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THE PSYCHOMETRIC PROPERTIES OF THE ADHD BELIEFS SCALE-REVISED

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THE PSYCHOMETRIC PROPERTIES OF THE ADHD BELIEFS SCALE-REVISED

BY

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ABSTRACT

Attention-deficit/hyperactivity disorder (ADHD) is one of the most common disorders of childhood, affecting approximately 1-2 students in every classroom across the United States. Teachers play a vital role in the assessment of student behavior and their academic performance; therefore, they need to possess an adequate level of knowledge and understanding of the various disorders that may occur during childhood and adolescence, including ADHD. Reliable and valid measurement instruments are essential for an accurate assessment of teacher knowledge of ADHD. A dearth of studies, however, has addressed the psychometric properties of questionnaires assessing teacher knowledge. The current study investigated the internal consistency, dimensionality, test-retest reliability, and construct validity of one of these measures, the ADHD Beliefs Scale-Revised, in a sample of in-service teachers (N = 226). A principal components analysis revealed two components, Beliefs about the Neurobiology of ADHD, and Beliefs about the Role of Parents in ADHD, with poor and acceptable internal consistency, respectively. Additionally, the test-retest reliability of the ADHD Beliefs Scale-Revised was found to be acceptable, and preliminary evidence of construct validity was found, despite limitations of the study. Implications for educators are discussed and suggestions for future studies are advanced.

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PREFACE

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The Psychometric Properties of the ADHD Beliefs Scale-Revised

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Chapter 1: Introduction

Statement of the Problem

Attention Deficit/Hyperactivity Disorder (ADHD) is among the most commonly diagnosed disorders of childhood (American Psychiatric Association, 2000; Barkley, 2006). Core symptoms include inattention, hyperactivity, and impulsivity that often lead to serious behavioral and academic problems for children, especially in the classroom (Barkley, 2006; Faraone et al., 1993; Raggi & Chronis, 2006). Research has found, for example, that children with ADHD are at greater risk for poorer academic performance, grade retention, and school drop-out (Barkley, 2006); hence, teachers are often the first to notice difficulties associated with ADHD.

Given that children spend the majority of their day at school, teachers play a vital role in the assessment of student behavior and their academic performance. For teachers to work effectively with students, it is important that teachers have an adequate level of knowledge and understanding of the various disorders that may occur during childhood and adolescence, including ADHD. Research has revealed that teachers often receive limited training concerning ADHD; however, they typically report that they would be interested in receiving more training (Pisecco, Huzinec, & Curtis, 2001; Vance & Weyandt, 2008). Studies have also found that teachers' knowledge about ADHD is minimal and that they commonly hold misperceptions about the disorder (Weyandt, Fulton, Schepman, Verdi, & Wilson, 2009). Collectively, this body of literature suggests that teachers, and ultimately students, could benefit from additional teacher training concerning ADHD.

To be able to accurately assess the knowledge level of teachers regarding ADHD and other disorders, reliable and valid measures are essential to the process. To date, only one study has assessed the psychometric characteristics of a teacher knowledge questionnaire; therefore, information is virtually nonexistent concerning the reliability and validity of such instruments. Due to the dearth of studies regarding the psychometric properties of questionnaires assessing teacher knowledge about ADHD and the importance of psychometrically sound instruments, the current study attempted to address this issue by assessing the internal consistency, factor structure, test-retest reliability, and construct validity of one of these measures, the ADHD Beliefs Scale-Revised (Vance & Weyandt, 2008; Weyandt et al., 2009).

Critical Review of the Literature

What is Attention Deficit Hyperactivity Disorder?

Attention-Deficit/Hyperactivity Disorder (ADHD) is a neurologically based developmental disorder, characterized by symptoms of inattention, impulsivity, and hyperactivity that are developmentally inappropriate and cause impairments in major life activities (American Psychiatric Association, 2000). The prevalence of ADHD is estimated to range from 3% to 7% in the United States school-aged population and has been found across various cultures (American Psychiatric Association, 2000). International prevalence rates have been reported to range from 3% to 9.5%, and are similar to U.S. estimates (Gingerich, Turnock, Litfin, & Rosen, 1998). Contrary to prior beliefs that ADHD was outgrown with the onset of puberty, research has found that the symptoms of ADHD typically persist throughout the lifespan (Barkley, 2003, Shekim, Asarnow, Hess, Zaucha, & Wheeler, 1990; Simon, Czobor, Bálint, Mészáros

& Bitter, 2009). Examples of the impairment associated with ADHD include social difficulties (Hinshaw, 2002), impaired family interactions (DuPaul, McGoey, Eckert, & VanBrackle, 2001), and reduced academic achievement (Frazier, Youngstrom, Glutting, & Watkins, 2007).

ADHD and Academic Difficulties

Children with ADHD commonly experience cognitive and academic problems (Faraone et al., 1993; Raggi & Chronis, 2006), such as difficulty following directions, focusing on tasks, and remaining attentive and seated. In addition, they often demonstrate a number of behavioral problems, such as noncompliance and aggressive behavior (Barkley, 2006). Moreover, these students are more likely than their peers to receive lower grades, fall behind academically, score lower on standardized assessments, receive special education services and other student services, repeat grades, drop out of high school (Faraone et al., 1993) and to not attend college (DuPaul, Weyandt, O'Dell, & Varejao, 2009).

Despite the clear evidence that students with ADHD commonly experience various academic problems, relatively little research exists concerning academic interventions, compared to research regarding behavioral and pharmacological interventions (DuPaul, Weyandt, & Janusis, 2011). Stimulant medication and behavior-modification strategies are the most common interventions for children with ADHD as they have been shown to significantly reduce ADHD symptoms (Barkley, 2006; Spencer, Biederman, & Wilens, 2000). These interventions, although often effective for remediating behavior problems, especially when implemented both in the home and in school settings, have not been equally successful at increasing academic

achievement (DuPaul et al., 2011). Given the lack of evidence-based methods for improving the academic performance of students with ADHD, meeting the academic needs of these children can be challenging for educators, especially their teachers, who are often among the primary agents of intervention for these students.

Teachers play an important role in identifying children with ADHD. While previous estimates indicated that on average, one in every twenty school-aged children is diagnosed with ADHD, (American Psychiatric Association, 2000), more recent numbers suggest that up to 10% of students are diagnosed with ADHD (Wolraich et al., 2012). Teachers often witness difficult and disruptive student behavior, as well as problems associated with inattention. Teachers therefore possess valuable clinical information and are often the first to initiate referrals for psychological assessment (Sax & Kautz, 2003; Weyandt et al., 2009). Teacher referrals, however, are not always warranted, as the information they are based on is not always accurate. For example, in a study by Glass & Wegar (2000), teachers were found to overestimate the prevalence of ADHD in their classrooms. Other research has reported similar results with teachers identifying a higher proportion of students as having ADHD than prevalence rates would indicate (Havey, Olson, McCormick, & Cates, 2005; Weiler, Bellinger, Marmor, Rancier, & Waber, 1999). Based on research that suggests that teachers have a tendency to over-identify, and some may actually under-identify ADHD in their classrooms (Glass & Wegar 2000; Fabiano et al., 2013; Havey et al., 2005; Sciutto & Eisenberg, 2007; Weiler et al., 1999), it is plausible that many teachers do not possess accurate and adequate knowledge about the disorder.

Teaching Experience and Knowledge of ADHD

Theoretically, increased teaching experience should lead to increased exposure to a variety of student characteristics; therefore, it is likely that increased teaching experience is associated with greater knowledge about various childhood disorders, including ADHD. Research by Weyandt et al. (2009), however, questions the accuracy of this hypothesis, as findings revealed that teaching experience was *negatively* correlated with knowledge of ADHD; specifically, increased teaching experience was associated with *less* knowledge about ADHD. The researchers noted, however, that extensive psychometric information for the scale they used, a revised version of The ADHD Beliefs Scale, was not available, although previous analyses using the original version of the scale among parents of children with ADHD indicated adequate internal consistency. Given the lack of psychometric information regarding the ADHD Beliefs Scale-Revised, the results of Weyandt et al. (2009) and others should be interpreted cautiously. In an earlier study, Vance and Weyandt (2008) explored professor perceptions of college students with ADHD, using the ADHD Beliefs Scale-Revised and findings revealed that college professors' perceptions of college students with ADHD did not differ by educational level, years of teaching experience, previous experience with students with ADHD or ADHD training. In a related study, Vereb and DiPerna (2004) examined teacher knowledge of ADHD, years of experience teaching students with ADHD and teacher ratings of ADHD treatment acceptability. Results did not provide evidence for an association between teaching experience and knowledge about ADHD, or between teaching experience and the acceptability of behavior management interventions for ADHD. Vereb and DiPerna (2004) created

their own instrument for their study and examined its content validity qualitatively by having a panel of experts rate the importance of each item of the questionnaire, where items that received a low importance rating were eliminated. In addition, the internal consistency of the four subscales of the instrument was assessed, for three of which Cronbach's alpha was acceptable while for the fourth it was poor (alpha coefficients ranged from .58 to .81). No other quantitative methods were used to further assess the reliability and validity of the instrument, therefore the findings should be interpreted cautiously. In a study conducted by Kos, Richdale, and Jackson (2004), teachers with more years of teaching experience tended to overestimate their knowledge about ADHD compared to teachers with less experience, although no significant association between years of teaching experience and degree of actual ADHD knowledge was found. In-service teachers were also compared to pre-service teachers on measures of ADHD knowledge. Although, among in-service teachers, amount of teaching experience was not associated with greater ADHD knowledge, in-service teachers scored higher than pre-service teachers on a measure of ADHD knowledge. Experience teaching students with ADHD was, however, related to greater knowledge about ADHD, as well as amount of ADHD training. Kos and colleagues (2004) developed their own survey for the purposes of their study, but no psychometric data on its reliability or validity were reported, which once again underscores the need for careful interpretation of the findings. Collectively, these studies suggest that increased teaching experience may not result in greater knowledge about ADHD, although the scarcity of studies on the psychometric properties of the various instruments used to

assess teacher knowledge about ADHD calls to question the validity and reliability of these findings.

Similar to findings reported by Kos et al. (2004), where previous experience teaching students with ADHD was associated with greater knowledge about ADHD, Sciutto, Terjesen and Bender-Frank (2000) reported that the extent to which teachers had taught children with ADHD in the past and teachers' confidence in their ability to effectively teach a child with ADHD, was positively related to their knowledge about the disorder. They also found that many teachers, however, held common misperceptions about the disorder, especially regarding the effects of sugar intake on ADHD symptoms and the long-term prognosis of the disorder. Sciutto et al. (2000) developed their own ADHD knowledge measure and reported "good internal consistency", but no further reliability or validity information was provided. Similarly, Anderson, Watt, Noble, & Shanley (2012) found that in-service teachers possessed both more actual and perceived knowledge about ADHD than pre-service teachers, which is an indication that increased teaching experience was associated with more knowledge about ADHD in this sample. Anderson et al. (2012) administered a revised version of an instrument developed by West, Taylor, Houghton, & Hudyma (2005), which was based on the instrument originally created by Sciutto et al. (2000). Anderson et al. (2012) reported acceptable to good internal consistency for the subscales of their version of this measure, but no further psychometric information about this scale has been published. In addition to examining whether teaching experience is associated with teacher knowledge about ADHD, the extent to which

teacher knowledge of the disorder relates to other variables, such as teacher perceptions of students with ADHD, has also been studied.

Teacher Perceptions of Students with ADHD

Labeling, that is, assigning a diagnostic label to a student such as a learning disability, autism or ADHD, can influence the way teachers interact with and evaluate students. Perhaps the most famous study on the impact of labels was conducted by Rosenthal and Jacobson in 1966, where students who had been randomly selected to receive the label "likely to demonstrate unusual intellectual achievement" showed significantly greater gains in cognitive ability than students who were not assigned that label. Results suggested that the expectations teachers held for students based on the labels, had an impact on student performance. Although in some cases, labels may have positive effects, they can also lead to more negative outcomes, such as decreased teacher expectations and negative stereotypes of students. In another landmark study, Foster and Ysseldyke (1976) found that teachers held negative expectations of students with a diagnostic label, such as emotional disturbance, learning disability, and mental retardation, compared with students without a label, even for students engaging in normal behavior that was inconsistent with the labels. In a more recent study, Batzle, Weyandt, Janusis, and DeVietti (2010), explored K-12 grade teachers' ratings of children, both with and without an ADHD label. Results revealed that the teachers rated children with an ADHD label less favorably than children without an ADHD label on measures of behavior, cognitive functioning, and personality. Similarly, in a study by Ohan, Visser, Strain, and Allen (2011), in-service and pre-service teachers responded differently to questions about children who had a diagnosis of ADHD than

to questions about children who did not have an ADHD diagnosis. Participants' negative expectations and negative emotions increased when a child was labeled "ADHD", and their confidence in their ability to instruct the child decreased. Findings reported by Liljequist and Renk (2007) corroborate the results reported by Ohan et al. (2011), wherein externalizing behaviors, such as aggression, impulsivity, or hyperactivity, which are among the core symptoms of ADHD, were found to "trouble" teachers more than internalizing behaviors, such as withdrawal and depression.

Teacher perceptions of students can affect their interactions with students, which can influence students' academic outcomes (Feldman & Theiss, 1982). Negative teacher expectations of students can thus serve to exacerbate students' problems and thereby create self-fulfilling prophecies, where students are perceived negatively, which adversely affects their academic outcomes, which, in turn, confirms teachers' original negative perceptions of these students (Eisenberg & Schneider, 2007; Harris, 1994). Research has also demonstrated that teacher perceptions of students with ADHD can affect other students' perceptions of those students (Atkinson, Robinson, & Shute, 1997).

It is plausible that teachers' level of ADHD knowledge contributes to their interactions with and perceptions of students who have the disorder. For example, Sherman, Rasmussen, and Baydala (2008) conducted a systematic review of the literature and concluded that a variety of teacher factors, such as tolerance of classroom behaviors, acceptability of various treatments for ADHD, as well as their level of knowledge and training regarding ADHD, can have an impact on the academic and behavioral outcomes of students with ADHD. In fact, Ohan, Cormier,

Hepp, Visser, and Strain (2008) found that teachers who retained greater levels of ADHD knowledge were more likely to believe that for students with ADHD, professional assessment services are beneficial, that academic support is helpful, as well as making various adjustments in the home and school environment. Teachers who were more knowledgeable, however, also reported less confidence in their ability to manage these students than those with less knowledge. Ohan and colleagues (2008) used a questionnaire designed by Jerome, Gordon, and Hustler (1994). No psychometric information for this scale was reported, which renders analyses difficult regarding how different aspects of ADHD knowledge contribute to teacher behavior and attitudes toward students with ADHD, and decreases the confidence with which the results can be interpreted.

