Running Head: EMPIRICAL EVIDENCE

Can Giftedness be Misdiagnosed as Attention Deficit Hyperactive Disorder? Empirical Evidence

Jillian C. Gates

Marcia Gentry

Purdue University

Abstract

To investigate whether giftedness might be misdiagnosed as ADHD, 71 gifted adolescents attending a summer residential camp were administered the Conners' ADHD/DSM-IV Scales – Adolescent (Conners, 1997) and the Overexcitabilities Questionnaire – Two (OEQ-II, Falk et al., 1999). This sample yielded clinically significant scores at a rate more frequent than the national average of three to seven percent. Fifty-six percent of the adolescents in this sample scored in this range for the ADHD-Inattentive subscale, 52% for the ADHD-Hyperactive subscale, and 49% for the ADHD-Combined subscale. Additionally, the OEQII Psychomotor OE and the ADHD-Hyperactive subscales were significantly correlated at r=.516, $p<.05$ with item overlap across all ten items of the Psychomotor OE and 8 of the 9 ADHD-H subscale items. These data indicate that there is a possibility that misdiagnosis may occur in a gifted population.

Identification and understanding of learning difficulties and capabilities is important in order for teachers to address students' learning needs. A variety of methods exist to identify students for gifted programs such as formal, standardized, or criterion-referenced tests, checklists, rating scales, observation forms, and portfolios. The availability of a variety of instruments provides flexibility for customizing identification procedures to the characteristics of students and to programs offered. However, this variety can also yield errors in diagnoses, identification, and interpretation of results. This study used The Conners' ADHD/DSM-IV Scales – Adolescent (CADS-A: Conners, 1997) and the Overexcitability Questionnaire – Two (OEQII: Falk, Lind, Miller, Piechowski & Silverman, 1999) to examine whether giftedness might potentially be misdiagnosed as Attention Deficit Hyperactivity Disorder (ADHD). Students enrolled in a summer enrichment program for gifted students who had not been diagnosed as having ADHD were assessed using both instruments to determine whether they might score in the clinical range for ADHD and exhibit overexcitabilities often attributed to gifted individuals as described by Piechowski (1975). A second objective involved investigating whether specific overexcitabilities correlated with the ADHD DSM-IV Hyperactivity, Inattentive, and Combined subscales on the CADS-A. The final objective addressed how these instruments might be used to help clinicians recognize potential giftedness and avoid possible misdiagnosis of ADHD.

Background

A study that investigated the overlap of items in the Conners' Rating Scale – Teacher Short Form, which contains similar items to the CADS-A (Conners, 1997) and the OEQII (Falk, Lind, Miller, Piechowski, & Silverman, 1999) was completed prior to this study (Author, 2007). The Conners' Rating Scale (CRS) (Conners, 1997) was compared with the Negative Behaviors of Gifted Individuals checklist (Reid et al., 1995), the Scales for Rating the Behavioral Characteristics of Superior Students (SRBCSS) - Creativity Subscale (Renzulli et al., 1976), and the Overexcitabilities Questionnaire – Two (OEQII) Psychomotor overexcitability subscale (Falk, Lind, Miller, Piechowski & Silverman, 1999). Results showed that 13 CRS items were similar to items on the Negative Behaviors of Gifted Individuals, 10 CRS items overlapped with the SRBCSS – Creativity Subscale and OEQII Psychomotor Overexcitability, respectively. The incidence of overlap indicated the possibility that children who exhibit behaviors normally associated with Attention Deficit Hyperactivity Disorder (ADHD) may also be viewed as exhibiting gifted behaviors, depending on the instrument used (Author).

Attention Deficit Hyperactivity Disorder

The Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition Text Revision (DSM IV-TR) defined ADHD as: six or more symptoms of inattention, hyperactivity or impulsivity that have persisted for a period of six months, are inconsistent with development, and affect normal social behaviors (American Psychological Association, 2000). These symptoms must be present before the age of seven and must be present in two or more settings, such as school and home. Finally, there must also be clear impairment in social, academic, or emotional functioning. Thus, the child with ADHD will have difficulty completing work, interacting socially, and following common routines; and these difficulties will occur at school and at home.

Several causes of ADHD have been posited in the research. Zentall (2006) theorized that individuals with ADHD have an extraordinary need for stimulation; whereas Cramond (1994) suggested that these students are easily confused with energetic, highly creative people. Both of these theories focus on environmental factors that cause the behaviors. These theories are based on the premise that when the environmental stimuli decrease, hyperactivity and inattention

increase as a means of self-stimulation (Baum, Olenchak, & Owen, 1998). Others claimed that motivational issues cause the behaviors, suggesting lack of attention is caused by the individual's need for rewards or reinforcements (Haenlein & Caul, 1987). Whatever the theorized etiology of the ADHD-like behaviors, all theories have environmental conditions and response to the environment in common.

The DSM-IV TR (APA, 2000) cited the prevalence of ADHD in the general population as three to seven percent. However, the Centers for Disease Control (CDC: 2003) reported ADHD prevalence in some states as greater than 10% of the general population. Attention Deficit Hyperactivity Disorder seems to affect more boys than girls, but the actual risk factors remain undetermined (CDC, 2003). Attention Deficit Hyperactivity Disorder can be broken into three subtypes: (1) Inattentive (ADHD-I), (2) Hyperactive (ADHD-H), and (3) Combined (ADHD-C) (APA, 2000).

Overexcitabilities

Overexcitabilities (OEs) have been discussed in the literature for many years. Dabrowski (1964), in his theory of positive disintegration. proposed that gifted individuals experience the world more intensely and thus feel and respond to their personal experiences in a more intense manner. Dabrowski (1972) defined OEs as intense psychological sensory experiences resulting from neuron sensitivity. He identified five intensities: Psychomotor, intellectual, Imaginational, Sensual, and Emotional. He derived these intensities from his observations of children's reactions to stress in the classroom, hypothesizing that gifted individuals experienced these intensities more deeply than their peers leading to higher moral development. He based his theory on the personal belief and empirical evidence that gifted individuals are prone to depression and difficulties in dealing with the stress of everyday life. This stress causes deep pain within the individual and leads to a positive disintegration of the person's development, which in turn leads to a higher level of development. The more intense the negative feelings of guilt, shame, conflict, the higher the person's moral development.

