EXAMINING THE PATTERN OF EXECUTIVE FUNCTIONING IN CHILDREN
IDENTIFIED AS EMOTIONALLY DISTURBED

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ABSTRACT

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Students who are diagnosed with an emotional disturbance experience the greatest levels of school failure and poor social outcomes after leaving school than any other disability group. Current diagnostic practices are subjective and often do not address the underlying cognitive processes associated with the disability. Because executive function skills are innately tied to the display of externalizing and internalizing behavior, an investigation into the pattern of executive function in children identified as emotionally disturbed may begin to determine the root of the problem and, in turn, properly address the needs of these students. Forty students diagnosed with an emotional disturbance along with a comparison group of 40 non-disabled students from inner-city public schools were selected for this quantitative investigation of teachers' reports of the executive function skills of these students with the Behavior Rating Inventory of Executive Function (BRIEF; Baron, 2000).

T-test, MANOVA, ANOVA, and Mann-Whitney U test analyses comparing the students with an emotional disturbance to the comparison group of non-disabled students as well as to the normative sample of students used to standardize the BRIEF, revealed that students with an emotional disturbance do exhibit elevated levels of executive function skill deficits and get progressively worse as they get older. The non-disabled students, while not to the same extent, also exhibited elevated levels of executive

function deficits. In addition, female students identified as having an emotional disturbance exhibited much more severe deficits in executive function skills than male students. Recommendations with regard to intervention as well as directions for future research in the area of assessment of executive function skill deficits in students with an emotional disturbance from more diverse backgrounds are also suggested.

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CHAPTER 1

INTRODUCTION

This dissertation aims to identify the pattern of cognitive processing deficits in school aged children identified as Emotionally Disturbed. An Emotional Disturbance is an educational eligibility classification that is characterized by a display of internalizing and externalizing behaviors that interfere educationally (IDEIA, 2004; 34 C.F.R 300.8). Roughly 10.5% of students ages six through 21 who receive special education services are classified under the federal definition of Emotional Disturbance (Wagner, 1995). Current IDEIA and PA Chapter 14 regulations define an Emotional Disturbance as follows: (i) The term means a condition exhibiting one or more of the following characteristics over long period of time and to a marked degree that adversely affects a child's educational performance: (A) An inability to learn that cannot be explained by intellectual, sensory, or health factors. (B) An inability to build or maintain satisfactory interpersonal relationships with peers and teachers. (C) Inappropriate types of behavior or feelings under normal circumstances. (D) A general pervasive mood of unhappiness or depression. (E) A tendency to develop physical symptoms or fears associated with personal or school problems. (ii) The term includes Schizophrenia. The term does not apply to children who are socially maladjusted, unless it is determined that they have an emotional disturbance (IDEIA, 2004; 34 C.F.R 300.8).

Across the U.S., 473,663 students received special education services under the category of Emotional Disturbance during the 2008-2009 school year (Twenty-fourth Annual Report to Congress, U.S. Department of Education, 2011) and many studies continue to reveal that these students have the worst academic and social outcomes of any

other disability group (Bradley, Doolittle, & Bartolotta, 2008). The research that has been conducted regarding the outcomes of students who display disruptive behaviors reveal that their outcomes are bleak and is the impetus to drive research in the direction of pinpointing a pattern of cognitive deficits that are present in students who display these behavioral difficulties.

Students with emotional and behavioral disorders earn lower grades, fail more courses throughout their school careers, and have more difficulties than students with other disabilities adjusting to adult life (Bradley, Doolittle, & Bartolotta, 2008). Fifty-five percent of students with emotional and behavioral disorders drop out of high school, forty percent of students with emotional and behavioral disorders do not earn a high school diploma or GED, and only twenty percent of students with emotional and behavioral disorders pursue any form of post secondary education after completing high school.

The pervasiveness of poor school outcomes for children with emotional and behavioral disorders leads to a predictable pattern of difficulties in the areas of employment and social interaction among these students according to Bradley, Doolittle, and Bartolotta (2008). They report that, on average, these students are employed for only twenty-five to thirty hours per week after leaving high school and they hold positions that often do not include health benefits. These students also often find themselves in precarious situations in their quest for independence. Following a high school performance that was less than remarkable, the employment patterns of students with emotional and behavioral disorders are often marked by instability that includes working an insufficient number of hours in order to become independent adults and an inclination

to turn to crime when they do not make enough money on their own. Students with emotional and behavioral disorders also often have dysfunctional interpersonal relationships within the domains of employment and family and also often have high rates of involvement with the justice system. Forty-three percent of students with emotional and behavioral disorders were arrested at least once after leaving high school and sixty-six percent had some contact with law enforcement. In addition, Wagner (1995) notes that despite being less likely to be married or living with someone of the opposite sex after leaving high school, female students with an emotional disturbance were more likely than their non-disabled peers to be single mothers. Individuals with emotional and behavioral disorders were also less likely to be registered to vote, and were more than twice as likely to be living in a correctional facility, halfway house, drug treatment center, or “on the street” than individuals with other disabilities (Wagner, 1995). Because of the impact that a student’s actions can have on their education and subsequent involvement in the community at large, an investigation into the origination of an emotional disturbance is warranted.

Current diagnosis of an Emotional Disturbance is highly subjective. Oftentimes students who consistently display externalizing behaviors (aggression, problems of conduct) are diagnosed as Emotionally Disturbed, regardless of the presence of an underlying disorder. My conceptualization of the diagnosis underscores the idea that identifying a student as Emotionally Disturbed, regardless of whether the behaviors are aggressive or internalizing (depressed, anxious), should stem from an internal disorder and what should constitute the diagnosis is an inability to demonstrate appropriate behavior, not simply an unwillingness to conform to established norms and rules. The

consequences imposed on these students are far from pleasant, so it is conceivable to think that there is an area of the brain that is responsible for controlling or regulating the associated behaviors that would be the cause of the continual engagement in behavior that results in unpleasant outcomes. Identifying the area of the brain associated with the behavioral characteristics of an emotionally disturbed student should allow for better initial diagnosis and subsequent intervention. While investigating effective interventions for this population is beyond the scope of this dissertation, a good place to start would be to examine the pattern of executive functions displayed by children diagnosed with an Emotional Disturbance.

Executive functions are the group of cognitive processes that are believed to be responsible for self-directed behavior (Gioia, Isquith, Kenworthy, & Barton, 2002). Executive function is a neuropsychological concept that refers to the cognitive processes needed for working memory, sustained attention, the ability to plan and direct activities, the ability to initiate and follow through on tasks, the ability to inhibit impulses, and the ability to persist in pursuit of an established goal (Dawson & Guare, 2004). The most recent research in the area of executive function is mostly centered around students that have been identified as having a Traumatic Brain Injury, a Learning Disorder, Autism, and probably most notably, Attention Deficit Hyperactivity Disorder. Because a person with poor executive function is believed to have difficulty with beginning a task, actively holding information, stopping an action, moving from one task to another, anticipating future events and developing steps, and attending to their own behavior and regulating their emotional responses (Gioia et al., 2002), this dissertation was designed to determine if there is a pattern of executive function deficits among students who display persistent

problematic behavior. It is my contention that a student with an emotional disturbance is not a student who chooses to behave inappropriately, but is a student who has difficulty behaving appropriately due to a pattern of weaknesses in his/her executive functioning abilities. The following review of the relevant literature on this topic will begin with a discussion on what makes up the neuropsychological construct of executive functions, how they develop in the brain, and how executive functions are relevant to a student's functioning in school. Following the discussion on executive functions, the remainder of this review will focus on how executive functions are assessed, their established relationship to individual behavior, and that relevance to school-aged children diagnosed with an emotional disturbance. To that end, this dissertation aimed to answer these questions: 1. Is there a pattern of executive function deficits, compared to the normative sample, that are characteristic of a student diagnosed with an emotional disturbance? 2. Is there a pattern of executive function deficits, compared to the comparison group of non-disabled students that are characteristic of a student diagnosed with an emotional disturbance? 3. Do non-disabled students who are developmentally the same age and from a similar demographic background, display a similar pattern of executive function strengths and weaknesses compared to the normative sample?

CHAPTER 2

LITERATURE REVIEW

Executive Functioning

Executive functions are a collective group of higher order brain processes that offer both the source and path to direct the thoughts and actions of an individual. Executive functions are defined as the skills that are necessary for purposeful, goal directed activity, and are generally considered to be largely mediated by the frontal and prefrontal cortices of the brain (Anderson, 1998). Executive skills include the ability to plan ahead and organize behavior across time and space in order to fulfill goals and intentions (Temple, 1997). They enable shifting of strategies and adaptation to changing circumstances and thus involve planning, decision making, directed goal selection, and monitoring of on-going behavior (Temple, 1997). Stuss and Benson (1984) describe executive functions as the planning and sequencing of complex behaviors, the ability to pay attention to several components at once, the capacity for grasping the gist of a complex situation, the resistance to distraction and interference, the inhibition of inappropriate response tendencies, and the ability to sustain behavioral output for relatively prolonged periods. Gioia, Isquith, Guy, and Kenworthy (2000) described executive functions as a collection of processes responsible for guiding, directing, and managing cognitive, emotional, and behavioral functions. These researchers also indicate that the term executive function is an umbrella that consists of allied functions that are responsible for problem-solving behavior that is purposeful and goal directed. It is critical to this current research to emphasize that executive functions are central to all aspects of behavior exhibited by an individual. Not only are executive functions central to the idea

of cognitive flexibility and control, they are also the fundamental abilities in an individual's regulatory control of emotional response and behavioral action (Gioia et al., 2004). According to Dawson and Guare (2004), executive functions are the necessary skills that allow individuals to manage their emotions and monitor their thoughts in order to effectively regulate their own behavior.

Until recently, any discussion on the brain and cognitive processes was almost always embedded in some discussion of the individual's level of intelligence. In fact, the field of school psychology is largely concerned with the investigation of specific cognitive processing weaknesses that exist in students who exhibit academic difficulty. However, it is important to this research to illustrate the distinction between an individual's executive function skills and intelligence level (usually indicated by overall IQ). While an investigation of cognitive ability is often conducted when a student exhibits problematic behavior, this investigation is most often conducted using an instrument that is not designed to detect the presence of an emotional disorder but is administered for the purpose of ruling out a differential diagnosis that could be a possible explanation for inappropriate behavior (i.e. ID, LD). In fact, in a study by Welsh et al. (1991), children from ages three to 12 years old and an adult group's IQ scores and performance on tests of executive function (i.e. tests of planning, organized search, and impulse control) were investigated to examine normative-developmental performance on the selected executive function tasks. According to the results of the study, executive function skills were found to be independent of IQ and test performance was either inversely or unrelated to intelligence. An example in the literature contributed by Denkla (1996) illustrates this finding clearly. She describes a student who has been determined

to be a “bright” student who has performed adequately on standard psychometric indices of intelligence and is untroubled by any domain specific information-processing deficits, but is still unable to function as a “good” student.