Although the results of the aforementioned studies suggest that teachers often lack adequate training and knowledge about ADHD and that their knowledge level has an impact on their perceptions of students with ADHD, the lack of psychometric data concerning the measures likely impacts the validity and reliability of these findings. Psychometric studies are sorely needed to determine the underlying properties of questionnaires that are used to determine teacher knowledge are about this disorder.

Psychometric Studies on ADHD Knowledge Questionnaires for Teachers

To date, the only study that has examined the psychometric qualities of an instrument measuring teacher knowledge and attitudes about ADHD was conducted by Hepperlen, Clay, Henly, and Barké in 2002. Hepperlen and colleagues (2002) created the Test of Knowledge about ADHD (KADD) as an indirect attitude measure using the “error-choice technique”. The error-choice technique involves a series of

multiple choice questions presented in the format of a test or exam, including questions about general knowledge topics that are unrelated to ADHD. The authors' rationale for using the error-choice method was to reduce response bias and social desirability responding. Hepperlen et al. (2002) surveyed approximately 100 teachers and found that the scale comprised one global factor with acceptable internal consistency. The researchers noted, however, that evidence regarding the validity of the KADD was lacking. Due to the unconventional approach to knowledge and attitude measurement and the limited evidence for its validity, the KADD (Hepperlen et al., 2002) was not chosen for use in the present study. Additional instruments of ADHD knowledge, however, have been validated psychometrically, albeit in different populations, and were therefore considered more appropriate for the purposes of current study.

The ADHD Beliefs Scale was originally designed by Johnston and Freeman (2002) to measure beliefs of parents of children with ADHD about the disorder, but has also been modified for use with teachers and college professors as the ADHD Beliefs Scale-Revised (Vance & Weyandt, 2008; Weyandt et al., 2009). The scale reflects a variety of beliefs concerning ADHD, such as the causes of ADHD (e.g., "ADHD is related to neurological functioning in the brain" or "Some children develop ADHD because they want attention") and various treatment options (e.g., "A combination of medication and behavior management is best for treating ADHD" or "Limiting a child's sugar intake can be an effective treatment for ADHD"). The most recent version of the scale (Johnston, Seipp, Hommersen, Hoza, & Fine, 2005) originally contained 27 items or statements, which participants respond to on a 7 point

Likert-scale, ranging from disagree to neutral, and from neutral to agree. A principal components analysis (PCA), conducted in a combined sample of 253 mothers and fathers of children with ADHD, yielded a four-factor solution that accounted for more than 50% of the variance in scores, and indicated that four items should be omitted due to inconsistent factor loadings (Johnston et al., 2005). The first factor was labeled Belief in Behavior Management (eight items, $\alpha = .73$), the second factor Belief in Medication (six items, $\alpha = .77$), and the third and fourth factors were named Belief in Psychological Causes/Treatments (five items, $\alpha = .74$) and Belief in Diet/Vitamin Treatments (four items, $\alpha = .71$), respectively. Results reported by Johnston, Hommersen, & Seipp (2008) indicate that the original parent-version of the ADHD Beliefs Scale has good construct validity, as parents' beliefs were related to their experience with ADHD treatment and their attributions for the causes of their children's behavior.

Purpose of the Present Study

A review of the literature revealed that a substantial number of studies have examined teacher perceptions and knowledge about ADHD and have explored the effect of teacher knowledge on interactions with students. None of the studies, however, properly addressed the psychometric properties of the measures used to assess teacher knowledge about ADHD. Because reliability and validity are fundamental characteristics of any measurement instrument, a rigorous examination of the psychometric properties of such instruments is of great importance. The present study explored the factor structure of one of these instruments, the ADHD Beliefs Scale-Revised, as well as its test-retest reliability, internal consistency, and construct

validity. Although other instruments have been used in the literature (e.g., the 20-item scale prepared by Jerome and colleagues (1994), the Knowledge of Attention Deficit Disorders Scale by Sciutto et al. (2000), and the Test of Knowledge about ADHD (KADD) by Hepperlen et al., (2002)), the ADHD Beliefs Scale was chosen for use in this study due to the a) number of published studies using the ADHD Beliefs Scale or the ADHD Beliefs Scale-Revised, b) psychometric information available for the parent version of the scale (Johnston & Freeman, 2002; Johnston et al., 2005; Johnston et al., 2008: Vance & Weyandt, 2008; Weyandt et al., 2009), and c) seven point Likert-scale response format of the ADHD Beliefs Scale, which is more appropriate for the proposed analyses (Reise, Waller, & Comrey, 2000) as opposed to the two to three response options format offered by other instruments (e.g., Jerome et al., 1994; Sciutto et al., 2000).

Based on previous research, the first hypothesis of the present study was that four factors would emerge, including Belief in Behavior Management, Belief in Medication, Belief in Psychological Causes/Treatments, and Belief in Diet/Vitamin Treatments (Johnston et al., 2005). Although Johnston et al. (2005) did not provide extensive psychometric information about the ADHD Beliefs Scale, such as the degree of correlation between factors, it was predicted that the four factors would be correlated due to their conceptual nature (e.g., beliefs in psychological treatments were expected to be associated with beliefs about behavior management). Reliability coefficients were expected to be adequate, internal reliability coefficients equal to or higher than 0.70, and test-retest reliability equal to or higher than 0.60.

Chapter II: Method

Procedure

Participants for the present study included in-service teachers, employed at the primary and secondary educational level. School administrators in various school districts in Rhode Island, Connecticut, and Massachusetts were contacted and asked for permission for the researcher to contact teachers working in the district. Emails were sent to a contact person (e.g., principal, assistant principal or school psychologist) at each school, who was asked to send an email to all teachers at the school. Information in the email directed participants to a secure website hosted by SurveyMonkey, where an online survey was accessible. Potential participants were instructed to read a consent form once they entered the website and confirm they understood the content by clicking on a statement of endorsement. Participants who provided consent were then directed to the ADHD Beliefs Scale-Revised and a demographic questionnaire designed by the researcher. Participants were also provided with information regarding how to contact the researcher if desired. Before beginning the survey, participants were asked to choose a six digit number that was easy to remember but difficult to trace to them, such as a parent's date of birth. They were then asked to provide that number on the questionnaire. Approximately two to three weeks later, this procedure was repeated. To match the answers from the first administration to those of the second administration, participants were asked to provide the six digit number they chose during the first administration. To encourage participation, participants were offered to register for a drawing, by providing their email address, where they had a chance of winning one of two $50 gift cards.

Participants. A convenience sample of 260 in-service teachers in Rhode Island, Connecticut, and Massachusetts was recruited, 233 of whom were eligible for participation and completed all study questionnaires. While exact response rates could not be calculated due to a lack of information concerning the number of teachers working in each school district as well as the number of teachers who received the participation email, eight school districts out of 30 agreed to participate in the study, that equals a participation rate of 26.7%. The final sample was smaller than the desired sample of 300, which was determined by Comrey and Lee's recommendation (1992) of an N of 200-300 for factor analysis, and Nunnally's (1978) recommendation for a minimum of 300 participants when assessing internal consistency. According to Guadagnoli & Velicer (1988), however, a sample of 100-200 is sufficient for factor or principal components analysis, provided that factor loadings are high. Participants were expected to be representative of the sex and race/ethnicity demographics of teachers in the United States; the majority of participants were expected to be White/Caucasian and female (Feistritzer, 2011). Table 1 contains information regarding the demographics of the final sample.

Table 1. *Participants by sex, race, and ethnicity*

Category	N	Percent
Sex		
Female	199	85.4
Male	33	14.2
Not reported	1	0.4
Race		
White/Caucasian	222	95.3
African American	1	0.4
Native American	2	0.9
Multiethnic	1	0.4
Other	2	0.9
Not reported	5	2.1
Ethnicity		
Hispanic/Latino	4	1.7
Non-Hispanic/Latino	223	95.7
Not reported	6	2.6

Participants were informed that to be eligible for participation they needed to be at least 18 years of age, working as teachers, i.e., not as school support/guidance staff, and to be able to read and write in English. Those who did not fulfill these criteria were excluded from participating in the study. Three participants identified as school support staff members (i.e., school psychologist, school nurse, and guidance counselor); therefore, their answers were not included in the analyses.

As Table 1 illustrates, the sample consisted mainly of White females of non-Hispanic/Latino ethnicity, which is mostly in accordance with expectations. With regard to the educational setting, 67% of participants reported teaching in the general education setting whereas 30.9% endorsed being special education teachers; 2.1% did not report the setting in which they teach; 52.8% reported teaching in elementary school, 24.0% in middle school, 19.3% in high school, and 3.9% did not report the

educational level at which they were teaching. In terms of the highest level of education completed, 21% reported having a bachelor's degree, 76% reported holding a master's degree, and 1.3% endorsed having earned a doctoral degree; 0.4% of participants did not disclose the level of education completed. The average age of participants was 43.3 years and the average length of teaching experience was 15.5 years.

Informed Consent. Prior to completing the research questionnaires, participants had to document that they had read and understood the consent form. The consent form included a basic description of the research project as well as any potential for harm, confidentiality, and benefits of participating. Participants were made aware that they could quit the study at any time, without any consequences to them, by discontinuing the survey. No identifying information was collected; however, participants were provided with the student investigator's contact information should they have any questions or concerns. See Appendix A for the consent form, and Appendix B for debriefing.

Measures

ADHD Beliefs Scale-Revised. For the purposes of this study, a revised version of the ADHD Beliefs Scale was prepared, consisting of the original 27 items. The statements were modified to be more appropriate for use among teachers, as the original version assumes that respondents are parents of children with ADHD (i.e. "Improving my parenting skills would benefit my child with ADHD" and "I would not hesitate to medicate my child if a doctor recommended it"). The ADHD Beliefs Scale-Revised is presented in Appendix C.

Demographics Questionnaire. A demographics questionnaire was administered, that included questions about the sex, age, race/ethnicity, educational level of participants, and the education level and setting in which participants were teaching (elementary, middle, high; special/general education). Participants were asked whether they had received ADHD training, the amount and format or type of training received, their perceptions of their preparedness to teach students with ADHD, as well as their interest in receiving more training. Although sex, age, ethnicity, educational level, educational setting, level of training and perceived preparedness were not included in the main research questions, these questions were included in the demographic questionnaire for descriptive information, post hoc analyses, and potential covariates for future studies. The demographic questionnaire is presented in Appendix D.

Design

The current study investigated the: 1) dimensionality of the ADHD Beliefs Scale-Revised; 2) internal consistency of the ADHD Beliefs Scale-Revised; and 3) test-retest reliability of the ADHD Beliefs Scale-Revised, and 4) construct validity of the ADHD Beliefs Scale-Revised; exploratory analyses included examining group differences on the ADHD Beliefs Scale-Revised as well as the correlation between perceived level of preparation to teach students with ADHD and actual ADHD knowledge as measured by the ADHD Beliefs Scale-Revised.

Hypothesis 1 stated that an exploratory principal components analysis (PCA) would reveal a factor structure of four underlying factors. To address hypothesis 1, an item analysis, followed by an exploratory PCA of the ADHD Beliefs Scale-Revised, was conducted. Items that poorly discriminated among participants as measured by

extremely high or low means and little variance were eliminated, as recommended by Redding, Maddock, & Rossi (2006). The item-total correlation was analyzed, wherein items with an item-total correlation of less than 0.25 were removed. Although guidelines for item elimination based on item-total correlation coefficients suggest using 0.30 (Ferketich, 1991; Kline, 1993) or 0.40 (Nunnally, 1978) as a cutoff, this procedure would have resulted in a very low number of items, which could have been problematic for the subsequent analyses. A more lenient criterion of an item-total correlation of 0.25 (approaching 0.30) was therefore used for item retention. To examine the dimensionality of the ADHD Beliefs Scale-Revised, an exploratory PCA with an orthogonal rotation was conducted. The number of factors was determined using Horn's parallel analysis and Velicer's minimum average partial (MAP), as recommended by O'Connor (2000). Most items with complex or inconsistent loadings, such as loading on more than one factor with coefficients greater than 0.40 or not loading onto any dimensions with coefficients greater than 0.40 were removed, and a final PCA with an orthogonal rotation was conducted. One item (item 27), however, that had a relatively complex loading but made sense conceptually and fit well with its respective component was retained.

Hypothesis 2 posited that internal reliability coefficients would be adequate, that is, equal to or higher than 0.70. Internal consistency was assessed by calculating Cronbach's alpha for each factor, using Nunnally's criteria (1978) of 0.70 or higher for a satisfactory internal consistency coefficient. Given that the correlation between factors was low (r = 0.151), a global ADHD Beliefs Scale-Revised score was not calculated, nor a global internal reliability coefficient.

Hypothesis 3 held that test-retest reliability would be adequate, that is, equal to or higher than 0.60. To assess test-retest reliability, the ADHD Beliefs Scale-Revised was administered twice, with approximately a two to three week interval, and the correlation between scores on the first and second administration was calculated. Given that any ADHD training participants may have received in the interim could have affected the test-retest reliability, participants were asked about the amount of ADHD training they had received, and their answers from the first and second administration of the questionnaire were compared.

Additionally, the construct validity of the ADHD Beliefs Scale-Revised was explored. Multiple regression analyses were used to determine whether years of experience teaching students with ADHD, as well as amount of ADHD training, were predictive of scores on the ADHD Beliefs Scale-Revised.

Finally, multiple regression and correlational analyses were conducted post-hoc to examine group differences on the ADHD Beliefs Scale-Revised based on educational setting, teaching experience, and age, as well as the association between perceived level of preparation to teach students with ADHD and actual ADHD knowledge as measured by the ADHD Beliefs Scale-Revised. Further, univariate ANOVAs were conducted to examine sex differences in ADHD knowledge as measured by the scale.

