Analysis of Teacher Ratings on the Behavior Rating Inventory of Executive Functions (BRIEF) at the Item Level for Urban Middle School Students Included in a Study of the Effectiveness of a Mindfulness Awareness Program

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Dedication

This work is dedicated to all those wonderful beings, who, with fullness of delight, upon beholding the shining light of the golden orb of the ancient sunrise, the rising of the sun at early dawn, devote their lives to the removal of human miseries and sufferings caused by human agents, natural disasters, genetic and/or environmental conditions. These change agents sow the ever-new consciousness to uplift all afflicted peoples, harvesting the superfluity of neuro-plasticity resources for timeless self-inquiry. This small effort is dedicated to Lord Ganesha, The Remover of Obstacles and The Pasayadan Song from Jnaneshwar Maharaj's Gita, a hidden well of pure silence, which, with its sheer poetic majesty, opens the door of "humility and gratitude without walls" to the restless mind enrolled in life-long learning, this life–"a school without walls," a garden of synergistically-adapted transformative learning experiences.

Textual prolixity leads to tedium, but like a balm for the restless mind, I was enriched by an accidental immersion in the ocean of Jnaneshwar Maharaj's Gita. Inspired by the exposition of executive functions (EF) and the principles of mental health, boldly delineated in the Bhagavad-Gita, self-inquiry endures and offers a neuropsychological glimpse into the role of EF in relation to mental health, as a public health concern for schools, communities, villages, and cities. This work is a small step toward epiphanies. The fusion of epiphanies lies in the promise of one's neural integration, whose brain development reflects, as it were, a blueprint for self-regulation/self-awareness, explored in the Gita's 18^{th} chapter, a hub of knowledge for beneficial actions. Brain research plays a role in education, in school without walls, in humility and gratitude without walls, in the dynamic experiences of a learner's span of the human brain development (Fig.5).

Acknowledgments

There are innumerable persons to acknowledge for the success of this endeavor. If I were a poet on their guest lists—a poet for whom pure silence is a canvas for speaking eloquently with splendid verses of gratitude, the researcher would sing a "Pasayadan song." A Pasayadan song that reflects the meaning of "Chakra-Boom" in accord with the meaning of "Obio-Ram" nurtured by parents, Denchukwu DenChukwu and Victoria Denchukwu, all my siblings, for a meaningful name that represents the true meaning of this page. Endless gratitude goes to all the wonderful beings, who are like wish-fulfilling wells, "wish-fulfilling trees" from the "hub of the heart." One can be certain that there is not enough space to fit the names of all these well-wishers, life teachers, role models, and advisors. Please understand that all those names are included in the "song."

One can be certain that in this "moment," the completion of this project would not have been a reality without a decade of life-transforming guidance of my primary advisor, Dr. Carol Kochhar-Bryant, whose moral support and modeling of how to be a true human being and a researcher, emerged as this product and the sheer wealth of confidence to defend this work. What else is there to say, but "Thank you!" "Humility and Gratitude Without Walls (Humility-GWW)" is a redemption song that reflects the researcher's experience of selfless service. One cannot hesitate to say "Thank you!" to Dr. Cheryl Desmond, the principal investigator of the two studies, qualitative and quantitative, and Dr. Laura Hanich, the co-investigator of the second study, who both entrusted me with the data set used for this secondary analysis. Without their largess, indeed, who else could have been more fortunate than this one? Dr. Desmond and Dr. Hanich crafted a path of success for this work at the AERA conference on April 4th,

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The Mindfulness and Learning Symposium held on September 29th, 2014, was an event that parallels the GWU first Yoga Conference for Children. This connects to the work of Dr. Deborah Norris, the researcher's doctoral internship site supervisor at The Mindfulness Center (TMC), whose guidance was pivotal for being fearless to "visualize and thrive." A bundle of thanks to Jessie Norris and Jacqueline Norris, co-founders of TMC with Dr. Norris, for their inspiration and uplifting support. Thanks to Shivani Fanning, who connected me with the presenters at the symposium, most of whom were cited in this work, and for her patience and support on my proposal defense. In addition, she encouraged me through hours and endless seven days of dedication, as I analyzed tons of data, hewn with endless mathematical calculations by hand and via EXCEL.

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Here is a special acknowledgment and appreciation poem to the office of student services:

> Synergy unfolds serendipity and resonates with gratitude to Dean Nancy Gilmore, Sara Lang, Jean Wright, Alicia Bellezza-Watts, Rachel Dorfman-Tandlich, Gianna Miller, Robin Cleveland, Chris Dietrich, Joyce G. Moreland, Cora White, and the numerous staff members at GSEHD and the Office of Student Services, over the past decade, for their incredible support to arrive at this occasion, "Thank you." What else can a thankful Griot say?

"Once we accept our limits, we go beyond them . . . Only those who attempt the absurd can achieve the impossible . . . Intellectuals solve problems, geniuses prevent them . . . Imagination is more important than knowledge. For knowledge is limited to all we now know and understand, while imagination embraces the entire world, and all there ever will be to know and understand." (Albert Einstein)

Here is another Griot-Style poem of appreciation titled:

Humility and Gratitude Without Walls

> Has the wind heard of the classroom without walls? See the sky-clad walls—birds in flight; have the ancient echoes of our epiphanies heard of life as a school for life-long learning? This poem of gratitude enrolls one's attitude in continuous enrollment…a momentum for a continuous moment of *Gratitude and Humility Without Walls,* Why and how *humility* and *gratitude* shine in the heart and mind,

and resonate powerfully as transformative forces in our lives: sing Heisenberg Uncertainty Principle- *Humility and Gratitude Without Walls (Humility-GWW)*. "Metro opens doors!" GSHED opens doors of "Humility and Gratitude Without Walls." While riding on the Blue Line of gracious alignment . . . of the Uncertainty Principle, this gracious alignment of events, your timeliness in orchestrating the success of all students, happens to be quite a reverberating moment of utter humility—resonant—boundless humility and endless thanksgiving to countless people. There is clearly the magic of ancient selflessness hidden all around us—even in nature: That Sky--- and School Without Walls—humility and gratitude without walls. [ObioRam 10/31/14]

Seeing all the students—brain trees—next to the GSEHD building in free play and spontaneity like the growing trees, growing brains making connections with the universe. I am eternally grateful that the Supreme Goddess created a fulcrum to elevate a Griot's ordinary life, a researcher . . . incredible obstacles hewn from ordinary and humble beginnings in this life's song of a meaningful one to serve humanity with humility and gratitude without walls. How does one get a glimpse into the boundlessness of *humility* and *gratitude* as powerful forces that impact the brain with wonder and awe about selflessness, research, and service to others? Where does one find a shed of gratitude? Find your Gratitude Shed, where imagination sheds light on transformation and exploration of Einstein's aphorisms: "…For knowledge is limited to all we now know and understand, while imagination embraces the entire world, and all there ever will be to know and understand." In this inner-village, there is the vibrant astronaut-village, on the yonder shore of the early dawn of imagination without ebb and flow.

Abstract of Dissertation

Analysis of Teacher Ratings on the Behavior Rating Inventory of Executive Functions (BRIEF) at the Item Level for Urban Middle School Students Included in a Study of the Effectiveness of a Mindfulness Awareness Program

Previous research suggests that executive functions (EF), including self-regulation skills, are essential for children's academic readiness and educational production, particularly middle school students, who are identified with learning disabilities (Desmond & Hanich, 2014; Hartman, 2012). Decline in the educational outcomes of middle school students remains an alarming concern for educators and researchers (Anderman, Anderman, & Greisinger, 1999; Bobik, 2010; Jimerson, 2001; Roderick, 1994; Rumberger, 1995). For special education students, who fall short on the "producing" end, academic goals do not address the EF deficits, which are more likely to be addressed by EF development geared for academic production in reading, writing, and mathematics (Denckla, 2002; Hartman, 2012; McCloskey, Perkins, & Van Diviner, 2009).

Furthermore, the wide-range of changes experienced by the early adolescent during the critical development stage is supported by research on the brain—development of adolescent and related cognitive processes, particularly EFs (Sylvan & Christodoulou, 2010; Jensen, 2008; Kellough & Kellough, 2008; Caskey & Ruben, 2007; Manning, 2002; Dorman, Lipsitz, & Verner, 1985). Findings from these researchers have supported a variety of school-based interventions designed to support children's EF development. Limited research has investigated interventions utilizing mindfulness to improve EFs and academic production in middle school. To address the gaps in literature, the study design is a secondary analysis of an existing data set at the item level.

Five questions were investigated in this analysis of a prior study; Desmond and Hanich (2014) conducted a randomized control experiment using a quasi-experimental design, including repeated measures analysis of variance (RMANOVA) and multiple regression analyses. Additional procedures were used for accounting for and handling missing data arising from attrition (Enders, 2013; Little & Rubin, 2002).

The results suggested the following: a refinement of the item pool to produce more valid sub-sets of indicators of positive change in order to create a Scale based on the findings; establishing a basis for a more sound methodology for assessing change in studies of mindfulness; and supporting the research on the continuing plasticity of the early adolescent brain and on school-based interventions for brain development. The recommendations for practice, policy, and research are presented.

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Chapter I: Introduction

Elementary school naturally precedes the transitional year of sixth grade for early adolescents. The sixth grade is a critical year in which the social-emotional learning and self-regulation skills become necessary for school readiness and executive functioning in subsequent years of middle school, high school, and throughout the life span. The importance of the developmental trajectories of executive functions (EF) from pre-school, kindergarten, and first grade to 5th grade, becomes even more important for academic production for early adolescents, especially in the transitional year of sixth grade for early adolescents in poverty with identified learning disabilities. Given the human brain development, numerable contextual factors of executive functions (Wallace, 2011) have been associated with low academic performance in relation to the urban setting. Included in these factors are: poverty, limited early childhood programming, cultural socialization, crime rates, the lack of parental employment, and few to nonexistent opportunities outside of the classroom (Hock et al., 2009; Lee, Spence & Harpani, 2003; Leventhal & Brooks-Gunn, 2003; Leventhal, Graber, & Brook-Gunn, 2001; McWayne, Fantuzzo, & McDermott, 2004). Academic production in middle school for early adolescents, particularly those in poverty, requires the improvement of executive functions skills that children need for success in school from pre-school on through the onset of the middle school years.