Lezak (1993) differentiates cognitive skills from executive skills by suggesting that cognitive skills may be seen as domain specific, whereas executive skills act more globally and impact all aspects of behavior and that appropriate and socially responsible conduct is dependent upon the integrity of these functions.

Friedman, Miyake, Corley, Young, DeFries, and Hewitt (2006) conducted a study investigating the relation of executive function and intelligence in which 243 twins from the Colorado Longitudinal Twin Study were administered shifting and inhibiting tasks as measures of executive function and fluid and crystallized intelligence measures from the Wechsler Adult Intelligence Scale – Third Edition (WAIS-III; Wechsler, 1997). The three different executive function tasks used to measure inhibition required the subjects to repress an automatic response and three different tasks were used to measure the subjects’ ability to switch between tasks (shifting). Fluid reasoning, an intelligence measure, was assessed with two different tests, The Raven’s Progressive Matrices Test, and the Block Design subtest from the WAIS. Crystallized ability, an intelligence measure, was also assessed with two subtests. The first was a multiple-choice vocabulary test in which the participants were required to identify the synonyms or definitions of words. The second test used to assess crystallized ability was the Information subtest from the WAIS. The general IQ composite from the WAIS was also considered to investigate the relationship between executive function and intelligence. The conclusions drawn from this study were that the relationship between the executive function skills,

inhibiting and shifting, were identical based on measures of fluid reasoning, crystallized ability, and overall IQ on the WAIS. A confirmatory factor analysis concluded that the three intelligence measures shared only two percent to 14% of their variances with the measures of inhibiting and shifting. The three different measures of intelligence showed identical patterns of executive function and intelligence relationships, all suggesting that while these inhibiting and shifting behaviors are important to intelligent behavior (Friedman et al., 2006), there is no significant relationship between these two aspects of executive function and intelligence.

Another study conducted by Ardila and Pineda (1999) investigated the correlation between intelligence test scores and executive function measures. In this study, fifty thirteen to sixteen year old males from Colombia were administered the Wechsler Intelligence Scale for Children – Revised, Spanish version (WISC-R; Wechsler, 1993), a verbal fluency test, a trail making test (TMT; Reitan & Wolfson, 1985), and the Wisconsin Card Sorting Test (WCST; Heaton, 1981). The results of this study indicated that traditional IQ tests do not assess executive functions and concluded that performance IQ on the WISC-R did not correlate with any executive function test score, except on the trail making test where a low correlation was detected.

The relationship between executive functions and intelligence in eleven to twelve-year-old children was also investigated in a study by Duan, Wei, Wang, and Shi (2010). Sixty-one Chinese children were selected from two Chinese schools. They, too, were administered executive function tests of inhibition and shifting. The Raven's advanced progressive matrices (RAPM) was the intelligence test used in this study. Just as in the

study by Friedman et al., 2006, this study also found that the abilities to inhibit and shift were not significantly correlated to performance on the intelligence measure.

Crinella and Yu (2000) set out to identify the distinction between intelligence and executive function in a paper by citing animal problem solving studies where only a modest degree of overlap existed between the brain structures that are believed to be essential for intelligence and brain structures that have been identified in the animal executive function systems. Crinella and Yu noted that students with attention deficit hyperactivity disorder (ADHD), a disorder that has been characterized by executive dysfunction, do not have lower IQ scores than children who do not have ADHD. This study also revealed that even when individuals have executive function deficits because of damage to their frontal lobes, their IQ scores are not necessarily also affected.

While the intertwined effect of executive function would, by definition, have an effect on an individual's overall intelligence, separating which area is the most impaired is likely to lead to stronger, more efficient intervention and, therefore, better outcomes, specifically with regard to students with an emotional disturbance. Recent research studies have demonstrated this idea by investigating the specificity of the profile of executive skill deficits on other clinical disorders. For example, executive dysfunction has been found in persons with schizophrenia (Axelrod, Goldman, Tompkins, & Jiron, 1994). According to Friedman et al., 2008, students with ADHD show deficits in inhibition and students with reading disorders showed deficits in verbal working memory. The two groups, combined, showed deficits in inhibition, working memory, and shifting. Students with Autism had more global executive functioning deficits (Friedman et al., 2008).

Gioia et al. (2004) purport that the collection of executive functions are composed of (8) sub-domains of functions that include the ability to initiate behavior, inhibit competing actions or stimuli, select relevant task goals, plan, and organize a means to solve complex problems, shift problem solving strategies when necessary, and monitor and evaluate behavior. The descriptions of the eight sub-domains of executive functions are the definitions offered by Gioia et al., (2004) and are outlined below: (1) A person's ability to *inhibit* is the ability to control their impulses and stop their own behavior when necessary. (2) An individual's *shifting* ability is the ability transition and to move flexibly from one situation, activity, or aspect of a problem to another. (3) *Working Memory* is defined as the individual's ability to hold relevant information "online" in order to complete a task. (4) *Initiating* is the ability to generate ideas and independently begin a task or activity. (5) A person's ability to *Plan/Organize* is defined as his/her ability to anticipate future events, set goals, develop steps to carry out a task or action in a manner that is systematic, and understand and communicate key concepts. (6) The *Organization of Materials* is the individual's ability to maintain order to play areas, work spaces, and materials. (7) An individual's ability to *Monitor* is defined as one's skill to assess one's own behavior and performance during or finishing a task in order to accomplish an established goal. Finally (8) *Emotional Control* is described as the ability to control emotional responses.

Executive functions are believed to adhere to a developmental path beginning in early infancy and continuing to develop, reaching a reasonable level by mid-to-late adolescence (Dawson & Guare, 2004). The capacity of an individual to exercise the different skills associated with good executive function is, therefore, dependent on the

maturation of specific brain function and should be taken into account when considering the level of behavioral-regulatory control individuals are expected to exhibit in different situations. Barkley (1997) outlines a sequence for the development of executive skills that begins with the skills that allow individuals to delay or stop a behavior and those associated with verbal working memory in children as early as five months to 12 months of age. Around five months of age, children with good executive skill have the ability to regulate their own motivation and arousal. The internalization of speech develops next around the ages of three to five and enables the individual to develop rules and use problem-solving, and metacognition strategies. The final executive function skill to develop is what Barkley termed reconstitution, which is operationalized as cognitive and behavioral flexibility, and is said to materialize around the age of six. After the initial development of executive functions, these skills continue to progress. They develop with the assistance of the individual's surroundings and barring any environmental disaster or insult to the brain, these skills continue to develop into late adolescence.

There appears to be consensus in the neuropsychological body of research that the frontal lobe is the harboring station for the group of cognitive processes termed executive functions. The development of an individual's brain is believed to be directly related to development of his/her ability to think, feel, and act (Dawson & Guare, 2004), so it is important to understand that while the frontal lobe is believed to play a dominant role in the development of executive function skills, this area of the brain is interconnected with surrounding and adjacent areas and executive function skills are, therefore, affected by not only the frontal lobe, alone, but what has been called the frontal systems of the brain. This fact also illustrates that underdevelopment of or trauma to one part of this brain

system can potentially cause executive dysfunction, or weakness in executive skill (Dawson & Guare, 2004).

The development of executive functions is influenced by genes and what would be described as normal brain development in the absence of injury or trauma (Dawson & Guare, 2004). Using data from monozygotic and dizygotic twins, Friedman, Miyake, Young, DeFries, Corley, and Hewitt (2008) conducted a study using a structural equation model to investigate the extent to which executive functions are influenced by genetic factors, and shared and nonshared environmental influences. In this study, Friedman et al. aimed to specify the extent to which individual differences in the executive skills of working memory, inhibition, and shifting are due to genetic and environmental influences and to specify how these influences combine to affect these executive functions. Friedman et al. reported that not only are individual differences in these executive functions not largely influenced by environmental factors, but that individual differences among them are almost entirely genetic and among the most heritable psychological traits. While the study indicated that the sample was representative of the general population in terms of IQ, limiting the generalization of the findings of this study was partly due to the fact that the participants same-sex twin pairs. This sample included only twins with normal birth weights, normal gestation periods, and who lived within two hrs of Boulder Colorado. This sample was not representative of populations of families from poor, inner city families, the population that was the focus of this dissertation study, so these results cannot be generalized to this study population. Also, because of the lack of environmental variability in Miyake et al.'s study, it is harder to detect the effect of the environment.

Dawson and Guare (2004) divide individuals' executive skills into two areas that are believed necessary in the quest of the individual to regulate their own behavior. The first are the skills needed to create, focus, make decisions, arrange the necessary components, allocate the appropriate amount of time to achieve a goal, draw on and hold necessary information important to the completion of a goal, and monitor one's skills and progress toward an end. The other facet involves an individual's ability to think before acting, initiate a task in a timely manner, adapt to changing situations, persist towards the end of a goal, and to manage or control their emotions in order to orchestrate behavior.

Similarly, Gioia et al. (2002) also divide an individual's executive functions into functions of either metacognitive problem solving or behavioral/emotional regulation. The domains of executive function that involve metacognitive problem-solving are dependent on people's capacity to initiate, to have sufficient working memory, and ability to plan, organize, and self-monitor, or attend to their behavior or performance in addition to changing that behavior when necessary. Functions of the behavioral/emotional regulation domain include people's ability to inhibit an action by stopping or not reacting to an impulse, by being able to shift, or move back and forth from one task or situation to another, and by regulating their own emotional responses.

While there are many definitions suggested in the literature that attempt to add clarity to the ability to describe this complex set of interrelated processes termed executive functions, one can conclude that all of the research on these processes agree that executive functions are a collective group of brain processes that, while related to, are independent of an individual's IQ level, and direct both the mental patterns and outward behavioral actions of an individual.

Executive Functions and School

The focus of this dissertation is on the pattern of executive function deficits exhibited by school-aged children diagnosed as emotionally disturbed. Because a person with poor executive functions is believed to have difficulty beginning a task, actively holding information, stopping an action, moving from one task to another, anticipating future events and developing steps, and attending to his/her own behavior and regulating his/her emotional responses, this dissertation focuses on the pattern of these deficits in relation to the display of problem behavior.