Other researchers have suggested that gifted individuals experience the world more intensely than their same-age peers of average ability (Hollingworth, 1942; Silverman, 1994). These intensities may be expressed through enthusiasm, active behavior, passion about hobbies, vivid imaginings, intense emotional displays, and emotional responses to stimuli (Hollingworth; Silverman). Piechowski's (1999) indicated that these intensities or excitabilities do not detract from an individual's ability to perform, but serve to highlight a person's abilities and talents. The term overexcitabilities was coined to show that these experiences went beyond those of the general population. This concept has served to fuel much debate on the subject and has resulted in the development of tools such as the Overexcitability Questionnaire (OEQ; Lysy & Piechowski, 1983); ElemenOE (Bouchard, 2004), and the Overexcitabilities Questionnaire – Two (Falk et al., 1999) used in this study.

Several themes emerged from the research regarding the presence and prevalence of overexcitabilities among gifted students. Studies that investigated the overexcitability profiles of school-age children indicate that students (K-12) who exhibit intellectual or creative giftedness also exhibit higher levels of Intellectual and Emotional overexcitabilities (Ackerman, 1997; Bouchard, 2004; Gallagher, 1986; Tucker & Hafenstein, 1997). Young children also exhibit higher levels of Psychomotor overexcitability than adults. In fact, for students in early childhood and elementary school, the Psychomotor overexcitability accounted for the majority of variance between gifted and average students in the samples (Ackerman; Bouchard; Bouchet & Falk, 2001; Miller, Silverman, & Falk, 1994; Piechowski & Cunningham, 1985; Silverman &

Ellsworth, 1981). Artistic adults from the United States also exhibited high levels of the Psychomotor overexcitability when compared to Venezuelan artists (Falk, Manzanero, & Miller, 1997).

Another theme present in the research was that intellectually gifted children and adults tend to have higher Intellectual and Emotional overexcitability profiles than their average peers (Lewis & Kitano, 1992). Imaginational overexcitabilities are also more prevalent in intellectually gifted individuals than in their average peers (Ackerman, 1997; Bouchard, 2004; Bouchet & Falk, 2001; Falk, Manzanero, & Miller, 1997; Lysy & Piechowski, 1981; Miller, Silverman, & Falk, 1994; Piechowski & Cunningham, 1985; Schiever, 1985; Silverman & Ellsworth, 1981).

Researchers who have studied OE suggest that OEs are stronger in gifted and/or creative people than in members of the general population. The most prevalent OEs among gifted or creative individuals are: Emotional, Intellectual, and Psychomotor. Several studies showed that the Psychomotor OE accounts for the most variance between groups followed by Intellectual and Emotional OEs (Ackerman, 1997; Bouchard, 2004; Bouchet & Falk, 2001; Falk, Manzanero, & Miller, 1997; Miller, Silverman, & Falk, 1994; Piechowski & Cunningham, 1985; Silverman & Ellsworth, 1981). Only one study of creativity in gifted students showed that Psychomotor OE scores were no different between groups (Schiever, 1985).

Tieso (2007a; 2007b) conducted two studies using the OEQII to examine family and individual factors that contribute to a child's OE profile. She investigated OE profile differences across gender, grade level, and between gifted and general students. She found significant correlations among all five subscales at the $p < 0.01$ level.

Identification

Many issues confound the process of student identification for gifted programming. In the field of gifted education many definitions of giftedness and talent exist ranging from Galton's (1869) work based on genetics and physical attributes to those of Renzulli (1978) and Tannenbaum (1991) who focused more on the environmental aspects along with performance or potential to perform. These theories are filtered through cultural, social, academic, and educational lenses (Borland, 2004), as well as interpreted by those who design gifted education programs. Tannenbaum (1991) and Renzulli (1978) theorized that several interacting facets must be present in order for a child to display gifted behaviors. These facets have overt behaviors associated with them such as task-commitment and achievement in some form. Gardner (1983) also contended that there were many behaviors that could be associated with giftedness and talent. Tannenbaum noted that if a child has the chance to showcase his or her attributes in a positive light then giftedness may be recognized. The converse may also be true. If the behaviors exhibited by the child are viewed as negative, then the child may be seen as having ADHD or some other disorder (Zentall, 2006).

When the behaviors purported to indicate giftedness are similar to or even the same as those associated with other less desirable conditions such as ADHD, misdiagnosis or misinterpretation can become problematic (Author, 2007; Eide, & Eide, 2006; Webb, 2000; Webb et al., 2005). The American Psychological Association defined ADHD as a prevalence of behavioral symptoms of inattention, hyperactivity, or impulsivity in two or more settings (APA, 2000). The question is whether or not the symptoms that lead to identification of giftedness or a diagnosis of ADHD are mutually exclusive. Previous research described item-level similarity between the CRS (Conners, 1997) and the OEQII (Falk et al., 1999), suggesting a relationship among behaviors associated with giftedness and ADHD (Author, 2007).

Identification Methods

The over-reliance on standardized test scores or single measures of intelligence for identification purposes have been criticized as these measures provide educators a snapshot of a child in time, rather than information over time and in different formats (Coleman, 2003; Passow & Frasier, 1996). This lack of multiplicity in the identification process has resulted in under-representation of some population groups (Naglieri, & Ford, 2003; Passow, & Frasier, 1996) and may also contribute to the misdiagnosis of giftedness as ADHD (Eide, & Eide, 2006; Webb, 2000; Webb et al., 2005).

Multiple identification measures and methods should be used to provide a clearer picture of the child and his or her capabilities, not to exclude him or her from a program or class (VanTassel-Baska, Feng, & deBrux, 2007). These may include the use of portfolios, self-, parent-, or teacher-nominations, school grades, checklists, and rating scales in addition to standardized measures (Borland, & Wright, 1994; VanTassel-Baska, et al., 2007). Single-occasion testing may result in an incorrect use of the information or in the mislabeling of a child. Once an incorrect label is assigned to a child it is difficult to remove it, and change possible perceptions of teachers and others (Cross, Coleman, & Stewart, 1993; Kerr, Colangelo, & Gaeth, 1988; Manaster, Chan, Watt, & Wiehe, 1994).

Research Questions

The following research questions guided this study:

1. How are gifted and ADHD behaviors of gifted students related to those of general students as measured by the CADS-A (Conners, 1997) and OEQII (Falk et al., 1999)?
2. What is the nature and extent of the correlations among subscales of the OEQII and the CADS-A on a sample of gifted fifth through twelfth grade students?
3. How might educators and clinicians use both the CADS-A (Conners, 1997) and the OEQII (Falk et al., 1999) to better understand the etiology of students' behaviors?