Today's middle school classrooms are populated with diverse student populations with diverse learning styles. These classrooms challenge and expect students to be prepared with school readiness skills, particularly self-regulation skills (one of the components of executive functioning) in order to be successful in early adolescence,

particularly the transitional year of sixth grade and throughout the life span. Preparing children for success through demonstrated expectancy of school readiness skills and self-regulation skills in the early years is an essential part of their growth and transition to early adolescence. This is a critical developmental stage of puberty (10 to 14 years old) driven by obvious and subtle changes in outlook and perception about self and others, cognitive, social, emotional, and moral development, (Caskey & Ruben, 2007; Desmond & Hanich, 2014; Dorman et al., 1985; Kellough & Kellough, 2008; Manning, 2002). Interventions shown to aid executive function development in children, four to 12 years old, can contribute to children's success, which requires creativity, flexibility, self-control and discipline, all of which are central to executive functions (Diamond & Lee, 2011). Concurrently, executive functions contribute to mathematics, reading, and writing skills which are all essential for school success, especially in the transitional year from elementary school to middle school.

As supported by research, inhibitory control, working memory, and cognitive flexibility are acquired with the development of executive functions skills geared for academic production in reading and writing (McCloskey et al., 2009). Research indicates three distinct but interrelated components of executive functions have been identified, namely, working memory, inhibitory control, and attention shifting or flexibility (Bierman, Nix, Greenberg, Blair, & Domitrovich, 2007). Three more complex executive functions skills pointed out by other researchers include problem-solving, reasoning, and planning (Diamond & Lee, 2011). Diamond and Lee (2011) posit that "to improve school readiness and academic success, targeting executive functions skills development is crucial and executive functions skills remain critical for success throughout life" (p. 11).

A young child having good executive function skills is an important component of being considered "school ready" from preschool years to the transitional year of sixth grade, which remain essential for success during the critical early adolescent years of middle school. Middle school teachers, who are provided with opportunities to support children with effective executive functions skills development, self-regulation assessment tools, and timely interventions, are key to ensure school success during the transition years of middle school, for social, emotional, and academic production. When examined in light of research from early theorists and recent studies undertaken by researchers, self-regulation, emotion knowledge, attention skills, behavior, school readiness, academic achievement and competence, are some of the key words that overlap with the concept of executive functioning.

Overview

For many adolescents with learning disabilities, the academic skill sets required to master the curriculum, coupled with the failure of schools to provide relevant executive functions training for teachers and students' development of these skills, contributes to the reality of falling short on the "producing" end (Denckla, 2002; Hartman, 2012). Such failure from schools is a critical issue that is detrimental to early adolescents, and consequently, if not addressed, proves to negatively affect educational outcomes of students. However, better educational outcomes can be created when the executive functions deficits associated with underachievement and lack of production in school, are addressed for early adolescents with learning disabilities.

In general, according to IDEA, teachers are required to comply with each student's Individual Education Program (IEP) by following the recommendations,

implementing goals, and providing accommodations, as recommended by the IEP Team, which typically includes an administrator, the student, the student's parents, a special education teacher, a general education teacher, and related service providers. Addressing a students' need for academic production and improvement while meeting their social, emotional, and IEP goals, fails to address the overarching problem of executive function deficits. As stated earlier, inhibitory control, working memories, and cognitive flexibility, are acquired with the development of executive functions skills geared for academic production in reading and writing (McCloskey et al., 2009). Essentially, early adolescents require these skills for school success given the delicate stage of brain development that, as a matter of neuro-biological progression, sixth grade is the critical year in which the social-emotional learning and self-regulation skills necessary for school readiness skills and executive functioning in subsequent years of middle school.

Schools' failure in providing timely and relevant targeted school-based interventions increase the likelihood of early adolescents to face consequences that might impede the opportunities of education geared for living a conceivably productive and meaningful life should they resort to truancy and drop out from school. Today's middle school classrooms require goal-oriented, self-motivating, self-directed, task-driven processes powered by the social charisma of early adolescence that perpetually requires social-emotional and academic competence that executive functions are associated with. For this reason, without being prepared to meet the challenges of academic rigor and high expectations of behavior geared toward success in school, some students may no longer believe they have the ability to learn an academic task and experience lack of self-efficacy (Bandura, 1987; Desmond & Hanich, 2014; Pajares, 1996). Furthermore, early

adolescents need to be prepared to meet the growing challenges of the middle school learning environment that are exacerbated by the digital age of virtual interactions, and endless distractions of social networks and staying relevant with peers.

According to Wolfe (2006), the brain, a pattern-finding organ, seeks to create meaning through establishing or refining existing neural networks; this is learning. Wolfe posits that emotions affect what is learned and what is returned. Early adolescents' brains, while "seeking to create meaning through establishing or refining existing neural networks," must deal with competing internal and external forces that involve emotional responses in order to thrive in a challenging middle school environment. Learning opportunities can be accentuated through executive functions skills development, which for early middle school students, becomes more pronounced and ubiquitous for expected performance in academic goals, and meeting school goals for age-appropriate social-emotional behaviors.

When children no longer believe they can successfully engage in learning and lack motivation, this may, in turn, "lead to an increase in behaviors that conflict with school goals" (Desmond & Hanich, 2014, p. 2). Since addressing executive functions deficits is not the mainstream school approach to deal with the wide range of emotional states among early adolescents, the problems of students are met with strategies that are not responsive to the specific areas of need. Thus, addressing the problem where academic "production" is a matter of improvement of executive functions may lead to a reversal in "decline" in the educational outcomes among middle school students (Anderman et al., 1999; Bobik, 2010; Jimerson, 2001; Roderick, 1994; Rumberger, 1995). Research on the brain development of young children and related cognitive

processes, in particular, executive functions and self-regulation skills, has provided increasingly strong evidence for their role in children's school readiness and in later years (Blair, 2002). Furthermore, significant evidence concerning the genetic and environmental conditions underlying the wide-range of changes experienced by the early adolescent is supported by research on the brain—development of adolescent and related cognitive processes, particularly executive functions (Jensen, 2008; Sylvan & Christodoulou, 2010). Findings from these researchers have supported a variety of school-based interventions designed to support children's achievement and social behaviors (Desmond & Hanich, 2014).

Measuring executive functions can be done through different standard approaches, albeit the varied definitions of executive functions. For the purposes of this study, a few operating definitions of the term "executive functions" are provided in the Definition of Key Terms section. The challenges that students face are those of behaviors that can be represented and rated as "inventory of executive functions" through the Behavior Rating Inventory of Executive Functions (BRIEF), which is used by school psychologists in various classroom settings or home settings. The BRIEF instrument which will be discussed in detail in Chapter III has Teacher Rating and Parent Rating Versions. The BRIEF represents an ecologically valid measure of executive functions compared to other more traditional assessment approaches (individually administered norm-referenced test that are individually administered tests that used by psychologists. Unlike norm-referenced individually administered tests that used in formal testing environments, the BRIEF items represent behaviors that are likely to occur at home and in the classroom that are judged by teachers and parents.

Statement of the Problem

The lack of executive functions interventions in remediating academic skills for students receiving special education services is a problem experienced by increasingly diverse populations of students every year in the nation. For example, as indicated in the original study conducted in an urban middle school, 90% of students in the sample were from homes that fall below the poverty level, and 94% of the students are from Hispanic or African American backgrounds (Desmond & Hanich, 2014). With increasing cultural diversity of students with learning disabilities in urban middle schools, some of whom are Hispanics and African Americans, this problem becomes critical, given that students with IEPs have goals aimed at improving their academic skills deficits, rather than interventions primed for executive functions development.

Over the past years, the problem has worsened. The reason for this is that academic goals created for students with disabilities do not address the executive functions deficits, which are more likely to be addressed by the development of executive functions skills geared for academic production in reading and writing (McCloskey, et al., 2009). Furthermore, teachers' lack of training about the importance of executive functions is part of the problem. Failure of school in addressing the problem by remediating executive functions deficits, remains a growing need for school districts to seek alternative interventions to respond to students' low academic skill sets. The development of executive functions skills targeted for academic production in reading and writing, including mathematics, are more likely to remediate and address students' academic and social-emotional goals.

There is need for research given the gap in knowledge and the dearth of research about the executive functions interventions for early adolescents in poverty. There is a gap in literature regarding early adolescents and the importance of the improvement of executive functions through school-based interventions. Executive functions skills are essential for children's school readiness and academic production at all levels of learning, particularly for early adolescents in the transitional year of middle school, who are identified with learning disabilities. It is estimated that six million (or 9.1%) of the population of children and youth between the ages of six and 21 receive special education and related services under the *Individualized Disabilities Education Improvement Act* (IDEA) (30th Annual Report to Congress, 2011). Students with disabilities represent growing demographics in American schools, increasing from 8.3% of the total enrollment in 1976-1977 to 13% in 2010-2011 (U.S. Department of Education National Center for Education Statistics, 2013). Literacy rates are associated with adolescents living in poverty (students requiring free and reduced price lunches), a target population of the current study, as represented in the shelf-data used in the proposed analysis in Chapter III. In 2011, *The National Report Card on Reading* provided test scores for students eligible for reduced price and free lunch programs, scales frequently used to assess students' families. As indicated in this report, 15% who were not eligible for free lunch or reduced lunches scored at "below basic" level, compared to 37% of those who were eligible for free and reduced price lunches (NCES, 2011). Young adolescents who fall within the minority and low-socio economic categories make up a high percentage of students in urban public school districts.

American public schools are increasingly populated with at-risk students in poverty, especially in the urban setting, with higher enrollment of African Americans, bilingual and linguistically diverse students, who remain at risk for truancy or dropout. Overwhelmingly, the nation's public schools are faced with a transforming landscape of increasingly diverse students comprised of cultural, racial, socio-economic, and linguistic backgrounds. Immigration is rapidly transforming and revising all aspects of American society, considering approximately 40 million foreign-born residents in the United States (Hirschman, 2006; Passel & Cohn, 2012). Some of the children who may be English language learners (ELL) enroll in these schools and enter the pool of the process of eligibility determination for special education needs, after meeting the eligibility requirements specific to their individual needs. English speaking students, ELL, or bilingual students, who receive special education services, receive specialized instruction based on an Individualized Education Plan (IEP).

