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Link Between Executive Functioning and Teacher Referrals for Gifted Testing

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THE LINK BETWEEN EXECUTIVE FUNCTIONING AND TEACHER REFERRALS FOR GIFTED TESTING

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Dissertation Approval

This is to certify that the thesis presented to us by Amanda Veronica Kenney on the 20th day of May, 2010, in partial fulfillment of the requirements for the degree of Doctor of Psychology, has been examined and is acceptable in both scholarship and literary quality.

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Abstract

It is possible that teachers are more likely to refer for gifted support students who are highly productive in class rather than students with classroom production difficulties such as those commonly exhibited by students with ADHD or other executive function-related difficulties. Some research support has been found for this hypothesis. In a study by Zentall, Moon, Hall, and Grskovic (2001), students diagnosed with ADHD, whether identified as academically gifted or not, were described as underachievers by their teachers (Zentall et al., 2001). There can be similar behavioral characteristics between ADHD and giftedness, including hyperactivity, disruptive behavior, and a tendency to challenge authority (Leroux & Levitt-Perelman, 2000). This study intended to assess teacher perceptions of the executive functioning of the students they referred for gifted testing, using the BRIEF checklist. It was suspected that students referred for gifted testing by their classroom teacher would have "better" (lower) BRIEF scores than those students not referred by their classroom teacher but who were found to have IQs in the superior to very superior range. It was hypothesized that teachers tend to refer based on "good student" behaviors such as productivity, task completion, motivation, and perseverance. This is contrary to traditional indicators of giftedness, which include creativity, higher level thinking skills, and quick processing speed. Findings supported the hypothesis because a greater number of parent-referred students were rated as having deficits in executive functioning as compared with teacher-referred students. Additionally, the brightest students were rated as having the most severe executive functioning difficulties and all were referred by parents.

Table of Contents

List of Figures

List of Tables

Chapter 1

Introduction

Pfeiffer (2001) described the academically gifted population as "one of America's most valuable resources (p.175)". However, gifted students may often be underserved in our nation's schools because special education students are viewed as a greater priority. The *No Child Left Behind* (NCLB) Act (Public Law 107-110), adopted in 2002, represents federal regulation supporting standards-based achievement. It involves "high stakes" testing for all students to achieve at a basic level. In order for school districts to achieve *Adequate Yearly Progress* (AYP), all students must meet certain fundamental standards of basic academic skill achievement. The emphasis placed on basic proficiency may negatively impact gifted students, who are likely beyond the basic level. With this high-stakes testing comes additional time spent on test preparation and less time spent on appropriately challenging the advanced students (Cross & Cross, 2005; Gallagher, 2004; Van Tassel-Baska & Stambaugh, 2005).

Gifted education is a controversial subject. As one author described it, "Many parents and educators see gifted education as exacerbating social, economic, and racial division in society (Matthews & Foster, 2006, p. 64)". Another criticism of gifted education is that it fosters elitism. In reality, providing instruction at the level of which a student is capable is giving that individual student what he needs, not giving him preferential treatment (Fiedler & Lange, 1993).

There are multiple barriers to the delivery of gifted education. In Pennsylvania, gifted education falls under Chapter 16 of the Pennsylvania School Code (22 Pa Code §16 2008). However, there is no federal funding provided for Chapter 16. This is unlike Chapter 14, which denotes special education services for students with disabilities that adversely impacts their

education. Chapter 16 is funded through local taxes at the individual district level. In addition, Chapter 16 is not monitored as closely as is Chapter 14. The lack of accountability negatively impacts gifted education. Last, teachers of gifted students are not required to be certified in the area of gifted education. Typically, administrators also lack knowledge of gifted education.

In order to receive gifted services, students must initially be referred for assessment and be identified as academically gifted. It is possible that teachers are more likely to refer for gifted support students who are highly productive in class rather than for students with classroom production difficulties such as the difficulties commonly exhibited by students with ADHD or other executive function-related difficulties. It is likely that some students of exceptionally high intellectual caliber are disorganized, do not complete assignments, and/or forget to turn in assignments. Teachers may sometimes consider these students as underachievers or even as lazy, and may be less likely to refer them for gifted testing despite their underlying high ability. Some research support has been found for this hypothesis. In a study by Zentall, Moon, Hall, and Grskovic (2001), students diagnosed with ADHD, whether identified as academically gifted or not, were described as underachievers by their teachers (Zentall et al., 2001). Before discussing the plight of intellectually capable students who do not appear to teachers to be capable, it is necessary to understand what is meant when educators and psychologists refer to a child as "gifted."

Literature Review

What is Giftedness?

There is not a great deal of consensus on what constitutes giftedness (Cross & Cross, 2005). The Columbus Group (1991) defined giftedness as "a distinctive and atypical pattern of development in which children's cognitive abilities are developing at a faster rate than expected

for their ages (as cited in Morelock & Morrison, 1999, p.195)". Under Pennsylvania's Chapter 16, the definition of "mentally gifted" pertains to students with "outstanding intellectual and creative ability, the development of which requires specially designed programs or support services, or both, not ordinarily provided in the regular education program" (22 Pa Code §16.1 2008). Criteria for identification of giftedness include the following:

> "Each school district shall establish procedures to determine whether a student is mentally gifted. This term includes a person who has an IQ of 130 or higher or when multiple criteria as set forth in this chapter and in Department Guidelines indicate gifted ability. Determination of gifted ability will not be based on IQ score alone. Deficits in memory or processing speed, as indicated by testing, cannot be the sole basis upon which a student is determined to be ineligible for gifted special education. A person with an IQ score lower than 130 may be admitted to gifted programs when other educational criteria in the profile of the person strongly indicate gifted ability. Determination of mentally gifted must include an assessment by a certified school psychologist" (22 Pa Code §16.21(d) 2008).

Students meeting criteria are entitled to individualized academic programming and specially designed instruction.

What is Intelligence?

The definition of giftedness that is provided defines mental giftedness in terms of a score two standard deviations above the mean on a test of intelligence. Many researchers consider intelligence synonymous with a universal general ability, or *g*, as measured by well-known ability tests. These tests often assess crystallized intelligence, which is the child's accumulation of knowledge that has been explicitly taught or implicitly learned and stored for later use. Non-

traditional means of gauging intelligence assess more fluid reasoning skills and involve a more dynamic approach to assessment (Van Tassell-Baska, Fend, & Evans, 2007).

Sternberg (2007) discussed intelligence as being culture-specific. He defined successful intelligence as,

> "What is needed for success in life, according to one's own definition of success, within one's sociocultural context. One acquires and uses these skills and this knowledge by capitalizing on strengths, correcting and compensating for weaknesses, and adapting to, shaping, or selecting environments, through a balance of analytical, creative, and practical abilities" (Sternberg, 2007, p. 148).

Sternberg argues that practical knowledge is often more valuable in non-Western cultures than traditional academic intelligence. Tacit knowledge encompasses information utilized for adaptive functioning; it is the type of intelligence that is neither learned nor taught in the classroom (Sternberg, 2007). Therefore, students from non-western cultures may be at a disadvantage when being assessed through the use of traditional intelligence tests.

Gifted Identification

Since its inception, intelligence quotient (IQ) testing has been used to determine if a child should be considered gifted (Mulhern, 1978). Although most school districts rely primarily on cognitive testing to identify gifted students, some argue that academic productivity should be the main criteria (Pfeiffer, 2001). The argument is that ability alone is neither indicative nor predictive of academic performance. Issues of underachievement, lack of motivation, and lack of task completion may arise. Stein wrote, "Another way to view giftedness in children is consideration of task commitment (motivation and perseverance) and creativity, in addition to

above average abilities" (Liu, Lien, Kafka, & Stein, 2005, p. 69). The students to whom Stein was referring would most likely have well developed executive functioning capacity.

Briggs, Reis, and Sullivan (2008) conducted a qualitative study on increasing diversity among gifted programs. In reviewing the research, this investigators found that culturally, linguistically, and ethnically diverse (CLED) students, as well as students from impoverished households, are over-represented in remedial programs and underidentified in gifted programs (Briggs, Reis, & Sullivan, 2008). The authors listed the following as reasons for the phenomenon:

> "Identification and subsequent provision of gifted programs services to CLED students are influenced by the specific assessment tools for identification, educator bias and perception of cultural behaviors, quantity and quality of teacher preparation for working with CLED students, and degree of variety in institutional strategies (Briggs, Reis, & Sullivan, 2008, p. 132)".

Gifted Education

For many decades, educators have discussed the need to accelerate students of high ability. Stanley (1977) was quoted as, "recommending that gifted children be allowed to zoom along at their own high speeds" (as cited by Mulhern, 1978, p. 3). Services for gifted students vary across school districts (Cross & Cross, 2005). The most common approaches to gifted education include acceleration and differentiation.

Acceleration refers to advancing students beyond chronological grade levels in order to meet advanced academic needs. This can be accomplished in the form of grade-skipping or early admittance into the next level of education, from kindergarten through college. Acceleration can also be achieved through curriculum compacting, which equates to covering curricular material

more quickly than the regular grade-level would cover it. "The pacing of instruction, the depth of content, and advancement in knowledge fields, which these students must have, cannot be effectively facilitated without a variety of ability grouped arrangements" (Rogers, 1993, p.11).

Differentiation refers to providing advanced content of the same curriculum. This can be done in the regular classroom using flexible grouping, substituting above-level texts, incorporating technology to extend curriculum, and using independent study (Van Tassel-Baska & Stambaugh, 2005). It is likely that the bulk of the material presented in heterogeneously grouped classrooms could be considered as having been mastered by gifted students. "Without regular encounters with challenging material, gifted students fail to learn how to learn and have problems developing the study skills they need for future academic pursuits" (Fiedler & Lange, 1993, p.3).

Executive Functioning

According to McCloskey, Perkins, and VanDivner (2009), executive functions can be defined as "a set of multiple cognitive capacities that act in a coordinated way. Executive functions are directive capacities that are responsible for a person's ability to engage in purposeful, organized, strategic, self-regulated, goal-directed processing of perceptions, emotions, thoughts, and actions" (McCloskey, Perkins, & VanDivner, 2009, p.15). It is of importance to note that executive functioning is a developmental process that involves a great deal of individual variation.

Attention Deficit Hyperactivity Disorder (ADHD) has been linked to deficits in executive functioning (Barkley, 2007). In a longitudinal study, adults that were diagnosed with ADHD in childhood displayed increased off-task behaviors, lessened response inhibition, slower response time, and increased inattention (Knouse, 2005). Another study linked only ADHD-

Predominantly Inattentive Type to deficits in executive functioning and decreased processing speed, whereas ADHD- Predominantly Hyperactive Type showed executive function deficits but quicker processing speed (Knouse, 2006).

Barkley (2007) calculated an approximate executive functioning delay of 30 percent for individuals diagnosed with ADHD (as cited in McCloskey et al., 2009). McCloskey et al. (2009) operationally defined 23 individual executive function capacities (McCloskey et al., 2009). However, according to the authors, deficits in the following capacities led to a diagnosis of ADHD. McCloskey et al. (2009) noted the following executive abilities as most adversely affected in ADHD: Inhibit, Time, Sustain, Focus/Select, Foresee/Plan. The capacity of Inhibit involves withstanding the temptation to act on one's impulses. The Time capacity involves the internal supervising of the length of time that one has been working on something. The Sustain capacity encompasses maintaining attention for a prolonged amount of time. The Focus/Select ability involves attending to what is important while tuning out distractions. The Foresee/Plan capacity encompasses foreseeing the desired outcome and arranging how best to achieve it (McCloskey et al., 2009).