Methods

Participants

This study used a purposive sample of 5th through 12th grade students ranging in age from 10 to 18 years (n=71) who attended a residential summer program for gifted students at a university in the Midwest. This group of students was chosen because they were already identified as gifted and none of them were diagnosed with ADHD. Students were recruited over the course of two summers with 32 consenting to participate in 2007 (85% response rate) and 39 consenting in 2008. Forty-three students were male. Students came from a variety of ethnic backgrounds: 51% white, non-Hispanic, 27% Asian, 8% African American, 5% Hispanic, 2% Native American, and 7% other.

Design and Procedures

Institutional Review Board approval was obtained and students were recruited during registration for the summer program. A brief synopsis of the study was given to students and parents verbally as well as in written-form. When students and parents agreed to be a part of the study, they signed assent and consent forms prior to data collection. The research design was a one-time survey administration. Students completed both the CADS-A (Conners, 1997) and the OEQII (Falk, Lind, Piechowski, & Silverman, 1999) in one session, which took approximately 20 minutes. Students and parents agreed to participate in the study without incentive.

Instrumentation

Conners' ADHD / DSM-IV Short Form – Adolescent (CADS-A). The Conners' Rating Scales are widely used in the diagnosis of ADHD and have been subjected to rigorous validation and normalization (Conners, 1997). The CADS-A was chosen specifically as it is an auxiliary,

self-report scale that contains the subscales used in the diagnostic scales. The CADS-A is not intended to diagnose ADHD, but it is used to identify the presences of ADHD-like behaviors. A score of greater than or equal to six on either of the ADHD- Hyperactive or ADHD-Inattentive subscales, or a score of greater than or equal to 12 on the ADHD-Combined subscale indicates that a complete diagnostic process should be pursued.

The CADS-A was derived using the ADHD Index of the Conners' Rating Scale (CRS) symptom subscales and factors as well as the ADHD Index (Conners, 1997). The CADS-A consists of 30 items: ADHD Index (12 items), DSM-IV Symptoms Subscales (18 items – 9 items for Inattentive and 9 items for Hyperactive). The Combined subscale score is the combined total of the Inattentive and Hyperactive Subscales. Results obtained from this form are useful when either a single scale or all subscale scores are used (Conners, 1997). The DSM-IV Symptoms subscales for the CADS-A were developed by Parker, Sitarenios, and Conners (1996b). Additional items were added to the CADS-A from the Conners' Adolescent Self-Report Scale – Short Version (CASS-S). The subscale items were subjected to factor analysis and maximum likelihood estimation using a normative sample of 3,486 children. Parker et al. reported a GFI of 0.932, AGFI of 0.912, and RMSEA of 0.048, indicating adequacy of fit. Internal consistency reliability estimates of the subscale data ranged from .82 to .90 (Edwards et al., 2005) These data were re-tested several times by Parker et al. (1996b), and Conners' (1997) reported a sensitivity score of 90.7% with a specificity score of 88.4%. These scores indicate the ability of the instrument to identify clinical cases in the general population and the ability to accurately measure normal cases in the population respectively (Conners, 1997).

The Overexcitability Questionnaire – Two. The OEQII (Falk et al., 1999) measures the five dimensions of overexcitabilities: Psychomotor, Imaginational, Sensual, Intellectual, and Emotional. The scale consists of 50 items with 10 questions per subscale, to which individuals respond using a 5-point response scale from "Not At All Like Me" to "Very Like Me". The OEQII is based on Dabrowski's (1964) theory of positive disintegration and the function OEs have in the development of a person's moral development. The OEQII was selected because several items in this instrument are similar to those on the CADS-A (Conners, 1997). This instrument was also chosen as the presence of overexcitabilities are one indicator of giftedness (Dabrowski, 1964; Piechowski, 1999).

The OEQII is adapted from the original OEQ, which used a free-response format with 21 items (Lysy & Piechowski, 1983). The OEQII was designed for analyzing group data and has not been normed as a diagnostic instrument for individuals (Falk et al., 1999). The instrument was designed as an easier means of identifying OEs than previous measures that included "open-ended responses to verbal stimuli" as well as evaluation of "autobiographical information and open-ended questionnaires" (Falk et al., 1999, p.2). The pilot study of the instrument was conducted using 563 college students enrolled in a social science course (ages ranged from 15 to 62) and yielded subscale means and standard deviations as follows: Psychomotor $\overline{X}$ =3.37, SD = 0.79; Sensual $\overline{X}$ =3.28, SD=0.87; Imaginational $\overline{X}$ =2.86, SD=0.83; Intellectual $\overline{X}$ =3.50, SD=0.79; and Emotional $\overline{X}$ =3.72, SD=0.77.

Construct validity of the OEQII was carried out on a sample of 852 people, ages 10-76. The youngest member of the sample was an identified gifted elementary school student. Forty nine percent of the sample was 17 years-old or younger (Falk et al., 1999). Female participants comprised 68% of the sample. Sixty-five percent of the sample participated in gifted or advanced educational programming (Falk, et al.) Alpha reliability coefficients for the five factors were: Psychomotor = 0.88, Sensual = 0.88, Imaginational = 0.90, Intellectual = 0.85, and Emotional

=0.83. An alpha coefficient of 0.70 or above is considered acceptable (Gable & Wolf, 1993; Nunnally, 1978) for an affective instrument; therefore these results indicate that the OEQII contains items with good internal consistency reliability estimates.

Scoring on the OEQII (Falk, et al., 1999) is not clarified in the test manual as this instrument is not yet normed for scoring individuals. However, the manual does offer means and standard deviations for each of the OEs for the standardization sample. Therefore, a score greater than one or two standard deviations above the mean may indicate a level of OE that is commensurate with theory (Dabrowski, 1964; Piechowski, 1999).

Using both OEQ II and the CAD-A allowed investigation of the possible co-occurrence of overexcitabilities and ADHD behaviors in individual gifted students.

Data Analysis

Alpha reliability estimates and descriptive statistics. Alpha reliability estimates of the sample data were calculated for the subscales on both instruments. The CADS-A and OEQII were scored according to the specifications in the user manuals for the instruments (Conners, 1997; Falk, Lind, Piechowski, & Silverman, 1999). These data were then transferred into a database that included both item-level scores as well as CADS-A subscale and OE scores. The total scores for each subscale and OE were obtained in order to analyze data from each of the measures. Descriptive statistics were generated in order to describe the prevalence of ADHD-like behaviors in the sample comparison to the general population. Overexcitabilities Questionnaire – Two (Falk et al., 1999) scores for the full study sample (N=71) and the sub-sample (n=39) who scored in the clinically significant range on any of the CADS-A subscales were investigated to see if any specific OEs were particularly associated with high scores on the CADS-A Hyperactive subscale.