The consequences of not addressing this problem are that students' academic and social-emotional goals are not met. In addition, teachers must deal with the backlash of accountability when there is little or no progress in students' executive functions skills development and the continuous decline in their educational outcomes. Addressing this problem engenders benefits for schools in meeting their goals, as students' academic, and social-emotional goals are met, along with improvement in teacher training on the importance of executive functions. Furthermore, additional benefits are that executive functions skills will stimulate and support the long-term academic skill sets needed by students. As teachers abandon the view that competence is a fixed trait, the increased teachers' awareness and students' competence will not fall short on the "producing" end

(Denckla, 2002). Benefits for the target populations, particularly the increasing bilingual, linguistically, and culturally diverse early adolescents in poverty, will be improvement in executive functions skills for organization, planning, study skills, working memory, and attention. Students identified with low executive functions tend to have difficulties with organization, planning, and study skills. Assessment of a target intervention will determine outcome. The impact of school failure to provide appropriate interventions to address students' executive functions needs is not only an immediate lack of production in middle schools, but in high school, as well. Based on the intervention and prevention of the cost of schools' failure to address the problem, the impact the problem has on the individual will be greatly reduced in decreasing opportunities for underachievement, truancy, and possible dropout from school. As the current study will seek to explore, the problem cannot be ignored if teachers expect improvement in study skills, turning in work on time, completing homework, improving grades, and improving productivity in classroom activities.

Supporting children with effective executive function interventions and self-regulation assessment tools is an important factor in ensuring school success at all levels. Several promising strategies have been developed to address the academic needs of adolescents in poverty, as indicated by the original study. Addressing students' social-emotional and academic needs can be better addressed through advancing and implementing research on executive functions and school-based interventions for brain development of early adolescents. Specifically, MAPs on EF skills and increasing teacher's awareness on the association of EF skills and learning, including a growing body of literature on self-regulation (Desmond & Hanich, 2014). There are several

promising strategies developed by MAPs that were established to address the needs and problems for the target population. The MAPs strategies for the target population and its overarching promising resource to middle schools will be presented in Chapter III, on the procedures and materials section.

One possible barrier to effectively solving this problem is the lack of teacher awareness about the association between executive functions and learning, which can be removed by increasing teachers' awareness of the role of executive functions in academic learning (Bobik, 2010). Another barrier is a school's aversion to a school-based intervention that includes mindfulness awareness practices. This can be addressed through local outreach to a school district willing to explore how to be supported and provided with incentives for school-based interventions for brain development based on emerging research on the neuroplasticity of the early adolescent and on executive functions (Desmond & Hanich, 2014). In addition to these barriers and their solutions, some teachers may be averse to new strategies about applying executive functions training, which is not the usual pathway for helping underachievers succeed in school. Thus, as Bobik (2010) points out, competence (including executive functions skills) is not considered a "fixed trait," but a set of skills that can be remediated, if deficient.

Based on research in the field, consideration of barriers and experience, the most promising approach for this population may be found in school-based interventions that incorporate training in executive function skills into the curriculum that is sensitive to developmental trajectories of early adolescents (Bobik, 2010). Moreover, interventions designed to deal with underachievement and support academically unsuccessful students who have deficiency in executive functions, may prove to be a most promising approach

for this population. In essence, school-based interventions can serve as an umbrella that engenders a promising integration of evidence-based approach for this population, specifically MAPS (Desmond & Hanich, 2014).

Purpose of the Study

This secondary analysis of an existing data set will utilize shelf-data to examine teacher ratings on the Behavior Rating Inventory of Executive Functions (BRIEF) at the item level for early adolescents included in a study of the effectiveness of a school-based, mindfulness awareness practices (MAPs) program used with urban middle school students. The purpose of the study is to fill the gap in knowledge about improving executive functions of early adolescents in poverty through school-based interventions. The proposed study will add to the growing body of literature on the effects of school-based, mindfulness awareness programs on early adolescents in poverty. By studying the effects of school-based, mindfulness awareness programs on early adolescents, ages 11-12, in sixth grade, in an urban, low-income public middle school, this study will add to the promising area of research on improving executive functions through mindfulness programs in urban schools. The overarching research question of this study is to determine which specific items of the BRIEF that were most frequently endorsed as problematic for the students in the control and intervention groups prior to the start of the intervention program.

Research Questions

Research Question 1: Which specific items of the Behavior Rating Inventory of Executive Function (BRIEF) were most frequently endorsed as problematic for the

students in the control and intervention groups prior to the start of the intervention program?

Research Question 2: Are there any significant differences between teacher BRIEF item rating changes from Time 1 to Time 2 for the control group compared to teacher BRIEF item rating changes from Time 1 to Time 2 for the intervention group?

Research Question 3: To what extent did teacher BRIEF item ratings change from Time 1 to Time 2 for the control group and from Time 1 to Time 2 for the intervention group?

Research Question 4: When BRIEF items are organized based on the BRIEF Scale structure, which cluster of executive function item ratings showed the most change from Time 1 to Time 2 for the control group and the intervention group?

Research Question 5: When BRIEF items are reorganized using the McCloskey Model of Executive Functions, which cluster of executive function item ratings showed the most change from Time 1 to Time 2 for the control group and the intervention group?

In examining the control and intervention group, one of the goals of the analysis will be to explore Research Question 5. The frequency distributions of the difference score categories of each item will be grouped using the McCloskey Model of Executive Functions (MMEF) and examined to determine the type of change most common for the control and intervention groups for each MMEF self-regulation executive function.

Frequency distributions of Time 1 and Time 2 teacher BRIEF item ratings of students in the control and intervention groups will be generated and used to conduct analyses to answer the research questions posed in Chapter I, along with a full description of the methodology presented in detail in the Chapter III.

Statement of Potential Significance

Through the analysis of shelf-data, this study will attempt to uncover new interpretations and perspectives. Through this analysis, the researcher will gleam from the findings, new understandings of the original research in order to explore their implications for a school-based, mindfulness awareness intervention on the improvement of executive functions on early adolescents in an urban middle school. This study will also add to new knowledge of the importance of mindfulness awareness practices in urban schools, and thus, promote greater awareness for educators and practitioners in their efforts for policy change. The potential significance of this study is that, adding to the existing body of literature on early adolescents in poverty, especially early adolescents in poverty in urban middle schools, educators, parents, and clinicians, will learn more about the study, particularly, the specific items of the Behavior Rating Inventory of Executive Function (BRIEF) that were most frequently endorsed as problematic for the students in the control and intervention groups prior to the start of the intervention program.

Furthermore, the findings from this proposed study will add to evidence-based research on the relevance of executive functions in academic production in middle school by promoting instruction in executive functions and the self-regulation processes and strategies during the critical transitional stage of early adolescence. As noted by Desmond and Hanich (2014), "this developmental stage has the potential of maintaining and improving school academic and behavioral outcomes and potentially, the resilience of early adolescents as they continue to high school" (p. 11). From this study, potentially, there are educational implications with regard to closing the achievement gap for

adolescents in poverty, particularly, as represented in current research, special populations enrolled in urban high schools from diverse, impoverished, multi-cultural backgrounds. In the study conducted in an urban middle school by Desmond and Hanich (2014), "90% of students in our sample come from homes that fall below the national poverty level and 94% of the students are from Hispanic or African American backgrounds" (p. 11). In addition, this study will provide useful data for educators and instructors in urban middle schools that are engaged with and responsive to the executive functions development of early adolescents in poverty. Schools will utilize the data in the development of curricula for social-emotional learning, especially by recognizing the importance of executive functions development in pre-school and elementary school grades prior to the transition of students to middle school.

This research will employ a review of literature that expounds on executive functions skills development that marks the importance for middle school years of early adolescence. The emerging ideas in neuroscience illuminate the importance of neural integration and neuroplasticity which undergird the appreciation for the development of executive function skills necessary for academic production in the classroom. This research will shed light on the improvement of executive functions of early adolescents in poverty through school-based interventions on mindfulness awareness practices. The study's findings will hopefully highlight the impact of the mindfulness awareness program on the executive functions of students in the urban setting, specifically, the implications of executive functions and academic production.

Theoretical Foundation and Conceptual Framework

For the purposes of this study, Vygotsky's (1978) social-cognitive theory is supported by the four theoretical models presented in this study: Stuss and Benson's (1986) comprehensive behavioral/anatomical model of frontal lobe functioning, Miyake's (2000) hypothesis of unity and diversity, Barkley's (2001) evolutionary model, and McCloskey et al.'s (2009) holarchical model of executive. Given the connections between the ideas of these theorists in relation to executive functions, these four supporting theoretical frameworks were chosen to structure the discussion of early adolescents in poverty and the role of executive functions in the middle school setting. This social-cognitive theory is supported by these theoretical frameworks of executive functions, as the adolescents in this study face academic difficulties and social-emotional challenges of the middle school setting and school community, where executive functions are required for success in school. This social-cognitive theory (Vygotsky, 2004) relates to the research findings that show the association between learning and executive functions (Bobik, 2010; Hartman, 2012). The McCloskey Model of Executive Functions (MMEFs) will be employed as the conceptual framework of this study. The assessment method represented by the BRIEF is more consistent with the MMEF than the use of traditional individually administered non-referenced tests in that the BRIEF attempts to assess the use of executive functions in the context of all four of the arenas of involvement, whereas traditional norm-referenced tests only assess the use of executive functions within the symbol system arena of involvement (McCloskey & Perkins, 2012). The MMEFs will be explained in detail in Chapter II along with its relevance to the fifth research question.

The theoretical framework that informs this study is the social-cognitive theory as it relates to the early adolescents' brain development and underachievement/academic achievement/academic production. The social-cognitive theory that informs this study is supported by four relevant executive functions models. The theoretical framework is relevant to the critical period of the transitional year of sixth grade, which is the transitional year from elementary school for the students in the middle school which includes sixth, seventh, and eighth grades. The social and cultural components in middle school learning environments need to be incorporated as part of the efficacy of learning supports for children's learning by schools and teachers. The goal-oriented, self-directed learning, classroom tasks involving social interactions and team activities, are part of the learning contexts that require executive functions skills within the middle school community, particularly within classroom management settings.

The school setting abounds with social-cognitive processes that put stress on early adolescents. Middle school is replete with novel challenges and demands that students follow rules and meet high expectations. Therefore, "as early adolescents transition from elementary school to middle school, they often experience decreases in their self-esteem, motivation, and interest and attention to academic tasks" (Desmond & Hanich, 2014; Eccles, Lord, & Midgeley, 1989; Frederick & Eccles, 2002). The demands of these expectations from adolescents within a middle school learning community require executive functions skills. According to Vygotsky (1978), the acquisition of knowledge and social development of cognitive processes can be achieved through the social construct. Vygotsky believed that learning and knowledge are achieved within the social construct in that the context of social interactions, participation, and reciprocal interface

of individuals provide opportunities for them to acquire higher levels of understanding. Moreover, he believed that learning must be meaningful for the individual student. The relevance of executive functions skills development must be part of the awareness of schools, teachers, students, and parents. The myriad of competing forces of peer pressure and the academic demands of middle school, require executive functions skills as part of the early adolescent brain development. Early adolescents can be motivated to apply executive functions skills within the social and cognitive contexts of social classroom interactions through evidenced-based, school-based executive functions interventions imbedded in the curriculum for improving related learning skills (Desmond & Hanich, 2014). These contexts are potentially rich with meaningful interactions for learning at this stage of development and in preparation for high school.