Chapter III: Results

To test the hypotheses, two sets of analyses were conducted. Specifically, the first set of analyses involved: a) analyses of the factor structure and internal consistency of the ADHD Beliefs Scale-Revised; b) an analysis of the test-retest reliability of the scale, and c) an exploration of the construct validity of the questionnaire. The second set of analyses were conducted post hoc to explore group differences in ADHD knowledge and the correlation between self-perceived preparedness to teach students with ADHD and teacher knowledge about ADHD, as measured by the scale.

Item Analysis, Dimensionality, and Internal Consistency

SPSS version 22 was used to conduct all analyses. An item analysis involving a comparison of item means, skewness, kurtosis, and item-total correlations was conducted, where items that had an item-total correlation lower than 0.25 were removed. To determine the appropriate number of components, Horn's parallel analysis and Velicer's MAP procedure were employed, as recommended by O'Connor (2000). After the initial PCA (N = 226 with listwise elimination of cases with missing data), complex items (i.e., loading on more than one component with coefficients greater than 0.40, not loading onto any components with coefficients greater than 0.40, or loading on components that did not make sense conceptually) were removed. One item (item 27) that made sense conceptually and fit well with its respective component, despite its complex loadings, was retained, however, to form a component that contained two items, instead of only one item.

The remaining items were entered into a second and third PCA with an orthogonal (Varimax) rotation, given the minimal correlation between factors, yielding the final version of the ADHD-Beliefs Scale-Revised. Internal consistency was assessed using Cronbach's alpha and Pearson's bivariate correlation was then calculated to assess the test-retest reliability of the ADHD Beliefs Scale-Revised. Multiple regression analyses were conducted to assess the construct validity of the questionnaire, as well as potential predictors of teacher knowledge. ANOVAs were conducted to analyze potential group differences. Table 2 depicts descriptive statistics for all 27 items on the scale.

Table 2. *Item analysis of the ADHD Beliefs Scale-Revised - descriptive statistics*

Item	N	Minimum	Maximum	M	SD	Skewness	Kurtosis
1	231	1	7	5.2381	1.43845	-.619	-.006
2	232	1	7	2.9009	1.42446	.475	.151
3	229	2	7	5.9083	1.11031	-.845	.210
4	231	2	7	**6.1429**	1.03899	**-1.228**	**1.257**
5	233	1	7	5.0687	1.52126	-.650	.168
6	233	1	7	5.5193	1.27334	-.783	.631
7	231	1	7	**5.9740**	1.24034	**-1.205**	**1.075**
8	233	1	7	**6.0815**	1.05751	**-1.157**	**1.648**
9	233	1	7	5.0987	1.26411	-.149	-.284
10	230	1	7	**6.2609**	1.01161	**-1.845**	**4.946**
11	232	1	7	3.9353	1.65410	-.076	-.627
12	231	1	7	4.8398	1.58399	-.429	-.271
13	233	1	7	5.6094	1.68597	-.991	-.103
14	232	1	7	4.3879	1.51627	.366	-.417
15	230	1	7	4.9739	1.65580	-.197	-1.069
16	232	1	7	**6.0431**	1.45877	**-1.468**	**1.158**
17	231	1	7	**5.8182**	1.31936	**-1.150**	**1.323**
18	232	1	7	4.3233	1.83845	-.055	-.909
19	231	1	7	4.0649	1.21230	.392	1.550
20	232	1	7	4.1379	1.75266	-.334	-.662
21	230	2	7	5.8217	1.43215	-.934	-.325
22	232	1	7	3.7284	1.63285	.433	-.362
23	232	1	7	4.4267	1.88495	-.284	-.904
24	232	1	7	**6.6207**	.94117	**-3.135**	**11.165**
25	232	2	7	5.9698	1.05844	-.624	-.373
26	232	3	7	**6.4224**	.84925	**-1.316**	**.942**
27	230	1	7	5.3000	1.71087	-.613	-.811

As shown in table 2, items 4, 8, 10, 16, 17, 24, and 26 had unusually high means, and skewness and/or kurtosis greater than |1.0| and were therefore discarded. Table 3 depicts the corrected item-total correlation for each of the remaining 20 items as well as the overall Cronbach's alpha for the scale if each of these items were deleted.

Table 3. *ADHD Beliefs Scale-Revised item-total correlation (20 items)*

Item	Corrected item-total correlation	Cronbach's alpha if item deleted
1	.548	.639
2	**.175**	**.677**
3	.466	.654
5	.290	.665
6	**.010**	**.689**
7	.480	.650
9	.364	.660
11	.367	.656
12	**.220**	**.673**
13	.287	.665
14	**.149**	**.680**
15	.306	.663
18	**.222**	**.674**
19	.254	.669
20	**-.170**	**.717**
21	.320	.662
22	**.189**	**.676**
23	.436	.645
25	**.043**	**.685**
27	.297	.664

As stated previously, a more lenient criterion for item-total correlation was adopted than has been suggested by some (e.g., Ferketich, 1991; Nunnally, 1978; Kline, 1993) due to the resulting low number of items, wherein items with an item-total correlation below 0.25 were discarded. As shown in Table 3, this resulted in the elimination of items 2, 6, 12, 14, 18, 20, 22, and 25 (bolded). To determine the number of factors, Velicer's MAP analysis and Horn's parallel analysis were conducted (O'Connor, 2000) and a PCA with an orthogonal (varimax) rotation was conducted. The results of the MAP analysis suggested retaining 2 components whereas the parallel analysis indicated that 3 components should be retained. Tables 4 and 5 contain information regarding loadings for 2 and 3 components, respectively.

Table 4. *Initial PCA on 12 items with 2 components*

Item	Component 1	Component 2
1. Medication is a safe treatment for ADHD.	**.726**	-.326
3. ADHD is related to neurological functioning in the brain.	**.572**	.213
5. ADHD is likely to be inherited.	**.450**	-.033
7. A combination of medication and behavior management is best for treating ADHD.	**.702**	-.289
9. It is likely that medications used to treat ADHD are effective because they alter the neurotransmitters in the child's brain.	**.560**	-.151
11. Medication is almost always an effective treatment for ADHD.	.577	-.445
13. ADHD results from parents being inconsistent with rules and consequences.	.393	**.719**
14. ADHD is often an allergic reaction or sensitivity due to food preservatives.	.317	.320
19. Vitamin therapy is useful in treating ADHD.	.174	.205
21. ADHD can be the result of the child not trying hard enough to control his/her behavior.	.440	.587
23. I would not hesitate to medicate a child with ADHD if a doctor recommended it.	.649	-.485
27. ADHD is related to parents' use of poor discipline strategies.	.449	**.691**

As Table 4 illustrates, five items loaded onto the first component and two items loaded onto the second component; however, item 27 had a complex loading but given that it fit well conceptually with item 13, which loaded on that same component, and loaded more highly on that component, it was retained. Items 11, 14, 19, 21, and 23 had complex loadings and were therefore removed. This resulted in a total of seven items.

Table 5. *Initial PCA on 12 items with 3 components*

Item	Component 1	Component 2	Component 3
1. Medication is a safe treatment for ADHD.	**.726**	-.326	.297
3. ADHD is related to neurological functioning in the brain.	.572	.213	-.479
5. ADHD is likely to be inherited.	.450	-.033	-.476
7. A combination of medication and behavior management is best for treating ADHD.	**.702**	-.289	.063
9. It is likely that medications used to treat ADHD are effective because they alter the neurotransmitters in the child's brain.	**.560**	-.151	-.379
11. Medication is almost always an effective treatment for ADHD.	.577	-.445	.049
13. ADHD results from parents being inconsistent with rules and consequences.	.393	**.719**	-.024
15. ADHD is often an allergic reaction or sensitivity due to food preservatives.	.317	.320	**.448**
19. Vitamin therapy is useful in treating ADHD.	.174	.205	**.546**
21. ADHD can be the result of the child not trying hard enough to control his/her behavior.	.440	.587	.063
23. I would not hesitate to medicate a child with ADHD if a doctor recommended it.	.649	-.485	.237
27. ADHD is related to parents' use of poor discipline strategies.	.449	.691	.008

The three component structure, depicted in Table 5, indicated that items 3, 5, 11, 21, 23, and 27 should be deleted. Three items loaded on the first component, one item on the second component, and two items on the third component. This resulted in

a suggested total of six items. Given that the two-component structure was more parsimonious, had fewer complex loadings, had more than one item loading on each factor, and appeared more readily interpretable, two components were retained. A second PCA using the seven remaining items was conducted; results can be found in Table 6.

Table 6. *Second PCA on 7 items*

Item	Component 1	Component 2
1. Medication is a safe treatment for ADHD.	**.741**	-.031
3. ADHD is related to neurological functioning in the brain.	.510	.466
5. ADHD is likely to be inherited.	**.555**	.153
7. A combination of medication and behavior management is best for treating ADHD.	**.775**	.019
9. It is likely that medications used to treat ADHD are effective because they alter the neurotransmitters in the child's brain.	**.670**	.069
13. ADHD results from parents being inconsistent with rules and consequences.	.013	**.892**
27. ADHD is related to parents' use of poor discipline strategies.	.065	**.855**

The second PCA on the seven remaining items revealed that item 3 had a complex loading, suggesting it should be discarded. A third PCA was therefore conducted for the six remaining items; results can be seen in Table 7.

Table 7. *Third and final PCA on 6 items*

Item	Component 1	Component 2
1. Medication is a safe treatment for ADHD.	**.792**	.024
5. ADHD is likely to be inherited.	**.526**	.112
7. A combination of medication and behavior management is best for treating ADHD.	**.798**	.036
9. It is likely that medications used to treat ADHD are effective because they alter the neurotransmitters in the child's brain.	**.658**	.039
13. ADHD results from parents being inconsistent with rules and consequences.	.034	**.902**
27. ADHD is related to parents' use of poor discipline strategies.	.112	**.890**

Table 8 provides information regarding the eigenvalues for each of the two components, labeled Beliefs about the Neurobiology of ADHD (component 1) and Beliefs about the Role of Parents in ADHD (component 2).

Table 8. *Eigenvalues for final PCA*

Component	Total	% of variance	Cumulative %
1	2.127	35.444	35.444
2	1.485	24.749	60.193

As Table 8 demonstrates, the two components accounted for 60.19% of the variance. The Cronbach's alpha coefficient for the first component was 0.635 which is below the threshold for acceptable internal consistency, while for the second component it was 0.775, which according to Nunnally (1978) is acceptable during the

initial stages of scale development. The factors were only minimally correlated: r = 0.151, p = 0.022, providing support for the orthogonal (varimax) rotation.

Test-Retest Reliability

The test-retest reliability of the ADHD Beliefs Scale-Revised was examined by calculating the Pearson bivariate correlation between scores at time point 1 and time point 2, separated by approximately 2-3 weeks. Responses from 17 participants who completed the retest were matched across the two time points, 14 of whom had no missing data, yielding a correlation coefficient of r = 0.795, p = 0.001 indicating adequate test-retest reliability for the beginning stages of scale development.

Construct Validity

Although the internal consistency of one of two subscales, Beliefs about the Neurobiology of ADHD, was below acceptable limits, the construct validity of the scale was explored via a series of multiple regression analyses. The validity analyses, however, should be interpreted with caution, given the less than optimal internal consistency of one of the two subscales.

To investigate the construct validity of the scale, the association between the self-reported level of ADHD training completed and scores on the two components, Beliefs about the Neurobiology of ADHD and Beliefs about the Role of Parents in ADHD was examined. The following variables, all measured on a 7 point Likert scale ranging from “never” to “frequently” or “substantial”, were entered as predictors into two multiple regression models: a) ADHD coursework taken at the university/college level, b) professional development training regarding ADHD, c) books read about ADHD, d) magazines read about ADHD, and e) research journals read about ADHD,

for each of the two subscales. Results for each of the two models can be found in tables 9 and 10, respectively. Potential violations of the assumptions of multiple regression were identified for some of the models (see Appendix E for an evaluation of the assumptions for multiple regression). To control the overall Type I error rate the Benjamini-Hochberg linear step-up procedure (1995), a modified version of the Bonferroni approach, was utilized.

Table 9. *Multiple regression: the association between self-reported level of training completed and scores on the Beliefs about the Neurobiology of ADHD component of the ADHD Beliefs Scale-Revised*

Predictor	B	SE B	β	p-value	R^2	Adjusted R^2
(Constant)	19.656	.764		.000	0.053	0.030
Coursework	-.073	.147	-.036	.621		
Professional development	.013	.158	.006	.935		
Books	.567	.199	.270	.005		
Magazines	-.007	.184	-.003	.971		
Research journals	-.116	.198	-.057	.559		

As shown in Table 9, the only significant predictor of scores on the Beliefs about the Neurobiology of ADHD component was books read about ADHD; β = 0.270, p = 0.005 (adjusted p = 0.008). The overall model explained approximately 5% of the variance in the dependent variable, with an adjusted R^2 = 0.030.

Table 10. *Multiple regression: the association between self-reported level of training completed and scores on the Beliefs about the Role of Parents in ADHD component of the ADHD Beliefs Scale-Revised*

Predictor	B	SE B	β	p-value	R^2	Adjusted R^2
(Constant)	9.717	0.595		0.000	0.085	0.064
Coursework	-0.205	0.116	-0.126	0.078		
Professional development	-0.001	-0.125	0.000	0.996		
Books	0.091	0.156	0.054	0.559		
Magazines	-0.062	0.145	-0.037	0.670		
Research journals	0.479	0.155	0.294	0.002		

The information depicted in table 10 indicates that the only significant predictor of scores on the Beliefs about the Role of Parents in ADHD is research journals read about ADHD: $\beta = 0.294$, $p = 0.002$ (adjusted $p = 0.004$). The overall model explained approximately 8.5% of the variance in the dependent variable, with an adjusted $R^2 = 0.064$. Scatter and normality plots of the distribution of the residual, however, are a cause for concern indicating violations of the assumptions of normality and homoscedasticity (for further information regarding the assumptions, see Appendix E). The results for predictors of scores on the Beliefs about the Role of Parents in ADHD component should therefore be interpreted carefully.

To further explore the construct validity of the scale, overall teaching experience (measured in years), experience teaching students with ADHD (measured on a 7 point Likert scale ranging from "never" to "frequently"), and number of students with ADHD taught were entered as predictors into a multiple regression model, with scores on the Beliefs about the Neurobiology of ADHD and Beliefs about

the Role of Parents in ADHD components as the dependent variables. Table 11 and 12 include the results of these analyses, respectively.