Dawson and Guare (2004) suggest that executive functions begin to develop in early infancy and continue to develop into adolescence. Developing the capacity to independently comply with established rules are skills that develop throughout a child's educational experience and are considered appropriate according to a developmental sequence. A student with good executive skills in kindergarten through second grade, according to Dawson and Guare (2004), should be able to follow safety rules, raise his/her hands prior to speaking, and keep his/her hands to himself/herself. By the time students enter the third grade, their capacity to self regulate in addition to inhibit certain behaviors should begin to emerge. Students in the third through fifth grades should be able to behave appropriately in accordance with adult expectations when the teacher is out of the classroom, display good manners, and refrain from engaging in temper tantrums. As students' executive functioning skills continue to develop, they should begin to exhibit higher level skills. Student in the sixth through eighth grades should be able to maintain and exhibit all of the earlier established executive function skills, but should also possess the ability to inhibit rule breaking behavior even when the threat of a

consequence from an authority figure is not present. In high school, students with good executive skill avoid engaging in illegal and reckless behaviors. Likewise, students who do not display these “good” executive functioning skills by the time they reach the developmental ages that correspond to the above grades theoretically have a deficit in the area that controls the development of that executive skill.

Williams and Mateer (1992) described the outcomes of trauma to the frontal lobe, the area believed to affect the expression of good executive skill, in two school-aged children. The first was an elementary school student who sustained a closed-head injury at the age of eight. Behavioral disruptions following the accident included temper tantrums, unpredictable emotional and aggressive outbursts, and periodic impulsivity. The student was described as being emotionally passive and as having a limited range of emotions. This student also reportedly had difficulty with social interactions. In the second case, an eleven-year-old student also sustained a closed-head injury and he, too, following the accident, displayed behavior that included tantrums, aggressive behavior, inappropriate laughter, eating disturbance, argumentativeness, and stubbornness. According to Silberman (2010), patterns of problematic behavior in students with executive function deficits begin at an early age. Examining the predictive relationship between executive functions and problem behaviors in preschoolers revealed strong associations between individual differences in executive functions and individual differences in problem behaviors and is an indication that later problem behavior is the result of early deficits in executive functions (Hughes & Ensor, 2007). In this longitudinal study, Hughes and Ensor followed 122 preschool children used in one of their previous studies and used factor analysis of various tests executive function and

aggregate measures of problem behaviors to investigate whether this predictive relationship did, indeed, exist. Combined scores from the Attention Deficit Hyperactivity Disorder and Conduct Disorder scales from the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997), the Externalizing Problems Scale from Social Skills Rating Scale (SSRS; Gresham & Elliot, 1990), and the Emotional Regulation Scale from the Bayley Rating Scales (Bayley, 1993) were used to determine the level of perceived problematic behavior in three and four year olds. These results were compared to the results of a similar study by the same authors that utilized this same sample of children when they were two and three years old. The children belonged to mothers from low-income neighborhoods in Cambridge, UK., and participants were required to meet at least one risk criteria. They had to have either a low socio-economic status, a concerned family structure defined by a single or teen parent, or have four or more children living in the home. Participants were also required to have maternal psychosocial risk which was defined by elevated scores on either the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Errbaugh, 1961), the Daily Hassels Questionnaire (Crnic & Greenberg, 1990), or the Parenting Sense of Competency-Efficacy Scale (Johnson & Mash, 1989). The findings of this study determined that a predictive relationship between executive dysfunction and problematic behavior does exist in preschool aged children. Individual differences in executive function in preschool aged children showed specific associations in problem behavior and early deficits in executive function were found to predict later behavior problems.

Raaijmakers, Smidts, Sergeant, Maassen, Posthumus, Engeland, and Matthys (2008) also investigated whether deficits in executive functions are associated with

problems of conduct. Eighty-two students who scored at or above the 80th percentile on the Aggressive Behavior Scale on the Childhood Behavior Checklist (CBCL; Achenbach & Rescorla, 2000) as well as 99 students who scored below the 50th percentile on the CBCL were selected for this study. The children were matched on IQ where students with an IQ that was less than 80 were excluded. The students were selected from a longitudinal study of the effect of a prevention intervention program and were four years old at the time of the assessment. In this study, the Wechsler Preschool and Primary Scale of Intelligence - Revised (WPPSI-R; Wechsler, 1997) was administered to measure intelligence. The Go/No go test was used to measure of inhibitory control. An adapted version of the WISC digit span subtest was used to measure verbal working memory. The Shape School task was used to measure working memory, inhibition, and switching processes. The Object Classification Task for Children was administered to measure cognitive flexibility and the Day-Night task was administered to measure response inhibition and working memory. A factor analysis of the scores obtained on six neuropsychological tasks administered to assess executive skills (set shifting, inhibition, working memory, and verbal fluency) was conducted to consider whether preschool children with aggressive behavior showed executive function deficits. The results of this study revealed that preschoolers who showed aggressive behavior also displayed impairments in inhibition and that they showed these deficits even when the effects of attention problems were controlled (Raaijmakers, et al, 2008). While the generalizability of the results of this study are limited due to the fact that the majority of the student's parents had a high education level, the fact that the sample represented the extremes of the behavioral spectrum, and the fact that perhaps a different set of

neuropsychological tests may have yielded different results, the results of this study did reveal that a deficit in inhibition, an executive construct, preceded aggressive behavior, and adds to the research that suggests executive function deficits do exist in children who exhibit behavior problems.

In a study conducted by Boulerice, Harden, Tremblay, and Pihl (1999), a cognitive-neuropsychological test battery along with teacher ratings of the student's aggressive behavior on the Diagnostic Interview Schedule for Children (DISC), a diagnostic tool based on the Diagnostic and Statistical Manual of Mental Disorders, was used to investigate the relationship between physically aggressive behavior and working memory. One thousand thirty-seven boys from a large, low socio-economic status community who had been followed since kindergarten were used in the study. Teacher ratings of the student's aggressive behavior on the Diagnostic Interview Schedule for Children obtained at ages six, ten, eleven, and twelve was used to form three sub-sample category groups that displayed differing levels of aggression. Individually administered neuropsychological tests were administered at ages thirteen, fourteen, and fifteen. Diagnostic Interview Schedule for Children ratings were obtained, again, at ages fourteen and sixteen, and an estimate of the subjects' IQ was determined when they were fifteen years old. A MANCOVA using the subjects' ADHD status, ratings of negative emotionality, memory, and IQ was used to determine that, irrespective of ADHD and IQ, a relationship between working memory, an executive function construct, and history of physical aggression existed. ADHD did not account for the association between executive functions and a history of physical aggression and while the study does cite credible reasons that the finding that executive function deficits did not appear to be

affected by ADHD status (i.e., measures used to diagnose ADHD, selected tests of executive function), what is pertinent to the results suggested here, is the recurring idea that executive functions, do indeed, play a critical role in students who exhibit problematic behavior.

The occurrence of neuropsychological deficits among special education students identified as having emotional/behavioral disorders was investigated in a study by Mattison, Hooper, and Carlson (2006). In this study, thirty-five students who attended a school for children with disabilities in Long Island, NY were selected for participation. While all of the students met the criteria to be qualified under the category for emotional disturbance, the students' actual classifications at the time of the study varied and only 37.1% were diagnosed with an emotional disturbance at the time of the study. At the same time, 31.4% were classified as other health impaired, 20.0 % as having multiple disabilities, with 8.6% falling into other categories. These special education elementary school students were investigated for the presence of neuropsychological deficits. The NEPSY, a comprehensive neuropsychological battery, was administered to all of the students. Teachers completed a rating form to rate the students' emotional and behavioral problems, and review of the child's comprehensive school file was used to obtain the most recent reports of the students' IQ and achievement test scores. Correlations of these students' performance on the Attention/Executive Functions, Language, Visuospatial Processing, and Memory and Learning domains from the NEPSY led the researchers to conclude that 54.3% of the sample had at least one NEPSY domain in the 2nd percentile, indicating severe deficits. Furthermore, these domains were identified as being in either the Language or Attention/Executive Functions Domains. In

this study, NEPSY deficits were significantly associated with lower IQ and reading scores; however, students classified as only emotional disturbed were not distinguished from students classified as learning disabled or any other special education category. While this is problematic because a condition where more than one diagnosis is present has the potential to cause an increase in both the number and intensity of the executive function deficits displayed by the individual (Salimpoor & Desrocher, 2006), there is still an indication that an executive function deficits play an important role in the behavior patterns of these students.

Good executive function skills are not only important for the expression of appropriate behavior in the school setting, but these skills have also been shown to be important to adequate academic functioning (Miller, 2005). Deficits in executive function have been linked not only to behavioral disorders such as attention deficit hyperactivity disorder and autism, but executive function deficits have also been identified in students with learning disabilities (Miller). Visu-Petra, Cheie, Benga, and Miclea (2011) investigated the impact of executive functions on academic performance with a study of students in the fifth and eighth grades. Eighty-seven children from a rural area in northwest Romania participated in a study to determine if executive function skill was a prerequisite or a correlate with academic performance. Measures of working memory, inhibition, and shifting were the executive function skills assessed as part of the study and school performance was measured by the students' semester grades and performance on a specially designed mathematics test. Regression models revealed that individual differences on executive function measures explained over one half of the variance in school performance.

A study by Monette, Bigras, and Guay (2011) utilized a sample of eighty-five kindergarten children from a suburban area of Quebec, Canada and measures of inhibition, flexibility, and working memory to determine the role of executive functions in school achievement at the end of the first grade. During the middle of their kindergarten school year, the students were administered school readiness tests and various tests of executive function in the home. When the same sample of students was in the first grade, their first grade teachers administered selected subtests from the Wechsler Individual Achievement Test – Second Edition (WIAT-II; Wechsler, 2005) to assess academic achievement. The results of this study suggested a general association between executive functions and academic achievement at the end of grade 1. Specifically, working memory and inhibition measured in kindergarten was a predictor of reading, writing, and math achievement at the end of the first grade.

An evaluation of ninety-one fifth grade students' from low-income urban schools in Boston, MA executive function and performance on high-stakes tests using neuropsychological tests and behavioral questionnaires was conducted by Waber, Gerber, Turcios, Wagner, and Forbes (2006). Direct neuropsychological testing with the Denckla Timed Motor Examination test (Denckla, 1974), the coding, symbol search, and letter-number sequencing subtests from Wechsler Intelligence Scale for Children – Fourth Edition (WISC-IV; Wechsler, 2003), the color-word interference test from the Delis-Kaplan Executive Function System (D-KEFS; Delis, Kaplan, & Kramer, 2001) the tower subtest from the NEPSY(Korkman, Kirk, & Kemp, 1997), and structured questionnaires from teachers the Behavioral Rating Inventory of Executive Function – Teacher Version (BRIEF; Gioia, Isquith, Guy, & Kenworthy, 2000) and the Behavioral Assessment

System for Children (BASC; Reynolds & Kamphaus, 1992) were used along with information from the state-mandated standards-based academic tests in Massachusetts (MCAS; Massachusetts Department of Education, 2003) to investigate the role of executive functions and the sample of students' performance on the standardized assessment of academic achievement. The results of this study indicated that there is a relationship between students' executive functioning and their performance on the standardized test, and revealed that this relationship accounted for thirty percent to forty percent of the variance in test scores.