Vygotsky's (1978) belief about learning and knowledge is supported by theoretical frameworks of executive functions that rely on brain research from the past two and half decades. Four theoretical frameworks of executive functions relevant to this study are Stuss' and Benson's "*comprehensive behavioral/anatomical model of frontal lobe functioning*" (1986), Miyake's hypothesis of "*unity and diversity*" (2000), Barkley's "*evolutionary model*" (2001), and McCloskey's "*holarchical model of executive*" (2009). Given the significant progress made on emerging ideas about the related cognitive processes of the brain, neuroscientists, psychologists, theorists, and educators have embraced the concept of executive functioning, the development of which requires creativity, flexibility, self-control and discipline, all of which are central to executive functions (Diamond & Lee, 2011). Executive functions are widely adopted by these researchers as a key term to describe a wide range of the self-regulation processes and

strategies on goal-directed activity and socially appropriate conduct of early adolescents. This considerable progress in research on the brain has led researchers to present evidence with regard to the genetic and environmental conditions that undergird the myriad changes experienced by the early adolescent and their impact on their behaviors (Anderson et al., 2004; Blakemore & Choudhury, 2006; Checa, Rodriguez-Bailon, & Rueda, 2008; Desmond & Hanich, 2014; Keating, 2004; Kuhn, 2006).

Research studies on the brain and neural correlates have attempted to postulate relationships between anatomical findings of the prefrontal-subcortical functions to executive functions (Barde & Thompson-Schill, 2002; Cummings, 1993; Rugg, Fletcher, Chua, & Dolan, 1999; Volz, Schubotz, & von Cramon, 2006). Nevertheless, "Stuss and Alexander (2000) emphasized that it would be misleading to attribute specific executive function difficulties to particular parts of the brain" (Bobik, 2008). In this vein, Stuss and Alexander (2000) noted, "there is no unitary executive function. Rather, distinct processes related to the frontal lobes can be differentiated which converge on a general concept of control functions" (p. 289).

The social-cognitive theory expounded by Vygotsky's (1978) belief about learning and knowledge is supported by the first theoretical framework of executive functions presented for this study, formulated by Stuss and Benson (1986), since executive functions include behaviors that are dynamically adaptable with social contexts and interactions of learning and meaningful exchange. They posited a comprehensive behavioral/anatomical model of frontal lobe functioning, whereby the prefrontal cortex, is the biological base for executive functions. Stuss and Benson (1986) conceptualized frontal lobe functioning as hierarchical and increasingly more abstract in nature. Their

overarching view is that “the executive functions remain among the most significant of human frontal lobe accomplishments” (p. 205). Furthermore, they posited that executive functions are interrelated with other brain functions and appear to play a superordinate role in relation to the posterior functional systems of the brain.

Stuss and Benson (1986) proposed that the brain is an integrated unit composed of separate, organized, yet interrelated functional systems that include among others, memory, language, sensory-motor functions, attention, emotion and cognitive abilities. These functional systems are posterior to the prefrontal cortex with reciprocal connections to the frontal lobes. The prefrontal cortex assumes a supervisory, executive role over these posterior systems.

As described by Bobik (2008) Stuss and Benson’s “comprehensive behavioral/anatomical model of frontal lobe functioning” (1986), are purposefully anatomical and correlated to behavior “frontal control exerts influence on systems of language, memory, and cognition during higher mental activities that require novel responses. Once activities become routine or overlearned, other brain regions replace frontal involvement” (p. 16).

As pointed out earlier, Stuss and Alexander believe there is no unitary executive function. Rather, their view is that “distinct processes related to the frontal lobes can be differentiated, which converge on a general concept of control functions” (p. 289). The logical point of the view is sustained by Miyake’s unity and diversity theory (2000), which is the second theoretical framework of executive functions presented for this study. In this model, Miyake identified inhibition, information updating, monitoring (working memory) and shifting to be specific, and yet integrated entities as assessed on various

tasks of executive function. The hypothesis of Miyake's study was supported by the results of his study, which suggested that EF be considered both as unitary and as a diverse construct whereby analysis of performance on tasks be viewed in the context of EF organization and roles based upon the task (Desmond & Hanich, 2014).

The third theoretical framework of executive functions presented for this study is Barkley's evolutionary model (2001), which postulates that self-control is the main purpose of self-regulation and inhibition. Self-control requires one to act in opposition to one's own immediate impulses and self-interest in order to achieve a future goal. Self-directed and intentional behaviors used in self-regulation are overseen by executive. According to this model, when the intention of a future goal is effectively regulated by executive functions, a temporal delay occurs during which the consequences of alternative responses are weighed in terms of risk/benefit ratios. Barkley links behavioral inhibition to four specific executive functions: (a) nonverbal working memory; (b) verbal working memory; (c) self-regulation of affect/motivation/arousal, and (d) reconstitution. "These components represent covert forms of behavior relative to the self that allows one to test, mentally, the possible consequences before engaging in a response, thereby facilitating adaptive functioning" (Bobik, 2008, p. 16; Hartman, 2012, p. 12).

Furthermore, Barkley's models describe nonverbal working memory as consisting of visual imagery and covert audition (covert seeing and hearing represented to the self), providing mental representations of possible future events. He defines verbal working memory as the covert self-directed speech that forms the basis of such activity as reflection, self-instruction, self-questioning, and problem-solving; self-regulation of affect/motivation/arousal comprises the associated affective and motivational properties

resulting from the first two executive functions. Barkley conceptualizes self-regulation as the source of one's intrinsic motivation to achieve a future goal and considers that *reconstitution* provides analysis and synthesis of behavioral units. Divided into smaller sequences (analysis) are familiar behavioral patterns, and new behavioral patterns are created by recombining units (synthesis) in novel ways. Generating new solutions when confronted with obstacles in goal attainment facilitates successful outcomes. The facilitation of successful outcomes is possible through generating new solutions when confronted with obstacles in goal attainment. Reconstitution is also known as fluency, flexibility, and generativity in the neuropsychological literature (Barkley, 2001; Bobik, 2008; Hartman, 2012).

The fourth theoretical framework of executive functions presented for this study is McCloskey's holarchical model of executive (2009). In this model, he posits that within the conceptual understanding of executive functioning are the varied levels of engagement that an individual may experience in relation to executive functions. These levels of engagement will be discussed in greater detail in the literature review. According to McCloskey et al. (2009), executive functions are responsible for directing four domains of functioning which include action, cognition, perception, and emotion. The researchers postulate that action is the executive control of modes of output including behavior in the external world and storage and retrieval of internal representations; cognition is the executive control of thoughts and thought processing; perception is the executive control of modes of perceptual input including external sensory stimuli (visual, auditory, kinesthetic) and internal (representational) stimuli, and emotion is the executive control of moods, feelings, and the processing of emotions. In

addition, a conceptual understanding of the use of these functions in various arenas is presented, specifically with the view that, dependent on the arena, the four arenas where the engagement and use of these self-regulatory functions can vary. These arenas, which be presented in greater detail in the literature review in Chapter II, include: intrapersonal, or the ability to control one's own internal states; interpersonal, or one's control in relation to interaction with others; environmental, or one's interaction with the environment; and the symbol system arena, or the ability to utilize the culturally derived symbol system used to process and share information (i.e., reading and writing) (McCloskey et al., 2009). According to this model, "executive functions comprise many different capacities that operate on numerous levels across independent developmental lines (Bobik, 2008, p. 16; Hartman, 2012, p. 12).

By incorporating the social-cognitive theory as it relates to knowledge acquisitions (Vygotsky, 1978) and these four theoretical frameworks a clear path for the conceptual understanding of executive functioning is made in early adolescents can apply EF skills in the real life experiences of the classroom learning and school community, as well as at home (McCloskey et al., 2009).

Since this study will use shelf-data to analyze a study conducted in an urban middle school that served predominantly adolescents in poverty, the lens of the social-cognitive theory support the MMEFs, which is the fifth analytical question of this study. The theoretical underpinning of this study is supported by the MMEFs, and therefore, will highlight the importance of research that seeks to ameliorate and revise the historically guiding perspectives of the intelligence quotient (IQ) score and how it is associated with successful and unsuccessful students. A goal of this study is to shift the

paradigm to a new perspective and conceptual frame work, in which executive functions, school-based mindfulness awareness practices, and the prototype perspective serve as a lens to remediate deficits in executive functions, albeit the overriding focus on IQ and IEP goals for students with learning disabilities. The conceptual framework of executive functions, school-based mindfulness awareness practices, and the prototype perspective postures this study. In light of the middle school experience, many adolescents are bound to face the overarching demands that require self-directed and goal-oriented behavior, and an academic learning environment in which executive functions are fundamental in acquiring academic competence (Blair, 2002; Bobik, 2008; Desmond & Hanich, 2014; Hartman, 2012; McCloskey et al., 2009).

Summary of the Methodology

The methodology used by the principal investigators involved a quasi-experimental design that utilized quantitative methodologies. Repeated measures analysis of variance (RMANOVA) and multiple regression analyses were the primary data analytic procedures (Desmond & Hanich, 2014).

The proposed study is a sub-set of an original study by Desmond and Hanich (2014). This secondary analysis of an existing data set that will utilize shelf-data to examine teacher ratings on the Behavior Rating Inventory of Executive Functions (BRIEF) at the item level for students included in a study of the effectiveness of a mindfulness program used with middle school students. Students in the study were divided into control and intervention groups. Each student was rated by a classroom teacher at Time 1 prior to the start of the mindfulness program instruction with the intervention group, and at Time 2 after the end of the mindfulness program instruction

with the intervention group. The students in the control group were rated by their teachers at Time 1 and Time 2, but were not exposed to the mindfulness program. Students in the intervention group participated in varying numbers of mindfulness instruction sessions shortly after being rated at Time 1. The students were rated again at Time 2 shortly after the end of the mindfulness program instruction. For the purposes of this study, only the students in the intervention group that participated in six or more mindfulness program sessions will be included in the intervention group.

Archival study data (Desmond & Hanich, 2014) will be retrieved from the data files of the principal investigators of the original mindfulness program study. The BRIEF individual item ratings from the original BRIEF forms, along with the demographic data variables (listed in Table 1), will be entered into an Excel file and later converted to an SPSS file for analyses. There will be no contact between the student researcher and the students or teachers who participated in the original study. It is hoped that undertaking an analysis at the item level will provide new and different interpretations and to draw new conclusions, given the unique population of at risk-students and limitations of the sample size.