Table 11. *Multiple regression with measures of self-reported teaching experience as predictors of scores on the Beliefs about the Neurobiology of ADHD component of the ADHD Beliefs Scale-Revised*

Predictor	B	SE B	β	p-value	R^2	Adjusted R^2
(Constant)	14.554	1.873		0.000	0.108	0.094
Overall teaching experience	0.006	0.030	0.014	0.839		
Experience teaching ADHD students	1.072	0.288	0.260	0.000		
Number of ADHD students taught	-0.003	0.001	-0.227	0.001		

Results revealed that the overall model explained approximately 10% of the variance in the dependent variable, with an adjusted $R^2 = 0.094$. Specifically, experience teaching students with ADHD significantly predicted scores on the outcome, Beliefs about the Neurobiology of ADHD: $\beta = 0.260$, $p < 0.0001$ (adjusted $p < 0.001$); number of students with ADHD taught was negatively associated with the outcome: $\beta = -0.227$, $p = 0.001$ (adjusted $p = 0.003$); whereas no significant association was found between overall teaching experience and Beliefs about the Neurobiology of ADHD: $\beta = -0.014$, $p = 0.839$. Another multiple regression model was analyzed for the other subscale, Beliefs about the Role of Parents in ADHD, using the same predictors, the results of which are shown in Table 12.

Table 12. *Multiple regression with measures of self-reported teaching experience as predictors of scores on the Beliefs about the Role of Parents in ADHD component of the ADHD Beliefs Scale-Revised*

Predictor	B	SE B	β	p-value	R^2	Adjusted R^2
(Constant)	8.852	1.646		0.000	0.030	0.015
Overall teaching experience	0.016	0.026	0.045	0.539		
Experience teaching ADHD students	0.310	0.253	0.089	0.222		
Number of ADHD students taught	-0.002	0.001	-0.154	0.035		

Based on the results presented in Table 12, only the number of students with ADHD taught was significantly associated with the outcome, suggesting a negative relationship between the number of students with ADHD taught and Beliefs about the Role of Parents in ADHD: β = -0.154, p = 0.035 (adjusted p = 0.038). Neither experience teaching students with ADHD: β = 0.089, p = 0.222, nor overall teaching experience; β = -0.045, p = 0.539 were significantly associated with the outcome. The model only explained 3% of the variance in the dependent variable, with an adjusted R^2 = 0.015. Given potential violations of the assumptions of residual normality and homoscedasticity for the relationship between teaching experience and scores on the ADHD Beliefs Scale-Revised (see Appendix E), these results should be interpreted with caution.

Post Hoc Analyses: Group Differences

With regard to descriptive statistics, the mean score on component 1, Beliefs about the Neurobiology of ADHD, was 21.37 (min = 8; max = 28), with a standard

deviation of 3.79, while the mean score on component 2, Beliefs about the Role of Parents in ADHD, was 10.91 (min = 2; max = 14), with a standard deviation of 3.07.

A multiple regression analysis was conducted to examine whether educational setting (general vs. special education) predicted scores on the two subscales of the ADHD Beliefs Scale-Revised while controlling for teaching experience. Results suggested that being a special education teacher was associated with a higher score on the Beliefs about the Role of Parents in ADHD component when holding teaching experience constant: $\beta = 0.161$, $p = 0.019$ (adjusted $p = 0.023$), $R^2 = 0.027$ (adjusted $R^2 = 0.018$) but not on the Beliefs about the Neurobiology of ADHD subscale: $\beta = 0.030$, $p = 0.671$. No significant correlation was found between age and scores on the Beliefs about the Neurobiology of ADHD: $r = 0.06$, $p = 0.334$ nor on the Beliefs about the Role of Parents in ADHD: $r = 0.000$, $p = 0.995$.

Two univariate ANOVAs revealed that females had higher scores than males on both the Beliefs about the Neurobiology of ADHD component: $F(1, 226) = 5.996$, $p = 0.015$ (adjusted $p = 0.021$), Cohen's $d = 0.428$, as well as the Beliefs about the Role of Parents in ADHD component: $F(1, 228) = 13.826$, $p = 0.0003$ (adjusted $p = 0.015$); Cohen's $d = 0.678$. One limitation related to these findings is the fact that group sizes based on participant sex were unequal. Levene's test of variance heterogeneity, however, was insignificant (Levene's statistic for Beliefs about the Neurobiology of ADHD = 0.947, $p = 0.332$; Levene's statistic for Beliefs about the Role of Parents in ADHD = 0.362, $p = 0.548$) and box plots of the distribution of the dependent variables across gender (see Appendix E) did not suggest significant differences in variance across the two groups.

Post Hoc Analyses: Teacher Knowledge Calibration

The correlation or agreement between perceived preparedness to teach students with ADHD (measured on a 7 point Likert scale ranging from "disagree" to "agree") and teacher knowledge about ADHD as measured by the two components of the ADHD Beliefs Scale-Revised, Beliefs about the Neurobiology of ADHD and Beliefs about the Role of Parents in ADHD, was explored via correlational analyses. Once again, the results should be interpreted cautiously given the suboptimal internal consistency (Cronbach's alpha = 0.635) of one of the two subscales. Results suggested a modest correlation between perceived preparedness to teach students with ADHD and Beliefs about the Neurobiology of ADHD: $r = 0.204$, $p = 0.002$ (adjusted $p = 0.004$), but no significant correlation between perceived preparedness and Beliefs about the Role of Parents in ADHD: $r = 0.096$, $p = 0.153$.

Of those who participated in the study, 82% indicated that they would be interested in receiving ADHD training. No significant correlation was found between interest in ADHD training and perceived preparedness to teach students with ADHD: $r = -0.095$, $p = 0.156$.

Chapter IV: Discussion

Teacher knowledge and attitudes concerning ADHD, one of the most commonly diagnosed disorders of childhood, have been found to predict the academic performance of students with the disorder (Sherman et al., 2008). It is therefore critical to investigate whether teacher knowledge and beliefs regarding ADHD are associated with outcomes of students with ADHD; however, in order to accurately interpret this information, reliable and valid measures are necessary to measure teacher knowledge. The purpose of the current study was to examine the dimensionality, internal consistency, test-retest reliability, and construct validity of a questionnaire intended to measure teacher knowledge and beliefs about ADHD, given significant gaps in the literature concerning the underlying psychometric properties of such measures. Moreover, the present study sought to identify group differences in ADHD knowledge and to assess the correlation between teacher perceptions of their preparation to work with students with ADHD and their actual knowledge as measured by the ADHD Beliefs Scale-Revised, the measure of interest in the current study.

Psychometric Findings of the ADHD Beliefs Scale-Revised

Results revealed that the factor structure of the ADHD Beliefs Scale-Revised in this sample was rather different from what was hypothesized based on the original version of the scale. In the present study, a two-factor structure emerged, as opposed to the four factor structure of the original version developed by Johnston and Freeman (2005). The two components were labeled Beliefs in the Neurobiology of ADHD and Beliefs about the Role of Parents in ADHD. The former component includes beliefs about the physiological aspects of ADHD (e.g., “It is likely that medications used to

treat ADHD are effective because they alter the neurotransmitters in the child's brain"), while the latter reflects beliefs about the role of parents in ADHD as causal agents (e.g., "ADHD results from parents being inconsistent with rules and consequences"). Based on the psychometric findings, the number of items on the ADHD Beliefs Scale-Revised decreased substantially, from 27 items to only six. As noted previously, the ADHD Beliefs Scale was originally designed to assess the knowledge and beliefs concerning ADHD among parents of children with the disorder. Given these divergent findings, it appears that the psychometric characteristics of the ADHD Beliefs Scale may not be equivalent across teacher and parent populations. While this was somewhat surprising, the divergent findings, however, make sense conceptually. Specifically, being the parent of a child with ADHD is clearly different from being the teacher of a student with ADHD, especially given the distinct responsibilities and experiences inherent in each of these roles. Furthermore, the present findings suggest that the ADHD Beliefs scale may not measure teacher knowledge and beliefs as well as it measures parent knowledge and beliefs of ADHD.

The elimination of items resulted in the loss of several statements reflective of common misconceptions of ADHD (e.g., limiting a child's sugar intake can be an effective treatment for ADHD) as well as beliefs about various behavior management strategies (e.g., behavior management is an effective treatment for ADHD) which may be problematic due to previous findings suggesting widespread misconceptions about the disorder among teachers (Sciutto et al., 2000; Weyandt et al., 2009) as well as the relevance of behavior management strategies for classroom management. Evaluating

these beliefs is important as they may possibly predict various teacher behaviors and their acceptance of interventions for students with ADHD.

In addition to the scant number of items on the final version of the scale, the internal consistency of one of the two subscales, Beliefs about the Neurobiology of ADHD, was below acceptable limits. One of the issues contributing to this finding may be the fact that the subscale only included four items. In contrast, the internal consistency coefficient of the other subscale, Beliefs about the Role of Parents in ADHD, however, was above acceptable standards although it only comprised two items. Together, the limited number of items and the low internal reliability of one of the two subscales, suggest that in its current form, the scale may be a less than optimal measure of teacher knowledge of ADHD.

Although the internal consistency of the subscale of the ADHD Beliefs Scale-Revised in the present study was lower than expected (i.e., Cronbach's alpha = 0.635), the 2-3 week test-retest reliability exceeded acceptable limits (i.e., r = 0.795), despite the small number of participants completing the retest. These findings are only preliminary, but indicate that scores on the ADHD Beliefs Scale-Revised are relatively stable over time. Such findings have important implications for intervention studies seeking to experimentally examine the impact of teacher training concerning ADHD, which requires measures to be temporally stable so that any differences in scores can be attributed to the intervention and not measurement instability.

Another focus of the present study was to evaluate the construct validity of the ADHD Beliefs Scale-Revised. Given the limited internal reliability of one of the subscales and the fact that an instrument can only be as valid as it is reliable, findings

pertaining to the validity of the scale should be interpreted cautiously. Preliminary results provide some evidence for the construct validity of the scale. Specifically, scores on the Beliefs about the Neurobiology of ADHD subscale were predicted by books read about ADHD while controlling for the amount of coursework and professional development taken and the amount of magazines and research journals read about ADHD. Similarly, scores on the Beliefs about the Role of Parents in ADHD subscale were predicted by the amount of research journals read about ADHD, while accounting for the amount of coursework taken, professional development, magazines, and books read about ADHD. Collectively, these findings suggest that greater ADHD-related training is associated with a higher score on the ADHD Beliefs Scale-Revised, supporting the notion that the scale is in fact measuring knowledge about ADHD.

Despite inconsistent findings in the literature concerning the relationship between teaching experience and knowledge of ADHD, the association between overall teaching experience, experience in teaching students with ADHD, and scores on the two subscales was assessed to further explore the construct validity of the scale. Results revealed that while controlling for overall teaching experience, self-reported experience teaching students with ADHD was positively associated with scores on the Beliefs about the Neurobiology of ADHD component, whereas the absolute self-reported number of students with ADHD taught was *negatively* associated with Beliefs about the Neurobiology of ADHD. Similarly, while accounting for overall teaching experience and self-reported experience teaching students with ADHD, the absolute self-reported number of students with ADHD taught was *negatively* associated with

scores on the Beliefs about the Role of Parents in ADHD subscale. Together, these findings suggest that while holding both overall teaching experience and experience teaching students with ADHD constant, a higher self-reported number of students with ADHD taught is associated with poorer knowledge about ADHD. It is important to note that these findings do not allow for causal inferences due to the lack of experimental manipulation and the self-report nature of information concerning teaching experience and exposure to students with ADHD. Further, although findings indicate a negative relationship between number of students with ADHD taught and knowledge about the disorder, this is not necessarily an indication that the scale lacks validity. It is possible that those with less knowledge about the disorder may overestimate the prevalence of ADHD in their classrooms (Glass & Wegar 2000; Havey et al., 2005; Sciutto & Eisenberg, 2007; Weiler et al., 1999), and thus report having taught a higher number of students with ADHD than those who are more knowledgeable. Conversely, however, experience in teaching students with ADHD was associated with a higher score on the Beliefs about the Neurobiology of ADHD component while holding overall teaching experience and number of students with ADHD taught constant. This finding is in accordance with those reported by Anderson et al., (2012), Kos et al. (2004), and Sciutto et al., (2004), who found that experience teaching students with ADHD was positively associated with knowledge about the disorder. Although making sense of these conflicting findings is challenging, is it clear from the results that the manner in which teaching experience is measured can alter its relationship with knowledge and beliefs about ADHD.

Post-Hoc Analyses: Group Differences and ADHD Knowledge Calibration

In terms of group differences, analyses revealed that while holding overall teaching experience constant, special education teachers as a group had a higher score on the Beliefs about the Neurobiology of ADHD component of the ADHD Beliefs Scale-Revised, compared with general education teachers in this sample. No group differences were found, however, for the other subscale, Beliefs about the Role of Parents in ADHD. Hence, these findings indicate that special education teachers may be slightly better aware of the neurological aspects of the disorder, while the groups seem to hold similar beliefs concerning parental behaviors as a causal factor in ADHD. Additionally, the results suggested that in the present study female teachers had somewhat higher scores on both subscales of the ADHD Beliefs Scale-Revised than males. Although findings pertaining to group differences should be interpreted cautiously due to unequal group sizes, an examination of variance homogeneity did not suggest any major violations of assumptions.

Also of interest was the agreement or calibration between teacher perceptions of their preparedness to teach students with ADHD and their actual level of knowledge as measured by the ADHD Beliefs Scale-Revised. Findings revealed a weak association between perceived preparedness to teach students with ADHD and scores on the Beliefs about the Neurobiology of ADHD component and no significant correlation between perceived preparedness and scores on the Beliefs about the Role of Parents in ADHD component. Therefore, it appears that teacher knowledge calibration regarding ADHD in this study was relatively poor, and teachers may thus not have been aware of potential gaps in their knowledge and training concerning

ADHD. These findings are corroborated by a number of findings from other studies supporting the notion that teachers would benefit from additional training regarding ADHD (e.g., Jones & Chronis-Tuscano, 2008).