Attention difficulties in the classroom are often identified because the student fails to generate acceptable academic products. Teachers typically cite lack of work completion or written assignments below expectation as areas of concern. McCloskey et al. (2009) described how responding to a request from outside oneself (termed external demand) takes multiple executive steps, compared with carrying out an activity for oneself (termed internal command). In the Zentall, et al. (2001) study involving boys diagnosed with ADHD, the students reported difficulty in completing homework. The authors described a situation in which the boys "had specific difficulties with reading that was long and boring (e.g. from texts), but not with free

reading…" (Zentall, et al., 2001, p. 513). This supports the theory concerning the increased executive function capacity needed to fulfill external demands, as described by McCloskey et al. (2009).

Students with executive functioning deficits often struggle to do things on demand. Denckla (1996; 2007) coined the term 'Producing Difficulties' to describe this phenomenon (as cited in McCloskey et al., 2009). In the Zentall et al. study, the students with ADHD also reported difficulty with math worksheets and handwriting exercises (Zentall, et al., 2001). Despite having the capability to perform the task, it is possible that the students with ADHD had difficulty producing completed work products.

Measuring Executive Functioning

Executive functioning can be measured either directly or indirectly. Direct measurement refers to standardized testing of a student's executive functioning on different tasks designed to gauge one's ability in that area. Indirect assessment refers to ratings of a student's behavior. One such indirect assessment is the Behavior Rating Inventory of Executive Functioning (BRIEF) (Gioia, Guy, & Kenworthy, 2000). The BRIEF provides measurements of executive functioning along 8 scales. The scale descriptors are as follows:

> Inhibit: This refers to the ability to resist impulses and to stop one's behavior at the appropriate time. Children with difficulties in this area may display a high level of physical activity, inappropriate physical responses to others, a tendency to interrupt and disrupt group activities, and a general failure to "look before leaping."
>
> Shift: Shifting is the ability to make transitions, tolerate change, problem solve flexibly, and switch or alternate one's attention from one focus or topic to another.

Caregivers often describe children who have difficulty with shifting as being somewhat rigid or inflexible and preferring consistent routines.

Emotional Control: This reflects the influence of the executive functioning on the expression and regulation of one's emotions. Children with emotional control difficulties often have overblown emotional reactions to seemingly minor events.

Initiate: Initiate is the ability to begin a task or activity without being prompted to do so. Key aspects of initiation include the ability to independently generate ideas, responses, or problem solving strategies. Children with initiation difficulties typically want to succeed at and complete a task, yet have difficulty getting started.

Working Memory: This refers to the capacity to hold information in mind in order to complete a task, encode and store information, or generate goals. Working memory is also needed to sustain attention.

Plan/Organize: Planning involves setting a goal and determining the best way to reach a goal, often through a series of steps. Organization involves the ability to bring order to information and to appreciate main ideas or key concepts when learning or communicating information, either orally or in writing.

Organization of Materials: Another aspect of organization is the ability to order and organize things in one's environment, including maintenance of orderly work, play, and storage spaces (e.g., school desks, lockers, backpacks, and bedrooms).

Monitoring: This can be viewed as consisting of two components: Task-oriented monitoring (work check habits) reflects a child's ability to check his/her own performance during or shortly after finishing a task to ensure that he/she has accurately or

appropriately attained a desired goal. Self-monitoring reflects a child's awareness of the effect that his/her behavior has on others (Gioia, Isquith, Guy, & Kenworthy, 2000).

The relationship between executive functioning and intelligence

It is likely that strong executive function capacities are often expected in gifted students to the degree that "Belmont (1978) recognized executive functioning as a hallmark of intelligence" (Borkowski & Burke, 1996, p.235). Borkowski and Peck (1986) found that gifted students were better able to generalize instructions and used better strategies to complete tasks than their non-gifted peers, thereby concluding that executive functioning is what separates the gifted from non-gifted students (as cited in Borkowski & Burke, 1996). Another study compared teacher ratings on gifted and non-gifted students and found that gifted students were rated significantly higher in the areas of competence and executive functioning (Bracken & Brown, 2006).

Denckla noted the "complex overlap of between *g* and EF" (Denckla, 1996, p. 268). She posed that intelligence may supersede executive functioning, meaning that those with high IQs may complete tasks with such ease that executive functions need not come into play (Denckla, 1996). Pennington (1995) posed the idea that executive functions are involved with fluid reasoning tasks and less so when demonstrating crystallized intelligence (as cited in Denckla, 1996). Therefore the performance, working memory, and processing speed components of intelligence tests may be more highly impacted by executive functioning capacities than are the verbal capacities.

Arffa (2007) reviewed a number of studies on the relationship between executive functioning and intelligence and determined that "the moderating influence of intelligence on executive function performance in children remains unclear" (Arffa, 2007, p.970). She went on

to determine that for children, executive functioning correlates most highly with three WISC-III subtests (Digit Span, Arithmetic, and Coding). She concluded that, "It is likely that gifted children employ the same cognitive strategies in solving executive function tasks than do average to superior children" (Arffa, 2007, p. 977). Another review of the research cited only nine percent shared variance between performance on IQ tests and performance on executive functioning assessments (Antshel, 2008).

Executive functioning difficulties

One study compared performance on executive functioning tasks by children with and without ADHD at various IQ levels (Mahone et al., 2002). The authors found that children with ADHD in the average range of intelligence scored more poorly on executive functioning tasks than children with ADHD in the above average and superior rages of intelligence, thereby concluding that IQ is a strong moderating variable on tasks of executive functioning (Mahone et al., 2002). Those results suggest that high intelligence reduces the effects of poor executive functioning, at least in test-taking situations.

Antshel reported that IQ and attention are negatively related, because symptoms of inattention lower the IQ. He cited studies using neuroimaging techniques and determined that the more efficiently the brain works, the more intelligent one appears (Antshel, 2008). Therefore, there may be a risk of underestimating the IQ of children with poor executive functioning, thereby leading to under identification of Gifted/ADHD students.

Gifted underachievement

Some gifted students may not be recognized as such because of what educators consider underachievement. This occurs even more often in schools that have an excessive focus on struggling students and in schools with needy populations (Baum, Renzulli, & Hebert, 1994).

One study compared three groups of boys: those diagnosed with ADHD, those identified as gifted, and those diagnosed with ADHD and identified as gifted (Zentall et al., 2001). The study found that students in both the ADHD groups (gifted and non-gifted) were described as underachievers by their teachers, whether they were identified as gifted or not. Reis and McCoach (2002) summed up three main reasons why bright students do not work up to their potential: an environmental mismatch, underlying learning issues or an emotional/behavioral disability, and issues with motivation, self-efficacy, or self-regulation (Reis & McCoach, 2002). Baum et al. (1994) mentioned similar reasons and added another: pressure from one's peer group. In other words, students may perform below their capabilities in order to fit in better with the majority of their peers.

Teachers' perceptions of gifted students may also impact achievement. In one study, college students pursuing a teaching degree were asked to complete a survey to assess their attitudes toward gifted students. Following the survey, the study participants viewed videos of gifted children discussing either the causes of achievement or the causes of underachievement. After watching the video, the participants completed a survey similar to the one completed prior to watching the videos. Results indicated that the attitudes of the student teachers who viewed the underachievement videos significantly changed from the pre-survey, compared with the student teachers who viewed the achievement videos; their attitudes remained unchanged. These findings illustrate how underachievement can severely impact the attitudes of teachers toward gifted students (Ribich, Barone, & Agostino, 1998).

A mismatch between the classroom environment and the gifted student may occur when the child is being required to learn material that he or she has previously mastered. One study found that student achievement improved for 83 percent of gifted underachievers when they

were given enrichment assignments pertaining to an area of individual interest (Baum et al., 1994). This relates to McCloskey's idea that more executive functioning capacity is needed to fulfill external demands as compared with fulfilling internal commands (McCloskey et al., 2009). These previously cited findings support the idea of allowing for creativity in order to motivate bright but otherwise underperforming students. Another environmental mismatch may occur when extremely active youngsters are required to learn within a traditional classroom setting where movement is limited.

Issues in self-regulation and self-directedness may lead to underachievement. Denckla explained:

> "Arriving with chief complaints of unexplained school underachievement, this group of patients presents itself as 'bright' on standard psychometrical indices of intelligence, untroubled by any modular, domain-specific information processing deficits, yet unable to function as 'good students'. Evaluation, using neuropsychological and behavioral-neurological systems approach reveals EF [Executive Functioning] to be the weak system in this group" (Denckla, 1996, p.264).

In other words, the reason for lack of performance in the classroom may be attributed to deficits in one's executive functioning capacity.

Gifted but executive deficient

Students identified as academically gifted are not exempt from executive functioning deficits; these students may have needs that are disguised by their high cognitive abilities. It is possible that teachers and other school professionals see this phenomenon often. For instance, a student may test in the very superior range of cognitive ability; however, this particular student may struggle on grade level academic assignments. The student is disorganized, does not

complete assignments, and forgets to turn in assignments. Teachers may sometimes refer to these students as underachievers or even as lazy. Parents may blame the behavior on boredom because the academic material is too easy. The resulting dilemma is how to assist the student with reaching his/her full potential and working up to his/her high ability level. The student may indeed be executive deficient and warrant a diagnosis of ADHD.

> "By expecting *more* independence, high IQ students with ADHD may be *less* able to manage gifted curricula. For example, by having delay-averse motivational style, high IQ/gifted students with ADHD may have significant work production/output difficulties that may arguably be one of the greatest educational challenges faced by gifted students with ADHD (who commonly have no difficulty learning course material but struggle to keep up with the written work)" (Antshel, 2008, p. 297).

This relates to the difficulties with production as described by Denckla (as cited in McCloskey et al, 2009).

There can be similar behavioral characteristics between ADHD and giftedness, including hyperactivity, disruptive behavior, and a tendency to challenge authority (Leroux & Levitt-Perelman, 2000). In gifted children, a highly energized child who appears driven to acquire new information may often be characterized as hyperactive. Given the nature of classrooms, gifted children may be viewed as oppositional when they question authority. It is possible that these children may exhibit behavior that is perceived as disruptive when they are not adequately challenged. The *Diagnostic and Statistical Manual of Mental Disorders- IV Text Revision* (*DSM-IV-TR*), in fact, states, "Inattention in the classroom may also occur when children with high intelligence are placed in academically understimulating environments" (American Psychiatric Association [APA], 2000, p.91).

Dabrowsky's theory of positive disintegration (as cited in Mendaglio & Tillier, 2006), specifically his concept of overexcitability (OE), has been linked to gifted learners (Mendaglio & Tillier, 2006).

> "In Dabrowsky's theory, OE is a heightened experience of sensory stimuli resulting from increased sensitivity of the neurons. Dabrowsky (1972) used the phrase overexcitability and defined it as 'higher than average responsiveness to stimuli, manifested either by psychomotor, sensual, emotional (affective), imaginational, or intellectual excitability, or the combination thereof'" (p. 303) (as cited in Mendaglio & Tillier, 2006, p.69).

Overexcitability, or OE, has been linked to giftedness in a number of studies (Mendaglio & Tillier, 2006). Findings repeatedly indicate that those identified as academically gifted load higher on "The Big Three" of the five concepts of OE. The Big Three consist of Intellectual, Imaginational, and Emotional overexcitabilities (Mendaglio & Tillier, 2006). In a qualitative study of five gifted children, all five displayed characteristics of The Big Three OEs and two of the children also showed evidence of the other two OEs, Sensual and Psychomotor (Tucker & Haferistein, 1997).

Some of the OEs identified here could possibly be linked to symptoms of ADHD. Specifically, Imaginational Overexcitability is operationally defined as "frequent distraction, wandering attention, and daydreaming… as a consequence of free play of the imagination" (as cited in Mendaglio & Tillier, 2006, p.69). Flint (2001) described "Children who possess imaginational OEs can have rich and fulfilling inner experiences during the pedestrian activities of a typical school day. What looks like inattention could be, instead, a rich imaginational scenario unfolding within a child's mind" (Flint, 2001, p. 64).