Results

Gifted Versus Normative Population Subscale Scores

To address research question one, *how are gifted and ADHD behaviors of gifted students related to those of general students as measured by the CADS-A (Conners, 1997) and OEQII (Falk et al., 1999)?,* scores were obtained for the three subscales on the CADS-A (ADHD-Inattentive, ADHD-Hyperactive, and ADHD-Combined) (Conners, 1997). Alpha reliabilities were calculated for both instruments using the sample in this study: CADS-A (Conners, 1997): Inattentive = 0.84, Hyperactive = 0.87, Combined = 0.91 and OEQII (Falk, Lind, Piechowski, & Silverman, 1999) Psychomotor= 0.88, Sensual= 0.88, Imaginational= 0.90, Intellectual= 0.85, Emotional=0.83.

A score of greater than or equal to six on either of the ADHD- Hyperactive or ADHD-Inattentive subscales, or a score of greater than or equal to 12 on the ADHD-Combined subscale indicates that further diagnostic investigations should be initiated to assess the possibility of a diagnosis of ADHD (Conners, 1997). This sample (n=71) yielded clinically significant scores at a rate more frequent than the estimated national average of 3-7% for all children (APA, 2000). Specifically, fifty six percent (n=40) of the sample scored in this range for the ADHD-I subscale, 55% (n=39) for the ADHD-H subscale, and 51% (n=36) for the ADHD-C subscale (Hyperactive and Inattentive subtypes of ADHD). Scores for the sample on the three CADS-A (Conners) subscales are summarized in Table 1.

Table 1. *Clinically Significant Scores on the CADS-A Subscales for Study Participants*

CADS-A Subscale	Number	Percentage
Inattentive (9 items)	40	56
Hyperactive (9items)	39	55
Combined (18 items)	36	51

Mean scores and standard deviations for each OE were obtained for the five overexcitability scales on the OEQII (Falk et al., 1999). These were compared with the means and standard deviations of the normative sample and the sub-sample of participants who scored high on the ADHD-H subscale. These data are summarized in Table 2 below.

Table 2. *Comparison of Means and Standard Deviations across Samples and Sub-Sample*

	Study Sample		Sample scoring ≥6 on Hyperactive Subscale		Normative Sample	
	n=71		*n*=39		*n*=872-879*	
OEQII Overexcitability	Mean Score	Standard Deviation	Mean Score	Standard Deviation	Mean	Standard Deviation
Psychomotor	3.04	0.95	3.43	0.82	3.35	0.79
Sensual	2.77	0.98	2.92	1.03	3.28	0.87
Imaginational	2.61	1.01	2.88	1.01	2.86	0.83
Intellectual	3.55	0.80	3.72	0.76	3.50	0.79
Emotional	2.87	0.83	2.92	0.82	3.72	0.77

Note. *Normative sample varied due to response rate on OE subscales.

Several Analyses explored the similarities and differences between the normative sample for the OEQII (*N*=872-879), the study sample (*n*=71), and the sub-sample (*n*=39) of participants who scored greater than or equal to six on the CADS-A Hyperactive subscale. Participants in the sub-sample showed a mean OE profile very similar to the study and normative sample profiles with Psychomotor, Intellectual, and Emotional OE scoring the highest. However, the sub-sample yielded mean scores for the Psychomotor OE ($\bar{X}$ =3.43, SD=0.82) and the Intellectual OE ($\bar{X}$ =3.72, SD=0.76) that were higher than both the study and the normative sample means. Emotional OE ($\bar{X}$ =2.92, SD=0.82) scores were lower on average than the normative sample, but higher than the study sample.

Historically, giftedness has been defined using standard deviations of IQ scores above the mean (Binet & Simonton, 1916). Therefore, in order to better understand this gifted sample, we

considered the frequencies of students who scored at or above the mean, and one or two standard deviations above the mean on the five OEs. Frequencies of study sample participants scoring at each of these levels were obtained using both their sub-sample mean scores and standard deviations and those of the normative sample as comparisons. These results are summarized in Tables 4 and 5.

Using the normal curve as a reference it is reasonable to expect that 34.1% of scores would lie between the mean and plus one standard deviation and 13.6% of scores would lie between the first and second standard deviations. Only 2.15% of scores would be expected to lie above the second standard deviation (de Moivre, 1738). The skewness and kurtosis of each OE was calculated in order to assess whether the assumption of normality was possible. These results are summarized in Table 3. In order to assess normality, the standard error of kurtosis (SEK) and standard error of skewness (SES) must be calculated (Tabachnik & Fidell, 1996). According to Tabachink and Fidell, kurtosis is significant if its absolute value exceeds twice the SEK. For this sample none of the standard errors of kurtosis are significant. Skewness is assessed using the same standard (i.e. twice the SES). None of the skewness statistics for this sample exceed twice the absolute value of SES. Therefore, we can treat this sample as normally distributed for all OEs.

Table 3. *Skewness and Kurtosis of Sample*

Statistic	Psychomotor	Sensual	Imaginational	Intellectual	Emotional
Mean	3.039	2.775	2.610	3.551	2.873
Median	3.1	2.8	2.5	3.6	2.8
Standard Deviation	0.954	0.984	1.005	0.803	0.835
Kurtosis	-0.533	0.108	-0.317	-0.345	0.086
Standard Error of Kurtosis	2.848	2.848	2.848	2.848	2.848
Skewness	-0.050	-0.200	0.503	-0.366	-0.218
Standard Error of Skewness	0.712	0.712	0.712	0.712	0.712

Mean sample OE scores compared with study sample means and standard deviations. Analyses showed that the percentage of sample participants with OE scores between the mean and one standard deviation exceeded that which would be expected in a normal distribution for all OEs (range: 41-49%), except the Imaginational OE (28%). The Intellectual OE had the highest percentage of students scoring in this range (49%).

The distribution between one standard deviation and two standard deviations was much closer to that which would be expected with the range between 10-13% of sample participants scoring at this level. Finally, the percentage of sample participants scoring above two standard deviations was also higher than expected for all OEs except Intellectual. This is not surprising given that this population would be expected to have a restricted range of intellectual OE due to the gifted status of all participants.