Although the present findings did not support an association between teacher interest in receiving ADHD training and perceived preparedness to teach students with ADHD, 82% of participants indicated that they would be interested in receiving training regarding ADHD. This suggests that in this sample, teachers who were less knowledgeable about ADHD were no more or less likely than teachers who were more knowledgeable about ADHD to report being interested in receiving ADHD training. On a more positive note, however, the majority of participants did endorse being interested in additional training, a finding also reported in other studies (e.g., Pisecco et al., 2001; Vance & Weyandt, 2008). This finding has important implications for practice in the schools and teacher preparation, particularly the training of both pre-service and in-service teachers.

Limitations and Future Directions

A major limitation of the present study was the small, largely homogeneous convenience sample. The goal was to recruit a minimum of 300 in-service teachers, ideally of diverse backgrounds. Due to substantial difficulty in the recruitment of participants, however, data were collected from 260 participants who were mostly White/Caucasian and female. The relatively small sample size may partially explain the less than optimal psychometric findings. In addition, the homogeneous nature of the sample and the fact that it was a convenience sample may restrict the generalizability of the findings.

Due to the reported psychometric properties of the ADHD Beliefs Scale-Revised as measured in the current study, particularly the internal consistency of one of the two components and the low number of items, all subsequent analyses using the scale should be interpreted with caution. Moreover, the current results highlight the need to carefully investigate the psychometric properties of all measures prior to collecting data rather than assuming they are reliable or valid. Previous findings regarding teacher knowledge of ADHD obtained using instruments that have not been validated psychometrically should therefore also be cautiously interpreted.

In light of the current findings regarding the ADHD Beliefs Scale-Revised and its poor psychometric properties in this sample, future studies are needed to further develop and validate measures of teacher knowledge and beliefs concerning ADHD. Such measures should include a variety of questions or items pertaining directly to teacher experiences in the classroom and with students with ADHD, and ideally, focus on a larger and more diverse sample of teachers. Furthermore, studies that explore the link between teacher knowledge and beliefs about ADHD, teacher behavior, and student outcomes are sorely needed. Given the important role teachers play in identifying students with ADHD and providing these students with appropriate instruction and interventions, teacher knowledge is likely a major contributor to the academic success and overall well-being of students with ADHD.

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Appendix A: Informed Consent

INFORMED CONSENT FORM
The Psychometric Properties of the ADHD Beliefs Scale-Revised

B. Gyda Gudmundsdottir, Student Investigator
University of Rhode Island
Psychology Department
10 Chafee Road
Kingston, RI 02881
401-282-9533

We are inviting teachers to participate in a study to investigate the psychometric characteristics of a questionnaire for assessing people's beliefs about Attention-Deficit/Hyperactivity Disorder (ADHD). You have been asked to take part in the research study described below. If you have any questions or concerns, you may contact the student investigator, B. Gyda Gudmundsdottir, who can be reached at (401) 282-9533 or at bgudmundsdottir@my.uri.edu, or her major professor, Lisa Weyandt, Ph.D., at (401) 874-2087, or at lisaweyandt@uri.edu.

Description of the project*:* This research study involves responding to a series of questions about Attention-Deficit/Hyperactivity Disorder (ADHD), as well as questions about your background. The purpose is to assess whether the questionnaire is appropriate for use among teachers who teach children who have ADHD.

What will be done: You will be asked to complete an online questionnaire about Attention Deficit/Hyperactivity Disorder (ADHD), asking for your opinions about possible causes of ADHD, characteristics of children with ADHD, and treatments for the disorder. Two weeks after joining the study, you will be receiving another email, where you will be asked to answer the same questions again. Your participation is very important to this study assessing the characteristics of the ADHD Beliefs Scale-Revised. Your participation is voluntary and you may quit at any time. The entire survey will take approximately 10-15 minutes to complete. To participate, you must be able to read English, and you must be at least 18 years of age, and working as a teacher at the primary or secondary educational level in the United States.

Risks or Discomforts*:* Although highly unlikely, you might experience some discomfort responding to questions about Attention Deficit/Hyperactivity Disorder (ADHD) or about your background. There are no known risks associated with participating in this study.

Benefits of this study: You may not receive any direct benefit from taking part in this study. If you are interested, however, you have the option of entering a drawing, where you will have a chance of winning one of three $50 gift cards.

Confidentiality: Your answers are anonymous and will only be seen by B. Gyda Gudmundsdottir, her major professor, Dr. Lisa Weyandt, and possibly research

assistants at the University of Rhode Island. Participation in this project is completely anonymous. Your information will not be shared with any organization.

Decision to quit at any time: You may choose not to participate at any time.

Rights and Complaints: If you have any questions or concerns about this study, please contact B. Gyda Gudmundsdottir, (401) 282-9533 or at bgudmundsdottir@my.uri.edu or her major professor, Dr. Lisa Weyandt, (401) 874-2987 or at lisaweyandt@uri.edu. If you have questions about your rights as a research participant, you may contact the Vice President for Research, 70 Lower College Road, University of Rhode Island, Kingston, RI at (401) 874-4328, B. Gyda Gudmundsdottir at (401) 282-9533, or at bgudmundsdottir@my.uri.edu, or Dr. Lisa Weyandt, at (401) 874-2087, or at lisaweyandt@uri.edu, and they will discuss them with you.

I have read the consent form and have no further questions about my participation in this project at this time. I understand that I may ask any additional questions at any time, that my participation in this project is voluntary, and that I may withdraw from this project at any time.

[ ] I have read the consent form and agree to participate.

[ ] I choose not to participate.

Appendix B: Debriefing

Participant Debriefing

Thank you for participating in this study. This study was anonymous, which means that the information collected cannot be traced to individual participants. If you have any questions or concerns regarding your participation in this study, please contact:

- B. Gyda Gudmundsdottir, B.S.
  Student Investigator
  Psychology Department
  University of Rhode Island, Kingston, RI
  bgudmundsdottir@my.uri.edu

- Lisa Weyandt, Ph.D.
  Professor
  Psychology Department
  University of Rhode Island, Kingston, RI
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- Vice President for Research
  70 Lower College Road
  University of Rhode Island, Kingston, RI
  (401) 874-4328

Appendix C: ADHD Beliefs Scale-Revised

ADHD Beliefs and Attitudes Scale

This questionnaire asks for your opinions about possible causes of ADHD, characteristics of children with ADHD, and treatments for the disorder. Please read each statement and circle the extent to which you disagree or agree.

Note: For the purposes of this questionnaire, ADHD also refers to diagnoses of ADD or ADD/H.

1. Medication is a safe treatment for ADHD.

1----------2----------3----------4----------5----------6----------7
Disagree Neutral Agree

2. Special diets are often helpful for treating ADHD.

1----------2----------3----------4----------5----------6----------7
Disagree Neutral Agree

3. ADHD is related to neurological functioning in the brain.

1----------2----------3----------4----------5----------6----------7
Disagree Neutral Agree

4. Special teaching techniques are helpful in managing ADHD.

1----------2----------3----------4----------5----------6----------7
Disagree Neutral Agree

5. ADHD is likely to be inherited.

1----------2----------3----------4----------5----------6----------7
Disagree Neutral Agree

6. Behavior management is an effective treatment for ADHD.

1----------2----------3----------4----------5----------6----------7
Disagree Neutral Agree

7. A combination of medication and behavior management is best for treating ADHD.

1----------2----------3----------4----------5----------6----------7
Disagree Neutral Agree

8. Training teachers in behavior management is a useful treatment for ADHD.

1----------2----------3----------4----------5----------6----------7
Disagree Neutral Agree

9. It is likely that medications used to treat ADHD are effective because they alter the neurotransmitters in the child's brain.

1----------2----------3----------4----------5----------6----------7
Disagree Neutral Agree

10. The amount of structure in the child's environment (e.g., routines) can affect ADHD symptoms.

1----------2----------3----------4----------5----------6----------7
Disagree Neutral Agree

11. Medication is almost always an effective treatment for ADHD.

1----------2----------3----------4----------5----------6----------7
Disagree Neutral Agree

12. Symptoms of ADHD often are evident early in the child's life.

1----------2----------3----------4----------5----------6----------7
Disagree Neutral Agree

13. ADHD results from parents being inconsistent with rules and consequences.

1----------2----------3----------4----------5----------6----------7
Disagree Neutral Agree

14. ADHD is caused by exposure to environmental substances such as lead.

1----------2----------3----------4----------5----------6----------7
Disagree Neutral Agree

15. ADHD often is an allergic reaction or sensitivity to food preservatives.

1----------2----------3----------4----------5----------6----------7
Disagree Neutral Agree

16. Some children develop ADHD because they want attention.

1----------2----------3----------4----------5----------6----------7
Disagree Neutral Agree

17. Improving the parenting skills of parents of children with ADHD would benefit their child.

1----------2----------3----------4----------5----------6----------7
Disagree Neutral Agree

18. Media reports make me uneasy about giving children medication for ADHD.

1----------2----------3----------4----------5----------6----------7
Disagree Neutral Agree

19. Vitamin therapy is useful in treating ADHD.

1----------2----------3----------4----------5----------6----------7
Disagree Neutral Agree

20. Family problems such as alcoholism or marital disorder often contribute to a child's ADHD.

1----------2----------3----------4----------5----------6----------7
Disagree Neutral Agree

21. ADHD can be the result of the child not trying hard enough to control his/her behavior.

1----------2----------3----------4----------5----------6----------7
Disagree Neutral Agree

22. Limiting a child's sugar intake can be an effective treatment for ADHD.

1----------2----------3----------4----------5----------6----------7
Disagree Neutral Agree

23. I would not hesitate to medicate a child with ADHD if a doctor recommended it.

1----------2----------3----------4----------5----------6----------7
Disagree Neutral Agree

24. I would be reluctant to learn specialized teaching techniques to treat a child's ADHD.

1----------2----------3----------4----------5----------6----------7
Disagree Neutral Agree

25. Social skills training can be helpful for children with ADHD.

1----------2----------3----------4----------5----------6----------7
Disagree Neutral Agree

26. Clear, consistent rules and consequences are helpful in treating children with ADHD.

1----------2----------3----------4----------5----------6----------7
Disagree Neutral Agree

27. ADHD is related to parents' use of poor discipline strategies.

1----------2----------3----------4----------5----------6----------7
Disagree Neutral Agree

Appendix D: Demographic Questionnaire

Demographic Questionnaire

1. **Sex:**
   A. Male
   B. Female
   C. Other:_____

2. **Age:**
   _____Years

3. **Are you of Hispanic, Latino, or Spanish origin?**
   A. Yes
   B. No

4. **Race:**
   A. White/Caucasian
   B. African American
   C. Native American
   D. Asian
   F. Pacific Islander
   G. Other: _____

5. **Years of teaching experience: _____**

6. **Educational level at which you are teaching:**
   A. Elementary school level
   B. Middle school level
   C. High school level
   D. Other:_____

7. **Educational setting in which you are teaching:**
   A. General/regular education
   B. Special education
   C. Other:_____

8. **Educational level:**
   A. Bachelor's degree
   B. Master's/specialist degree
   C. Doctoral degree
   D. Other: _____

Please read each statement and circle the extent to which each statement applies to you.

9. I have taught students with ADHD.

1----------2----------3----------4----------5----------6----------7
Never Somewhat Frequently

10. How many students with ADHD have you taught? (please provide an estimate): _____

11. I have received training about Attention-Deficit/Hyperactivity Disorder (ADHD).

1----------2----------3----------4----------5----------6----------7
Never Somewhat Substantial

12. I have taken classes/had coursework at the college/university level about ADHD.

1----------2----------3----------4----------5----------6----------7
Never Somewhat Substantial

13. I have received training/information about ADHD through professional development.

1----------2----------3----------4----------5----------6----------7
Never Somewhat Substantial

14. I have read books about ADHD.

1----------2----------3----------4----------5----------6----------7
Never Somewhat Frequently

15. I have read magazines about ADHD.

1----------2----------3----------4----------5----------6----------7
Never Somewhat Frequently

16. I have read research journals about ADHD.

1----------2----------3----------4----------5----------6----------7
Never Somewhat Frequently

17. I feel adequately prepared to teach students with ADHD.

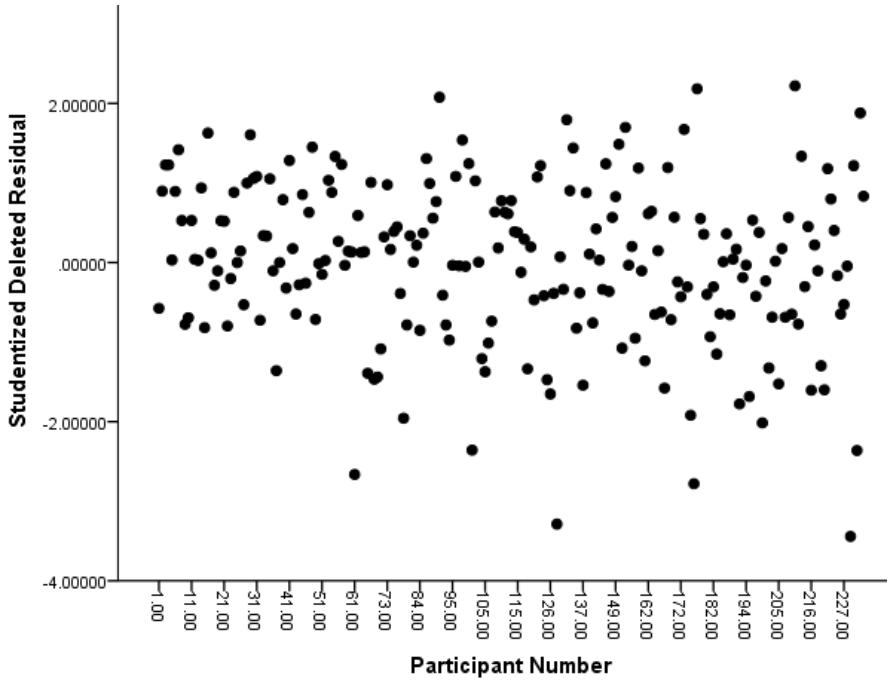
1----------2----------3----------4----------5----------6----------7
Disagree Neutral Agree

18. I would be interested in receiving ADHD training.

1----------2----------3----------4----------5----------6----------7
Disagree Neutral Agree