Dabrowsky operationally defined psychomotor overexcitability as "surplus energy and nervousness…emotional tension is translated into psychomotor activity such as tics, nail biting, or impulsive behavior" (as cited in Mendaglio & Tillier, 2006, p. 69). Additional characteristics include restlessness, impulsivity, and feeling a constant drive to be in motion (Flint, 2001). Flint explained, "The difference appears to be that children with ADHD can't stop moving, whereas children with high psychomotor behavior love to move" (Flint, 2001, p. 64).

Intellectual overexcitability is described as a thirst to learn novel information (Mendaglio & Tillier, 2006; Flint, 2001). Flint described it in this way: "These are the people that think and wonder, who ask questions instead of knowing the answers, who exhibit sustained concentration, and who integrate intuition and concept" (Flint, 2001, p. 65). To the outside observer, children with intellectual oversensitivity may look distracted and hyperfocused similar to children with ADHD; however, their heightened interest in intellectual pursuits may be truly characteristic of giftedness.

The possibility of misdiagnosis

If students identified as gifted often display higher OEs than non-identified students, could OE be mistaken for ADHD in gifted students? Baum and Olenchak (2002) published a case study to highlight the problem of misdiagnosing and over-labeling students. They noted that labels are more often added than removed after a more accurate diagnosis is given, thereby creating "alphabet children" (Baum & Olenchak, 2002). Boredom which results from being under challenged in school may be another reason why some bright students display ADHD characteristics. Gallagher and Harradine (1997) interviewed gifted students and found that the majority reported being bored in class. They summed up the complaints in the following statement:

> "The strongest recurring themes were having to wait for others to catch up, having to sit through additional visitations of long-ago mastered content, having teachers refuse to allow them to go ahead to further assignments or to other topics, and of getting into trouble because of the resulting time on their hands" (Gallagher & Harradine, 1997) p. 136).

As previously stated, behavioral characteristics of giftedness and ADHD can be very similar. Hartnett, Nelson, and Rinn (2004) conducted a study in which they provided a vignette describing the behavior of a child to various school counselors. The behavioral descriptions of the child contained characteristics both of ADHD and of giftedness. The counselors were asked to come up with a diagnosis based on the vignette. One-half of the counselors were given options either of ADHD or of giftedness or of both. The other half of the participants were asked to provide a diagnosis by way of an open-ended question. Results showed a significant difference in the diagnosis given by the counselors in which giftedness was an option. On the open-ended questionnaire, not one participant mentioned giftedness as a possibility (Hartnett, Nelson, & Rinn, 2004). The findings suggest that school professionals may need more training in identifying behaviors associated with giftedness. Tucker and Haferistein (1997) noted, "If teachers were made aware of the five overexcitabilities and that their presence is intrinsic to child's giftedness, they would have additional conceptual tools for understanding the emotional development of advanced children" (Tucker & Haferistein, 1997, p75).

According to the *Centers for Disease Control and Prevention* (as cited in Leslie, Plemmons, Monn, & Palinkas, 2007), 56 percent of children diagnosed with ADHD in the United States are treated pharmacologically. Baum and Olenchak (2002) suggested that medication may hamper the cognitive functioning and the creative thought processes of gifted

students. They explained: "There is little doubt that in at least some cases, students of high ability are being 'cured of their giftedness' in exchange for controlled, compliant classroom behavior" (Baum & Olenchak, 2002, p. 79). The authors charged that evaluators fail to consider alternative diagnoses when assessing a student with inattentive or hyperactive behaviors. They also criticize teachers who "tend to view atypical classroom behavior among students as indicative of weaknesses and problems rather than symbolic of strengths and gifts" (Baum & Olenchak, 2002, p. 81). Tucker and Haferistein posited the idea that "behaviors that have been viewed as indicators of psychological problems are more positively understood as manifestations of advanced development" (Tucker & Haferistein, 1997, p.75).

True dual diagnosis

Antshel, along with a group of his colleagues, has conducted several studies to validate the possibility of a comorbid identification of giftedness and ADHD (Antshel, 2008). In a study that compared two groups of high IQ students (full scale IQ>120), one group with a diagnosis of ADHD and one without that diagnosis, findings indicated that the group with ADHD had characteristics similar to ADHD in the average-IQ population, thereby empirically validating the comorbidity of ADHD and giftedness in the high IQ sample (Antshel et al., 2007). Additionally, significant academic impairment was noted in the gifted ADHD population. This disputes the idea posed previously, that "ADHD symptoms among gifted/high IQ children are simply an expression of boredom with schoolwork that is too easy. Instead, it suggests that ADHD interferes with learning and achievement" (Antshel et al., 2007, p. 692).

In a follow-up study, Antshel et al. (2008) found that ADHD and IQ were stable traits over time (4.5-year period) among the gifted population. An interesting finding within this study that differed from research among the ADHD and average IQ population was that high IQ

adolescents with ADHD were less likely to have issues with substance abuse, including drugs, alcohol, and cigarettes (Antshel et al., 2008).

The symptoms of inattention and hyperactivity seen in the gifted population may look subtly different from true ADHD in gifted children. For instance, one defining feature of ADHD is inconsistency of performance; gifted students tend to be less variable in their performance across tasks (Reis & McCoach, 2002). Additionally, the true dually identified (gifted ADHD) students may perform quite differently, based on characteristics of the instructor or delivery of instruction (Flint, 2001). Difficulty with sustained attention is another hallmark of ADHD. Although gifted children may struggle to attend to information considered boring or repetitive, they are most likely *able* to attend when interested. Given the nature of ADHD, children who legitimately warrant a diagnosis are likely unable to sustain attention regardless of the material. Hyperactivity is another trait of ADHD. The high energy level of a gifted child is typically goal-directed, whereas hyperactivity in a child with ADHD is unfocused and disorganized (Tucker & Haferistein, 1997). Last, the *DSM-IV-TR* requires that behaviors of inattention and/or hyperactivity/impulsivity be present in multiple settings (APA, 2000). More often than not, home reports of gifted children do not indicate issues with inattention or hyperactivity (Reis & McCoach, 2002).

Statement of Problem

Students are typically identified as gifted based on cognitive assessments that measure overall ability. However, some argue that ability alone is neither indicative nor predictive of academic performance and pose the idea that gifted students should be identified based on academic productivity (Pfeiffer, 2001). Students with poor executive functioning capacity may have difficulty producing work despite having the capability to do so. The research on the

relationship of executive functioning and intelligence is unclear (Arffa, 2007). Some argue that gifted students demonstrate high executive function capacities (Borkowski & Peck, 1986; Bracken & Brown, 2006). Others claim that IQ is a strong moderating variable of executive functioning in children with above average ability (Denckla, 1996; Mahone et al., 2002).

Gifted students may have other exceptionalities that mask their gifted potential (Flint, 2001). It is possible that classroom teachers typically view such students as underachievers. There are similar behavioral characteristics between conditions involving poor executive functioning such as ADHD and giftedness (Tucker & Haferistein, 1997). Gifted students may present as hyperactive, inattentive, and impulsive. This may lead to the possibility of misdiagnosis and over-labeling. Several studies discussed the tendency to view ADHD-like behaviors as problematic instead of viewing them as possible indicators of giftedness (Tucker & Haferistein, 1997; Baum & Olenchak, 2002). Disruptive behaviors may preclude these students from being referred for gifted programs in the first place or may be the reasons these students are deemed inappropriate for placement in gifted programs (Reis & McCool, 2002).

The present study intended to assess whether or not teacher perceptions of the executive functioning of the students they refer for gifted testing are influenced by their use of the BRIEF checklist. It was suspected that students referred for gifted testing by their classroom teachers would have "better" (lower) BRIEF scores than students not referred by their classroom teachers but who are found to have IQs in the superior to very superior range. It was hypothesized that teachers tend to refer based on "good student" behaviors such as productivity, task completion, motivation, and perseverance. This is contrary to traditional indicators of giftedness, which include creativity, higher level thinking skills, and quick processing speed.

There are two ways of looking at this phenomenon. One side may argue that students who lack productivity are not in need of advanced material when they have yet to master the regular curriculum. Another side may make a case that many highly able students may be missing exposure to more challenging material because they do not consistently exhibit those "good student" behaviors. This gets at the very core of a gifted education program. Should the program be targeted for students that are highly able or students that are hard working, productive, and highly motivated? Ideally, one would hope a student identified as gifted would exhibit both high ability as well as "good student" behaviors. However, this is not always the case.

Creativity and curiosity, which typically come to mind when someone is identified as gifted, may work against the notion of productivity and task completion. Talented students with areas of special interest may have difficulty responding to external demands, or to requests made by teachers. For such students, internal demand, or the idea of carrying out an activity for oneself, often exerts much greater motivation and is easier for them to accomplish.

Research Questions

Question 1. What is the relationship between teacher perceptions of the frequency of behavior indicating executive functions difficulties and intellectual capacity, as reflected in the WASI Full Scale IQ score for students referred for assessment to determine eligibility for gifted program placement?

Question 2. What is the relationship between teacher perceptions of the frequency of behavior indicating executive functions difficulties and the referral source for students referred for assessment to determine eligibility for gifted program placement?

Question 3. What is the relationship between teacher perceptions of the frequency of behavior indicating executive functions difficulties and placement decision outcomes for students referred for assessment to determine eligibility for gifted program placement?

Question 4. What is the relationship between teacher perceptions of the frequency of behavior indicating executive functions difficulties and intellectual capacity as reflected in the WASI Full Scale IQ score and the referral source for students referred for assessment to determine eligibility for gifted program placement?

Question 5. What is the relationship between teacher perceptions of the frequency of behavior indicating executive functions difficulties and intellectual capacity as reflected in the WASI Full Scale IQ score and placement decision outcomes for students referred for assessment to determine eligibility for gifted program placement?

Question 6. What is the relationship between teacher perceptions of the frequency of behavior indicating executive functions difficulties and intellectual capacity as reflected in the WASI Full Scale IQ score, the referral source, and placement decision outcomes for students referred for assessment to determine eligibility for gifted program placement?

Question 7. Are there specific items on the BRIEF Scales that are more closely associated with referral sources and/or placement decisions or that were endorsed more frequently than others by teachers evaluating students referred for assessment to determine eligibility for gifted program placement?

Chapter 2

Methodology

Description of the Data Source

The current study involved a retrospective analysis of existing educational data. The data accessed for this study consisted of archival data for 60 students referred for gifted testing from four elementary schools within one suburban school district. The students on which the data were collected ranged in age from 6 years old to 11 years old and fell between grade 1 and grade 5. Nineteen of the students in the sample were referred by their classroom teacher and 41 of the students were referred by their parent(s) or a school counselor.

Measures

The data in this study were collected from student files. Two measures were included in the study. The first was a brief measure of intelligence. The second was a measure of teachers' perceptions of students' uses of executive functions within the classroom.

Wechsler Abbreviated Scales of Intelligence (WASI). The data set used in this study included scores from the WASI. The variable from the WASI used in this study was the Full Scale Intelligence Quotient (FSIQ). The WASI was standardized with a stratified sample of 2,245 children and adults, ages 6 to 89 years (Wechsler, 1999). For the children's sample, internal reliability coefficients for the FSIQ ranged from .88 to .93. The average standard error of measurement for the FSIQ was 3.08. Validity data comparing the WASI FSIQ with various other measures of intelligence are available in the test manual.