Table 4. *Percentages of Study Sample Participants Scoring Above Study Sample Mean*

	Study Sample (*n*=71)				
OEQII Overexcitability	Mean Score	Standard Deviation	*% x^{-} - 1SD*	*% 1SD - 2SD*	*% > 2SD*
Psychomotor	3.04	0.95	41	12	3
Sensual	2.77	0.98	37	11	4
Imaginational	2.61	1.01	28	13	6
Intellectual	3.55	0.80	49	13	0
Emotional	2.87	0.83	41	10	3

Mean sample OE scores compared with normative sample means and standard deviations. Analyses of the mean Intellectual OE scores of the sample compared to the mean OE scores of the normative sample shows several differences in characteristics between the two groups. Forty two percent of participants scored between the mean and one standard deviation, with a further 20% scoring between one and two standard deviations above the mean. Thirty percent of sample participants scored between the mean and one standard deviation for both the Psychomotor and Sensual OEs. Both the Imaginational and Emotional OEs scored substantially lower than would be expected at 15% and 14% respectively. The means and standard deviations for the normative sample were higher than those of the study sample therefore it was impossible to receive a score greater than two standard deviations above the mean for three of the OEs as the maximum possible score on the OEQII scale was 5. Therefore, only the Psychomotor and Imaginational OEs had any scores in this range. These percentages were 3% and 4% respectively.

Overexcitability profiles of the study sample differed with comparison to the different means and standard deviations. Compared to the normative sample, the gifted sample showed an elevated profile for the Intellectual, Psychomotor, and sensual OEs. However, when compared to the gifted sample means, the profile showed elevated scores for the Intellectual, Psychomotor, and Emotional OEs.

Table 5. *Percentages of Study Sample Participants Scoring Above Normative Sample Mean*

	Normative Sample (*n=872-879)*		Study Sample (*n=71)*		
OEQII Overexcitability	Mean	Standard Deviation	*% x^{-} - 1SD*	*% 1SD - 2SD*	*% > 2SD*
Psychomotor	3.35	0.79	30	13	3
Sensual	3.28	0.87	30	7	0
Imaginational	2.86	0.83	15	13	4
Intellectual	3.50	0.79	42	20	0
Emotional	3.72	0.77	14	3	0

The Nature and Extent of Correlations

Correlations. Correlation is described as a measure of the degree of association between variables. Correlational analyses allow researchers to investigate association between variables, but not to predict outcomes or determine causal relationships (Asuero, Sayago, & Gonzalez, 2006; Cohen, 1988; Tabachnick & Fidell, 1989). Thus, several different correlational procedures were used to analyze these data. Correlations between CADS-A and OEQII subscales were calculated, followed by item-level correlations for any subscales that yielded statistically significant correlations between subscales.

In order to answer the research question, *what is the nature and extent of the correlations among subscales of the OEQII and the CADS-A on a sample of gifted fifth through twelfth grade students?,* correlations between the variables under investigation were run. Bivariate correlations were used to measure the strength of relationships among the variables as the distinction between the independent variables and the dependent variables were not clear. This procedure was also appropriate because none of the variables were manipulated and no inferences about causality were intended (Tabachnik & Fidell, 1989). Additionally, Spearman correlations were generated to account for the difference between scales. This type of correlation was chosen due to the ordinal nature of the data. All analyses were done using SAS.

Both simple and bivariate correlations were run to investigate whether differences between these types of correlations existed for this sample. Simple correlation is appropriate for use with small samples. However, covariates must be accounted for when correlating the subscales and OEs. Therefore bivariate correlations were also calculated to account for multicollinearity among variables.

Subscale-level correlations. Spearman simple and bivariate correlations were run for the CADS-A subscales and the OEQ-II, and are summarized in Tables 6 and 7. Simple Spearman correlations revealed a significant correlation between the Hyperactive subscale of the CADS-A and the Psychomotor OE (r=.516, p < .0001) and between the Combined subscale of the CADS-A and the Psychomotor OE (r=.453, p < .0001). Bivariate Spearman correlations show the same CADS-A and OEQ-II subscale correlations. However, the correlation coefficient is reduced to.433, p< .05 for the Hyperactive subscale and .375, p<0.05 for the Combined subscale respectively. In each instance, the Combined subscale includes the items in the Hyperactive

subscale, therefore the correlations between the Combined scale and Psychomotor scale do not offer new information.

Item-level correlations. Of the 9 items on the Hyperactive subscale of the CADS-A (Conners, 1997) and the 10 items on the Psychomotor OE of the OEQII (Falk et al., 1999) only item B11 from the CADS-A was not correlated with the other OEQII items. Specifically, the 10 OEQII items were correlated with two or more items from the remaining CADS-A Hyperactive subscale items. The magnitude and number of inter-item correlations between the two subscales are depicted in Figure 1.

Table 6. Simple Spearman Correlations of CADS-A Subscales and OEQII Overexcitabilities

OEQII	CADS-A		
	Inattentive	Hyperactive	Combined
Psychomotor	.340*	.516**	.453**
Sensual	.059	.189	.140
Imaginational	.294*	.365*	.367*
Intellectual	.244*	.267*	.256*
Emotional	.072	.139	.128

*Note. *p < .05 ** p< .0001.*

Table 7. *Bivariate Spearman Correlations of CADS-A Subscales and OEQII Overexcitabilities*

OEQII	CADS-A		
	Inattentive	Hyperactive	Combined
Psychomotor	.304*	.433*	.375*
Sensual	.121	.148	.139
Imaginational	.387*	.443**	.432*
Intellectual	.304*	.304*	.322*
Emotional	.154	.109	.145

*Note. *p < .05 ** p< .0001.*

CADS-A Hyperactive Subscale Items	OEQII - Psychomotor OE Items									
	Q2 I am a competitive person	Q7 If an activity is physically exhausting, I find it satisfying	Q10 I love to be in motion	Q15 When I have a lot of energy, I want to do something really physical	Q18 I am more energetic than most people my age	Q21 The longer that I have to sit still, the more restless I get	Q29 I feel like my body is constantly in motion	Q39 When I am nervous, I need to do something physical	Q42 I am the type of person who has to be active - walking, cleaning, organizing, doing something	Q50 I thrive on intense physical activity, e.g. fast games and sports
B10 I fidget (with hands or feet) or squirm in my seat	.126	.039	.217	.170	**.274**	**.510**	**.365**	.115	.274	.081
B11 I leave my seat when I am not supposed to (e.g. in school)	.104	-.023	.138	.085	.012	.170	.106	.068	-.002	.073
B12 I am restless or overactive	.156	**.262**	**.329**	**.239**	**.330**	**.048**	**.400**	**.295**	.118	.154
B13 I have trouble playing or doing leisure activities quietly	.200	.087	.169	.159	**.279**	**.412**	**.338**	.052	.202	.190
B14 I am always on the go	**.255**	**.319**	**.361**	**.358**	**.336**	**.277**	**.267**	.201	**.353**	**.434**
B15 I talk too much	.197	.128	.144	**.241**	**.329**	**.361**	**.471**	**.275**	**.346**	.138
B16 I give answers to questions before the questions have been completed	**.295**	.102	**.279**	**.299**	**.287**	**.338**	**.474**	**.263**	**.305**	**.252**
B17 I have trouble waiting in line or taking turns with others	.178	.013	.189	.094	.154	**.417**	.175	.081	.038	.059
B18 I interrupt others when they are working or playing	.055	.103	**.243**	**.235**	.162	.085	.178	.012	.147	.166

Figure 1. Item-level correlations for the CADS-A Hyperactive subscale and the Psychomotor OE.