Emotional Disturbance

Students who exhibit persistent problematic behavior within the school setting are often evaluated and determined to have an Emotional Disturbance based on their seeming unwillingness to comply with established rules. It is my contention that a student with an emotional disturbance is not a student who chooses to behave inappropriately, but is a student who cannot behave appropriately.

Currently, the federal definition of ED is defined as follows: (i) The term means a condition exhibiting one or more of the following characteristics over a long period of time and to a marked degree that adversely affects a child's educational performance: (A) An inability to learn that cannot be explained by intellectual, sensory or health factors; (B) An inability to build or maintain satisfactory interpersonal relationships with peers and teachers; (C) Inappropriate types of behavior or feelings under normal circumstances; (D) A general pervasive mood of unhappiness or depression; (E) A tendency to develop physical symptoms or fears associated with personal or school problems; (ii) The term includes schizophrenia. The term does not apply to children who

are socially maladjusted, unless it is determined that they have an emotional disturbance. (IDEIA, 2004; 34 C.F.R. 300.8). The exclusionary clause that indicates that children who are socially maladjusted should not be considered emotionally disturbed has caused great controversy with regard to proper diagnosis of children who exhibit behavioral problems. Some of the research of students with emotional disturbances suggest that due to the ambiguity of the federal definition (Wodrich, Stobo, & Trca, 1998), these students are often identified at low rates because of a lack of clear decision rules (Merrell & Walker, 2004). While the exclusionary clause related to social maladjustment precludes socially maladjusted students from being diagnosed with an emotional disturbance, documentation regarding specific details surrounding the inclusion of the exclusionary clause are elusive (Merrell & Walker). No documents exist that support the inclusion of this clause and many researchers believe it was added to satisfy the concerns of legislators and administrators who feared that schools would be required to provide services to delinquent and antisocial students (Merrell & Walker). However, while the term, social maladjustment, has not been operationally defined in the federal regulations (Rudy & Levinson, 2008), researchers and practitioners, alike, have concluded that this term can be equated with the Diagnostic and Statistical Manual of Mental Disorder (4th ed., text rev. [DSM-IV-TR] American Psychiatric Association, 2000) criteria for Conduct Disorder and Oppositional Defiant Disorder (Merrell & Walker, 2004) whereby socially maladjusted children are believed to be children who choose not to adhere to societal rules and norms. These students are believed to understand what is expected of them, but they are motivated by self-gain; they are not characterized by internalizing emotional

problems (Merrell & Walker), and they still choose to behave inappropriately (Rudy & Levinson).

The exclusionary clause should prevent students who understand societal norms and rules but still resort to misbehavior from being classified as emotionally disturbed but research suggests that children who are socially maladjusted or conduct disordered are still represented, in large proportion, in the population of students found eligible under the emotionally disturbed category (Forness, 1992). This population is “difficult to reach” (Merrell & Walker, 2004 p.901) and their choice to be non-compliant with societal norms and rules and instead be motivated by self-gain by definition, separates them from the group identified as emotionally disturbed (Rudy & Levinson, 2008). Emotionally Disturbed students are believed to have difficulty controlling the mechanisms responsible for goal-directed behavior (executive function) and this finding lends credence to the fact that the identification of specific brain processes believed to be deficient in students with emotional disturbances should allow for purer identification of the disability that justifies excluding the population of students whose behavior is willful and goal oriented.

Students who are evaluated to determine the presence of an emotional disturbance are most often the students who display severe externalizing behaviors that are inconsistent with the rules and expectations established in the school, home, and community. Creating an assessment plan to identify an emotional disturbance is influenced by the belief surrounding the cause of the disorder and the overall purpose of the assessment (Rudy & Levinson, 2008) but even with the advent of discussion surrounding the presence of executive function deficits in the presence of behavioral

disorders, the most recent revision of IDEA, still does not identify a standardized procedure for assessing students with emotional or behavioral problems within the education system (Rudy & Levinson). This finding is extremely disheartening given the fact that the population of student with an emotional disturbance is one of the fastest growing populations in the United States, and is the group with some of the poorest outcomes (Rudy & Levinson). Children diagnosed with an emotional disturbance are often characterized by behaviors that lessen the likelihood that they will experience success in or outside of the school setting. They earn the lowest grades of any other groups of children with disabilities, they are less likely to graduate, are more likely to be arrested, and are overrepresented with African Americans and students from low socioeconomic backgrounds (Rudy & Levinson).

Currently, the perspective on the type of misbehavior along with the approach to classification drives the assessment of a student suspected of having an emotional disturbance (Rudy & Levinson, 2008). The assessment of a student suspected of having an emotional disturbance is either the result of the belief that psychopathology exists, that there are behavioral-environmental factors, that functional relationships exists between environmental events and behavior, or that student's behavior has been resistant to interventions. The authors further suggest that a different perspective on the nature of the emotional disturbance be considered whether the purpose of the assessment is to help teachers cope with behavior problems in the classroom setting, to help children reduce their problem behavior, to refer for mental health services, or to determine whether a child is eligible to receive special education services. In order for the student to have the optimal educational experience and avoid some of the pitfalls associated with this

diagnosis, all of the purposes of assessment identified by Rudy and Levinson should be considered (Rudy & Levinson).

Currently, school psychologists use IQ tests, achievement tests, standardized rating scales, structured, unstructured, and semi structured interviews, as well as direct observations when considering a diagnosis of Emotional Disturbance. IQ tests provide information with regard to general and specific cognitive processing abilities but, with the exception of working memory, often do not include specific measures of executive function. Other measures designed for the purpose of neuropsychological assessment such as the NEPSY-II or the D-KEFS are less often used. Academic tests provide information with regard to the student's current level of academic functioning. And many of the standardized rating scales, while they may offer important information with regard to the overall level of problem behavior, measure a range of problem and adaptive behaviors, and not the specific underlying factors that may be contributing to the behavior.

Best practice when conducting an evaluation to determine the presence of an emotional disturbance includes gathering information from parents and teachers and direct assessment of the child's behavioral functioning (Rudy & Levinson, 2008). While there is still no standard battery for assessing students suspected of being emotionally disturbed (Rudy & Levinson) the research does suggest that an evaluation include standardized rating scales, interviews, direct observations, functional behavioral assessments, an assessment of the students' social skills and social competence, and tests of achievement and academic functioning. These assessments are recommended in order to investigate the history of the presenting problems, other possible problem areas, and

the plausibility of developing effective interventions (Rudy & Levinson). Evaluating the presence of an emotional disturbance in this manner also allows for the cross-validation of information from various sources (Fisher, Doyon, & Saldana, 2007).

The etiology of an emotional disturbance has been largely underinvestigated (Lane, Carter, Pierson & Glaeser, 2006). According to McDermott, Steinberg, and Angelo (2005), the need to improve the diagnosis and treatment of children with emotional and behavioral problems was highlighted in a statement released by the Surgeon General in 1999.

Currently, a diagnosis of an emotional disturbance is made without investigating the role of the individual's executive functioning. An emotional disturbance is usually diagnosed after a student has exhibited a persistent pattern of problematic behavior and is assessed with rating scales that simply describe or categorize the behaviors (Behavioral Assessment System for Children-Second Edition, Scale for Assessing Emotional Disturbance [SAED; Epstein & Cullinan, 1998]). Cognitive assessment aims to explain why a student is not performing well academically by identifying a pattern of cognitive strengths and weaknesses in order to drive intervention. Because there is an association between poor performance on neuropsychological tests and reports of real-world executive dysfunction (Kaufman, 2010), an investigation of the pattern of cognitive deficits believed to be associated with the display of problematic behavior (executive function skills) should also prove useful when developing interventions for these students. Early and appropriate identification of students with emotional disturbances is important, especially since early behavioral patterns are the most amenable to change (Bradley, Doolittle, & Bartolotta, 2008).

The complex nature of executive functions and their inherent contribution to many developmental and neurologically based disorders is basis enough for the need for accurate assessment of these skills. The identification of any disorder provides the impetus to develop interventions that will address the deficit and in turn, provide relief to the individual. Because the development of executive functions is innately tied and connected to pathways leading to other areas of the brain, it is imperative to distinguish whether the source of the weakness is inherent or whether the weakness is the result of another disorder believed to be the result of weaknesses in executive functioning skills (i.e. traumatic brain injury, learning disabilities, or ADHD). Another reason that an accurate assessment of the strengths and weaknesses of a child suspected of having executive function deficits is that without such focus, attempts to intervene will be nonspecific and likely to address a skill not desired with the proposed intervention (Dawson & Guare, 2004). That being said, accurate assessment of a child's executive function skills is not easy. As reiterated many times so far, the skills associated with the bundle of processes termed executive functions are interrelated and the exhibition of one skill is likely to be dependent on the development or the facility to display another. It is for this reason, together with the fact that an individual testing session is too structured to demand many executive skills, that determining executive functioning skill deficits in the context of a formal evaluation (administration of IQ and achievement tests in a standardized manner) is particularly difficult.

While anecdotal information may provide a clue to the fact that a student has deficits or weaknesses in an area of executive function, many factors that demand the use of executive function skills are removed from the standardized testing situation. It is the

assertion of the research completed by Dawson and Guare (2004) that there is also a problem with assessing executive skill within the context of a formal evaluation because of the lack of relation of the behaviors displayed in the testing situation to the context of the “real world.” School Psychologists often encounter this dilemma when attempting to determine if a student’s performance on a standardized measure will be indicative of their behavior when faced with real-life situations that require the same skill. During testing, because the examiner cues the student to start and presents items that reduce the need for sustained attention, assessing the student’s capacity for initiation and sustained attention is reduced. The monitoring of one’s own response behavior is also reduced because the examiner takes on much of this role. The need for the student to plan is also assumed by the examiner, lessening if not eliminating the need for the student to use this executive function skill (Dawson & Guare, 2004). While formal measures designed to specifically assess executive functions provides the context for examining the skills often impacted and allows the examiner to see how an executive functioning skill deficit manifests to determine which interventions (i.e. cuing, external structure) is likely to impact their behavior (Dawson & Guare, 2004), the combination of a detailed case history, classroom observations, work samples, and standardized rating scales are believed to be the best course of action for accurately assessing executive functioning skills in students.

The notion that accurately assessing executive functions has tremendous utility in educational systems has been gaining momentum according to recent literature on the topic. While it is still important to consider the development of a student’s executive functions within a developmental framework (Reynolds & Horton, 2008), the understanding of executive function decision making skills among school-age children

may give school psychologists more knowledge of how to distinguish poor decision-making from an actual emotional disturbance.