Behavior Rating Inventory of Executive Functions (BRIEF). The BRIEF is a behavior rating scale that teachers can use to offer their judgments of difficulties that a student might be having with the use of executive functions in the classroom. The BRIEF is composed of eight

Scales: Inhibit, Shift, Emotional Control, Initiate, Working Memory, Plan/Organize, Organization of Materials, and Monitor. Variables from the BRIEF used in this study included the T-scores and percentile ranks from all scales in the teacher rating form. BRIEF T-scores are normalized standard scores with a mean of 50 and a standard deviation of 10. Brief T-scores for the various Scales ranged from a low of 41 to a high of 120. Percentile ranks ranged from a low of 4 to a high of 99. The BRIEF item ratings are negative indicators; that is, high scores indicate a lack of effective use of the executive functions represented on the Scale. For example, for the Monitor Scale item "Makes Careless Errors" a rating of "Often" earns three points; a rating of "Sometimes" earns 2 points, and a rating of "Never" earns 1 point. Because high ratings reflect a lack of functioning, the higher a percentile rank for a Scale or Index, the greater the deficiency in the use of executive functions as judged by the rater. The BRIEF was standardized with 720 teacher ratings of children, ages 5-18 years, in a normative sample designed to reflect U. S. demographic groups of the rated students. Internal consistency coefficients for the teacher form were Inhibit, .95 and .96; Shift, .91 (for both samples); Emotional Control, .94 and .93; Initiate, .84 and .90; Working Memory, .90 and .93; Plan/Organize, .87 and .91; Organization of Materials, .90 and .92; Monitor, .89 and .90. Test-retest reliability for teacher ratings for all scales ranged from .83 to .92. Analyses of correlation with other behavior rating scales suggested convergent and divergent validity with similar construct measures, but less strong correlations with broader measures of emotional functioning (Gioia et al., 2000).

Procedures Used to Generate the Data Base Used in this Study

A certified school psychologist individually assessed each student referred for gifted testing via administration of the WASI. As part of the data gathering prior to testing, the classroom teacher of each referred student completed a BRIEF rating scale. The WASI FSIQ

scores and BRIEF Scale scores composed the data set used in this study. Also included in the data set were student ages and grades, the sources of the referral (parent or teacher) and the outcomes of the evaluation (GIEP or no GIEP).

Criteria for identification as gifted in the state of Pennsylvania include obtaining an IQ score of 130 or higher. Part of this district's gifted identification process included additional testing for students who achieve FSIQ scores between 120 and 129. In that case, two achievement subtests are administered, as well as an additional teacher rating scale. A matrix formula is used to calculate a score. Students who have sufficiently high achievement scores and who obtain teacher ratings are then identified as gifted and provided a Gifted Individualized Education Program (GIEP).

For analysis purposes, the BRIEF T-scores for each subtest were divided into three ranges by percentile rank. The first range consisted of scores less than or equal to the 50th percentile. Children scoring in this range were rated as having no executive functions difficulty in that specific area. The second range, scores between the 51st and 75th percentile, indicated mild to moderate difficulties with executive functions in that area. The third range consisted of scores greater than or equal to the 76th percentile. Scores in this range indicate more severe executive functions difficulties.

Additionally, FSIQ scores were divided into three ranges. The first range consisted of students scoring at or below 119. The second range consisted of FSIQ scores between 120 and 129. The third range consisted of scores at or above 130. This allowed for comparisons at varying ability ranges.

Research Design

A descriptive and correlational research design was used for this study. The analyses were conducted to determine if there was a relationship between teacher reports of executive functioning within the classroom, referral sources for gifted testing, and outcomes of gifted testing.

Chapter 3

Results

Description of the Sample

This study incorporated the data collected on 60 students referred for gifted testing. Of the 60 participants, 19 (32%) were referred by a teacher and 41 (68%) were referred by a parent (and 2 students were referred by a counselor). In addition, 25 (42%) of the participants were identified as gifted and 35 (58%) did not qualify. Of the identified students, 7 (28%) were referred by teachers and 18 (72%) were referred by parents. Of the non-identified students, 12 (34%) were referred by teachers and 23 were referred by parents (66%). Of the participants referred by teachers, 7 (37%) were identified as gifted and 12 (63%) were not. Of the participants referred by parents, 18 (44%) were identified as gifted and 23 (56%) were not. The hit rate or percentage of referred students that qualified from parent referrals (44%) was slightly higher than from teacher referrals (37%).

Question 1: What is the relationship between teacher perceptions of the frequency of behavior indicating executive functions difficulties and intellectual capacity, as reflected in the WASI Full Scale IQ score for students referred for assessment to determine eligibility for gifted program placement?

The first research question examined the relationship between FSIQ and teacher ratings of executive functions. Pearson correlation coefficients were calculated and revealed extremely low levels of relationship between WASI FSIQ scores and BRIEF Scale T-scores. Table 1 presents the correlation coefficients. Table 2 presents additional data which examines the relationship between IQ and executive functions, using WASI FSIQ ranges and BRIEF Scale

percentile ranks. IQ is divided into 3 ranges (less than or equal to 119, 120-129, and greater than or equal to 130). BRIEF ratings by Scale were divided into 3 percentile ranges (less than or equal to the 50th percentile, 51st to 75th percentile, and greater than or equal to the 76th percentile). For 3 of the scales (Initiate, Working Memory, and Monitor), a large majority in each IQ range earned scores at or below the 50th percentile. The Organization of Materials scale was also consistent across ranges, but fewer than half of the participants at each IQ level earned scores at or below the 50th percentile. For the Inhibit and Plan/Organize scales, the majority of students that scored at or below 119 and at or above 130 earned scores at or below the 50th percentile. The students who scored between 120 and 129, however, had lower percentages, scoring at or below the 50th percentile (Inhibit LTE 119- 72%, Inhibit 120-129- 47%, Inhibit GTE 130- 67%; Plan/Organize LTE- 80%, Plan/Organize 120-129- 52%, Plan/Organize GTE- 83%). For the Shift and Emotional Control scales, the majority of students that scored at or below 119 and between 120 and 129 earned scores at or below the 50th percentile. The students who scored 130 and above, however, had lower percentages at or below the 50th percentile (Shift LTE 119- 64%, Shift 120-129- 64%, Shift GTE 130- 44%; Emotional Control LTE- 60%, Emotional Control 120-129- 59%, Emotional Control GTE- 33%).

Table 1

Correlations between WASI FSIQ standard scores and BRIEF t scores (N=60)

	BRIEF Scales							
	INH	SFT	EC	INI	WM	PLOR	OMAT	MON
WASI FSIQ	.046	.294	.262	.121	.093	.148	.156	.146

Table 2

BRIEF Scale Percentile Levels by WASI FSIQ Levels

WASI FSIQ Range	BRIEF Scale Percentile Range		
	LTE 50%ile	51-75%ile	GTE 76%ile
Inhibit Scale			
LTE 119	18 (72%)	2 (8%)	5 (20%)
120-129	8 (47%)	7 (41%)	2 (12%)
GTE 130	12 (67%)	4 (22%)	2 (11%)
Shift Scale			
LTE 119	16 (64%)	6 (24%)	3 (12%)
120-129	11 (64%)	2 (12%)	4 (24%)
GTE 130	8 (44%)	5 (28%)	5 (28%)
Emotional Control Scale			
LTE 119	15 (60%)	9 (36%)	1 (4%)
120-129	10 (59%)	3 (18%)	4 (23%)
GTE 130	6 (33%)	6 (34%)	6 (33%)
Initiate Scale			
LTE 119	19 (76%)	3 (12%)	3 (12%)
120-129	13 (76%)	1 (6%)	3 (18%)
GTE 130	14 (78%)	1 (6%)	3 (16%)
Working Memory Scale			
LTE 119	18 (72%)	5 (20%)	2 (8%)
120-129	12 (71%)	1 (6%)	4 (23%)
GTE 130	12 (66%)	3 (17%)	3 (17%)
Plan/Organize Scale			
LTE 119	20 (80%)	4 (16%)	1 (4%)
120-129	9 (52%)	4 (24%)4	4 (24%)
GTE 130	15 (83%)	1 (6%)	2 (11%)
Organization of Materials Scale			
LTE 119	11 (44%)	10 (40%)	4 (16%)
120-129	8 (47%)	1 (6%)	8 (47%)
GTE 130	8 (44%)	5 (28%)	5 (28%)
Monitor Scale			
LTE 119	17 (68%)	4 (16%)	4 (16%)
120-129	12 (70%)	2 (12%)	3 (18%)
GTE 130	12 (67%)	4 (22%)	2 (11%)

Question 2: What is the relationship between teacher perceptions of the frequency of behavior indicating executive functions difficulties and the referral source for students referred for assessment to determine eligibility for gifted program placement?

The second research question examined the relationship between referral sources and reported executive functions difficulties. Table 3 presents this data. Results indicate that the percentage of parent-referred students rated by classroom teachers as having executive functions difficulties was much greater than the percentage of teacher-referred students. Of teacher-referred students, those rated at or below the 50th percentile ranged from 63-95% across the 8 different Scales. Of parent-referred students, those rated at or below the 50th percentile ranged only from 34-68% across the Scales. The least noticeable difference in teacher ratings of the teacher and parent referred students was on the Shift scale, on which 63% of teacher-referred and 56% of parent-referred students were rated as at or below the 50th percentile. All of the other scales had more notable differences between the percentage of students rated as at or below the 50th percentile by referral source, as shown in Table 3.

Table 3

BRIEF Scale Percentile Levels by Referral Source

WASI FSIQ Range	BRIEF Scale Percentile Range		
	LTE 50%ile	51-75%ile	GTE 76%ile
Inhibit Scale			
Teacher Referral	16 (84%)	2 (11%)	1 (5%)
Parent Referral	22 (54%)	11 (26%)	8 (20%)
Shift Scale			
Teacher Referral	12 (63%)	5 (26%)	2 (11%)
Parent Referral	23 (56%)	8 (20%)	10 (24%)
Emotional Control Scale			
Teacher Referral	14 (74%)	5 (26%)	0 (0%)
Parent Referral	17 (42%)	13 (32%)	11 (27%)
Initiate Scale			
Teacher Referral	18 (95%)	0 (0%)	1 (5%)
Parent Referral	28 (68%)	5 (12%)	8 (20%)
Working Memory Scale			
Teacher Referral	17 (90%)	1 (5%)	1 (5%)
Parent Referral	25 (61%)	8 (20%)	8 (20%)
Plan/Organize Scale			
Teacher Referral	17 (90%)	1 (5%)	1 (5%)
Parent Referral	27 (66%)	8 (20%)	6 (15%)
Organization of Materials Scale			
Teacher Referral	13 (68%)	4 (21%)	2 (11%)
Parent Referral	14 (34%)	12 (29%)	15 (37%)
Monitor Scale			
Teacher Referral	17 (90%)	1 (5%)	1 (5%)
Parent Referral	24 (59%)	9 (22%)	8 (20%)

Question 3: What is the relationship between teacher perceptions of the frequency of behavior indicating executive functions difficulties and placement decision outcomes for students referred for assessment to determine eligibility for gifted program placement?

The third research question examined the relationship between placement decision outcomes and teacher ratings of executive functions difficulties. Table 4 depicts the data. Most of the scales (6 of 8) had almost equal levels of students scoring at or below the 50th percentile both for students identified as gifted and for those who did not qualify. The Shift and Emotional Control scales had the greatest discrepancy (Shift GIEP- 48%, Shift No GIEP- 66%; Emotional Control GIEP- 40%, Emotional Control No GIEP- 60%). In those two scales, students with a GIEP had more reported executive functioning difficulties than students without a GIEP.