Delimitation of the Study

A delimitation of this study is the low sample size from the data from the principal investigator (Desmond & Hanich, 2014) that will be analyzed for this study. The research was completed with findings generated from a study on "The effects of a Mindfulness Awareness Program on the Executive Functions of Early Adolescent in an Urban Middle School," which used a quasi-experimental design utilizing quantitative methodologies. Repeated measures analysis of variance (RMANOVA) and multiple

regression analyses were the primary data analytic procedures utilized in the study. The current study will examine this study at the item level for the same target population within the randomized sample. The targeted population will be equally addressed in this study, and how an item analysis will be conducted will highlight the delimitations inherent in the shelf data. The number of the participants and the demographic were already established and analyzed, and was made available to the researcher by the principal investigators as shelf data.

The delimitations remain within the constraints of the shelf data as noted by Desmond and Hanich (2014), as follows:

> Participants in the study included 52 sixth grade students, between 11 and 12 years of age in an urban middle school in its sixth year of Corrective Action II under the regulations of the No Child Left Behind Act in a mid-sized city in Pennsylvania (Pennsylvania Department of Education, 2012). The school is one of four middle schools in a central Pennsylvania school district of approximately 11,000 students of which 75% fall below the national poverty level. Of the approximately 550 students in the middle school, approximately 90% are economically disadvantaged; 73% are Hispanic; 20% African American; and 6% White; with the remaining 1% from other ethnic or racial groups. Within this population, approximately 24% of the children require special education services; approximately 30% are identified as English language learners; and approximately 7% are identified as homeless. Sixth grade is the transitional year from elementary school for the students in the middle school which includes sixth, seventh, and eighth grades (p. 8-9).

Limitations of the Study

This study will be limited to the small sample size, and bounded by the participants within the constraints of the shelf data of a completed study of early adolescents in an urban middle school. Nevertheless, the goal of the current study will be to add to the literature in the field concerning adolescents in poverty, as well as making the findings for future research on school-based interventions for improving the executive functions of early adolescents in urban middle schools. With optimism, it is hopeful that this study will contribute to the dearth of literature on mindfulness awareness programs and executive functions for adolescents in poverty, particularly in urban schools.

Caution must be used in generalizing to other school contexts, demographic groups, geographic regions, and other age groups.

Definition of Key Terms

Culturally and Linguistically Diverse (CLD) - This is a term used to describe individuals who come from a home, living environment, or culture where a language other than English is spoken (Baca & Cervantes, 2004).

Executive Functions (EF) - Researchers have identified three distinct but interrelated components of executive functions (Bierman et al., 2008) to include working memory, inhibitory control, and attention shifting or flexibility. In addition, three more complex executive functions skills pointed out by other researchers include problem-solving, reasoning, and planning (Diamond & Lee, 2011). Children's development of school readiness skills and academic achievement in later years is seen from the lens of understanding executive function as a construct that unites working memory, attention,

and inhibitory control for the purposes of planning and executing goal-oriented activity (Blair, 2002).

Desmond and Hanich (2014) state that executive functions "includes a variety of correlated but distinct skills such as attentional control, cognitive flexibility, self-regulation, inhibition, strategic planning, working memory, and impulse control that support learning, academic achievement, and behavioral competence" (p. 3). There are ample definitions of executive functions, and some researchers seek to find an umbrella definition. For example, Waber, Gerber, Turcios, Wagner, and Forbes (2006) identified a common feature of EF as the *top-down* executive system, enabling regulatory control over thought and actions in contrast to the *bottom-up* motivational and emotional responses to situations of risk and reward. According to Desmond and Hanich (2014), "this contrast of skills is especially relevant to early adolescents who are less risk-averse, more driven by rewards and are easily influenced by peers and who can experience and manifest a wide range of emotional states" (p. 3).

English Language Learner (ELL) - This refers to students whose first language is not English, and encompasses both students who are just beginning to learn English (often referred to in federal legislation as Limited English Proficient or LEP) and those who have already developed considerable proficiency but are in the midst of the English acquisition process (The George Washington University Center for Excellence and Equity in Education, 2012).

Individualized Education Plan (IEP) - refers to a written education plan developed, reviewed, and revised annually for any student with a disability receiving special education services [IDEA 2004, Federal Statute, Section 614(d)(1)(a)(1). An IEP serves

as a written plan of academic and/or emotional supports for individuals with disabilities. An IEP is developed by a multi-disciplinary team and describes the educational program and all the components deemed necessary as part of a design to meet the unique needs of each individual student receiving special education services or related services as required by IDEA.

Inclusion Setting - Inclusion setting refers to "the maximum integration of students with disabilities into general classrooms or the increase in numbers and proportions of students who receive special education services while attending general education classes" (Kochhar, West, & Taymans, 2004, p. 14).

Mindfulness - Bishop et al., (2004) define mindfulness as a process of regulating attention in order to bring a quality of nonelaborative awareness to current experience and a quality of relating to one's experience within an orientation of curiosity, experiential openness, and acceptance. Mindfulness is a process of gaining insight into the nature of one's mind. Taylor (2008) provides in contrast to the definitions, a neurobiological understanding of mindfulness from the point of "deep inner peace" that informs our attention connection to an inner reality, to an inner neurological circuitry. She posits that, "our perception of the external world, and our relationship to it, is a product of our neurological circuitry" (Taylor, 2006, p. 12). She further states that the ecosystem of the life of cells evolved "as a bridge across time," owing to their ability to interact and communicate by "interweaving a continuum of sequential moments, into a common thread" (Taylor, 2006, p. 12). The practice of mindfulness is a cultivation of being present in the moment. Our ability to take "new pictures" of the present moment is a result of the maturity of our higher cortisol cells, which become more integrated in

complex networks with other neurons " (Taylor, 2006, p. 18). An overview of "mindfulness" and its relevance to academic settings is also discussed.

Self-Regulation - Proponents of social-cognitive theories of self-regulation generally define self-regulation as those processes and skills that a learner proactively employs to direct his/her behaviors to achieve self-set goals and subsequently, relies on the affective, cognitive, motivational, and behavioral feedback to adjust their strategies and behaviors when unable to initially attain their goals (Desmond & Hanich, 2014; Zimmerman, 1989). When students apply self-regulation skills to academic tasks, they "incorporate self-regulation processes including goal setting, self-observation and self-evaluation with task strategies such as attention, initiation, organization, study behaviors, and time-management" (Desmond & Hanich, 2014).

Students with Learning Disabilities - For the purposes of this study, a student with disabilities is defined as a student who experiences "deficits in one or more of the several domains of academic achievement, including reading disabilities, mathematics disabilities, and disabilities in written expression" (Fletcher, Lyon, Fuchs, & Barnes, 2007, p. 26). These students are usually identified as having a disability through an eligibility process, and thus, required to receive special education services as required by the Individuals with Disabilities Education Act (IDEA). According to the Individuals with Disabilities Education Improvement Act of 2004 (IDEIA), a student with a disability is a child diagnosed "with intellectual disabilities, hearing impairments (including deafness and speech or language impairments, visual impairments, (including blindness), serious emotional disturbance, orthopedic impairments, autism, traumatic brain injury (TBI), other health impairments, or specific learning disabilities." A student identified as

a special education student typically receives explicit instructions responsive to the student's unique and individual academic needs. A student with learning and/or behavioral problems has displayed evidence of poor academic performance, and is identified with challenges and lacks the ability to perform at grade level in one or more academic areas (Vaughn & Bros, 2009). A student with a disability experiences "deficits in one or more domains of academic achievement, including reading disabilities, mathematics disabilities, and disabilities in written expression" (Fletcher et al., 2007, p. 26). A student with behavioral problems may display evidence of attention issues, hyperactivity, depression, aggressive behavior, withdrawn behavior or inconsistent patterns of behavior (Vaughn & Bros, 2009); as expressive of these deficits may also be reflected in memory problems, poor language abilities, and poor executive functioning skills.

Conclusion

Public schools in the United States are havens with immense opportunities for school-based interventions to support the academic success and social-emotional wellbeing of early adolescents. School-based interventions create opportunities to decrease the chances for at-risk students to experience failure in school, rather than success. For many of these at-risk adolescents with learning disabilities, the academic skill sets required to master the curriculum, coupled with the failure of schools to provide relevant executive functions training for teachers and students' development of these skills, contribute to the reality of falling short on the *producing* end (Denckla, 2002; Hartman, 2012). Such failure from schools is a critical issue that is detrimental to early

adolescents, and consequently if not addressed, proves to negatively affect educational outcomes of students.

The current study will highlight the importance of executive functions development for early adolescents during a critical period–the transitional year of sixth grade, which is the transitional year from elementary school for the students in the middle school, which includes sixth, seventh, and eighth grades. Utilizing shelf-data, the study will examine teacher ratings on the Behavior Rating Inventory of Executive Functions (BRIEF) at the item level for students included in a study of the effectiveness of a mindfulness program used with middle school students. The social and cultural components in middle school learning environments need to be incorporated as part of the efficacy of learning supports for children's learning by schools and teachers. The goal-oriented, self-directed learning, classroom tasks involving social interactions and team activities, are part of the learning contexts that require executive functions skills within the middle school community, particularly within classroom management settings.

The theoretical and conceptual framework for this proposed study recognizes the demographically rendered population that are often at-risk for failure, namely, adolescents in poverty, for whom, the disparities of executive functions developmental progression, lend the opportunity for interventions and systematic instruction designed to ameliorate and accommodate their academically unsuccessful categorization (i.e., dealing with problem solving, lack of organization, and poor self-monitoring, etc.) (Hartman, 2012, p. 132). The failure of schools to address executive functions deficits of students who demonstrate low academic performance and underachievement and the perception of their lack of capacity to produce highlights the relevance of this study. The attempt of this

study is to promote better educational outcomes for urban middle school students in poverty, through school-based interventions, for example, MAPs.

The association between learning and executive functions and the need to increase teachers' awareness of this association (Bobik, 2008), undergirds the theoretical lens of this study, which will lend support to the promotion of interventions that incorporate mindfulness awareness programs (Desmond & Hanich, 2014). Along these lines, this study will potentially support school districts' efforts to emphasize teacher professional development with training in executive functions skills. This would translate into curriculum that is sensitive to the specific needs and trends of early adolescents, whose developmental trajectory, progression, and cultivation of executive functions skills are necessary for the demands of middle school (Bobik, 2010; Hartman, 2012).