The aim of this study is to examine the relationship between weaknesses in specific areas of executive function in students diagnosed as emotionally disturbed under the current IDEIA regulation. Because of the complex nature of the development of executive function skills, the fact that they are thought to involve multiple mental functions, and that no one test can feasibly assess the many facets of these complex skills, it may appear daunting to identify which of these skills are deficient in students identified as emotionally disturbed. While the task may be off-putting, it is very necessary. Offering some assurance to the fact that this is indeed possible, however, is the recent research in the field of neuropsychology that suggests it is possible to separate the skills believed to control thought and action (Friedman, Miyake, Young, DeFries, Corley, & Hewitt, 2008). According to Friedman et al., executive functions are among the most heritable psychological traits and while the investigation of what makes up these important cognitive processes are under much investigation, identifying which skills are flawed should still provide the foundation for developing effective intervention for affected students.

CHAPTER 3

METHODS

Participants

The data for this study were drawn from teacher ratings of the executive function skills of children identified as emotionally disturbed. Eighty school-aged children in grades K – 11 were recruited. According to Cohen (1992), forty participants per cell should yield sufficient power to detect a moderate effect size. Forty students were selected based on whether they had been identified as students with an emotional disturbance by a school-based IEP team. The students that were diagnosed with an emotional disturbance were not evaluated for the purposes of this dissertation. All of the students had been previously diagnosed by a School Psychologist before being recruited to participate in this study. Forty students who had not been identified with a special education disability were also selected. The students with an emotional disturbance were selected from three different urban, inner city schools where the majority of students were from low socio-economic backgrounds and were eligible to receive free or reduced lunch. The comparison group of forty students who had not been identified with a qualifying educational disability was selected from five different schools, one of which was the same school attended by some of the emotionally disturbed subjects. These schools were also urban, inner city schools, where the majority of students were from low socio-economic backgrounds and were eligible to receive free or reduced lunch. Teachers of students who had not been identified with a qualifying educational disability were asked to select students who had not been diagnosed with a disability, showed no signs of behavioral distress, and who were achieving adequately based on the specified

grade's curriculum. Emotionally Disturbed students in grades K - 11 were matched with non-identified students in grades K - 11 according to gender and grade in order to investigate the pattern of executive skill development in children that is consistent with the sequence of development.

Measures

The Behavior Rating Inventory of Executive Function (BRIEF) is a valid and reliable standardized rating scale that affords the investigation of the qualitative aspects of a full range of executive function problems (Baron, 2000). The BRIEF questionnaire package contains an 86 question Parent Form and an 86 question Teacher Form that uses a three point scale (Never, Sometimes, Often) that should only take fifteen minutes to complete (Gioia, Isquith, Guy, & Kenworthy, 1996), and that respondents with at least a fifth grade reading level should be able to complete without difficulty (Baron, 2000).

The BRIEF focuses on executive functions and contains 86 items that measure working memory, the ability to inhibit, shift, control emotions, initiate, plan/organize, and monitor one's own behavior (Gioia, Isquith, Guy, & Kenworthy, 1996). The BRIEF was validated for use with children ages 5 through 18 and was chosen because it attests to being an instrument with good internal consistency (.80 - .98), good interrater reliability (correlations between parent and teacher raters were moderate, $r = .32$), and good test-retest reliability on the clinical scales on the teacher form (mean $r = .87$, range = .83 -.92). The BRIEF also claims to be an instrument with good content and construct validity.

The BRIEF identifies eight sub-domains of executive function and is embedded with two validity scales, the Negativity and Inconsistency Scales (Baron, 2000).

Table 3.1

Definitions of the Eight Executive Function Areas Assessed with the BRIEF

Scale	Behavioral Description
Inhibit	Assesses inhibitory control (i.e., the ability to inhibit, resist, or not act on impulse) and the ability to stop one's own behavior at the appropriate time.
Shift	Assesses the ability to move freely from one situation, activity, or aspect of a problem to another as the circumstances demand.
Emotional Control	Assesses the manifestation of executive functions within the emotional realm and assesses a child's ability to modulate emotional responses.
Initiate	This scale contains items relating to beginning a task or activity, as well as independently generating ideas, responses, or problem-solving strategies.
Working Memory	Items from this scale measure the capacity to hold information in mind for the purpose of completing a task.
Plan/Organize	Measures the child's ability to manage current and future-oriented task demands.
Organization of Materials	Measures orderliness of work, play, and storage spaces (e.g., such as desks, lockers, backpacks, and bedrooms).
Monitor	Assesses work-checking habits (i.e., whether a child assesses his

or her own performance during or shortly after finishing a task to ensure appropriate attainment of a goal). This scale also evaluates a personal monitoring function (i.e., whether a child keeps track of the effect his or her behaviors has on others).

Note. From the Behavior Rating Inventory of Executive Function Professional Manual (Gioia, Isquith, Guy, & Kenworthy, 2000).

The BRIEF was standardized on a normative sample of 1419 children for the parent form and 720 children for the Teacher Forms all between the ages of five and eighteen and without a history of special education or usage of psychotropic medication (Baron, 2000). Parent education levels, socioeconomic status, and ethnic groups of the children used in the normative sample were also investigated along with the length of time the teacher had known the student and were all proven not to be major factors in interpretation (Baron, 2000).

Feifer and Rattan (2007) used the BRIEF in a research study designed to look at executive functioning and the impact on the self-regulation skills of emotionally disturbed students and found that Emotional Control and Shifting Attention were statistically significant variables. The authors did not indicate whether executive dysfunction was evident nor whether typically developing students were included. The authors did, however, use the BRIEF as the means to examine executive function skills and the instrument was chosen for use here for that same reason.

Procedure

A large urban school district was the target of this study. Teachers were asked to send home consent forms for selected students, and for those whose parents signed

consent, complete the 86-question rating scale from the Behavior Rating Inventory of Executive Function (BRIEF). The BRIEF was administered to the teachers of the selected students. Parent responses were also requested; however, so few forms were returned that they could not be analyzed for this study. Teacher ratings were given higher priority due to the fact that parent and teacher rating forms are only moderate in interrater reliability ($r = .32$) and since it is mainly teacher expectations and perceptions that are considered most with regard to a student's behavior in a classroom setting it was more important to this particular research to put the responses of the teachers at the forefront.

The BRIEF teacher rating forms were scored according to the standard directions, yielding T-scores (mean of 50, SD of 10) based on age norms for each of the eight areas of executive functioning. On this measure, elevated scores indicate difficulties in the specified area of functioning.

CHAPTER 4

RESULTS

In order to determine if a pattern of executive functions, compared to the normative sample, exist in students who had been identified as emotionally disturbed, one sample t-tests were conducted using the data collected for the group of students who have been identified as emotionally disturbed. This group was compared to the normative sample used for the standardization of the BRIEF. A one sample t-test was conducted for each of the eight domains of executive functioning assessed with the BRIEF.

Figure 4.1. Average T-Scores obtained on the BRIEF for ED and Non-Identified students

Table 4.1

Means of the Emotionally Disturbed Group Compared to the Normative Sample

Scale	ED (n = 40)		
	M	SD	<i>p</i>
Inhibit	81.23	(15.35)	<.001*
Shift	82.08	(24.70)	<.001*
Emotional Control	83.65	(20.32)	<.001*
Initiate	73.60	(13.13)	<.001*
Working Memory	74.05	(16.42)	<.001*
Plan/Organize	74.33	(13.83)	<.001*
Organization of Materials	67.08	(24.36)	<.001*
Monitor	76.93	(14.78)	<.001*

Note. T-scores have a mean of 50, SD of 10

* $p < .05$

As shown in table 4.1, there was a significant difference in the scores obtained for the students diagnosed with an emotional disturbance and the normative sample on each of the executive function domains assessed with the BRIEF. The students diagnosed with an emotional disturbance scored significantly higher than the normative sample on the Inhibit, Shift, Emotional Control, Initiate, Working Memory, Plan/Organize, Organization of Materials, and Monitor domains. The data was analyzed to determine if emotionally disturbed students exhibit a specific pattern of executive function deficits compared to the normative sample. The data did not reveal a specific pattern of executive function strengths or weaknesses, but did reveal a pattern of elevated executive function deficits, overall.

In order to determine if non-disabled students who are developmentally the same age and from a similar demographic background display a similar pattern of executive function weaknesses, compared to the normative sample, one sample t-tests were also conducted for each of the eight domains of executive functioning assessed with the BRIEF.

Table 4.2

Means of the Non-Identified Students Compared to the Normative Sample

Scale	Non-ED (<i>n</i> = 40)		
	M	SD	<i>p</i>
Inhibit	67.93	(18.39)	<.001*
Shift	69.35	(19.44)	<.001*
Emotional Control	70.28	(21.55)	<.001*
Initiate	62.43	(14.21)	<.001*
Working Memory	64.22	(16.05)	<.001*
Plan/Organize	64.05	(15.28)	<.001*
Organization of Materials	63.43	(21.32)	<.001*
Monitor	65.83	(15.36)	<.001*

Note. T-scores have a mean of 50, SD of 10

**p* < .05

As shown in table 4.2, there was a significant difference in the scores obtained for the students who had not been identified with a disability and the normative sample on each of the executive function domains assessed with the BRIEF. Students who had not been identified with a disability also scored significantly higher than the normative

sample on the Inhibit, Shift, Emotional Control, Initiate, Working Memory, Plan/Organize, Organization of Materials, and Monitor domains.

Table 4.3

Summary of ANOVA Comparing Emotionally Disturbed Students to Comparison Group

	Sum of		Mean	
	Squares	df	Square	F
Inhibit	3537.80	1	3537.80	12.32*
Shift	3238.51	1	3238.51	6.55*
Emotional				
Control	3577.81	1	3577.81	8.16*
Initiate	2497.61	1	2497.61	13.34*
Working				
Memory	1930.61	1	1930.61	7.32*
Plan/Organize	2111.51	1	2111.51	9.94*
Organization of				
Materials	266.45	1	266.45	.509
Monitor	2464.20	1	2464.20	10.84*

*Note.** $p < 0.05$

After determining that students who have been diagnosed with an Emotional Disturbance have significantly elevated results on the eight areas of executive functioning with the BRIEF, a MANOVA was conducted to determine if significant differences exist between students diagnosed with an emotional disturbance and a comparison group of

students who have not been diagnosed with a qualifying educational disability. With the exception of the organization of materials domain, the MANOVA revealed significant effects for each of the executive functioning areas assessed. A one-way MANOVA revealed a significant multivariate main effect for students diagnosed with an Emotional Disturbance. Wilks $\Lambda = .726$ $F(8,71) = 3.349$, $p = .003$, partial eta squared = .274. Given the significance of the overall test, the univariate main effects were examined. Significant univariate main effects for ED were obtained for all but one of the executive functioning domains assessed with the BRIEF. (Inhibit $p = .001$; Shift $p = .012$; Emotional Control $p = .005$; Initiate $p = .000$; Working Memory $p = .008$; Plan/Organize $p = .002$; Monitor $p = .001$). A significant univariate main effect was not obtained for the organization of materials domain (Organization of Materials $p = .478$). According to this data, with the exception of the organization of materials, students with an emotional disturbance exhibited greater levels of executive function deficits than the comparison group of non-disabled students in each domain. These findings were confirmed with a Mann-Whitney U test, a non-parametric test used due to the skewed nature of the variables obtained for this sample.