Table 4

BRIEF Scale Percentile Levels by GIEP Status

WASI FSIQ Range	BRIEF Scale Percentile Range		
	LTE 50%ile	51-75%ile	GTE 76%ile
Inhibit Scale			
GIEP	17 (68%)	5 (20%)	3 (12%)
No GIEP	21 (60%)	8 (23%)	6 (17%)
Shift Scale			
GIEP	12 (48%)	6 (24%)	7 (28%)
No GIEP	23 (66%)	7 (20%)	5 (14%)
Emotional Control Scale			
GIEP	10 (40%)	8 (32%)	7 (28%)
No GIEP	21 (60%)	10 (29%)	4 (11%)
Initiate Scale			
GIEP	20 (80%)	1 (4%)	4 (16%)
No GIEP	26 (74%)	4 (11%)	5 (14%)
Working Memory Scale			
GIEP	18 (72%)	3 (12%)	4 (16%)
No GIEP	24 (69%)	6 (17%)	5 (14%)
Plan/Organize Scale			
GIEP	18 (72%)	4 (16%)	3 (12%)
No GIEP	26 (74%)	5 (14%)	4 (11%)
Organization of Materials Scale			
GIEP	11 (44%)	6 (24%)	8 (32%)
No GIEP	16 (46%)	10 (29%)	9 (26%)
Monitor Scale			
GIEP	18 (72%)	4 (16%)	3 (12%)
No GIEP	23 (66%)	6 (17%)	6 (17%)

Question 4: What is the relationship between teacher perceptions of the frequency of behavior indicating executive functions difficulties, and intellectual capacity as reflected in the WASI Full Scale IQ score, and the referral source for students referred for assessment to determine eligibility for gifted program placement?

The fourth research question examined the relationship between participants' WASI FSIQ, teacher ratings of executive functions, and referral source. Table 5 presents this data. For teacher referrals, on the Inhibit, Shift, Initiate, Plan/Organize, and Monitoring scales, there were more participants with FSIQ scores less than or equal to 119 rated at or below the 50th percentile, as compared with the other IQ ranges. For teacher referrals on the Shift, Emotional Control, and Organization of Materials scales, there were fewer participants with IQ scores less than or equal to 119 rated at or below the 50th percentile, as compared with the other IQ ranges. For parent referrals, on the Inhibit, Shift, Emotional Control, Organization of Materials, and Monitor scales, there were more participants with IQ scores less than or equal to 119 rated at or below the 50th percentile, as compared with the other IQ ranges. For parent referrals on the Shift, Emotional Control, Organization of Materials, and Monitor scales, there were fewer participants with IQ scores of 130 and above that were rated at or below the 50th percentile, as compared with the other IQ ranges.

Table 5

BRIEF Scale Percentile Levels by WASI FSIQ Level and Referral Source

WASI FSIQ Range	BRIEF Scale Percentile Range		
	LTE 50%ile	51-75%ile	GTE 76%ile
Inhibit Scale			
Teacher Referrals			
LTE 119	7 (88%)	0 (0%)	1 (12%)
120-129	5 (72%)	2 (28%)	0 (0%)
GTE 130	4 (100%)	0 (0%)	0 (0%)
Parent Referrals			
LTE 119	11 (64%)	2 (12%)	4 (24%)
120-129	3 (30%)	5 (50%)	2 (20%)
GTE 130	8 (57%)	4 (29%)	2 (14%)
Shift Scale			
Teacher Referrals			
LTE 119	4 (50%)	3 (37%)	1 (13%)
120-129	5 (71%)	1 (14%)	1 (14%)
GTE 130	3 (75%)	1 (25%)	0 (0%)
Parent Referrals			
LTE 119	12 (71%)	3 (17%)	2 (12%)
120-129	6 (60%)	1 (10%)	3 (30%)
GTE 130	5 (36%)	4 (28%)	5 (36%)
Emotional Control Scale			
Teacher Referrals			
LTE 119	5 (33%)	3 (67%)	0 (0%)
120-129	6 (86%)	1 (14%)	0 (0%)
GTE 130	3 (75%)	1 (25%)	0 (0%)
Parent Referrals			
LTE 119	10 (59%)	6 (35%)	1 (6%)
120-129	4 (40%)	2 (20%)	4 (40%)
GTE 130	3 (21%)	5 (36%)	6 (43%)
Initiate Scale			
Teacher Referrals			
LTE 119	7 (88%)	0 (0%)	1 (12%)
120-129	7 (100%)	0 (0%)	0 (0%)
GTE 130	4 (100%)	0 (0%)	0 (0%)
Parent Referrals			
LTE 119	12 (71%)	3 (17%)	2 (12%)
120-129	6 (60%)	1 (10%)	3 (30%)
GTE 130	10 (71%)	1 (7%)	3 (22%)

Working Memory Scale			
Teacher Referrals			
LTE 119	7 (88%)	0 (0%)	1 (12%)
120-129	7 (100%)	0 (0%)	0 (0%)
GTE 130	3 (75%)	1 (25%)	0 (0%)
Parent Referrals			
LTE 119	11 (65%)	5 (29%)	1 (6%)
120-129	5 (50%)	1 (10%)	4 (40%)
GTE 130	9 (64%)	2 (14%)	3 (22%)
Planning/Organization Scale			
Teacher Referrals			
LTE 119	7 (88%)	0 (0%)	1 (12%)
120-129	6 (86%)	1 (14%)	0 (0%)
GTE 130	4 (100%)	0 (0%)	0 (0%)
Parent Referrals			
LTE 119	13 (76%)	4 (24%)	0 (0%)
120-129	3 (30%)	3 (30%)	4 (40%)
GTE 130	11 (79%)	1 (7%)	2 (14%)
Organization of Materials Scale			
Teacher Referrals			
LTE 119	4 (50%)	3 (37%)	1 (13%)
120-129	6 (86%)	0 (0%)	1 (14%)
GTE 130	3 (75%)	1 (25%)	0 (0%)
Parent Referrals			
LTE 119	7 (100%)	7 (0%)	3 (0%)
120-129	2 (20%)	1 (10%)	7 (70%)
GTE 130	5 (36%)	4 (28%)	5 (36%)
Monitor Scale			
Teacher Referrals			
LTE 119	7 (88%)	0 (0%)	1 (12%)
120-129	6 (86%)	1 (14%)	0 (0%)
GTE 130	4 (100%)	0 (0%)	0 (0%)
Parent Referrals			
LTE 119	10 (59%)	4 (23%)	3 (18%)
120-129	6 (60%)	1 (10%)	3 (30%)
GTE 130	8 (57%)	4 (29%)	2 (14%)

Question 5: What is the relationship between teacher perceptions of the frequency of behavior indicating executive functions difficulties, the intellectual capacity as reflected in the WASI Full Scale IQ score, and placement decision outcomes for students referred for assessment to determine eligibility for gifted program placement?

The fifth research question examined the relationship between participants' WASI FSIQ, teacher ratings of executive functions difficulties, and gifted testing status. Table 6 depicts this data. For 6 of the 8 BRIEF Scales, students who scored 130 or above were rated at or below the 50th percentile less often than students who scored between 120 and 129 (indicating that the brighter students had more EF difficulties). When comparing those students who scored between 120 and 129 that were identified as Gifted with those who did not qualify, the scales were split. On one-half of the BRIEF Scales (Inhibit, Initiate, Working Memory, and Monitor), students who qualified for gifted programming were more likely to be rated at or below the 50th percentile, as compared with those who did not qualify. On the other half of the BRIEF Scales (Shift, Emotional Control, Planning/Organize, and Organization of Materials), students who qualified were less likely to be rated at or below the 50th percentile, as compared with those who did not qualify.

Table 6

BRIEF Scale Percentile Levels by WASI FSIQ Level and GIEP Status

WASI FSIQ Range	BRIEF Scale Percentile Range		
	LTE 50%ile	51-75%ile	GTE 76%ile
Inhibit Scale			
No GIEP in Place			
LTE 119 (n=25)	18 (72%)	2 (8%)	5 (20%)
120-129 (n=10)	3 (30%)	6 (60%)	1 (10%)
GIEP in Place			
120-129 (n=7)	5 (71%)	1 (14%)	1 (14%)
GTE 130 (n=18)	12 (67%)	4 (22%)	2 (11%)
Shift Scale			
No GIEP in Place			
LTE 119 (n=25)	16 (64%)	6 (24%)	3 (12%)
120-129 (n=10)	7 (70%)	1 (10%)	2 (20%)
GIEP in Place			
120-129 (n=7)	4 (57%)	1 (14%)	2 (29%)
GTE 130 (n=18)	8 (44%)	5 (28%)	5 (28%)
Emotional Control Scale			
No GIEP in Place			
LTE 119 (n=25)	15 (60%)	9 (36%)	1 (4%)
120-129 (n=10)	6 (60%)	1 (10%)	3 (30%)
GIEP in Place			
120-129 (n=7)	4 (57%)	2 (27%)	1 (14%)
GTE 130 (n=18)	6 (34%)	6 (33%)	6 (33%)
Initiate Scale			
No GIEP in Place			
LTE 119 (n=25)	19 (76%)	3 (12%)	3 (12%)
120-129 (n=10)	7 (70%)	1 (10%)	2 (20%)
GIEP in Place			
120-129 (n=7)	6 (86%)	0 (0%)	1 (14%)
GTE 130 (n=18)	14 (78%)	1 (7%)	3 (15%)
Working Memory Scale			
No GIEP in Place			
LTE 119 (n=25)	18 (72%)	5 (20%)	2 (8%)
120-129 (n=10)	6 (60%)	1 (10%)	3 (30%)
GIEP in Place			
120-129 (n=7)	6 (86%)	0 (0%)	1 (14%)
GTE 130 (n=18)	12 (66%)	3 (17%)	3 (17%)

Planning/Organization Scale			
No GIEP in Place			
LTE 119 (n=25)	20 (80%)	4 (16%)	1 (4%)
120-129 (n=10)	6 (60%)	1 (10%)	3 (30%)
GIEP in Place			
120-129 (n=7)	3 (43%)	3 (43%)	1 (14%)
GTE 130 (n=18)	15 (83%)	1 (6%)	2 (11%)
Organization of Materials Scale			
No GIEP in Place			
LTE 119 (n=25)	11 (44%)	10 (40%)	4 (16%)
120-129 (n=10)	5 (50%)	0 (0%)	5 (50%)
GIEP in Place			
120-129 (n=7)	3 (43%)	1 (14%)	3 (43%)
GTE 130 (n=18)	8 (44%)	5 (28%)	5 (28%)
Monitor Scale			
No GIEP in Place			
LTE 119 (n=25)	17 (100%)	4 (0%)	4 (0%)
120-129 (n=10)	6 (60%)	2 (20%)	2 (20%)
GIEP in Place			
120-129 (n=7)	6 (86%)	0 (0%)	1 (14%)
GTE 130 (n=18)	12 (67%)	4 (22%)	2 (11%)

Question 6: What is the relationship between teacher perceptions of the frequency of behavior indicating executive functions difficulties, the intellectual capacity as reflected in the WASI Full Scale IQ score, the referral source, and placement decision outcomes for students referred for assessment to determine eligibility for gifted program placement?

The sixth research question examined the relationship between and among all four variables: participants' IQ, teacher ratings of executive functions difficulties, referral source, and gifted identification status. Table 7 presents this data. Of the 16 students who scored 130 or above, 4 were teacher-referrals and 12 were parent-referrals. Of those 4 teacher-referrals, all 4 were rated at or below the 50th percentile on the following scales: Inhibit, Initiate, Plan/Organize, and Monitor. On the Shift, Emotional Control, Working Memory, and Organization of Materials, 3 of the 4 were rated at or below the 50th percentile. On each of those scales, the other student was rated in the 51st to 75th percentile, indicating moderate difficulty with EF. Parent-referred students that scored 130 or higher were less likely to be rated at or below the 50th percentile, as compared with the teacher-referred students (Inhibit Teacher- 100%, Inhibit Parent- 57%; Shift Teacher- 75%, Shift Parent- 36%; Emotional Control Teacher- 75%, Emotional Control Parent- 21%; Initiate Teacher- 100%, Initiate Parent- 71%; Working Memory Teacher- 75%, Working Memory Parent- 64%; Plan/Organize Teacher- 100%, Plan/Organize Parent- 79%; Organization of Materials Teacher- 75%, Organization of Materials Parent- 36%; Monitor Teacher- 100%, Monitor Parent- 57%).