Summary of Chapter I

In this chapter, the researcher introduced the study, stated the problem, and addressed ideas about the problem, the purpose of the study, research questions, and the potential significance of the study. The researcher presented the theoretical foundation, a summary of the methodology, delimitations, limitations, and definitions of key terms. In the next chapter, the researcher will address the context, review of the literature, analysis and synthesis across studies, theoretical framework, and inferences for the forthcoming study.

Chapter II: Literature Review

Literature Review Introduction: Methods, Topic, and Purposes

This study explores the field through a review of literature on executive functions and related searches. A systematic literature search was utilized to explore research related to the study published within the past 20 years, in addition to seminal literature from earlier years. The researcher's efforts to uncover current empirical findings on the subject matter entailed focusing on choosing the most recent period to the present. Online searches of 59 education-related databases were conducted to find pertinent research and literature responsive to the research topics discussed in Chapter I (e.g., executive functions, self-regulation, and academic achievement. Academic electronic databases, such as ArticlePlus, PubMed, Medline, Scopus, and Google Scholar, were the main databases used for relevant literature. Other databases used included Education Resource Information Center (ERIC), Education Abstracts, Academic Search Premier, Aladin, Psychological Abstracts (PsychINFO), and ProQuest Research Library Plus and Dissertations and Theses database. Over 5,000 reference journals were available in the searches on these databases. The journals in which the articles were chosen for this review included: Child Development, Development and Psychology, Developmental Science, Early Childhood Research Quarterly, International Journal of Early Years Education, Journal of Experimental Child Psychology, American Association for the Development of Science, American Psychologist, Neuropsychology Review, Development and Psychopathology, The Journal of Primary Prevention, and Annals New York Academy of Science.

PubMed and Scopus databases were the first used to conduct searches on research studies on executive functions, using the key terms: executive functions and academic production, mindfulness programs and brain development, executive functions and mindfulness, executive functions and early adolescents, executive functions and neuroplasticity, attributes of executive functioning, self-regulation skills and poverty, executive functions skills, urban middle school students and executive functions, mindfulness awareness programs and executive functions skills, executive functions and low socio-economic status, executive functions assessment, and self-regulation assessment. These terms indicated that the participants in the study were within the primary grade age group to middle school, including early adolescents as the primary focus.

Using the ProQuest Dissertation and Theses database, a separate search was conducted using these terms; this search yielded 23 articles. Out of the 23 articles, five were already included in the initial body of literature. In an effort to identify related and pertinent literature, the researcher employed citation chasing to mine the reference sections reviewed, and through this process, yielded 35 additional pertinent articles. Of the search terms listed above, five were not usable due to the eligible criteria.

Research Study Selection

A variety of databases were explored and yielded research on executive functions and self-regulation. However, research was scarce on executive functions related to poverty in early adolescents. The search on executive functions yielded 90 searches when combined with self-regulation. Twenty five of the chosen articles revealed a meaningful purpose for the topics. Inclusion of the studies was determined when the studies met the

following criteria: peer-reviewed, relevance, rigor, scholarship and quality, and date of the publication. Some studies were not chosen even though they had interesting ideas and elements, but were not specifically relevant to the purpose of the study.

Three primary criteria employed in the online searches were: (a) the publication of the articles must have been within the past 20 years (unless there was a pertinent seminal research article published at an earlier year), (b) the articles must have been published in peer-reviewed journals, and (c) the studies must have included early adolescents or a related research for the target population. Of the 137 articles yielded from the search, 35 studies focused on executive functions and academic production, and only 20 of these were eligible for this review.

One strength of the research is that there are clear definitions of executive functions in the studies chosen. The discussions are consistent with the target population in the early adolescent years with regard to the attributes of executive functions that contribute to the development of self-regulation skills. An additional strength of the research is that the importance of executive functions for academic success for students is highlighted in all the articles. Some of the articles make an attempt to connect learning and executive functions. The third strength is that a case is made for improving teacher training to support the growing need to promote the literacy success and social-emotional development of all students.

The weaknesses, however, of the studies are apparent. First, the assessment used in some studies appears to lack generalizability. Second, no studies investigated individual differences in self-regulation, despite the growing interest in self-regulation for direct relevance to school success. There is a gap in the research about individual

differences in self-regulation and their connection to individual differences to functional outcomes, such as adjustment to school (Blair, 2002). Understanding children's inherent individual differences and unique responses to school functioning is important in preparing them for school readiness skills.

The present study will use shelf-data to examine teacher ratings on the Behavior Rating Inventory of Executive Functions (BRIEF) at the item level for early adolescents included in a study of the effectiveness of a mindfulness program used with urban middle school students.

Theoretical Framework

The theoretical framework for this study is comprised of a set of interrelated constructs that provide a perspective or a *lens* through which the research problem is viewed and through which the choices about the research will be made. The theoretical framework that informs this study is social-cognitive theory as it relates to the early adolescents' brain development and underachievement, academic achievement, and academic production, in addition to being supported by executive functions models. The theoretical framework is relevant to the critical period of the transitional year of sixth grade, which is the transitional year from elementary school for the students in the middle school which includes sixth, seventh, and eighth grades. The social and cultural components in middle school learning environments needs to be incorporated as part of the efficacy of learning supports for children's learning by schools and teachers. The goal-oriented, self-directed learning, classroom tasks involving social interactions and team activities, are part of the learning contexts that require executive functions skills within the middle school community, particularly within classroom management settings.

The school setting abounds with novel challenges and demands that students follow rules and meet high expectations. Therefore, "as early adolescents transition from elementary school to middle school, they often experience decreases in their self-esteem, motivation, and interest and attention to academic tasks" (Desmond & Hanich, 2014; Eccles et al., 1989; Frederick & Eccles, 2002). The demands of these expectations from adolescents within a middle school learning community require executive functions skills. According to Vygotsky (1978), the acquisition of knowledge and social development of cognitive processes can be achieved through the social context. Vygotsky believed that learning and knowledge are achieved within the social construct in that the context of social interactions, participation, and reciprocal interface of individuals provides opportunities for them to acquire higher levels of understanding. Moreover, he believed that learning must be meaningful for the individual student. The relevance of EF skills development must be part of the awareness of schools, teachers, students, and parents. The myriad of competing forces of peer pressure and the academic demands of middle school requires EF skills as part of early adolescent brain development. Early adolescents can be motivated to apply EF skills within the social and cognitive contexts of social classroom interactions through evidenced-based, school-based EF interventions imbedded in the curriculum for improving related learning skills (Desmond & Hanich, 2014).

Vygotsky's (1978) belief about learning and knowledge is supported by theoretical frameworks of executive functions that rely on brain research from the past two and half decades. Four theoretical frameworks of executive functions relevant to this study are Stuss and Benson's (1986) comprehensive behavioral/anatomical model of

frontal lobe functioning, Miyake's (2000) hypothesis of unity and diversity, Barkley's (2001) evolutionary model, and McCloskey's (2009) holarchical model of executive functions. According to this model, executive functions comprise many different capacities that operate on numerous levels across independent developmental lines. These levels include: (a) self-activation, (b) self-regulation, (c) self-realization and self-determination, (d) self-generation, and (e) trans-self-integration. At the lowest level, self-activation relates to basic executive functions that initiates the "awakening of the mind." At the next level, self-regulation refers to a set of processes that cue the use of other mental capacities to direct and control perceptions, thoughts, actions, and emotions. There are a total of 33 self-regulation executive functions that include: perceive, sustain, organize, manipulate, retrieve, monitor, as well as others. These 33 self-regulation capacities serve to mobilize and direct other mental processes to act flexibly and successfully toward the accomplishment of a task when responding to new demands or situations. At the next level, self-realization and self-determination represent increasingly more abstract conceptualization of executive functions. Self-realization refers to self-awareness and self-analysis. Self-determination executive functions cue the use of other cognitive processes to visualize the future and to formulate plans for goal-directed behavior. At the next higher level, self-generation executive functions provide the cues to direct the generation of a philosophy of life that serves as guidance in the realization of intentional behavior. At the highest level, trans-self-integration executive functions assume a spiritual quality. According to McCloskey et al. (2009), "it directs the engagement of mental processes that enable realization and experiencing of a trans-self state of ultimate or unity consciousness" (Bobik, 2008, p. 18). Given the significant

progress made on emerging ideas about related cognitive processes of the brain, neuroscientists, psychologists and educators have used the concept of executive functions as a key term to describe many of the self-regulation processes and strategies on goal-directed activity and socially appropriate conduct of early adolescents. These executive functions concepts have also presented evidence as to the genetic and environmental conditions that undergird the wide-range of changes experienced by the early adolescent and their impact on their behaviors (Anderson et al., 2004; Blakemore & Choudhury, 2006; Checa et al., 2008; Desmond & Hanich, 2014; Keating, 2004; Kuhn, 2006).

Research studies on the brain and neural correlates have attempted to postulate relationships between anatomical findings of the prefrontal-subcortical functions to executive functions (Barde & Thompson-Schill, 2002; Cummings, 1993; Rugg et al., 1999; Volz et al., 2006). Nevertheless, "Stuss and Alexander (2000) emphasized that it would be misleading to attribute specific executive function difficulties to particular parts of the brain" (Bobik, 2008, p. 12). In this vein, Stuss and Alexander (2000) noted "there is no unitary executive function. Rather, distinct processes related to the frontal lobes can be differentiated which converge on a general concept of control functions" (p. 289).

The social-cognitive theory expounded by Vygotsky's (1978) belief about learning and knowledge is supported by the first theoretical framework of executive functions presented earlier for this study, formulated by Stuss and Benson (1986). This model highlights the neural correlates of executive functions, and is relevant to the current study since executive functions include behaviors that are dynamically adaptable with social contexts and interactions of learning and meaningful exchange. Stuss and Benson (1986) posited a comprehensive behavioral/anatomical model of frontal lobe

functioning, whereby the prefrontal cortex is the biological base for executive functions. Stuss and Benson (1986) conceptualized frontal lobe functioning as hierarchical and increasingly more abstract in nature. Their overarching view is that "the executive functions remain among the most significant of human frontal lobe accomplishments" (p. 205). Furthermore, they posited that executive functions are interrelated with other brain functions, and appear to play a superordinate role in relation to the posterior functional systems of the brain.

Stuss and Benson (1986) proposed that the brain is an integrated unit composed of separate, organized, yet interrelated functional systems that include among others, memory, language, sensory-motor functions, attention, emotion and cognitive abilities. These functional systems are posterior to the prefrontal cortex with reciprocal connections to the frontal lobes. The prefrontal cortex assumes a supervisory, executive role over these posterior systems.