Table 4.4

*Number of Emotionally Disturbed Students and Comparison Group of Non-Disabled**Students According to Gender and Grade Level*

Grade Level	ED (n = 40)		Non-ED (n = 40)	
	Male	Female	Male	Female
Eleven	1	0	1	0
Ten	1	0	1	0
Nine	1	4	1	4
Eight	3	1	3	1
Seven	4	0	4	0
Six	0	0	0	0
Five	5	0	5	0
Four	8	0	8	0
Three	2	2	2	2
Two	3	1	3	1
One	2	0	2	0
Kindergarten	2	0	2	0

Post hoc analyses were conducted in order to examine the demographic differences of the sample of students used for this research study. As part of secondary analyses, this study also examined if there are any differences in executive functioning domains between males and females diagnosed with an Emotional Disturbance. Due to the unequal numbers of male and female students, a Mann-Whitney U test was conducted

to evaluate the hypothesis that significant differences exist for males and females diagnosed with an Emotional Disturbance on the eight executive functioning domains assessed with the BRIEF. The results of the Mann-Whitney U test revealed significant differences in the means for the Shift ($p = .018$), Initiate ($p = .036$), Working Memory ($p = .034$), Plan/Organize ($p = .030$), Organization of Materials ($p = .037$), and Monitor ($p = .024$) domains, with female students with emotional disturbance scoring higher (more impaired) in each area. Means for the Inhibit ($p = .094$) and Emotional Control ($p = .310$) domains were not significantly different, indicating that there is no difference in the scores obtained for Emotionally Disturbed males and females in these areas.

Table 4.5

The Mean Scores of Emotionally Disturbed Students According to Gender and

Probability of Difference According to Mann-Whitney U Test

	Male	Female	
Scale	Mean ($n=32$)	Mean ($n=8$)	P
Inhibit	78.50		.094
Shift	76.91		.018*
Emotional Control	81.34		.310
Initiate	71.38		.036*
Working Memory	71.25		.034*
Plan/Organize	71.19		.030*
Organization of Materials	63.25		.037*
Monitor	73.75		.024*

Note. T-scores have a mean of 50 and a standard deviation of 50

* $p < .05$

A two-way MANOVA was also conducted to determine if grade level results in significant differences in the eight executive functioning domains assessed with the BRIEF for students who have been diagnosed with an Emotional Disturbance and the comparison group of students who have not been diagnosed with an educational qualifying disability. The students were divided into three grade groups. These groups were created with the intention of grouping students according to developmental level. The three groups created were made up of students in grades kindergarten through third, grades four through seven, and grades eight through eleven.

This analysis revealed a significant multivariate main effect for Group indicating that Emotionally Disturbed students displayed more executive function deficits in each area except for the organization of materials domain (Wilks $\Lambda = .715$, $F(8,67) = 3.341$, $p = .003$, partial eta squared = .285). Given the significance of the overall test, the univariate effects were examined. Significant univariate effects were obtained for Inhibit ($p < .001$), Shift ($p = .001$), Emotional Control ($p = .002$), Initiate ($p < .001$), Working Memory ($p = .002$), Plan/Organize ($p < .001$), and Monitor Domains ($p < .001$). No significant effect was detected for the Organization of Materials Domain ($p = .220$).

A significant multivariate main effect for grade was detected (Wilks $\Lambda = .424$, $F(16,134) = 4.487$, $p < .001$, partial eta squared = .349). The means indicated that students in Grades 8 – 11 demonstrated greater deficits than students in the two lower grade groups. Significant univariate effects were also obtained for all of the executive functioning domains (Inhibit $p < .001$; Shift $p = .001$; Emotional Control $p < .001$; Initiate

$p = .020$; Working Memory $p = .003$; Plan/Organize $p = .009$; Organization of Materials $p < .001$ Monitor $p < .001$). As before, students in Grades 8 – 11 performed more poorly.

A significant interaction between Group and Grade was detected between the students (Wilks $\Lambda = .561$, $F(16,134) = 2.806$, $p = .001$, partial eta squared = .251). Means are reported in Table 4.6. However, univariate analysis revealed that the interaction of Emotional Disturbance and grade indicated significant effects only for the Shift ($p = .001$) and Organization of Materials ($p = .011$) domains. Plots of the two significant interactions are presented below:

Figure 4.2. Interaction between Group and Grade for “Shift”

Figure 4.3. Interaction between Group and Grade for “Organization”

As shown in Figures 4.1 and 4.2, the difference between the ED and non-Ed groups remained relatively constant for the two lower grade groups. However, by the last grade grouping the difference between the ED and non-ED groups markedly increased. No reliable interaction was revealed for the Inhibit ($p = .411$), Emotional Control ($p = .118$), Initiate ($p = .225$), Working Memory ($p = .089$), Plan/Organize ($p = .057$), and Monitor ($p = .087$) domains.

Table 4.6

Executive Function Scores and Standard Deviations by Grade Level and Diagnostic Group

	Inhibit	Shift	EC	Initiate	WM	Plan/Organize	Org. of Materials	Monitor
Grade 0-3, $n = 24$								
ED	71.75	63.42	68.67	72.08	69.33	72.00	60.92	69.17
	(10.11)	(13.84)	(11.80)	(12.24)	(14.01)	(11.25)	(15.19)	(10.24)
No ED	65.25	67.42	68.00	60.25	61.17	62.42	64.75	62.08
	(15.54)	(18.14)	(19.52)	(15.23)	(16.43)	(16.88)	(18.82)	(15.41)
Grade 4-7, $n = 34$								
ED	78.29	75.18	81.41	67.94	67.29	67.29	53.65	71.29
	(10.79)	(12.32)	(16.31)	(10.55)	(11.83)	(10.07)	(10.92)	(8.86)
No ED	61.82	64.88	64.94	61.94	63.88	63.82	59.00	64.23

(13.69) (13.11) (17.44) (10.11) (12.11) (10.66) (11.79) (11.43)

Table 4.6 continued

Grade 8-11, $n = 22$

ED	96.09	113.09	103.45	84.00	89.64	87.73	94.54	94.09
	(15.98)	(19.19)	(17.94)	(12.37)	(15.51)	(12.51)	(26.21)	(12.68)
No ED	80.27	78.36	81.00	65.54	68.09	66.18	68.82	72.36
	(22.67)	(26.63)	(26.90)	(18.77)	(21.11)	(20.18)	(21.32)	(19.55)

Note. EC = Emotional Control, WM = Working Memory, Org. of Materials = Organization of Materials

T-scores have a mean of 50, SD of 10

CHAPTER 5

DISCUSSION

In this investigation of the pattern of executive function deficits in students diagnosed with an emotional disturbance, two main research questions were posed. In this chapter, the answers to these questions, some implications of the findings, as well as directions for future research are offered. Students who exhibit persistent problematic behaviors in the school setting may be determined to be in need of specially designed instruction under the Individuals with Disabilities Education Act (IDEA) eligibility category of emotionally disturbed. An emotional disturbance is defined as a condition in which a student exhibits one or more of a specified set of inappropriate behaviors that is displayed for a long period of time, is displayed to a marked degree, and adversely affects a child's educational performance (IDEIA, 2004; 34 C.F.R 300.8). This population of special education students has the worst academic and social outcomes of any other disability group (Bradley, Doolittle, & Bartolotta, 2008). As a group, students diagnosed with an emotional disturbance earn lower grades and fail more courses than any other students while they are in school and they suffer the most social and employment difficulties than any other disability group after leaving school (Bradley, Doolittle, & Bartolotta, 2008). Students with an emotional disturbance are also more likely to live in a correctional facility, halfway house, drug treatment center, or "on the street" than individuals with other disabilities (Wagner, 1995).

Currently, the process of determining whether a student has an emotional disturbance is highly subjective. Also, the assessment tools that are used to assess the

presence of this disability are used to rule out differential diagnoses or simply categorize the behaviors of concern by description and perceived level of severity. Because students diagnosed with an emotional disturbance have some of the worst outcomes after leaving school than any other disability category, proper intervention is imperative for these students and was the impetus for this direction of research. And while developing interventions for students diagnosed as emotionally disturbed is beyond the scope of this dissertation, an attempt to determine if a pattern of executive function deficits exists in students diagnosed with an emotional disturbance and then comparing those results to a comparison group of peers who have not been identified with an educational qualifying disability, was believed to be a good place to start on a path to properly addressing the needs of these students.

The Behavior Rating Inventory of Executive Functions (BRIEF; Gioia, Isquith, Guy, & Kenworthy, 2000) was used to evaluate each student's skills in eight areas of executive functioning. One of the goals of this dissertation was to test the hypothesis that students who have been diagnosed with an emotional disturbance exhibit a greater level of executive function deficits than both the standardization sample of the BRIEF and of a comparison group of non-identified peers. The comparison group was used in order to provide a closer demographic match than the normative sample, as it was not known whether inner-city minority students would differ in their executive functions from the standardization group. Not surprisingly, Students with an emotional disturbance were found to have higher levels of executive function deficits than the normative sample in each of the eight areas assessed. The pattern of executive function deficits in students identified as emotionally disturbed was a little more than one standard deviation higher

than the normative sample in the Organization of Materials domain. Students with an emotional disturbance exhibited deficits that were more than two standard deviations higher than the normative sample in the Inhibit, Shift, Emotional Control, Initiate, Working Memory, Plan/Organize, and Monitor Domains.

According to these results, approximately 68% of students who are emotionally disturbed demonstrate difficulty keeping work spaces orderly and free of clutter. More than 95% of emotionally disturbed students can be expected to have difficulty inhibiting responses, shifting from one activity to another, modulating their own emotional responses, independently beginning a task, holding information in mind for the purpose of completing a task, managing current tasks and planning the completion of future tasks, and assessing and monitoring their own behavior.