$p<.0001$ $p<.001$ $p<.05$

Non-Significant Findings

No significant correlations were found between the Sensual and Emotional OEs and the CADS-A Hyperactive subscale in this study. This may be due to the characteristics of students who attend the summer program from which the sample was taken. The program is predominantly STEM (Science, Technology, Engineering, and Math) related, which may not attract the type of students who might score higher on the Sensual or Emotional OE. Also, this is a residential program that may deter students with sensual or emotional intensities from attending as they might find living in a dorm-like atmosphere with large numbers of students overwhelming. Sampling a wider population may result in different OE profiles.

The Inattentive subscale of the CADS-A correlated with the Psychomotor OE (r=.340, p<.05), a substantially lower correlation than between the Psychomotor OE and the CADS-A Hyperactive and Combined subscales.

Discussion

Relationship Between OEQII Score and ADHD Subscale Score

The findings from this study reveal that a relationship exists between scores on the CADS-A (Conners, 1997) subscales and the OEs for an academically gifted sample. These data indicate significant numbers of high Psychomotor OE scores together with high scores on all of the CADS-A subscales. These scores are trustworthy as Conners (1997) found that adolescents were more accurate reporters of their own behaviors than their parents. The adolescents in this study identified behaviors in themselves on both scales in a neutral environment during a summer program. This raises the question of how this information might be treated in a school setting if adults (parents, teachers, counselors) recorded the same information, especially on the ADHD scales. Professional and clinical experience (Eide & Eide, 2006; Author, 2007; Webb at al., 2005) indicates that a prevalence of these behaviors would result in the pursuit of an ADHD diagnosis, but further research is required to fully address this question.

The Synonymous Nature of Giftedness and ADHD

We found similar behaviors associated with both ADHD and giftedness. These behaviors are clustered in the ADHD-Hyperactive and the Psychomotor OE indicators. The high scores on the Psychomotor OE of this gifted sample are consistent with the work of Ackerman (1997), Falk et al. (1997), and Bouchard (2004) who found that the Psychomotor OE accounted for the majority of the variance between gifted and non-gifted groups. The behaviors associated with the Psychomotor OE are very similar in nature to those associated with the Hyperactive subtype of ADHD (Author, 2007). The current data support the idea that overlap exists between the instruments in this area.

CADS-A and OEQII in Prevention and/or Detection of Misdiagnosis

The findings discussed in the previous section indicate that, although the CADS-A and the OEQII are psychometrically sound instruments, the results they yield are subject to interpretation. Do the behaviors indicate giftedness or ADHD or both? Baum, Olenchak, and Owen (1998) and Passow and Frasier (1996) suggested that a child who receives a diagnosis of ADHD should also be cognitively tested. Results from these tests would provide insight into whether the child is also gifted or if a misdiagnosis might have occurred. Testing alone will not answer this question, but if high cognitive functioning is found, then the delivery of rigorous curriculum may also inform the diagnostic process. A child who is bored and gifted may not exhibit those same overt behaviors when the rigor of the curriculum is increased as challenge and engagement may result in motivation and remove the need for self-stimulation (Baum et al., 1998; Webb at al., 2005). The students who took part in this study were all identified as gifted.

None of them were identified as having ADHD as reported by their parents. However, 55% of these students scored uncharacteristically high on the ADHD self-report form – CADS-A. This sub-sample of students scored similarly high on the OEQII Intellectual, Psychomotor, Sensual, and Emotional OEs. Overall gifted students in this sample whether they scored high on the Hyperactive subscale or not, scored high on the Intellectual, Psychomotor, and Emotional OE subscales. However, those students whose scores were highest on the CADS-A Hyperactivity subscale had higher mean scores for these three OEs. Thus, the students with the highest hyperactivity scores also had the highest intensities in other areas when compared with their intellectual peers. When compared to the normative sample, the OE profile of the gifted sample was slightly different with Intellectual, Psychomotor, and Sensual OEs showing the largest number of students scoring above the mean and first standard deviation. Researchers have shown that gifted and talented students exhibit high levels of Intellectual and Emotional OEs (Ackerman, 1997; Bouchard, 2004; Gallagher, 1986; Tucker & Hafenstein, 1997). In addition, it has been shown that for younger students, the Psychomotor OE accounts for the majority of the variance between gifted and average students (Ackerman; Bouchard; Bouchet & Falk, 2001; Miller, Silverman, & Falk, 1994; Piechowski & Cunningham, 1985; Silverman & Ellsworth, 1981). The study sample comprised students from fifth through twelfth grades, with half the sample from fifth and sixth grade. Therefore, these findings support the previous literature on OE profiles. The data comparing the gifted sample, sub-sample, and normative sample do not provide clear delineation between the gifted sample and the sub-sample that scored high on the CADS-A Hyperactive subscale. However, we can see that mean scores for the Intellectual and Psychomotor OEs that exceed the mean scores of the normative sample or the sample from which they are drawn should give educators and psychologists pause to consider whether a possible misdiagnosis or dual diagnosis should be investigated. Thus, ADHD symptoms as measured by the Conners' Rating Scale – CADS-A are congruent and common with behaviors of students who are indentified as gifted and are busy and active.

The Nature and Extent of the Ability to Determine if Misdiagnosis Has Occurred

The correlation between the CADS-A Hyperactive subscale and the OEQII Psychomotor, Imaginational, and Intellectual OEs indicates that possible misdiagnosis may occur when the Conners' Rating Scales are used alone to diagnose ADHD. These findings provide support for the use of a multi-modal, multi-informant approach to any diagnostic or identification procedure (Baum et al., 1998; Renzulli, 1994). Further research is needed in this area to investigate the extent of misdiagnosis that has occurred or that may occur.