As described by Bobik (2008), Stuss and Benson's (1986) "comprehensive behavioral/anatomical model of frontal lobe functioning" are purposefully anatomical and correlated to behavior:

> Parallel and superordinate to these posterior systems are two anterior systems that regulate behavioral control functions. These anterior systems involve:
> 1) sequencing, set development, and information integration; and 2) drive, motivation, and will. Higher mental activities depend on the ability to maintain and organize units of information in sequence; to identify relevant information and form new sets of sequences; and to integrate data from sets of information to form new knowledge. The processing and integration of sequential information

require intact lateral frontal structures. Drive, motivation, and will comprise the other group of behavior control functions linked to prefrontal regions. These are systems related to medial frontal structures. Drive is seen as an energizing force. Motivation and will are associated with drive, but reflect a higher degree of mental control over basic instincts.

Within the hierarchy, muscle control represents the lowest level, progressing to superordinate levels of frontal lobe functioning, represented as the 'executive controller.' The executive controller acts as the 'internal programmer' or 'decision-maker' for the establishment and attainment of internally motivated goals. According to Benson and Stuss, executive functions include anticipation, goal-selection, planning, monitoring, and use of feedback. These levels of control are conceptually viewed as independent, yet interactive and increasingly more abstract. They become activated during novel non-routine activities where situations require new solutions or when initial learning is taking place. Frontal control exerts influence on systems of language, memory, and cognition during higher mental activities that require novel responses. Once activities become routine or overlearned, other brain regions replace frontal involvement (Stuss & Benson, 1986, p. 16).

As pointed out earlier, Stuss and Alexander (2000) believe that there is no unitary executive function. Rather, their view is that "distinct processes related to the frontal lobes can be differentiated which converge on a general concept of control functions" (p. 289). The logical point of view of this apparent diversity or "distinct processes" is

sustained by Miyake's (2000) unity and diversity theory, albeit their inherent integration according to Miyake.

The second theoretical framework of executive functions presented for this study is that proposed by Miyake (2000), who posits a unity and diversity hypothesis. In this model, Miyake identified inhibition, information updating, monitoring (working memory) and shifting to be specific, and yet integrated entities as assessed on various tasks of executive function. The hypothesis of Miyake's study was supported by the results of his study which suggested that EF be considered both as a unitary and as a diverse construct, whereby analysis of performance on tasks be viewed in the context of EF organization and roles based upon the task (Desmond & Hanich, 2014).

The third theoretical framework of executive functions presented for this study is Barkley's evolutionary model (2001). He presents an evolutionary model for understanding executive functions. In this model, self-control is the main purpose of self-regulation and inhibition. Self-control requires one to act in opposition to one's own immediate impulses and self-interest in order to achieve a future goal. Self-directed and intentional behaviors used in self-regulation are overseen by the executive functions. According to this model, when the intention of a future goal is effectively regulated by executive functions, a temporal delay occurs during which the consequences of alternative responses are weighed in terms of risk/benefit ratios. Barkley (2001) links behavioral inhibition to four specific executive functions: (a) nonverbal working memory, (b) verbal working memory, (c) self-regulation of affect/motivation/arousal, and (d) reconstitution. "These components represent covert forms of behavior relative to the

self that allows one to test mentally, the possible consequences before engaging in a response, thereby facilitating adaptive functioning" Hartman, 2012, p. 12).

Furthermore, Barkley's (2001) models describes nonverbal working memory as consisting of visual imagery and covert audition (covert seeing and hearing represented to the self), providing mental representations of possible future events. He defines verbal working memory as the covert, self-directed speech that forms the basis of such activity as reflection, self-instruction, self-questioning, and problem-solving; self-regulation of affect/motivation/arousal comprises the associated affective and motivational properties resulting from the first two executive functions. Barkley (2001) conceptualizes self-regulation as the source of one's intrinsic motivation to achieve a future goal, and considers that reconstitution provides analysis and synthesis of behavioral units. Divided into smaller sequences (analysis) are familiar behavioral patterns. New behavioral patterns are created by recombining units (synthesis) in novel ways. Generating new solutions when confronted with obstacles in goal attainment facilitates successful outcomes. The facilitation of successful outcomes is possible through generating new solutions when confronted with obstacles in goal attainment. Reconstitution is also known as fluency, flexibility, and generativity in the neuropsychological literature (Barkley, 2001; Bobik, 2008; Hartman, 2012).

The fourth theoretical framework of executive functions presented for this study is McCloskey's Holarchical Model of Executive Functions (McCloskey et al., 2009). In this model, McCloskey posits that within the conceptual understanding of executive functioning, there are varied levels of engagement that an individual may experience in relation to executive functions. This model is presented in greater detail in the conceptual

framework for the forthcoming section. According to McCloskey, Perkins, and Van Diviner (2009), executive functions are responsible for directing four domains of functioning which include: action, cognition, perception, and emotion. These researchers postulate that *action* is the executive control of modes of output including behavior in the external world and storage and retrieval of internal representations. *Cognition* is the executive control of thoughts and thought processing. *Perception* is the executive control of modes of perceptual input including external sensory stimuli (visual, auditory, kinesthetic) and internal (representational) stimuli. *Emotion* is the executive control of moods, feelings, and the processing of emotions. In addition, a conceptual understanding of the use of these functions in various arenas is presented. Specifically, with the view that dependent on the arena, there are four arenas where the engagement and use of these self-regulatory functions can very. These arenas, which will be presented in greater detail in the literature review in Chapter II, include: *intrapersonal*, or the ability to control one's own internal states; *interpersonal*, or one's control in relation to interaction with others; *environmental*, or one's interaction with the environment; and the *symbol system arena*, or the ability to utilize the culturally derived symbol system used to process and share information (i.e., reading and writing) (McCloskey et al., 2009). According to this model, "executive functions comprise many different capacities that operate on numerous levels across independent developmental lines" (Hartman, 2012, p. 12). Individuals naturally have unique dispositions and exhibit different capacities according to one's internal state and interpretation.

Description and Critique of Scholarly Literature

The purpose of this literature review is six-fold. First, research on the conceptualization of the critical elements of executive functions and social neuroscience is presented. Second, the review presents research on executive functions in urban, low-income children. Third, the review presents a discussion on literacy skills and adolescents with disability. A fourth review presents research on academic achievement and executive functioning. Next, a fifth review focuses on research using BRIEF as an assessment tool. A final and sixth review is focused on research on items and analyses BRIEF.

Social Neuroscience and the Conceptualization of Executive Functions

For the purposes of this study, the critical elements of executive functions and their role in learning can be better explored through the perspective of social neuroscience. The understanding of executive functions and self-regulation is reasonably conceived through new understandings about the interconnectedness of neural processes. Self-regulation is a major component of executive functions, and the concept of executive functions is better understood through the perspective of social neuroscience, which is "vibrantly interdisciplinary" (Adolphs, 2010, p. 157). The concept of self-regulation is equally viewed from the interconnections of neural processes identified in neural imaging and brain structures that represent the executive functions.

Definition of Self-Regulation as a Component of Executive Functions

Several social-cognitive theories of self-regulation provide different definitions in their analysis (Bobik, 2008; Desmond & Hanich, 2014; Hartman, 2012; McCloskey et al., 2009). However, proponents, generally, define self-regulation as,

> The specific processes and skills that a learner proactively uses to direct his/her behaviors to achieve self-set goals and subsequently, depends on the affective, cognitive, motivational, and behavioral feedback to adjust their strategies and behaviors when unable to initially attain their goals. (Desmond & Hanich, 2014, p. 3)

Desmond and Hanich (2014) point out that, "applied to academic tasks, students incorporate self-regulation processes including goal setting, self-observation and self-evaluation with task strategies such as attention, initiation, organization, study behaviors, and time-management" (p. 3). The relationship between learning and executive functions has a logical point of discussion in their associations with learning environments, including social and biological associations.

Social Neuroscience and Critical Elements of Executive Functions

Social neuroscience is a subdiscipline that aims to understand "the associations and influences between social and biological levels" (Cacioppo & Decety, 2011, p. 163). Social neuroscience has flourished as a subdiscipline stemming from the emerging ideas in neuroscience, particularly, the increasing understanding about the "genes-environment interactions (Adolphs, 2010; Cacioppo & Decety, 2011; McEwen & Akil, 2011; SfN, 2012). The mapping of the human and animal genomes provides a framework for neuroscientists to identify "genes that regulate and control many complex behaviors" (SfN, 2012, p. 5).

> This single organ controls every aspect of our body, ranging from heart rate and sexual activity to emotion, learning, and memory . . . ultimately, it shapes our thoughts, hopes, dreams, and imaginations. It is the ability of the brain to perform

all of these functions that make us human. (Society for Neuroscience [SfN], 2012, p. 4)

In light of the growing research on the brain and its related cognitive processes within the past two and half decades, neuroscientists, psychologists, interdisciplinary researchers, and educators have employed the concept of executive functions as an umbrella term to describe many of the self-regulation processes and strategies on goal-directed activity and socially appropriate conduct of early adolescents. This research is supported by evidence with regard to the genetic and environmental conditions underlying the wide-range of changes experienced by the early adolescent and their effects on their behaviors (Adolphs, 2010; Anderson et al., 2004; Cacioppo & Decety, 2011; Checa et al., 2008; Desmond & Hanich, 2014; Keating, 2004; Kuhn, 2006; McEwen & Akil, 2011; Zelazo & Paus, 2010).

As stated earlier, according to Wolfe (2006), the brain, a pattern-finding organ, seeks to create meaning through establishing or refining existing neural networks. Wolfe points out that learning involves this process of meaning creation, and emotion affects what is learned and what is returned. Cognition, behavior, emotion, and self-regulation are key points of discussion that are naturally conceptualized with regard to the brain. As noted earlier, self-regulation processes include executive functions skills such as, goal setting, self-observation and self-evaluation with task strategies such as attention, initiation, organization, study behaviors, and time-management. These neural processes require complex interconnections and essentially linked by complex networks.

Cacioppo and Decety (2011) described the complexity of the linkages between complex behaviors and brain structures and functions by initially providing a list of several aspects of the self, followed by the naming of the associated brain structures:

> The self is, itself, a complex construct and has included manifold dimensions, including: the ecological self, the present self, the distant self, the experimental self, the prereflexive self, mental self, core self, minimal self, spatial self, emotional self, autobiographical self, and narrative self. An impressive number of neuroimaging studies and brain regions have associated the self, including the medial prefrontal cortex, vento- and dorsolateral- prefrontal cortex, lateral parietal cortex, bilateral temporal poles, insula and subcortical regions, such as brain stem, colliculi, and periaqueductal gray. (Cacioppo & Decety, 2011, pp. 167-168)

Kagan (2008) posits that cognitive, affective, and physiological processes are neurologically *cascades of processes*. Given the complex brain architecture and brain plasticity, domains are not distinct operational processes, but are rather interconnected and interrelated in their activations and processes owing to experiences (Wallace, 2011).