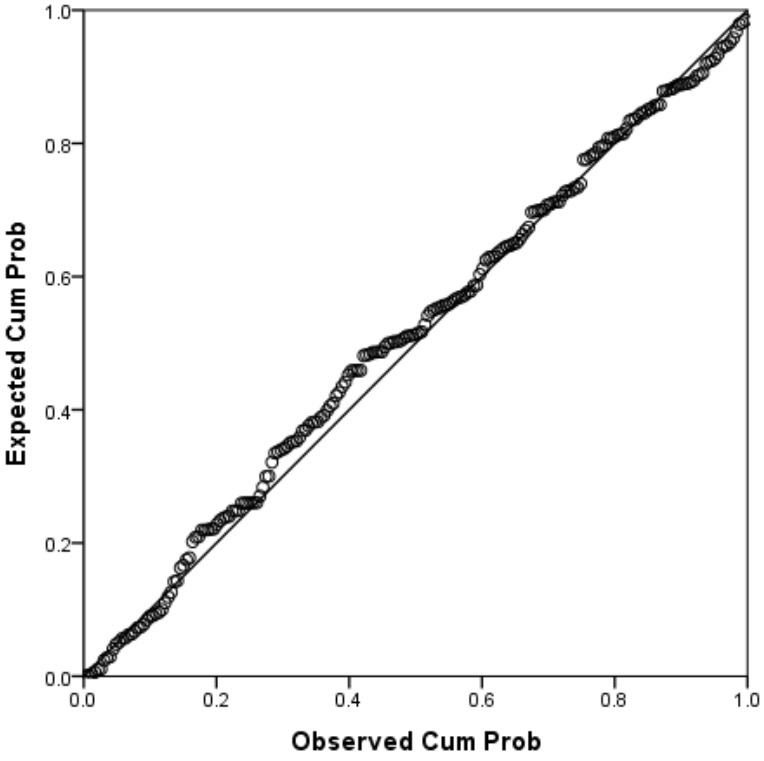
Appendix E: Evaluation of Assumptions

Figure 1. *Assumption of residual independence for multiple regression assessing the association between self-reported level of training completed and scores on the Beliefs about the Neurobiology of ADHD component of the ADHD Beliefs Scale-Revised*



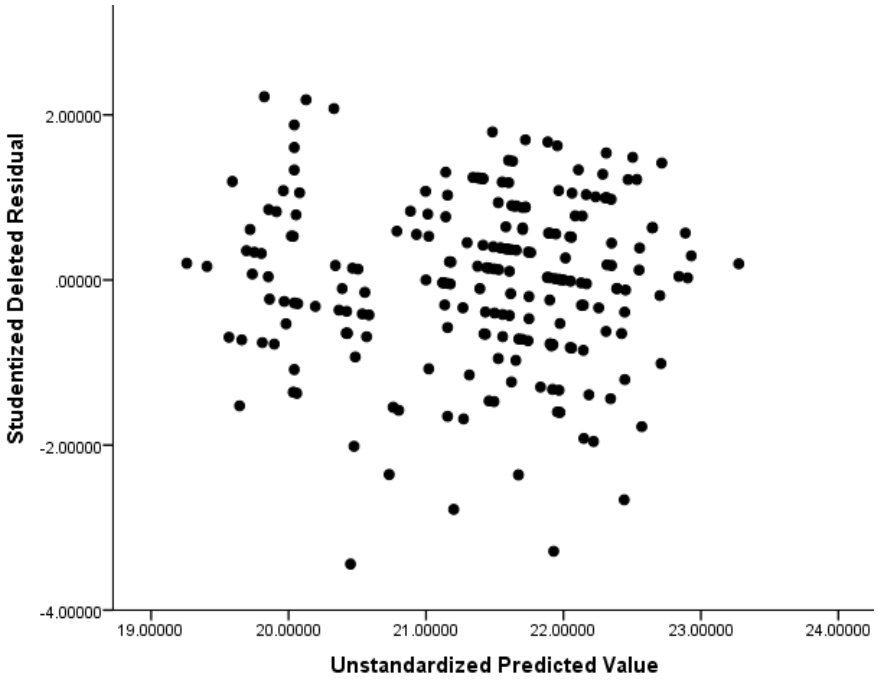
As depicted in Figure 1, the residual does not appear to be severely affected by participant number, indicating that the time at which participants completed the questionnaire did not have a large impact on the results. The range of residual values, however, appears to widen slightly over time, indicating that the time at which participants responded to the questionnaire is associated with somewhat greater response variability.

Figure 2. *Assumption of residual normality and linearity for multiple regression assessing the association between self-reported level of training completed and scores on the Beliefs about the Neurobiology of ADHD component of the ADHD Beliefs Scale-Revised*



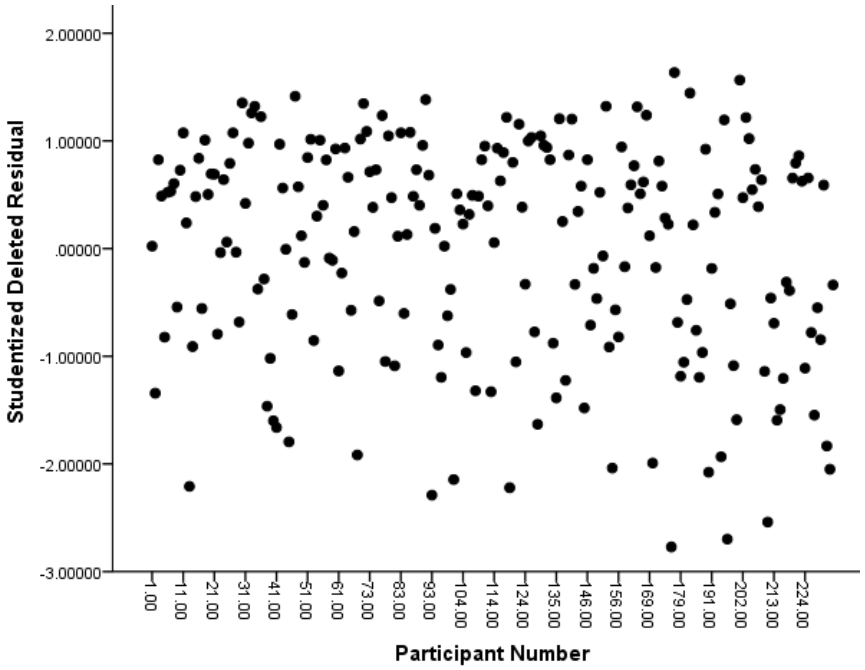
No significant deviations from the assumptions of normality and linearity can be identified in Figure 2.

Figure 3. *Assumption of residual homoscedasticity for multiple regression assessing the association between self-reported level of training completed and scores on the Beliefs about the Neurobiology of ADHD component of the ADHD Beliefs Scale-Revised*



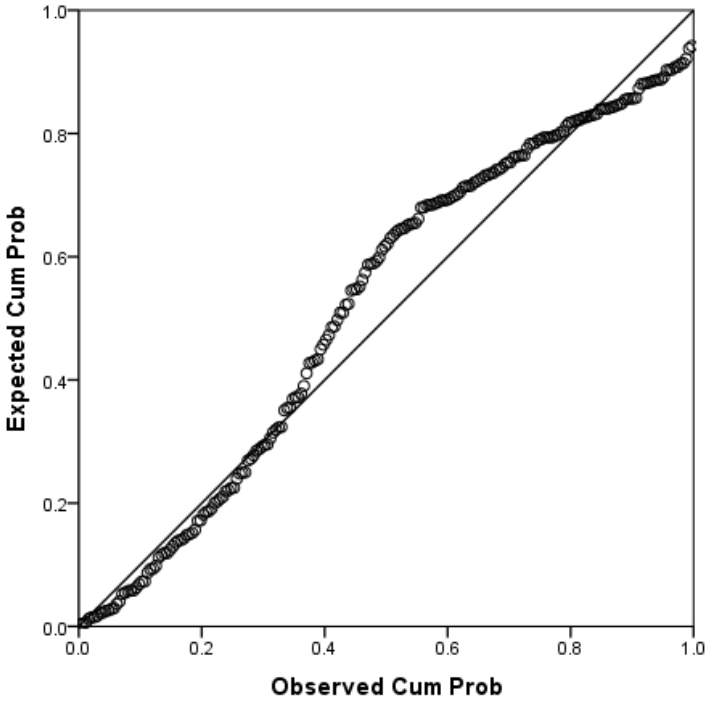
While no major violations of the assumption of residual homoscedasticity can be identified in Figure 3, the residual appears to follow somewhat of a downward trend.

Figure 4. *Assumption of residual independence for multiple regression assessing the association between self-reported level of training completed and scores on the Beliefs about the Role of Parents in ADHD component of the ADHD Beliefs Scale-Revised*



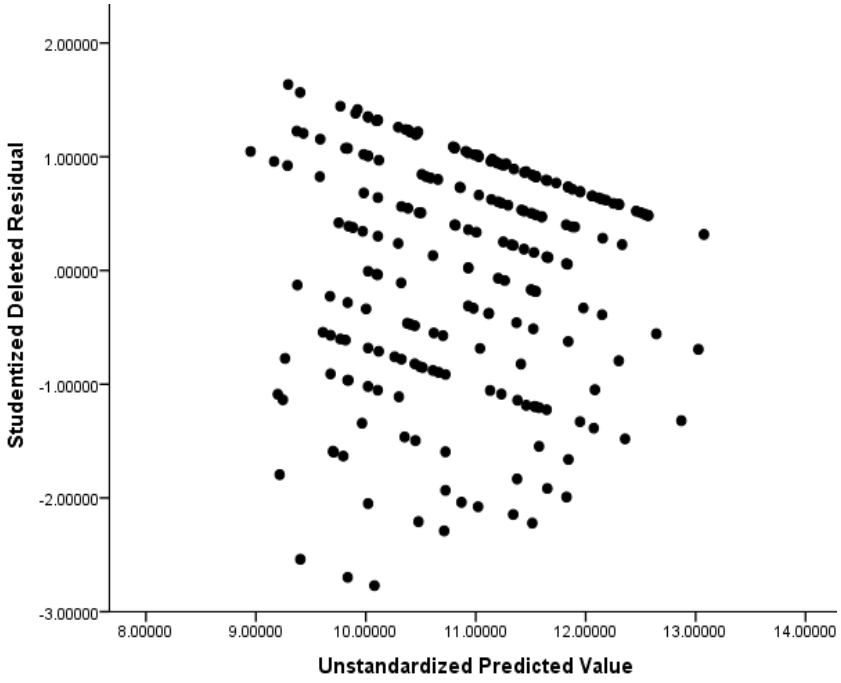
As depicted in Figure 4, the residual does not appear to be affected by participant number, indicating that the time at which participants completed the questionnaire did not impact results.

Figure 5. *Assumption of residual normality and linearity for multiple regression assessing the association between self-reported level of training completed and scores on the Beliefs about the Role of Parents in ADHD component of the ADHD Beliefs Scale-Revised*



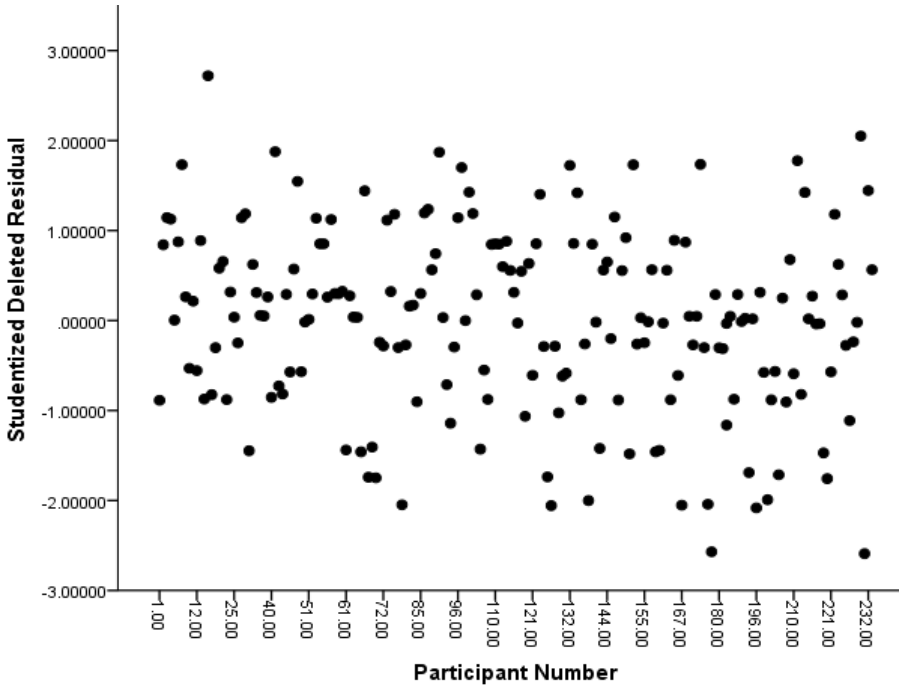
No major deviations from the assumption of linearity can be identified in Figure 5. The distribution of the residual, however, suggests minor deviations from the assumption of normality, but not necessarily severe enough to constitute an assumption violation.

Figure 6. *Assumption of residual homoscedasticity for multiple regression assessing the association between self-reported level of training completed and scores on the Beliefs about the Role of Parents in ADHD component of the ADHD Beliefs Scale-Revised*



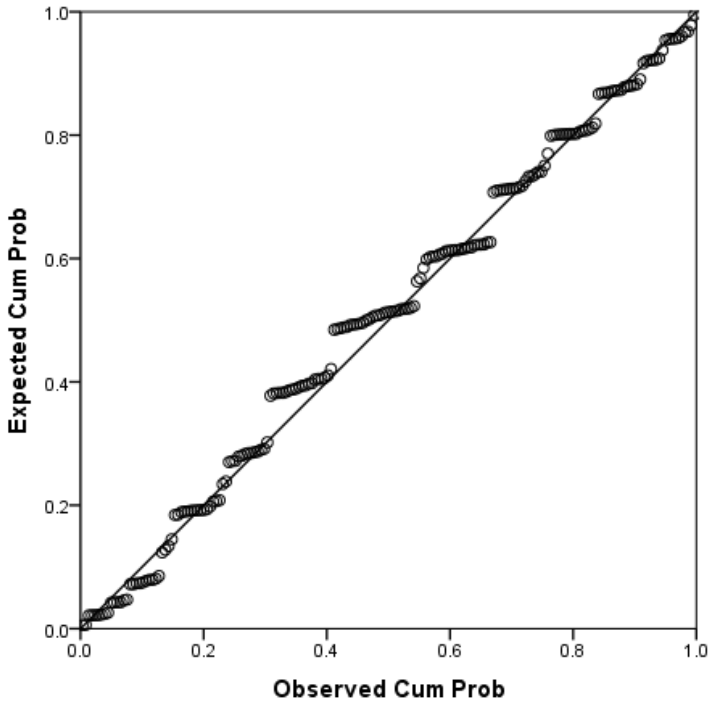
According to Figure 6, the distribution of the residual appears to follow a distinct downward pattern that suggests a violation of the assumption of residual homoscedasticity.