Because executive function deficits have profound implications for classroom behavior it is not surprising that emotionally disturbed students who are exhibiting difficulty in these areas also have great difficulty being successful in the classroom environment. In the classroom, executive function deficits may cause students with an emotional disturbance to have more difficulty independently starting an assignment than their non-disabled peers. Executive function deficits may cause students with an emotional disturbance to have more difficulty transitioning from one subject or activity to another than their non-disabled peers. Students with an emotional disturbance are also more likely to have difficulty suppressing outbursts or waiting until it is their turn to ask a question or solve a problem. They are less likely to handle teachers' assertions that their behavior align more closely to that of their non-disabled peers appropriately, and may display this frustration by exhibiting problematic externalizing or internalizing behaviors.

These difficulties, overtime, are almost always likely to translate into lower grades as a result the students' inability to manage the cognitive and behavioral task completion expectations of the classroom effectively. The results presented here suggest that the behavioral difficulties exhibited by students with an emotional disturbance emotionally disturbed students may be linked to executive function deficits. And because of these deficits, these students have difficulty with behaviors that are conducive to successful school performance that come naturally to students without such deficits.

The scores obtained from the comparison group of non-disabled students who had been selected to match the group of students with an emotional disturbance were also compared to the means of the normative sample and while the scores obtained were lower than those obtained by the group of students with an emotional disturbance, they too, obtained scores that were significantly higher than the normative sample in each of the executive function areas assessed. This finding is particularly alarming. The results indicate that the non-disabled students used in this study, too, have difficulty in the areas of executive function that are essential to adequate school performance. While more research needs to be conducted on executive function development in students from low income, inner city public schools, the results here indicate that the school performance of this study's population is also at-risk. Non-disabled students, albeit to a lesser degree, may also benefit from strategies and interventions designed to improve executive function skill; however, it is a concern that, because they have not formally been identified as a student in needed of specially designed instruction, these students may not get this attention if these strategies are not embedded into the regular education curriculum. The implication here is that the same poor school and social outcomes that

exist for students diagnosed with an emotional disturbance may also become a reality for these students or that they, too, will eventually be labeled with a special education diagnosis because of a lack of proper early intervention.

While the comparison group of students was found to also have elevated levels of executive functioning deficits, albeit unexpected, a MANOVA did confirm that the difference in the executive function deficits between the Emotionally Disturbed group and the comparison group was also significant. This is an indication that while the comparison group displayed deficits in executive functioning, the difference in the scores were high enough to conclude that students with an emotional disturbance do, in fact, exhibit greater executive function deficits to a marked degree than their non-disabled peers. A closer look at the data revealed that not only do students with an emotional disturbance exhibit greater executive functioning deficits in general, but that these deficits were more specifically expressed in each executive function area except for the organization of materials domain. The subsequent univariate analyses revealed that students with an emotional disturbance do not have greater difficulty keeping their workspaces free of clutter and arranging materials in an orderly fashion. These students do, however, have greater difficulty controlling impulses and stopping their behavior; flexibly transitioning from one situation to another; adjusting their own emotional responses; independently beginning a task or activity; holding information in immediate awareness in order to complete a task; setting goals and completing them in a systematic manner; and assessing their own performance while keeping track of the effects of their own behavior on others than do their non-disabled peers.

Secondary analyses were conducted to determine if males with an emotional disturbance differed in their executive functioning from females with an emotional disturbance, and also to determine if executive functioning differed across age groups. Due to the disparity in the number of female ($n = 8$) to male students ($n = 32$) diagnosed with and Emotional Disturbance, a Mann-Whitney U test was used as it is less sensitive to differences in n . The test revealed that males and females differed significantly on six out of the eight domains of the BRIEF: Shift, Initiate, Working Memory, Plan/Organize, Organization of Materials, and Monitor. Unexpectedly, females displayed more severe executive function deficits than males, of more than one standard deviation in each domain. Males and females with an emotional disturbance showed no differences in their abilities to control impulses and adjust their own emotional responses appropriately. However, females exhibited greater levels of impairment in their ability to flexibly transition from one situation to another, independently begin a task or activity, hold information in immediate awareness in order to complete a task, set goals and complete them in a systematic manner, keep their work spaces free of clutter and arrange materials in an orderly fashion, and assess their own performance while keeping track of the effects of their own behavior on others. The results of this study indicate that while executive function deficits are inherent to adequate academic performance and prosocial behaviors, deficits in executive function may manifest differently in females. Research on executive function deficits in females is not prevalent; however there is a limited amount of research that suggests that ADHD, a disorder that is also believed to be characterized by executive function deficits, is displayed differently in females (Adams, 2007; Quinn, 2005). According to Quinn (2005), ADHD is often under and misdiagnosed in females

because the symptoms of the disorder are characterized by higher rates of anxiety disorders, mood disorders, substance disorders, and learning disabilities. Hormone levels are also believed to be a factor contributing to the under identification of this disorder in females. Female students with ADHD are less likely than males to display hyperactive or impulsive behaviors (Adams, 2007) and the comorbidity of other disorders often delay the diagnosis of ADHD because what are symptoms of ADHD are often primarily attributed to depression, or some other manifestation of the disorder that is not often seen in males. The elevated levels of executive function deficits displayed by females in this study raises the question of whether emotionally disturbed females simply display the effects of executive function deficits to a greater degree than males or if this is an indication that emotionally disturbed females, too, are under identified, because of the comorbidity of other issues that are given precedence as the explanation for their display of inappropriate behavior.

Next, the entire sample of students was arranged into three groups according to grade. The groups were composed of students that were in kindergarten through third grade, fourth through seventh grade, and eighth through eleventh grade. As a group, students with an emotional disturbance displayed more executive function deficits than non-disabled students in each area except for the organization of materials domain. Significant differences also indicated that the students in grades eight to eleven demonstrated greater levels of executive function deficits than students in the two lower grade groups in each executive function domain.

According to the data, while students with an emotional disturbance did perform worse than the two lower grade groups, the difference in the skills displayed by the

emotionally disturbed students and comparison group were consistent for the two lower grade groups. However, the difference between the executive function deficits displayed by the two groups increased greatly in the eight to eleven grade group with the emotionally disturbed students continuing to show greater deficits.

The cause of executive function deficits in the students used in this study is not known. Multiple feasible explanations for these deficits in this study's population are plausible and include developmental risk factors such as poverty, lead exposure, and low levels of parental education (Weiher & Tedin, 2006). However it is more germane to the results of this study to propose that executive function skills that are not intact get worse as the students get older if proper intervention is not obtained. Because the development of executive function skills develop according to a developmental sequence, it is not unreasonable to assert that a the lack of these skills will be portrayed in students' behavior, to a greater extent as the task demands of the school setting become greater. Logically, one could assume that when a student's executive function deficits are not properly addressed in the school setting, that these deficits would be compounded with increasing age and increasingly complex educational and social situations.

School Psychologists evaluate specific cognitive processing skills when students exhibit academic difficulties in an attempt to gain insight into the level and type of intervention needed to improve academic functioning. While an investigation of cognitive ability is often conducted when a student exhibits problematic behavior, researchers have found that executive skills were found to be independent of IQ (Welsh et al., 1991) so, this investigation is most often conducted for the purposes of ruling out a differential diagnosis. Furthermore, research suggests that cognitive skills may be seen

as domain specific, whereas executive skills act more globally (Lezak, 1993). Executive skills impact all aspects of behavior and appropriate and socially responsible conduct is dependent upon the integrity of these functions (Lezak). Currently, a diagnosis of an emotional disturbance is typically made without investigating the role of the individual's executive functioning. Instead, the diagnosis is made after the student exhibits problematic behavior for an extended period of time and these behaviors are simply restated and categorized when making the determination that the disability is present. The problems associated with diagnosing an emotional disturbance in this way are multifaceted; however, one very important problem is that the traditional approach does not necessarily indicate how to properly intervene when students' behavior is negatively affecting their academic performance. Because early patterns of behavioral problems are the most amenable to change (Bradley, Doolittle, & Bartolotta, 2008), this dissertation began with the notion that just as assessment of cognitive strengths and weaknesses drives intervention development for students with specific learning disabilities, an investigation of the pattern of cognitive deficits believed to be associated with the display of problematic behavior (executive function skills) should also prove useful when developing interventions for emotionally disturbed students. The relationship between executive function deficits and students diagnosed with an emotional disturbance has been largely underinvestigated and the research conducted as part of this dissertation provides one place to begin to properly address the needs of this troubled population.

Recommendations for Future Research

Examining the pattern of executive function deficits in students diagnosed with an emotional disturbance revealed some poignant findings that, while still in the beginning

stages, should begin to offer not only the impetus for future research but also some ideas for immediate intervention for students diagnosed with this disorder. This research was limited to low income students who attend public school in a large urban school district and while on one hand the findings are limited with regard to a global perspective of students diagnosed with this disability, the implication of what these findings do mean with regard to these students' education and future place in society creates an urgent matter. Students that are diagnosed with an emotional disturbance need immediate attention. Not only do these students exhibit greater levels of impairment than do their non-disabled peers, but these impairments are far greater and only get worse and they get older. The results gathered from this dissertation indicate that more research on executive function needs to be conducted in other populations of emotionally disturbed students to give better insight into the impact of executive function skills in this population of students from different backgrounds. The results gathered during this research study indicated that non-identified students from an inner-city school district also have elevated levels of executive function skill deficits, so more evaluation of at-risk students who have not been identified is also warranted. The data here indicates that emotionally disturbed students in higher grades exhibit greater executive function deficits. Because many of the students used in this dissertation study had already been placed in emotional support programs prior to being recruited, further research in the form of a longitudinal study beginning when students are initially placed in an emotional support program would be beneficial to investigate the trajectory of these deficits.

It is not clear from the research here why females display greater levels of executive function deficits, but more research needs to be conducted on females with an

emotional disturbance to determine the specific needs of this population. And while it may not be possible to determine the cause of the deficits, at the very least, we know that interventions to address executive function weaknesses are needed for all students and more specifically students with an emotional disturbance in the Inhibit, Emotional Control, and Initiate domains. This dissertation study provides an extremely clear indication that more research is needed to determine the extent that executive functions impact not only on students with an emotional disturbance but with all students in order to intervene early and set the course of their lives on a path that will enable them to be good students and productive members of society as adults. While the investigation of specific intervention programs is beyond the scope of this dissertation, research does indicate that providing children with strategies such as frequent adult monitoring, teaching new skills and content systematically and explicitly in the same manner in which they would be applied in real-life learning contexts, minimizing demands on working memory, providing many opportunities for guided and extended practice, and anticipating which aspects of tasks and situations that students are likely to find threatening and then modeling strategies to manage these difficulties when they occur are strategies that improve executive function skills (Kaufmann, 2010). Building executive function processes into an already existing curriculum by using rubrics to teach planning, goal setting, and prioritizing, and offering direct and systematic instruction on setting goals are also strategies that have been provided in the literature as a ways to enhance the executive function skills of all students (Meltzer, 2010). Formal emotional-based curriculums that specifically address the common characteristics of students with executive function deficits such as the Open Circle and Second Step programs can also be

implemented and have been reported to result in improved impulse control, improved problem-solving and conflict resolution skills, decreased aggression and depression, an improvement in standardized achievement test scores (Greenberg, Kusche, Cook, & Quamma, 1995; Hawkins & Catalano, 1992) and improved self-awareness, self-control and fewer physical fights (Taylor, Liang, Tracy, Williams, & Seigle, 2002).