Prevalence of ADHD behaviors

ADHD-like behaviors among the gifted students in this study were also more common than in the general population. When a sample of gifted students is used, as in this study, scores may well be different from those in the general population, and these findings affect generalizability. This result furthers the understanding that a gifted population differs from the general population, especially with regard to levels of physical and psychomotor energy.

No significant correlations were found between the Sensual or Emotional OEs and the CADS-A Hyperactive subscale in this study. This may be due to the make-up of the sample in this study and the nature of the program that students were attending.

Results from this Study Compared to Previous Findings

Tieso (2007a) reported inter-correlation of the five OEQII subscales ranging from 0.207 to 0.589 with $p<0.01$. The present study resulted in inter-correlations on the OEQII ranging from 0.426 to 0.815 with $p<0.01$. These differences may be due to the differences in sample

composition between the two studies. Tieso's sample included both gifted and average students as well as those who exhibited learning difficulties from five different school corporations with age ranges of 7 to 15 years old. This study used a purposive sample of gifted students, none of whom reported a diagnosis of ADHD with an age range of 11 to 18 years old. The substantially higher inter-correlations in the present study might be accounted for as this instrument was intended to identify traits of gifted individuals, not typical individuals.

Limitations

This study was limited to a small number of students in a summer program for gifted students. The results are therefore not generalizable to the regular school setting. Further research is warranted in this area in order to investigate whether the use of the CADS-A in school and home settings leads to a diagnosis of ADHD without consideration of giftedness. Another limitation of the study is that only self-report measures were used. In order to fully assess a child, multiple informants should be used. This study was intended to test the evidence in a previous analysis of the overlap of multiple instruments (Author, 2007) and as a pilot study to assess the potential for wider research on the topic.

The data were collected in one session. Students completed both instruments one after the other. Answers on one instrument may have influenced answers on the other. This can be controlled for in the future by administering the instruments at different times and in different order.

Finally, the correlation between the Hyperactive subscale and Psychomotor OE is not surprising. However, this study provides empirical evidence that the two scales are related. This study, although limited in its sample, offers evidence to confirm clinical and qualitative evidence and provides a basis for scaling-up future research in this area to include a wider population, multiple informants, and other environments.

References

Ackerman, C. (1997). Identifying gifted adolescents using personality characteristics: Dabrowski's overexcitabilities. *Roeper Review,19,*229-236.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders (4th ed.).Text revision*. Washington, DC: Author.

Asuero, A.G., Sayago, A., & Gonzalez, A.G. (2006, January). The correlation coefficient: An overview. *Critical Reviews in Analytic Chemistry*.

Baum, S.M., Olenchak, F.R., & Owen, S.V. (1998). Gifted students with attention deficits: Fact and/or fiction? Or can we see the forest… *Gifted Child Quarterly, 42*(2), *96-105.*

Biederman, J., Wilens, T.E., Mick, E., & Faraone, T. (1991). Does attention-deficit hyperactivity disorder impact the developmental course of drug and alcohol abuse and dependence? *Biological Psychiatry, 44*(4), 269-273.

Binet, A., & Simon, T. (1916). *The development of intelligence in children.* Baltimore, MD: Williams and Wilkinson.

Borland, J.H. (2004). Issues and practices in the identification and education of gifted students from under-represented groups. *Monographs of the National Research Center on the Gifted and Talented,* (Serial No. RM04186).

Borland, J. H., & Wright, L. (1994). Identifying young, potentially gifted, economically disadvantaged students. *Gifted Child Quarterly, 38,* 164-171.

Bouchard, L. L. (2004). An instrument for the measure of Dabrowskian overexcitabilities to identify gifted elementary students. *Gifted Child Quarterly, 48,* 339-350.

Bouchet, N., & Falk, R. E. (2001). The relationship among giftedness, gender, and overexcitability. *Gifted Child Quarterly, 45,* 260-267.

Center for Disease Control (2003). http://www.cdc.gov/ncbddd/ADHD/adhd prevalence.htm Retrieved on March 28, 2007.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers.

Coleman, L. J. (1994). Portfolio assessment: A key to identifying hidden talents and empowering teachers of young children. *Gifted Child Quarterly, 38,* 65-69.

Coleman, M. R. (2003). *The identification of students who are gifted.* Arlington, VA: Eric Clearinghouse on Disabilities and Gifted Education.

Conners, C. K. (1997). *Conners' Rating Scales-Revised: Technical manual.* North Tonawanda, NY: Multi-Health Systems.

Cramond, B. (1994). Attention deficit-hyperactivity disorder and creativity: What is the connection? *Journal of creative Behavior, 28,* 193-209.

Cross, T., Coleman, L., & Stewart. R. (1993): The social cognition of gifted adolescence: An exploration of the stigma of giftedness paradigm. *Roeper Review, 16*(1), 37-40.

Dabrowski, K. (1964). *Positive disintegration*. London: Little Brown.

Dabrowski, K., & Piechowski, M. M. (1977). *Theory of levels of emotional development: Vol. 2. From primary integration to self-actualization.* Oceanside, NJ: Dabor Science.

De Moivre, A. (1738). *The doctrine of chances: Or, a method of calculating the probability of events in play*. London: Woodfall.

Edwards, M.C., Schulz, E.G., Chelonis, J., Gardner, E., Philyaw, A., & Young, J. (2005). Estimates of validity and utility of unstructured clinical observations of children in the assessment of ADHD. *Clinical Pediatrics*, *44*(1), 49-57.

Eide, B., & Edie, F. (2006). *The mislabeled child: How understanding your child's unique*