Table 7

BRIEF Scale Percentile Levels by WASI FSIQ Level, Referral Source and GIEP Status

WASI FSIQ Range	BRIEF Scale Percentile Range		
	LTE 50%ile	51-75%ile	GTE 76%ile
Inhibit Scale			
No GIEP in Place			
Teacher Referrals			
LTE 119 (n=8)	7 (88%)	0 (0%)	1 (12%)
120-129 (n=4)	2 (50%)	2 (50%)	0 (0%)
Parent Referrals			
LTE 119 (n=17)	11 (65%)	2 (12%)	4 (23%)
120-129 (n=6)	1 (17%)	4 (67%)	1 (17%)
GIEP in Place			
Teacher Referrals			
120-129 (n=3)	3 (100%)	0 (0%)	0 (0%)
GTE 130 (n=4)	4 (100%)	0 (0%)	0 (0%)
Parent Referrals			
120-129 (n=4)	2 (50%)	1 (25%)	1 (25%)
GTE 130 (n=14)	8 (57%)	4 (29%)	2 (14%)
Shift Scale			
No GIEP in Place			
Teacher Referrals			
LTE 119 (n=8)	4 (50%)	3 (37%)	1 (13%)
120-129 (n=4)	4 (100%)	0 (0%)	0 (0%)
Parent Referrals			
LTE 119 (n=17)	12 (71%)	3 (17%)	2 (12%)
120-129 (n=6)	3 (50%)	1 (17%)	2 (33%)
GIEP in Place			
Teacher Referrals			
120-129 (n=3)	1 (33%)	1 (33%)	1 (33%)
GTE 130 (n=4)	3 (75%)	1 (25%)	0 (0%)
Parent Referrals			
120-129 (n=4)	3 (75%)	0 (0%)	1 (25%)
GTE 130 (n=14)	5 (36%)	4 (24%)	5 (36%)
Emotional Control Scale			
No GIEP in Place			
Teacher Referrals			
LTE 119 (n=8)	5 (63%)	3 (37%)	0 (0%)
120-129 (n=4)	4 (100%)	0 (0%)	0 (0%)
Parent Referrals			
LTE 119 (n=17)	10 (59%)	6 (35%)	1 (6%)

120-129 (n=6)	2 (33%)	1 (17%)	3 (50%)
GIEP in Place			
Teacher Referrals			
120-129 (n=3)	2 (67%)	1 (33%)	0 (0%)
GTE 130 (n=4)	3 (75%)	1 (25%)	0 (0%)
Parent Referrals			
120-129 (n=4)	2 (50%)	1 (25%)	1 (25%)
GTE 130 (n=14)	3 (21%)	5 (36%)	6 (43%)
Initiate Scale			
No GIEP in Place			
Teacher Referrals			
LTE 119 (n=8)	7 (88%)	0 (0%)	1 (12%)
120-129 (n=4)	4 (100%)	0 (0%)	0 (0%)
Parent Referrals			
LTE 119 (n=17)	12 (70%)	3 (18%)	2 (12%)
120-129 (n=6)	3 (50%)	1 (17%)	2 (33%)
GIEP in Place			
Teacher Referrals			
120-129 (n=3)	3 (100%)	0 (0%)	0 (0%)
GTE 130 (n=4)	4 (100%)	0 (0%)	0 (0%)
Parent Referrals			
120-129 (n=4)	3 (75%)	0 (0%)	1 (25%)
GTE 130 (n=14)	10 (71%)	1 (7%)	3 (22%)
Working Memory Scale			
No GIEP in Place			
Teacher Referrals			
LTE 119 (n=8)	7 (88%)	0 (0%)	1 (12%)
120-129 (n=4)	4 (100%)	0 (0%)	0 (0%)
Parent Referrals			
LTE 119 (n=17)	11 (65%)	5 (29%)	1 (6%)
120-129 (n=6)	2 (33%)	1 (17%)	3 (50%)
GIEP in Place			
Teacher Referrals			
120-129 (n=3)	3 (100%)	0 (0%)	0 (0%)
GTE 130 (n=4)	3 (75%)	1 (25%)	0 (0%)
Parent Referrals			
120-129 (n=4)	3 (75%)	0 (0%)	1 (25%)
GTE 130 (n=14)	9 (64%)	2 (14%)	3 (22%)
Planning/Organization Scale			
No GIEP in Place			
Teacher Referrals			
LTE 119 (n=8)	7 (88%)	0 (0%)	1 (12%)
120-129 (n=4)	4 (100%)	0 (0%)	0 (0%)
Parent Referrals			

LTE 119 (n=17)	13 (76%)	4 (24%)	0 (0%)
120-129 (n=6)	2 (33%)	1 (17%)	3 (50%)
GIEP in Place			
Teacher Referrals			
120-129 (n=3)	2 (67%)	1 (33%)	0 (0%)
GTE 130 (n=4)	4 (100%)	0 (0%)	0 (0%)
Parent Referrals			
120-129 (n=4)	1 (25%)	2 (50%)	1 (25%)
GTE 130 (n=14)	11 (79%)	1 (7%)	2 (14%)
Organization of Materials Scale			
No GIEP in Place			
Teacher Referrals			
LTE 119 (n=8)	4 (50%)	3 (37%)	1 (13%)
120-129 (n=4)	4 (100%)	0 (0%)	0 (0%)
Parent Referrals			
LTE 119 (n=17)	7 (41%)	7 (41%)	3 (18%)
120-129 (n=6)	1 (17%)	0 (0%)	5 (83%)
GIEP in Place			
Teacher Referrals			
120-129 (n=3)	3 (67%)	0 (0%)	0 (0%)
GTE 130 (n=4)	3 (75%)	1 (25%)	0 (0%)
Parent Referrals			
120-129 (n=4)	1 (25%)	1 (25%)	2 (50%)
GTE 130 (n=14)	5 (36%)	4 (24%)	5 (36%)
Monitor Scale			
No GIEP in Place			
Teacher Referrals			
LTE 119 (n=8)	7 (88%)	0 (0%)	1 (12%)
120-129 (n=4)	3 (75%)	1 (25%)	0 (0%)
Parent Referrals			
LTE 119 (n=17)	10 (59%)	4 (23%)	3 (18%)
120-129 (n=6)	3 (50%)	1 (17%)	2 (33%)
GIEP in Place			
Teacher Referrals			
120-129 (n=3)	3 (100%)	0 (0%)	0 (0%)
GTE 130 (n=4)	4 (100%)	0 (0%)	0 (0%)
Parent Referrals			
120-129 (n=4)	3 (75%)	0 (0%)	1 (25%)
GTE 130 (n=14)	8 (57%)	4 (29%)	2 (14%)

Question 7: Are there specific items on the BRIEF Scales that are more closely associated with referral sources and/or placement decisions or that were endorsed more frequently than others by teachers evaluating students referred for assessment to determine eligibility for gifted program placement?

The seventh research question examined the relationship of teacher ratings on specific items of the BRIEF with gifted identification and teacher BRIEF item ratings and referral sources. Although the item analyses by referral source and GIEP status did not produce any items that specifically discriminated between referral sources or GIEP status (see data analyses in Appendix A), a number of BRIEF items were more frequently endorsed than other items when teachers expressed concerns about a student's use of executive functions. The items that were endorsed most frequently when concerns were or were not present are listed by BRIEF Scale in Tables 8-15.

Table 8

Frequency of Inhibit Scale Item Teacher Ratings of "Sometimes" or "Often" by Student Inhibit Scale Score Percentile Rank Range

	Inhibit Scale Score Percentile Rank Range		
	≤ 50th Percentile	51st -75th Percentile	≥ 76th Percentile
Scale Item	Frequency of 2 (Sometimes) or 3 (Often) Inhibit Scale Item Rating by Teacher		
Cannot get a disappointment, scolding, or insult off his/her mind	3%	46%	50%
Resists or has trouble accepting a different way to solve a problem with schoolwork, friends, chores, etc.	0%	9%	36%
Becomes upset with new situations	3%	9%	36%
Acts upset by a change in plans	0%	0%	43%
Is disturbed by a change in teacher or class	0%	0%	29%
Resists change of routine, food, places, etc.	0%	0%	14%
Has trouble getting used to new situations (classes, groups, friends)	0%	3%	43%
Thinks too much about the same topic	0%	18%	43%
Gets stuck on one topic or activity	0%	9%	43%
After having a problem will stay disappointed for a long time	0%	18%	57%
Has trouble moving from one activity to another	6%	9%	36%
Says the same things over and over	6%	0%	21%

Table 9

Frequency of Shift Scale Item Teacher Endorsements of "Sometimes" or "Often" Ratings by Student Shift Scale Score Percentile Rank Range

	Shift Scale Score Percentile Rank Range		
	≤ 50th Percentile	51st -75th Percentile	≥ 76th Percentile
	Frequency of 2 (Sometimes) or 3 (Often) Shift Scale Item Rating by Teacher		
Needs to be told "no" or "stop that"	3%	67%	80%
Does not think before doing	0%	17%	90%
Interrupts others	3%	42%	70%
Is impulsive	0%	42%	90%
Gets out of seat at the wrong times	3%	42%	60%
Gets out of control more than friends	0%	8%	70%
Acts too wild or "out of control"	0%	0%	56%
Has trouble putting the brakes on his/her actions	0%	33%	50%
Gets in trouble if not supervised by an adult	0%	17%	70%
Does not think of consequences for actions	0%	25%	70%
Has trouble waiting his or her turn	0%	25%	80%
Has to be closely supervised	0%	25%	60%
Cannot stay on the same topic when talking	3%	42%	80%
Blurts things out	0%	42%	70%
Talks at the wrong time	0%	50%	90%

Table 10

Frequency of Emotional Control Scale Item Teacher Endorsements of "Sometimes" or "Often" Ratings by Student Emotional Control Scale Score Percentile Rank Range

	Emotional Control Scale Score Percentile Rank Range		
	≤ 50th Percentile	51st -75th Percentile	≥ 76th Percentile
Scale Item	Frequency of 2 (Sometimes) or 3 (Often) Emotional Control Scale Item Rating by Teacher		
Overreacts to small problems	0%	35%	83%
Has explosive, angry outbursts	0%	0%	17%
Has outbursts for little reason	0%	0%	17%
Mood changes frequently	0%	0%	33%
Reacts more strongly to situations than other children	0%	29%	83%
Mood is easily influenced by the situation	0%	18%	58%
Angry or tearful outbursts are intense but end suddenly	0%	0%	25%
Small events trigger big reactions	0%	0%	33%
Becomes upset too easily	0%	6%	58%

Table 11

Frequency of Initiate Scale Item Teacher Endorsements of "Sometimes" or "Often" Ratings by Student Initiate Scale Score Percentile Rank Range

	Initiate Scale Score Percentile Rank Range		
	≤ 50th Percentile	51st -75th Percentile	≥ 76th Percentile
Scale Item	Frequency of 2 (Sometimes) or 3 (Often) Initiate Scale Item Rating by Teacher		
Is not a self-starter	4%	25%	80%
Needs to be told to begin a task even when willing	4%	50%	80%
Does not show creativity in solving a problem	7%	50%	40%
Has problems coming up with different ways of solving a problem	2%	50%	70%
Has trouble getting started on homework or chores	0%	25%	80%
Does not take initiative	0%	25%	90%
Has trouble thinking of a different way to solve a problem when stuck	0%	25%	60%
Leaves messes that others have to clean up	4%	25%	80%