Implications for Practice

The limited amount of research conducted in the area of executive function and behavior suggests that executive function skill development begins in early infancy and continues to develop into late adolescence (Dawson & Guare, 2004), early deficits in executive function predict later behavior problems (Hughes & Ensor, 2007) and that early behavioral patterns are the most amenable to change (Bradley, Doolittle & Bartolotta, 2008). The results of this dissertation suggests that if executive functions are impaired and students continue to develop without proper intervention, these deficits become more pronounced and increase the likelihood that the unfortunate outcomes will become a reality for these students. We can conclude from the data that students with an emotional disturbance exhibit elevated levels of executive function deficits and that these deficits are expressed to a greater degree than the normative sample and non-disabled students who attend the same large urban school district. So, this is an indication that the evaluation of executive function should be always be included when students are referred for behavior problems.

Perhaps the most surprising finding is that low income students from the large urban district who are developmentally the same age and from a similar demographic

background who have not been diagnosed with an emotional disturbance, or any other disability for that matter, also exhibit a pattern of executive function deficits. This finding is particularly disheartening because while the outcomes for students with an emotional disturbance are bleak, the finding that executive function deficits likely have an impact on their behavior can drive intervention development and implementation that target these deficits to see if they are amenable to change in these students. However, students who have not been identified as special education students have not been recognized but are also in need of interventions that address executive function skill deficits. Not only do the non-disabled students used in this study appear to be in need of intervention to address executive function deficits, the results of this dissertation study also raises the question of whether or not students with an emotional disturbance should be considered the only ones at considerable risk for school failure and poor social outcomes once they leave school. Low income and minority students have the worse drop-out rates (US Department of Education, 2009). While 1.2 million students drop out each year, more than half of those students are from minority groups. (US Department of Education). To that end, the research here suggests that programs aimed to improve the executive functioning skills of all at-risk students should be implemented in classrooms beginning in kindergarten and should continue to be incorporated into classroom instruction as they get older and move into higher grades.

Limitations

One of the limitations of this research is that the ratings of all of the students with an emotional disturbance were gathered from only three schools in a limited geographic region. The comparison group of students was gathered from five different schools, only

one of which was the same location from where some of the Emotionally Disturbed population was gathered. All of the students were selected from inner city urban schools where the majority of students come from low income households. Also, only teachers' ratings were included in this study because while parent ratings were solicited, they were not returned at a rate that would have allowed them to be included in the data analysis. With the sample of students being limited to a few schools throughout the district, limited number of teachers completing the rating forms, and the location of the sample being in a low income, urban setting, it is not possible to tell if the results are due to teacher expectations, biological factors, environmental factors, or some other factor that is unknown. Another limitation of this research is that the executive function skills in the sample of students used was assessed with only one instrument, the BRIEF. The BRIEF is a rating scale that purports to examine eight domains of executive function, and these ratings were based on a teacher's knowledge and familiarity of the particular student. It is not clear if different standardized measures of executive function skills, direct assessment, or direct observations might have yielded different results. Also, it is not known whether the raters' responses to the questions on the BRIEF were inconsistent, unusually negative, or both as the negativity and inconsistency scales were not investigated as part of the interpretation of the results. It should be noted, however, that according to the BRIEF professional manual (Gioia, Isquith, Guy, & Kenworthy, 2000) elevated scores on the inconsistency and negativity scales should not immediately be discounted. Instead, an elevated score on the inconsistency scale should prompt the administrator to consider that there is a reasonable explanation and that an elevated negativity scale score does not necessarily mean that the rater was excessively negative,

but could mean that the student being rated really does exhibit considerable levels of executive dysfunction.

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APPENDIX A
TEACHER CONSENT FORM (ED)

EXAMINING THE PATTERN OF EXECUTIVE FUNCTIONING IN CHILDREN IDENTIFIED AS
EMOTIONALLY DISTURBED

Schhcra Coleman, M.Ed. - Student Investigator Psychological Studies in Education Temple University 215.740.9525	Catherine Fiorello, Ph.D. - Principal Investigator Psychological Studies in Education Temple University 215.204.6254
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An Emotional Disturbance is an educational eligibility classification that is characterized by a display of disruptive internalizing and externalizing behaviors (IDEIA, 2004; 34 C.F.R 300.8). Roughly 10.5% (of students ages 6 through 21 receive special education services under the federal definition of Emotional Disturbance (Wagner, 1995).

We are conducting a dissertation research study to determine if a pattern of the cognitive processes that allow individuals to manage their emotions and thoughts in order to control their own behavior exists in students who have been diagnosed with an Emotional Disturbance. We are also attempting to determine if non-disabled students who are developmentally the same age and from a similar demographic background, display a similar pattern of strengths and weaknesses.

You have been selected to participate because you are the teacher of a child identified as a student with an emotional disturbance.

The research project would include:

1. Your completion of one (1) report form that asks questions regarding your student's ability to monitor and control their own behavior. This may take about 15 minutes of your time.
2. Your student's parent/guardian will be asked to complete one (1) report form that asks questions regarding your student's ability to monitor and control their own behavior. This may also take about 15 minutes to complete.

There are no known risks, discomforts, or hazards associated with this data collection other than the incidences of donating time for data collection.

_____ (signature) _____ (date)

TEACHER CONSENT FORM

EXAMINING THE PATTERN OF EXECUTIVE FUNCTIONING IN CHILDREN IDENTIFIED AS EMOTIONALLY DISTURBED

All documents and information pertaining to this research study will be kept confidential, unless required by applicable federal, state, and local laws and regulations to be disclosed. I understand that records and data generated by the study may be reviewed by Temple University and its agents, the study sponsor or the sponsor's agents (if applicable), and/or governmental agencies to assure proper conduct of the study and compliance with regulations. I understand that the results of this study may be published. If any data is published, I will not be identified by name.

Your agreement to provide the data is completely voluntary. You may choose not to participate, and/or change your decision to collect the data at any time. Regardless of your decision, your relationship with Temple University or the investigators will not be jeopardized in any way.

If I have any questions about my rights as a research subject, I may contact the Institutional Review Board Coordinator at (215) 707-3390. The IRB Coordinator may also be reached by email:

IRB@temple.edu or regular mail:

Institutional Review Board Coordinator
Temple University Research Administration
Student Faculty Conference Center
3340 North Board Street - Suite 304
Philadelphia, PA 19140

We welcome questions about the study at any time.

Signing your name below indicates that you have read and understand the contents of this Consent Form and that you agree to collect the data as described above. Please return this form, and the completed teacher rating form (enclosed) to me. You can simply seal them in the enclosed envelope.

Schehera Coleman, M.Ed.

You are welcome to copy this form. Thank you for your consideration.

Adult Signature

Date

Investigator's Signature

Date

TEMPLE UNIVERSITY
IRB (COMMITTEE B) APPROVAL
OCT 28 2010

APPENDIX B
TEACHER CONSENT FORM (NON-DISABLED)

EXAMINING THE PATTERN OF EXECUTIVE FUNCTIONING IN CHILDREN IDENTIFIED AS
EMOTIONALLY DISTURBED

Schehera Coleman, M.Ed/- Student Investigator Psychological Studies in Education Temple University 215.740.9525 215.204.6254	Catherine Fiorello, Ph.D. - Principal Investigator Psychological Studies in Education Temple University
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An Emotional Disturbance is an educational eligibility classification that is characterized by a display of disruptive internalizing and externalizing behaviors (IDEIA, 2004; 34 C.F.R 300.8). Roughly 10.5% of students ages 6 through 21 receive special education services under the federal definition of Emotional Disturbance (Wagner, 1995).

We are conducting a dissertation research study to determine if a pattern of the cognitive processes that allow individuals to manage their emotions and thoughts in order to control their own behavior exists in students who have been diagnosed with an Emotional Disturbance. We are also attempting to determine if non-disabled students who are developmentally the same age and from a similar demographic background, display a similar pattern of strengths and weaknesses.

You have been selected to participate because you are the teacher of a child who has not been identified with a special education disability and your ratings will be used for the purpose of comparison.

The research project would include:

1. Your completion of one (1) report form that asks questions regarding your student's ability to monitor and control their own behavior. This may take about 15 minutes of your time.
2. Your student's parent/guardian will be asked to complete one (1) report form that asks questions regarding your student's ability to monitor and control their own behavior. This may also take about 15 minutes to complete.

There are no known risks, discomforts, or hazards associated with this data collection other than the incidences of donating time for data collection.

There may not be any benefit to the participant of the study; however the rating forms that you and your student's parent/guardian complete may help better understand ED in the future.

_____(signature)_____ (date)

TEACHER CONSENT FORM

EXAMINING THE PATTERN OF EXECUTIVE FUNCTIONING IN CHILDREN IDENTIFIED AS EMOTIONALLY DISTURBED

All documents and information pertaining to this research study will be kept confidential, unless required by applicable federal, state, and local laws and regulations to be disclosed. I understand that records and data generated by the study may be reviewed by Temple University and its agents, the study sponsor or the sponsor's agents (if applicable), and/or governmental agencies to assure proper conduct of the study and compliance with regulations. I understand that the results of this study may be published. If any data is published, I will not be identified by name.

Your agreement to provide the data is completely voluntary. You may choose not to participate, and/or change your decision to collect the data at any time. Regardless of your decision, your relationship with Temple University or the investigators will not be jeopardized in any way.

If I have any questions about my rights as a research subject, I may contact the Institutional Review Board Coordinator at (215) 707-3390. The IRB Coordinator may also be reached by email:

IRB@temple.edu or regular mail:

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We welcome questions about the study at any time.

Signing your name below indicates that you have read and understand the contents of this Consent Form and that you agree to collect the data as described above. Please return this form, and the completed teacher rating form (enclosed) to me. You can simply seal them in the enclosed envelope.

Schehera Coleman, M.Ed.

You are welcome to copy this form. Thank you for your consideration.

Adult Signature _____ Date _____

Investigator's Signature _____ Date _____