Figure 7. *Assumption of residual independence for multiple regression assessing the association between self-reported teaching experience and scores on the Beliefs about the Neurobiology of ADHD component of the ADHD Beliefs Scale-Revised*



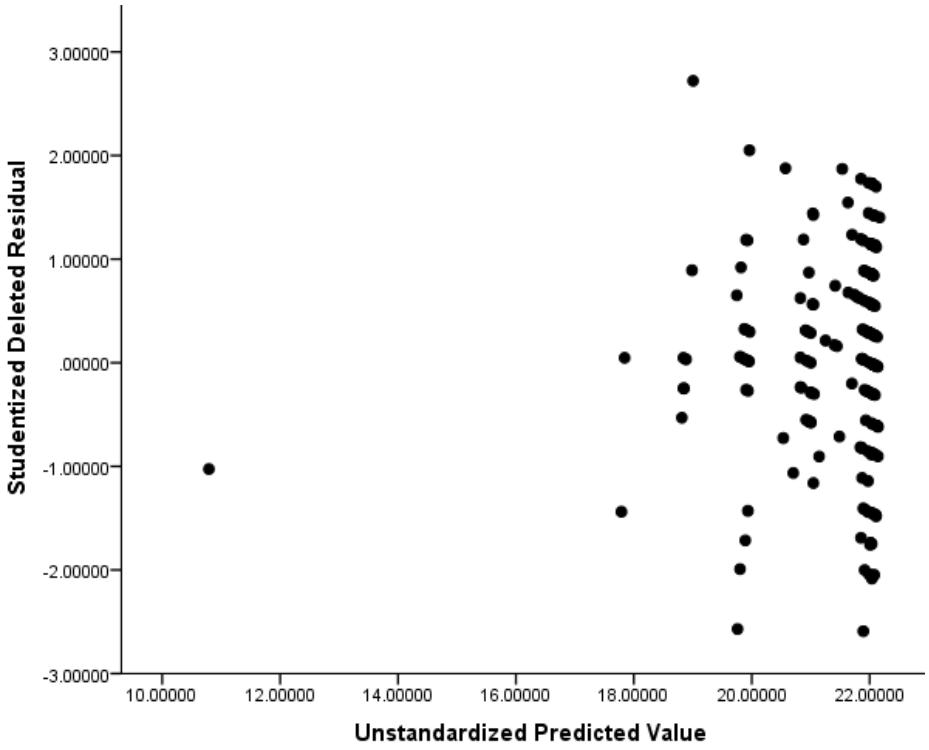
As depicted in Figure 7, the residual does not appear to be affected by participant number, indicating that the time at which participants completed the questionnaire did not impact results.

Figure 8. *Assumption of residual normality and linearity for multiple regression assessing the association between self-reported teaching experience and scores on the Beliefs about the Neurobiology of ADHD component of the ADHD Beliefs Scale-Revised*



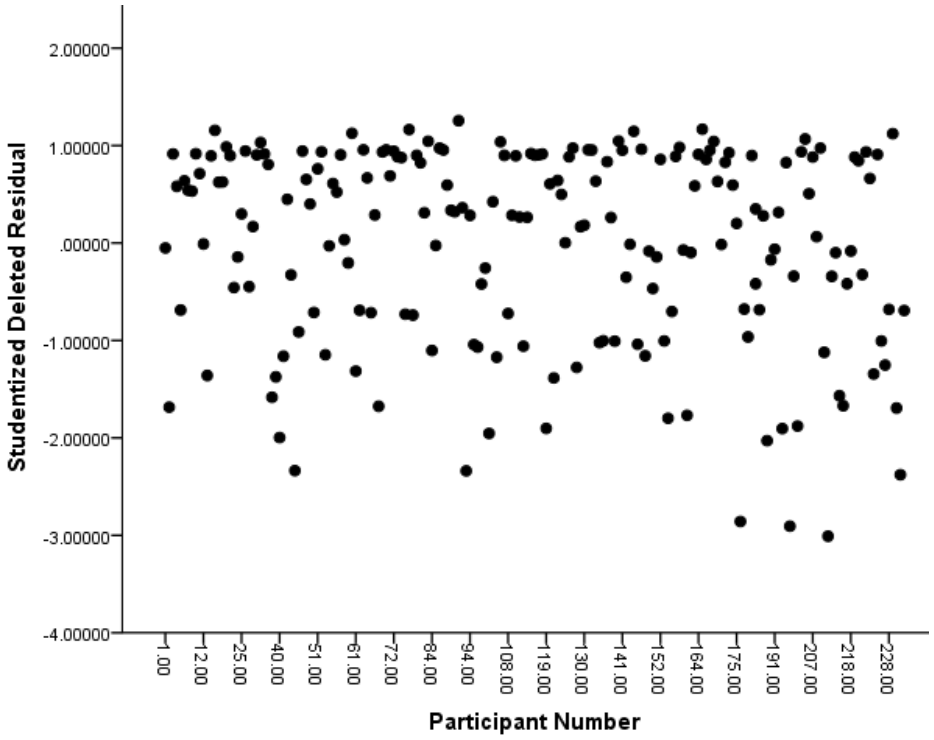
No major deviations from the assumption of linearity can be identified in Figure 8. The distribution of the residual, however, suggests some deviation from the assumption of normality.

Figure 9. *Assumption of residual homoscedasticity for multiple regression assessing the association between self-reported teaching experience and scores on the Beliefs about the Neurobiology of ADHD component of the ADHD Beliefs Scale-Revised*



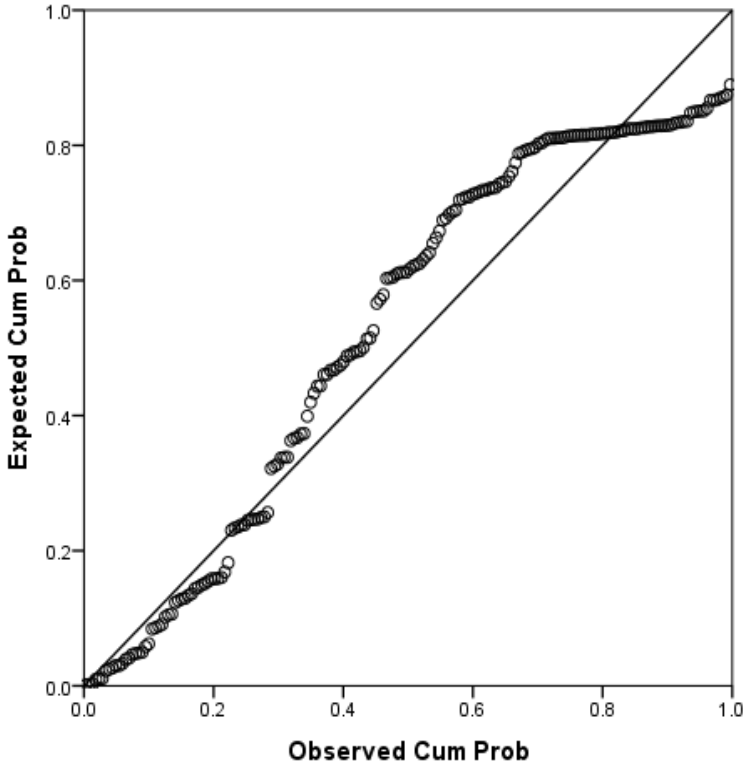
According to Figure 9, the distribution of the residual appears to follow a distinct pattern suggesting a violation of the assumption of residual homoscedasticity. Further, a ceiling effect appears to be present.

Figure 10. *Assumption of residual independence for multiple regression assessing the association between self-reported teaching experience and scores on the Beliefs about the Role of Parents in ADHD component of the ADHD Beliefs Scale-Revised*



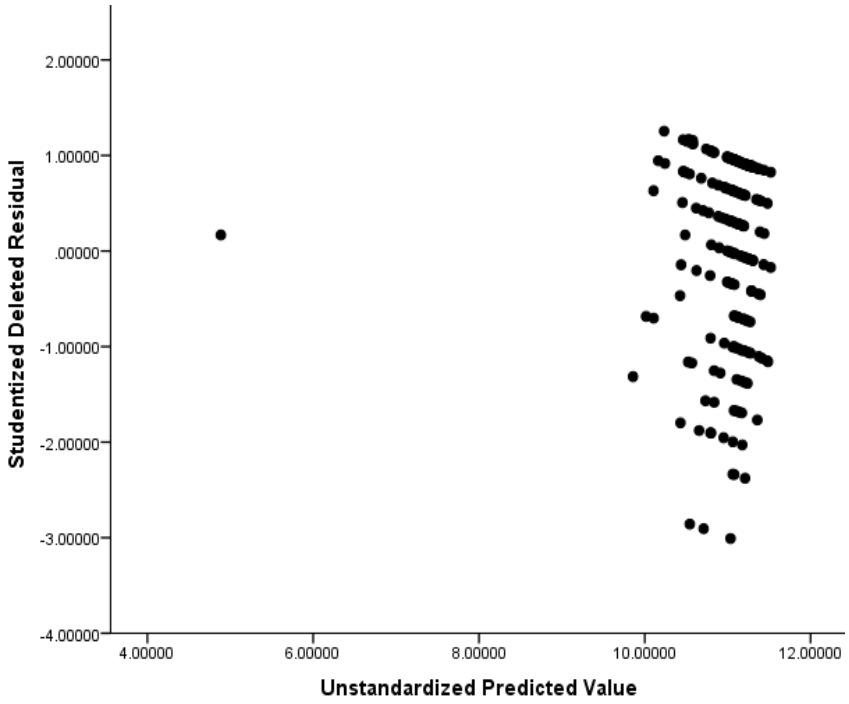
As depicted in Figure 10, the residual does not appear to be affected by participant number, indicating that the time at which participants completed the questionnaire did not impact results.

Figure 11. *Assumption of residual normality and linearity for multiple regression assessing the association between self-reported teaching experience and scores on the Beliefs about the Role of Parents in ADHD component of the ADHD Beliefs Scale-Revised*



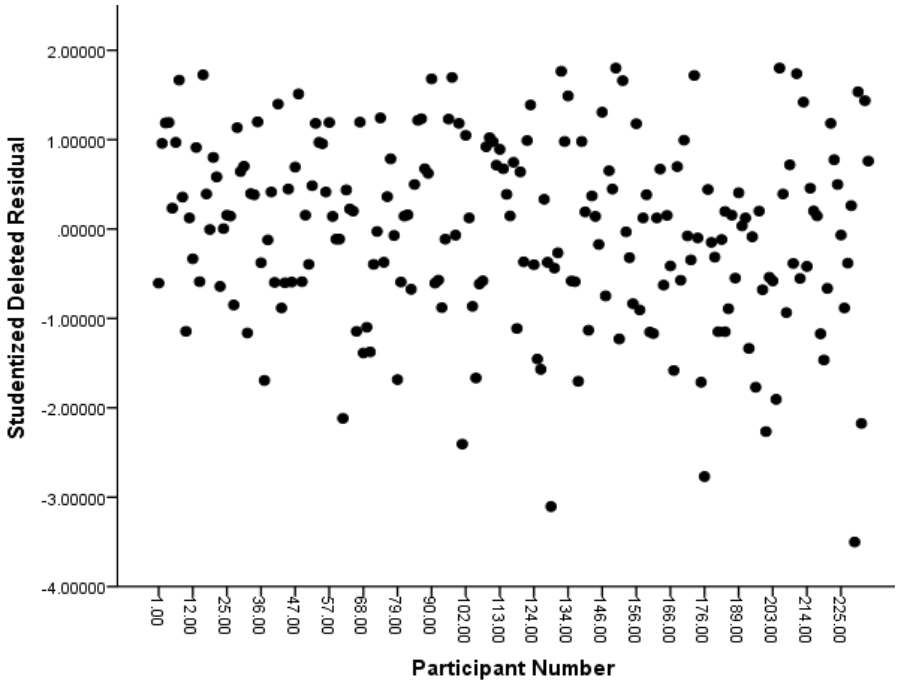
No major deviations from the assumption of linearity can be identified in Figure 11. The distribution of the residual, however, suggests some deviation from the assumption of normality.

Figure 12. *Assumption of residual homoscedasticity for multiple regression assessing the association between self-reported teaching experience and scores on the Beliefs about the Role of Parents in ADHD component of the ADHD Beliefs Scale-Revised*



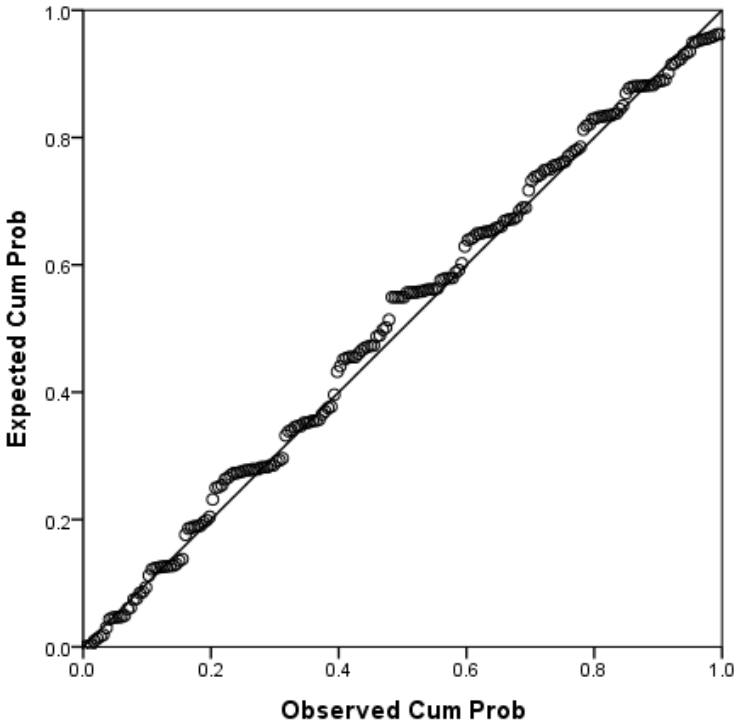
According to Figure 12, the distribution of the residual appears to follow a distinct pattern suggesting a violation of the assumption of residual homoscedasticity.

