Defiant Disorder

N = 118 except for the ASCA Delinquency scale (*n* = 100) because the ASCA Delinquency scale is not scored for females under 12 and the ASCA Lethargic (Hypoactive) scale (*n* = 72) because the ASCA Lethargic (Hypoactive) scale is not scored for males or females over 12.

* *p* < .05

***p* < .01

Appendix D

Pearson Product-Moment Correlation Coefficients among Adjustment Scales for Children and Adolescents (ASCA) Global Scales, Core Syndromes, and Supplementary Syndromes

	Adjustment Scales for Children and Adolescents (ASCA)									
	ADH	SAP	SAI	OPD	DIF	AVO	DEL	LEH	OVR	UNR
ADH	-									
SAP	.41**	-								
SAI	.31**	.63**	-							
OPD	.39**	.77**	.56**	-						
DIF	-.22*	-.08	-.14	-.01	-					
AVO	.10	.44**	.44**	.43**	.20*	-				
DEL	.20	.55**	.49**	.51**	.04	.38**	-			
LEH	.03	.14	.17	.22	.46**	.56**	.06	-		
OVR	.86**	.69**	.59**	.73**	-.16	.33**	.42**	.14	-	
UNR	-.07	.22*	.20*	.30**	.74**	.74**	.29**	.65**	.13	-

Note.-OVR = Overactivity; UNR = Underactivity; ADH = Attention Deficit/Hyperactive; SAP = Solitary Aggressive (Provocative); SAI = Solitary Aggressive (Impulsive); OPD = Oppositional Defiant; DIF = Diffident; AVO = Avoidant; DEL = Delinquent; LEH = Lethargic (Hypoactive)

$N = 118$ except for the ASCA Delinquency scale ($n = 100$) because the ASCA Delinquency scale is not scored for females under 12 and the ASCA Lethargic (Hypoactive) scale ($n = 72$) because the ASCA Lethargic (Hypoactive) scale is not scored for males or females over 12.

* $p < .05$

** $p < .01$

Appendix E

Pearson Product-Moment Correlation Coefficients Among Conners 3-Teacher (Conners 3-T) Subscales, Scales, Symptom Scales, and Global Index Scales

Conners 3-T	Conners 3-T											
	IN	HY/IM	LP/EF	LP	EF	D/A	PR	CGI	ADHD IN	ADHD HY/IM	CD	ODD
IN	-											
HY/IM	.49**	-										
LP/EF	.70**	.32**	-									
LP	.31**	.05	.78**	-								
EF	.76**	.47**	.80**	.41**	-							
D/A	.29**	.65**	.16	-.13	.35**	-						
PR	.41**	.42**	.39**	.08	.48**	.53**	-					
CGI	.70**	.86**	.45**	.10	.61**	.66**	.55**	-				
ADHD IN	.91**	.50**	.78**	.39**	.83**	.39**	.57**	.71**	-			
ADHD HY/IM	.47**	.96**	.33**	.06	.47**	.71**	.43**	.88**	.52**	-		
CD	.38**	.50**	.28**	-.08	.45**	.81**	.67**	.56**	.55**	.52**	-	
ODD	.27**	.67**	.11	-.16	.29**	.96**	.50**	.67**	.35**	.71**	.74**	-

Note.- IN = Inattention; HY/IM = Hyperactivity/Impulsivity; LP/EF = Learning Problems/Executive Functioning; LP = Learning Problems; EF = Executive Functioning; D/A = Defiance/Aggression; PR = Peer Relations; CGI = Conners Global Index; ADHD IN = DSM-IV-TR ADHD Inattention; ADHD HY/IM = DSM-IV-TR Hyperactivity/Impulsivity; CD = DSM-IV-TR Conduct Disorder; ODD = DSM-IV-TR Oppositional Defiant Disorder

N = 118

** $p < .01$