Table 12

Frequency of Working Memory Scale Item Teacher Endorsements of "Sometimes" or "Often" Ratings by Student Working Memory Scale Score Percentile Rank Range

	Working Memory Scale Score Percentile Rank Range		
	≤ 50th Percentile	51st -75th Percentile	≥ 76th Percentile
Scale Item	Frequency of 2 (Sometimes) or 3 (Often) Working Memory Scale Item Rating by Teacher		
When given three things to do, remembers only the first or last	3%	44%	90%
Has a short attention span	5%	33%	89%
Has trouble concentrating on chores, homework, etc.	5%	33%	89%
Is easily distracted by noises, activity, sights, etc.	5%	44%	100%
Has trouble with chores or task that have more than one step	0%	22%	78%
Needs help from an adult to stay on task	2%	56%	89%
Forgets what he/she was doing	0%	22%	78%
When sent to get something, forgets what he/she is supposed to get	0%	11%	56%
Has trouble finishing tasks (chores, homework)	0%	11%	67%
Has trouble remembering things, even for a few minutes	0%	11%	67%
Cannot stay on topic when talking	0%	0%	44%

Table 13

Frequency of Plan/Organize Scale Item Teacher Endorsements of "Sometimes" or "Often" Ratings by Student Plan/Organize Scale Score Percentile Rank Range

	Plan/Organize Scale Score Percentile Rank Range		
	≤ 50th Percentile	51st -75th Percentile	≥ 76th Percentile
Scale Item	Frequency of 2 (Sometimes) or 3 (Often) Plan/Organize Scale Item Rating by Teacher		
Does not bring home homework, assignment sheets, materials, etc.	2%	44%	100%
Has good ideas but cannot get them on paper	9%	33%	86%
Forgets to hand in homework even when completed	0%	22%	86%
Gets caught up in details and misses the big picture	5%	11%	86%
Has good ideas but does not get job done (lacks follow-through)	2%	22%	86%
Becomes overwhelmed by large assignments	0%	22%	100%
Underestimates time needed to finish tasks	0%	22%	100%
Starts assignments or chores at the last minute	2%	22%	86%
Does not plan ahead for school assignments	0%	22%	86%
Written work is poorly organized	14%	22%	86%
Does not connect doing tonight's homework with grades	0%	11%	57%
Does not come prepared for class	0%	0%	86%

Table 14

Frequency of Organization of Materials Scale Item Teacher Endorsements of "Sometimes" or "Often" Ratings by Student Organization of Materials Scale Score Percentile Rank Range

	Organization of Materials Scale Score Percentile Rank Range		
	≤ 50th Percentile	51st -75th Percentile	≥ 76th Percentile
Scale Item	Frequency of 2 (Sometimes) or 3 (Often) Organization of Materials Scales Item Rating by Teacher		
Loses lunch box, lunch money, permission slips, homework, etc.	0%	6%	53%
Cannot find clothes, glasses, shoes, toys, books, pencils, etc.	0%	13%	59%
Backpack is disorganized	0%	19%	71%
Cannot find things in room or school desk	0%	19%	77%
Leaves a trail or belongings wherever he/she goes	0%	0%	47%
Has a messy desk	0%	29%	100%

Table 15

Frequency of Monitor Scale Item Teacher Endorsements of "Sometimes" or "Often" Ratings by Student Monitor Scale Score Percentile Rank Range

	Monitor Scale Score Percentile Rank Range		
	≤ 50th Percentile	51st -75th Percentile	≥ 76th Percentile
Scale Item	Frequency of 2 (Sometimes) or 3 (Often) Monitor Scale Item Rating by Teacher		
Does not check work for mistakes	15%	80%	100%
Makes careless errors	17%	90%	100%
Is unaware of how his/her behavior bothers others	2%	20%	67%
Leaves work incomplete	2%	10%	67%
Does not notice when his/her behavior causes negative reactions	2%	20%	78%
Is unaware of own behavior when in group	2%	10%	56%
Has poor understanding of own strengths and weaknesses	0%	10%	78%
Talks or plays too loud sly	5%	30%	67%
Work is sloppy	22%	40%	89%
Does not realize that certain actions bother others	2%	10%	78%

Chapter 4

Discussion

In this study, teacher ratings of executive functions use by students referred for gifted testing were examined in relation to WASI FSIQ, sources of referral, and evaluation status. It was suspected that students referred for gifted testing by their classroom teachers would have "better" (lower) BRIEF scores than students referred for testing by someone other than their classroom teachers. It was hypothesized that teachers tend to refer based on "good student" behaviors such as productivity, task completion, motivation, and perseverance; all of these characteristics are associated with effective use of executive functions.

The findings summarized under the descriptive results section discussed the hit rate, or percentage of referred students that were identified as gifted. The hit rate for parent-referred students was slightly higher than it was for teacher-referred students. This is of interest because it suggests that parents may be better able than teachers to identify gifted students. The general expectation would be the opposite; that is, that teachers who work with students of varying ability levels for the majority of the child's day would be better able to spot signs of giftedness than would parents, who have a limited, and understandably more biased, perspective.

Question 1: What is the relationship between teacher perceptions of the frequency of behavior indicating executive functions difficulties and intellectual capacity, as reflected in the WASI Full Scale IQ score for students referred for assessment to determine eligibility for gifted program placement?

There was no discernable pattern of relationship between WASI FSIQ and BRIEF Scale T-scores for the entire sample of 60 students. However, when results were examined using FSIQ

score ranges and BRIEF Scale percentile rank range, a number of interesting results emerged. The Organization of Materials scale was an area in which the majority of students across all IQ levels were rated as having executive functions difficulties, as represented by ratings above the 50th percentile. The items of this scale describe behaviors such as ordering and organizing things in one's environment, including maintenance of orderly work, play, and storage spaces (e.g., school desks, lockers, and backpacks). Teachers reported that the majority of students who were identified had a tendency to lose things and to be unable to locate things.

For the Shift and Emotional Control Scales, the majority of the brightest students were rated as having executive functions difficulties. The items of the Shift scale describe behaviors involving making transitions, tolerating change, problem-solving flexibly, and switching or alternating one's attention from one focus or topic to another. This is consistent with McCloskey's explanation that it takes a greater executive function capacity to respond to an external demand than it does to engage in a behavior that satisfies one's internally generated interests (McCloskey, et al, 2009). Teachers often describe children who have difficulty with shifting as being somewhat rigid or inflexible, preferring to do things their own way instead of accepting suggestions about alternate approaches to solving problems.

The items included on the Emotional Control Scale reflect the use of executive functions in the expression and regulation of one's emotions. Children with difficulties in this area often overreact to seemingly minor events. They may become upset very easily and exhibit moods that are unpredictable and shift quickly. Difficulties in this area are similar to the Emotional Overexcitability described in Dabrowsky's Theory of positive disintegration (as cited in Mendaglio & Tillier, 2006).

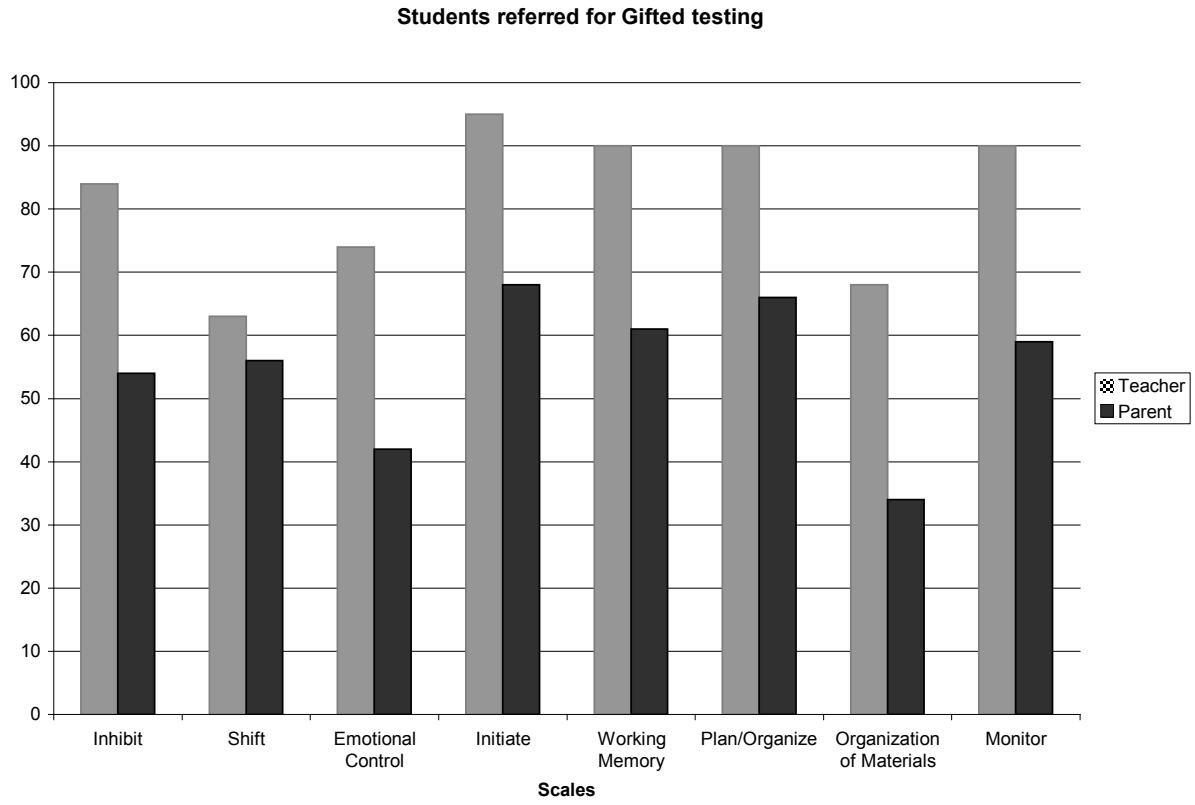
It is noted that the 3 students with the highest IQ scores (greater than or equal to 140) often were rated by teachers as having executive functions difficulties. On the Inhibit scale, 2 of the 3 students were rated in the elevated range (above the 50th percentile). On the Shift scale, all 3 of the students were rated in the elevated range. On the Emotional Control scale, all 3 students were rated in the elevated range. On the Organization of Materials scale, 2 of the 3 students were rated in the elevated range. On the Monitor scale, 2 of the 3 students were rated in the elevated range. Therefore, on 5 of the 8 BRIEF scales, the majority of the highest scoring children were rated as having more executive function difficulties, relative to same-age peers.

Question 2: What is the relationship between teacher perceptions of the frequency of behavior indicating executive functions difficulties and the referral source for students referred for assessment to determine eligibility for gifted program placement?

Analysis of the data indicated that a greater percentage of parent-referred students, as opposed to teacher-referred students, were rated by their classroom teachers as having executive functions difficulties. Figure 1 graphically depicts the percentage of referred students that were rated as having few if any executive functions difficulties (scores less than the 50thpercentile). A greater percentage of teacher-referred students were in this group for all eight BRIEF Scales. These findings support the hypothesis that teachers tend to refer students that exhibit effective use of executive functions in the classroom setting.