learning style can open the door to success. New York, NY:Hyperion.
Falk, R. F., Manzanero, J. B., & Miller, N. B. (1997). Developmental potential in Venezuelan and American artists: A cross-cultural validity study. *The Creativity Research Journal 10*, 201-206.
Falk, R.F., Lind, S., Miller, N.B., Piechowski, M.M., & Silverman, L.K. (1999). *The overexcitability questionnaire – two (OEQII).* Denver, CO: Institute for the Study of Advanced Development.
Feldhusen, J. F. (1992). *TIDE: Talent identification and development in education.*
Gable, R.K., & Wolf, M.B. (1993) *Instrument development in the affective domain: Measuring attitudes and values in the business and school setting*. (2nd ed.). New York: Springer.
Gage, D. F., Morse, P. A., & Piechowski, M. M. (1981). Measuring levels of emotional development. *Genetic Psychology Monographs, 103,* 129-152.
Galton, F. (1869). *Hereditary genius.* London: Macmillan.
Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences.* New York: Basic Books.
Author, J. (2007, November). The possibility of misdiagnosing giftedness as Attention Deficit Hyperactivity Disorder (ADHD). Paper presented at the annual conference of the National Association for Gifted Children Conference, Minneapolis, MN.
Haenlein, M., & Caul, W.F. (1987). Attention deficit disorder with hyperactivity: A specific hypothesis of reward dysfunction. *Journal of the American Academy of Child and Adolescent Psychiatry, 26,* 356-362.
Hollingworth, L. S. (1929). The production of gifted children from the parental point of view. *Eugenics, 2,* 3-7.
Hollingworth, L.S. (1942). *Children above 180 IQ Stanford-Binet: Origin and development*. New York: World Book.
Kerr, B., Colangelo, N., & Gaeth, J. (1988). Gifted adolescents' attitudes toward their giftedness. *Gifted Child Quarterly, 32*(2), 245-247.
Khatena, J., & Torrance, E. P. (1976). *Manual for Khatena-Torrance Creative Personality Perception Inventory.* Chicago: Stoelting.
Lysy, K. Z., & Piechowski M. M. (1983). Personal growth: An empirical study using Jungian and Dabrowskian measures. *Genetic Psychology Monographs, 108,* 267-320.
Manaster, G. J., Chan, J. C., Watt, C., & Wiehe, J. (1994). Gifted adolescents' attitudes toward their giftedness: A partial replication. *Gifted Child Quarterly, 38*(4), 176-178.
Miller, N. B., Silverman, L. K., & Falk, R. E. (1994). Emotional development, intellectual ability, and gender. *Journal for the Education of the Gifted, 18,* 20-38.
Naglieri, J. A., & Ford, D. Y. (2003). Addressing underrepresentation of gifted minority children using the Naglieri Nonverbal Ability Test (NNAT). *Gifted Child,Quarterly, 47,* 155-161.
Nunnally, J. C. (1978). *Psychometric theory (2nd ed.).* New York: McGraw-Hill.
Parker, J.D.A., Sitarenios, G., & Conners, C.K. (1996b). *Assessment of Attention-Deficit/Hyperactivity Disorder: A new index for parent, teacher, and adolescent rating.*
Passow, A.H., & Frasier, M.M. (1996). Toward improving identification of talented potential among minority and disadvantaged students. *Roeper Review, 18,* 198-202.
Piechowski, M.M. (1975). A theoretical and empirical approach to the study of development. *Genetic Psychology Monographs, 92,* 231-297.
Piechowski, M. M., & Cunningham, K. (1985). Patterns of overexcitability in a group of *artists.*

Journal o f Creative Behavior, 19, 153-174.
Piechowski, M.M. (1999). Overexcitabilities. In Academic Press (Ed.), *Encyclopedia of Creativity* (Vol. 2., pp. 325-334). San Diego, CA: Academic Press.
Reid, B.D., et al. (1995) *Square pegs in round holes – These kids don't fit: High ability students with behavioral problems,* National Research Center on the Gifted and Talented.
Renzulli, J. S. (1978). What makes giftedness? Re-examining a definition. *Phi Delta Kappan, 60,* 180-184, 261.
Renzulli, J. S. (1979b). *What makes giftedness*? Los Angeles, CA: National/State Leadership Training Institute on the Gifted and Talented.
Renzulli, J. S. (1986). The three-ring conception of giftedness: A developmental model for creative productivity. In R. J. Sternberg & J. E. Davidson (Eds.), *Conceptions of giftedness* (pp. 53-92). New York: Cambridge University Press.
Renzulli, J. S. (1994). *Schools for talent development: A practical plan for total school improvement*. Mansfield Center, CT: Creative Learning Press.
Renzulli, J. S., Smith, L. H., White, A. J., Callahan, C. M., & Hartman, R. K. (1976). *Scales for Rating the Behavioral Characteristics of Superior Students*. Wethersfield, CT: Creative Learning Press.
Schiever, S. W. (1985). Creative personality characteristics and dimensions of mental functioning in gifted adolescents. *Roeper Review*, 7, 223-226.
Silverman, L. K. (1993) (Ed.). *Counseling the gifted & talented*. Denver, CO: Love.
Silverman, L.K. (1994). The moral sensitivity of gifted children and the evolution of society. *Roeper Review, 17,* 110-116.
Silverman, L. K., & Ellsworth, B. (1981). The theory of positive disintegration and its implications for giftedness. In N. Duda (Ed.), *Overexcitability research theory of positive disintegration: Proceedings of the third international conference* (pp. 179-194). Miami, FL: Xerox.
Tabachnick, B.G., & Fidell, L.S. (1996). *Using multivariate statistics (3nd ed.).* New York, NY: Harper Collins.
Tabachnick, B.G., & Fidell, L.S. (1989). *Using multivariate statistics (2nd ed.).* New York, NY: Harper Collins.
Tannenbaum, A.J. (1991). Nature and nurture of giftedness. In N. Colangelo & G. A. Davis (Eds.), *Handbook of gifted education* (pp. 45-59). Boston, MA: Allyn and Bacon.
Terman, L. M. (1925). *Genetic studies of genius: Vol. 1. Mental and physical traits of a thousand gifted children.* Stanford, CA: Stanford University Press.
Terwilliger, J.S., & Anderson, D.H. (1969). An empirical study of the effects of standardizing scores in the formation of linear composites. *Journal of Educational Measurement, 6*(3), 145-154.
Tieso, C.L. (2007a). Overexcitabilities; A new way to think about talent? *Roeper review, 29*(4), 232-239.
Tieso, C.L. (2007b). Patterns of overexcitabilities in identified gifted students and their parents: A hierarchical model. *Gifted Child Quarterly, 51*(1), 11-23.
VanTassel-Baska, J., Feng, A., & de Brux, A. (2007). A study of identification and achievement profiles of performance task-identified gifted students over 6 years. *Journal for the Education of the Gifed. 31,* 7-34.
Webb, J.T. (2000). Misdiagnosis and dual diagnosis of gifted children. In M. Neihart (Ed.),

Symposium on Cutting Edge Minds – What It Means to be Exceptional, Scottsdale, AZ: Great Potential Press.

Webb, J.T., Amend, E.R., Webb, N.E., Goerss, J., Beljan, P., & Olenchak, R.E. (2005). *Misdiagnosis and dual diagnoses of gifted children and adults: ADHD, bipolar, OCD, Asperger's, depression, and other disorder.* Scottsdale, AZ: Great Potential Press.

Zentall, S. S. (2006). *ADHD and education: Foundations, characteristics, methods, and collaboration.* Upper Saddle River, N.J., Pearson Merrill Prentice Hall.