Figure 13. *Assumption of residual independence for multiple regression assessing the association between educational setting, teaching experience and scores on the Beliefs about the Neurobiology of ADHD component of the ADHD Beliefs Scale-Revised*



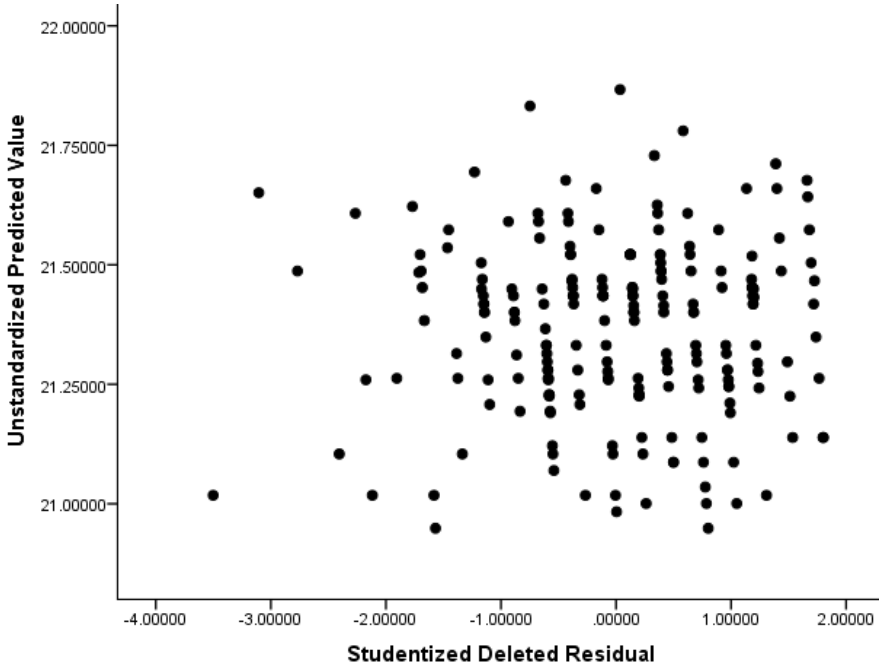
As depicted in Figure 13, the residual does not appear to be affected by participant number, indicating that the time at which participants completed the questionnaire did not impact the results.

Figure 14. *Assumption of residual normality and linearity for multiple regression assessing the association between educational setting, teaching experience and scores on the Beliefs about the Neurobiology of ADHD component of the ADHD Beliefs Scale-Revised*



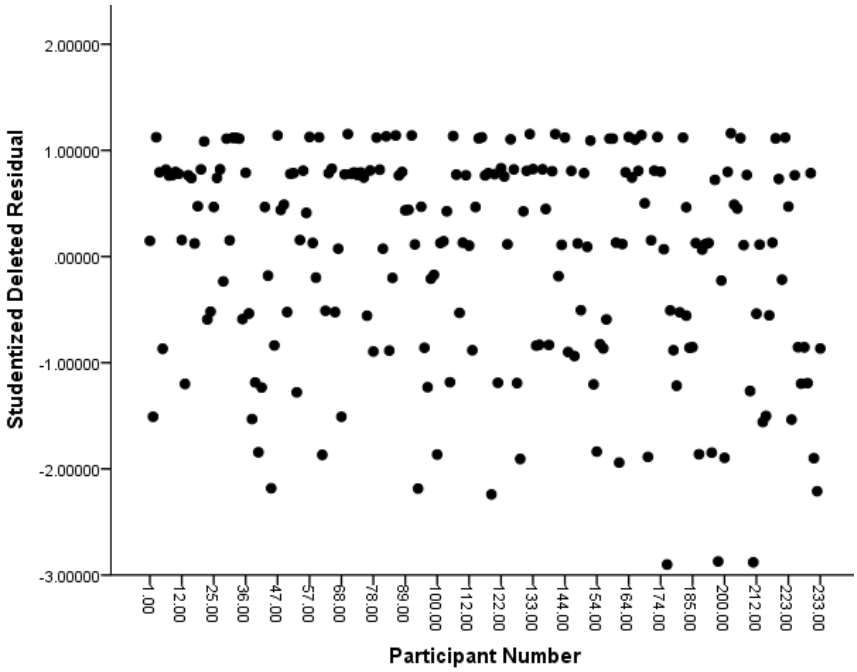
No major deviations from the assumption of linearity or normality can be identified in Figure 14.

Figure 15. *Assumption of residual homoscedasticity for multiple regression assessing the association between educational setting, teaching experience and scores on the Beliefs about the Neurobiology of ADHD component of the ADHD Beliefs Scale-Revised*



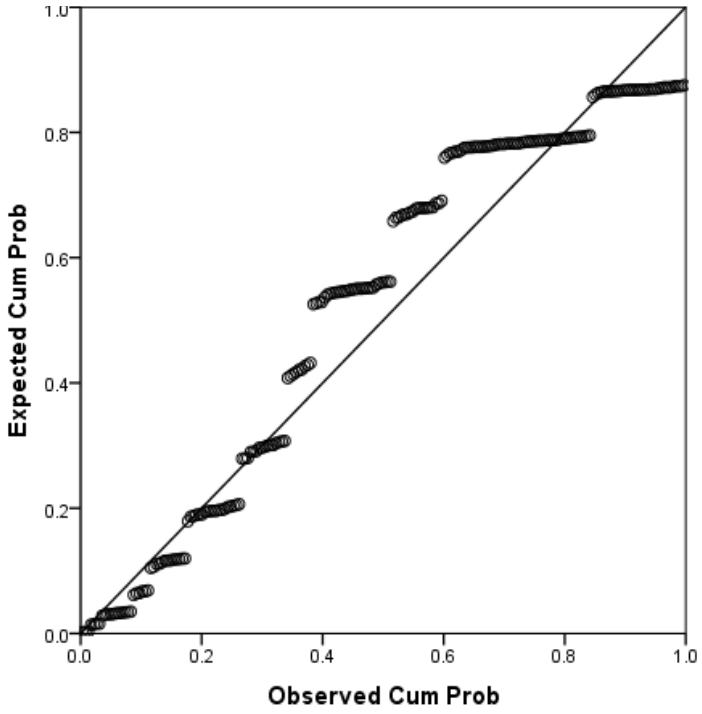
According to Figure 15, the distribution of the residual does not suggest a violation of the assumption of residual homoscedasticity.

Figure 16. *Assumption of residual independence for multiple regression assessing the association between educational setting, teaching experience and scores on the Beliefs about the Role of Parents of ADHD component of the ADHD Beliefs Scale-Revised*



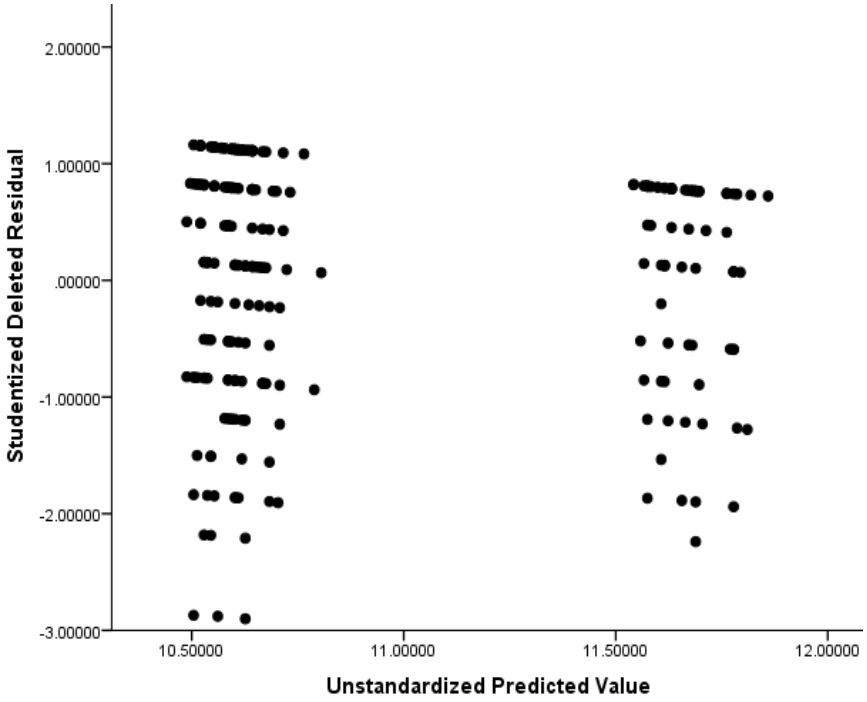
As depicted in Figure 16, the residual does not appear to be affected by participant number, indicating that the time at which participants completed the questionnaire did not impact the results.

Figure 17. *Assumption of residual normality and linearity for multiple regression assessing the association between educational setting, teaching experience and scores on the Beliefs about the Role of Parents in ADHD component of the ADHD Beliefs Scale-Revised*



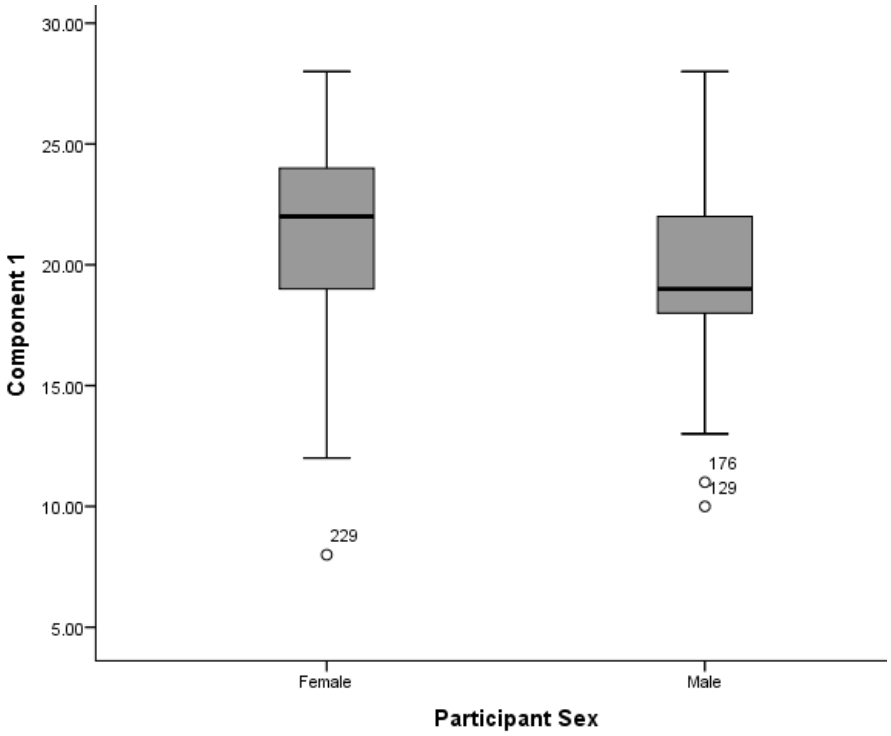
No major deviations from the assumption of linearity can be identified in Figure 17. The distribution of the residual, however, suggests a deviation from normality which may be an indication of an assumption violation.

Figure 18. *Assumption of residual homoscedasticity for multiple regression assessing the association between educational setting, teaching experience and scores on the Beliefs about the Neurobiology of ADHD component of the ADHD Beliefs Scale-Revised*



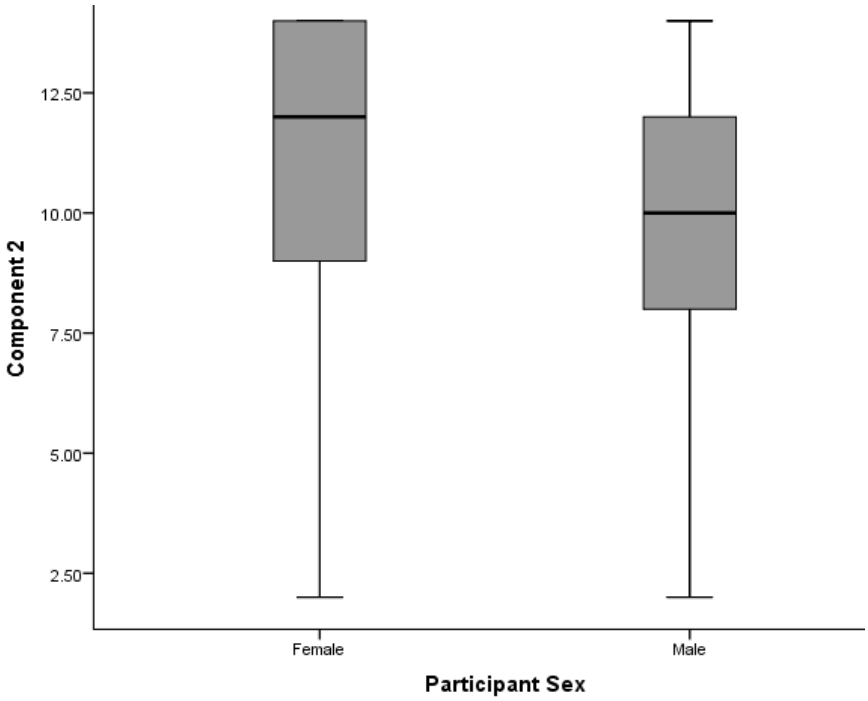
According to Figure 18, the distribution of the residual appears to be heteroscedastic, indicating a violation of the assumption of homoscedasticity.

Figure 19. *Assumption of variance homogeneity for ANOVA assessing sex differences in scores on the Beliefs about the Neurobiology of ADHD component of the ADHD Beliefs Scale-Revised*



Judging by Figure 19, the distribution of scores appears to be relatively homogeneous across the two groups indicating that the assumption of variance homogeneity is met.

Figure 20. *Assumption of variance homogeneity for ANOVA assessing sex differences in scores on the Beliefs about the Role of Parents in ADHD component of the ADHD Beliefs Scale-Revised*



While the variance across groups as depicted in Figure 20 is not fully homogeneous, this does not constitute a violation of the assumption of variance homogeneity.