Figure 1

Percentage of students rated as less than or equal to the 50th percentile on each BRIEF scale



Of note, the 3 students who scored the highest on the WASI (FSIQ greater than or equal to 140) were parent-referrals. Each of these students was rated as exhibiting executive function difficulties by his/her classroom teacher on 5 of the 8 BRIEF Scales. In other words, the brightest students that were referred by parents were judged by their teachers as having less than exemplary executive functions, which may have had something to do with the reason why they were not referred for gifted testing by their teachers. These findings suggest that teachers tend not to refer students they judge as having executive functions difficulties, despite having extremely high ability. It is also possible that the parents of these children inquired about gifted testing before the teacher had the opportunity to make a formal referral.

Question 3: What is the relationship between teacher perceptions of the frequency of behavior indicating executive functions difficulties and placement decision outcomes for students referred for assessment to determine eligibility for gifted program placement?

There were few distinct patterns revealed by the analysis of the relationship between teacher ratings of executive functions and placement decisions. Most of the Scales had almost equal proportions of different levels of executive functions ratings both for Gifted and for non-Gifted students. However, there were two scales that reflected discrepancies. For the Shift and Emotional Control scales, students identified as Gifted were rated as having more executive function difficulties than the non-Gifted students. As noted in the discussion of Question 1, the brightest students were rated as having more difficulties on the Shift and Emotional Control Scales, and as noted in the discussion of Question 2, a greater number of students referred by parents were identified as Gifted and were rated as having more executive functions difficulties.

Question 4: What is the relationship between teacher perceptions of the frequency of behavior indicating executive functions difficulties, intellectual capacity as reflected in the WASI Full Scale IQ score, and the referral source for students referred for assessment to determine eligibility for gifted program placement?

The fourth question examined the relationship among teacher ratings of executive functions, referral sources, and WASI FSIQ. There were few distinct patterns revealed by this analysis. One pattern that emerged was in the case of teacher- referred students who did not qualify (WASI FSIQ scores at or below 119). They were rated as having few if any executive function problems on the majority of the BRIEF Scales. This is perhaps the reason why they were referred in the first place and this supports the hypothesis that teachers tend to consider a student's effective use of executive functions as a basis for gifted referrals. Interestingly, these same students (IQs at or below 119) were rated as having more executive functions difficulties compared with students at other FSIQ levels on the Shift, Emotional Control, and Organization of Materials Scales.

For parent referrals, the majority of the students that did not qualify (FSIQs at or below 119) were rated by their classroom teachers as having few if any executive function difficulties. On one-half of the scales, the parent-referred students who scored the highest (IQs at or above 130) were rated as having executive functions difficulties. Therefore, for parent-referrals, the students identified as gifted were viewed as having executive functions difficulties by teachers, which is potentially the reason why they were not referred for gifted testing by their classroom teachers.

Question 5: What is the relationship between teacher perceptions of the frequency of behavior indicating executive functions difficulties, intellectual capacity as reflected in the WASI Full Scale IQ score, and placement decision outcomes for students referred for assessment to determine eligibility for gifted program placement?

The fifth research question examined the relationship between teacher ratings of executive functions, FSIQ, executive functioning ability, and identification status. For 6 of the 8 scales, the brightest students (IQs 130 or above) were rated as having more executive function difficulties, as compared with the slightly less bright students (IQs between 120 and 129).

The students that scored between 120 and 129 are considered to be on the "borderline" range for giftedness and therefore they required very high achievement scores in order to be identified as gifted. For that group, the BRIEF teacher ratings were variable. On one-half the scales (including the Shift, Emotional Control, and Organization of Materials Scales), students identified as Gifted were rated as having executive functions difficulties more frequently than the students who were not identified as Gifted. This again suggests that bright and high achieving students often continue to struggle with organization, emotional control, and transitioning.

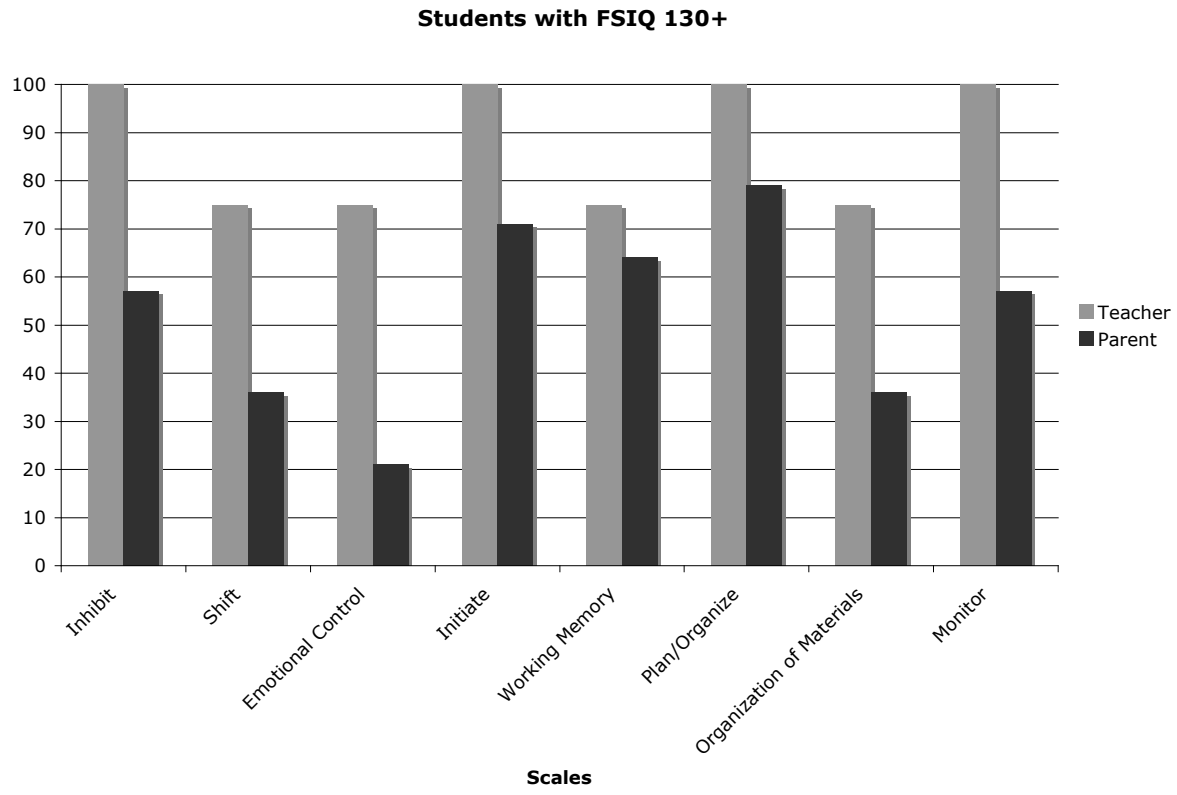
Question 6: What is the relationship between teacher perceptions of the frequency of behavior indicating executive functions difficulties, intellectual capacity as reflected in the WASI Full Scale IQ score, the referral source, and placement decision outcomes for students referred for assessment to determine eligibility for gifted program placement?

This question examined the relationship among all 4 variables. Of greatest interest was the group of students who scored 130 or above. Only 4 of 16 (25%) were teacher referrals and the rest (75%) were referred by a parent. Among the teacher referrals, the majority of students

were rated as having no executive functions difficulties. Among the parent referrals, these very bright students were much more likely to be rated as having executive functions difficulties. Figure 2 depicts this data. This again supports the hypothesis that teachers refer students who demonstrate strong executive functions skills. Additionally, very bright students who were referred by parents were more likely to be rated as executive deficient.

Figure 2

Percentage of students scoring 130+ rated as less than or equal to the 50th percentile on each BRIEF scale



Question 7: Are there specific items on the BRIEF Scales that are more closely associated with referral sources and/or placement decisions or that were endorsed more frequently than others by teachers evaluating students referred for assessment to determine eligibility for gifted program placement?

This question about specific items of the BRIEF associated either with gifted identification or referral source did not produce any items that specifically discriminated between either. However, there were a number of items that were more frequently endorsed than the other BRIEF items when teachers expressed concerns about a student's use of executive functions. Items that were endorsed for 80% or more of the students whom teachers rated as having executive functions difficulties included:

From the Shift scale:

- Needs to be told "no" or stop that
- Does not think before doing
- Is impulsive
- Has trouble waiting his or her turn
- Cannot stay on topic when talking
- Talks at the wrong time

From the Emotional Control scale:

- Is not a self-starter
- Needs to be told to begin a task even when willing
- Has trouble getting started on homework or chores
- Does not take initiative
- Leaves messes that others have to clean up

From the Working Memory scale:

- When given three things to do, remembers only the first or last
- Has a short attention span
- Has trouble concentrating on chore, homework, etc.
- Is easily distracted by noises, activity, sights, etc.
- Needs help form an adult to stay on task

From the Plan/Organize scale:

- Does not bring home homework, assignment sheets, materials, etc.
- Has good ideas but cannot get them on paper

- Forgets to hand in homework even when completed
- Gets caught up in details and misses the big picture
- Has good ideas but does not get the job done
- Becomes overwhelmed by large assignments
- Underestimates time needed to finish tasks
- Starts assignment or chores at the last minute
- Does not plan ahead for school assignments
- Written work is poorly organized
- Does not come prepared for class

From the Organization of Materials scale:

- Has a messy desk

From the Monitor scale:

- Does not check work for mistakes
- Makes careless errors
- Work is sloppy

For the Inhibit scale, there were no items that were endorsed 80% or more for students that were rated as having executive functions difficulties in this area.

Conclusion and Implications

The term intelligence is much more complicated than IQ testing suggests. There are multiple ways to define intelligence. This study supports the idea that teachers expect to see strong executive functions exhibited by gifted students, to the degree that "Belmont (1978) recognized executive functioning as a hallmark of intelligence" (Borowski & Burke, 1996, p. 235). This study indicates that teacher referrals for gifted testing are more consistent with efficient use of executive functions than they are with IQ scores. Perhaps there should be a more inclusive definition of gifted students, which includes metacognitive ability. Perhaps the upcoming DSM-V should include a new category to account for executive dysfunction. This would help to clarify the idea that the students that appear deficient are in reality very highly, cognitively talented. Additionally, cognitively gifted but executively deficient students could be identified as needing *both* enriched curricula as well as interventions to improve executive

functioning. Rather than exclusionary, a more holistic approach to each GIEP would be beneficial to students with executive difficulties. This would support increased differentiation in classrooms.

There is a tendency to view ADHD-like behaviors as problematic instead of as indicators of giftedness (Tucker & Haferistein, 1997; Baum & Olenchak, 2002). ADHD tends to be the go-to conclusion when behavioral difficulties are described (Hartnett, Nelson, & Rinn, 2000). Teachers need more training on indicators of giftedness. In addition, pre-service psychologists and counselors need more training, in order to better inform other staff members. As demonstrated in this study, not all students with gifted ability demonstrate strong executive function use.

Limitations

This study focused on a small number of students from one school district. Additionally, the majority of the students, despite referral source, were rated as exhibiting few if any executive functions difficulties. Of greatest importance, this study did not directly measure each student's use of the executive functions. Instead, it relied on teacher judgments to determine students' levels of executive functions use. This allowed rater bias to enter the equation. In addition, BRIEF ratings are subjective and ratings were collected from multiple teachers. Perhaps an individual teacher's tolerance for certain behaviors was a confounding variable within the study.

Future Research

Future research could examine the use of executive functions of a larger sample of referred students. It would be interesting to see how teachers rate the executive functions capacities of students referred for possible learning difficulties, as compared with students referred for gifted assessment. Future research could utilize parent perceptions of executive

functions as rated by the BRIEF parent version. Last, several studies have suggested that executive functions are more highly involved with fluid reasoning than they are with crystallized intelligence (Pennington, 1995; Denckla, 1996). Perhaps additional research could compare scores on verbal and performance components of an IQ test with ratings of student's executive functions use.

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