Recent research shows that neural networks remain plastic for much longer throughout the lifespan than previously understood (Immordino-Yang, 2007; Wallace, 2011; Zelazo & Paus, 2010). Plasticity is marked by the interconnectedness of neural processes that ensue throughout the lifespan across the domain of executive functions including mindfulness and learning, memory and recall, emotional and learning, language acquisition, numeracy, perceptions, emotion and socialization.

Recent findings in social neuroscience indicate that “no brain structures or subpopulation of neurons, operate in isolation” (Adolphs, 2010, p. 758). For example,

research studies have sought to relate anatomical findings of the prefrontal-subcortical functions to executive functions (Barde & Thompson-Schill, 2002; Cummings, 1993; Rugg et al., 1999; Volz et al., 2006). Given the complexity of brain structures and their complex connections, Stuss and Alexander (2000) emphasized that it would be misleading to attribute specific executive function difficulties to particular parts of the brain. According to Stuss and Alexander (2000), "there is no unitary executive function. Rather, distinct processes related to the frontal lobes can be differentiated which converge on a general concept of control functions" (p. 289). No one control function is activated or has a neural connection in isolation.

Similarly, Cacioppo and Decety (2011) emphasize that, "a target behavior at one level of organization can have multiple antecedents within and across levels of organization" (p. 166). Physiological, affective, and cognitive brain functions are activated through related neural processes. Immordino-Yang (2007) argues that real-life learning context and educationally relevant principles are rendered more speculative in light of failure to recognize the interconnections between cognition and emotion (OECD, 2007).

Social neuroscience is based on understanding the facets of development and influences of outside factors on an individual (Society for Neuroscience [SfN], 2012). The distinctions and interconnections among physiological, cognitive, and affective development are highlighted by recent theories on brain development (Fischer & Daley, 2007). Furthermore, it is established that the structures and functions of the brain are marked by continuous changes resulting in the development across cognitive, emotional, and physiological domains throughout the lifespan (Immordino-Yang, 2007). Previously

considered distinct functions of the brain, cognitive, affective, or physiological, have been revised as to their interconnectedness in functions and activation (Kagan, 2008; Organization for Economic Co-operation and Development (OECD), 2007).

Critical Elements of Executive Functions

The general domain functions of the brain, including the development across cognitive, emotional, and physiological domains throughout the lifespan, become more critical for an individual with respect to the social neuroscience perspective, in that executive function is readily viewed as an "umbrella" construct of central control processes (Bobik, 2010; Denckla, 2002, Diamond, 2002). This theoretical perspective conceives the executive function umbrella as including these processes: inhibition and delay of responding, planning, organization, maintenance of anticipatory set/preparedness to act, and integration of cognitive and output processes (Denckla, 2002). Furthermore, processes of the cortical areas that relate to the executive function domain include strategic encoding and retrieval of verbal and visuospatial information, working memory functions, directing and sustaining attention to novel situations, inhibiting attention to distraction, initiating goal-directed behaviors, and utilizing higher order organizational strategies (Bobik, 2010).

Several other smaller neuropsychological studies have associated executive functions with the frontal lobes of the brain (Bobik, 2008; Lezak, 1995; Miller & Cohen, 2001). Bobik notes that according to neurosychological theories on executive functions, the frontal lobes are anatomical structures that are involved with many higher thought and motor processes. According to these researchers, the prefrontal cortex (the foremost area of the frontal lobes) plays an important role in coordinating thought and actions in

accordance with internally motivated intentions or goals. Executive functions is viewed as an umbrella term for a set of psychological constructs that have been associated in a very general way to the prefrontal cortex, but the specific delineation of executive functions differs according to theoretical models and disciplines (Stuss & Knight, 2013; Barkley, 2001; Borkowski & Burke, 1999; Denckla, 2002; Lezak, 1995; Krasnegor, Lyon, & Goldman-Rakic, 1997; Stuss, 1992).

Several other smaller neuropsychological studies have associated the concept of executive functions as an umbrella term in accordance with evidence related to the genetic and environmental conditions underlying the vast array of developmental changes experienced by the early adolescent and their effects on their behaviors (Anderson et al., 2004; Blakemore & Choudhury, 2006; Checa et al., 2008; Desmond & Hanich, 2014; Keating, 2004; Kuhn, 2006). Desmond and Hanich (2014) note that executive functions includes "a variety of correlated but distinct skills such as attentional control, cognitive flexibility, self-regulation, inhibition, strategic planning, working memory, and impulse control that support learning, academic achievement, and behavioral competence" (p. 3).

Bobik (2010) notes that, from a neuropsychological perspective, executive functions were initially investigated with patients that suffered injury to their frontal lobes and exhibited behavioral and personality changes (Lezak, 1995). Lezak posits from these studies that varying kinds of executive dysfunction were associated with damage to the prefrontal regions of the brain as well as to subcortical, interconnected regions. Several other studies indicated in their findings that executive functions are mainly mediated by the prefrontal cortex of the brain and associated with descending neural systems (Goldman & Rosvold, 1970; Stuss & Benson, 1986). Other researchers have

found that the frontal lobe brain areas begin to develop during early childhood and continue to mature in adolescence, paralleling the emergence and continued development of executive functions (Levin et al., 1991; Welsh, Pennington, & Groisser, 1991).

The anatomical position of the frontal lobes, which appear as two fairly symmetrical lobes that can be each divided into three major areas: dorsal-lateral, medial, and basilar-orbital, locates them toward the front of the head above the Sylvian fissure (Bobik, 2010; Diamond, 2002). According to Bobik, using the Broadman area number system, Area 4 comprises the central gyrus, which is the primary motor area; Area 6 and the posterior part of Area 8 comprise the premotor area; Area 8 relates to the frontal eye fields; the remaining area is named the prefrontal cortex with further subdivisions into the basal-medial (Areas 9-13, 24, 32), dorsal-lateral (9, 10, 11, 12, 46, 47), mesial (9, 10, 11, 12), and orbital (10, 11, 12, 13, 14, 15, 47) regions. Additionally, there are connections between the frontal lobes and almost all regions of the brain, along with neural networks routed through subcortical areas convey auditory, visual, and somatosensory information to the frontal lobes. Parietal, temporal, olfactory, and occipital sensory areas connect directly to the frontal lobes. Stuss and Benson (1986) describe association cortices to have afferent connections to the frontal lobes, and contralateral connections allow communication between frontal lobe regions across the two hemispheres of the brain. Furthermore, 40 years ago, Nauta observed that the frontal lobes interconnect with the three limbic systems: the cortical limbic lobe, a subcortical system called the septo-hypothalamo-mesencephalic continuum, and a peripheral viseroendocrine system that is associated with mood and motivation (Nauta, 1971; Stuss & Benson, 1986; Stuss & Knight, 2013; Diamond, 2002). Connections between the brain stem and the prefrontal

cortex are linked to the regulation of arousal and tone (Luria, 1973). Given the normal development of the prefrontal cortex (Diamond, 2002), and as noted in early salient work, 40 years ago, Luria observed that,:

> The frontal lobes (and, in particular, their medial zones) constitute the cortical apparatus regulating the state of activity and they thus play a decisive role in the maintenance of one of the most important conditions of human conscious activity – the maintenance of the required cortical tone and modification of the state of waking in accordance with the subject's immediate tasks. (p. 197).

He further stated, "Maintenance of the optimal cortical tone is absolutely essential for the basic condition of all forms of conscious activity, mainly, the formation of plans and intentions that are stable enough to become dominant and to withstand any distracting or irrelevant stimulus" (p. 198).

Bobik (2010) provides the following additional description of the frontal lobe:

> Extending from the sensory region to the frontal lobe and are considered associative chains are afferent neural connections from the visual, auditory, and somatic sensory areas. Another conduction route involves the mediodorsal nucleus of the thalamus. Sensory information undergoes transformation along the transcortical route to the frontal lobe to produce an internal representational form of the external environment. The frontal cortex is connected by efferent pathways to other cortical structures, such as the anterior temporal cortex, inferior parietal lobe, cingulate and parahippocampal gyri and subcortical regions of the hypothalamus, associated mesencephalic tegmentum, ventral tegmental area,

> brain stem structures, striatum, subthalamic region, mesencephalic region and red nucleus. (p. 10)

According to Nauta (1971), "The unique feature of the neural circuitry is that it places the frontal cortex in a reciprocal relationship with two great functional realms, namely: (1) parietal, occipital and temporal regions of the cerebral cortex involved in the processing of visual, auditory, and somatic sensory information, and (2) the telencephalic limbic system and its subcortical correspondents, in particular, the hypothalamus and meso-and diencephalic structures associated with the hypothalamus" (p. 181). Nauta further stated that:

> The frontal lobe is characterized so distinctly by its multiple associations with the limbic system, and in particular by its direct connections with the hypothalamus, that it would seem justified to view the frontal cortex as the major – although not the only – neocortical representative of the limbic system. The reciprocity in the anatomical relationship suggests that the frontal cortex both monitors and modulates limbic mechanisms. (p. 182)

The frontal lobes' close associations with the limbic system and hypothalamus are seen as related to changes in an individual's affective and motivational responses to their surroundings following frontal lobe damage are thought (Nauta, 1971). Further description of this part of the brain shows five parallel circuits that link the frontal lobes with subcortical regions. According to Alexander and Stuss (2000) and Stuss and Knight (2013), each circuit involves a portion of the frontal lobe, projections to striatal regions, to globus pallidus, thalamus, and back to the frontal lobe. Two circuits relate to motor functions and three circuits, the dorsalateral, lateral orbital, and medial frontal/anterior

cingulate, relate to cognitive and affective abilities. It is believed that given their connections to other parts of the brain, the frontal lobes play an important role in executive function processes, personality, emotions, and self-awareness. Alexander and Stuss (2000) posit that disorders affecting frontal lobe functions have been characterized as behavioral problems, cognitive impairments, and motor deficits.

Disorders of Executive Functions

Brain injuries affecting prefrontal circuits have been associated to clinical syndromes (Bobik, 2010). Bobik points out that General executive function deficits have been observed with lesions to the dorsolateral prefrontal circuit (Cummings, 1993), and that,

> Specific executive function deficits such as disinhibition with lesions to the orbitofrontal circuit, apathy with lesions to the anterior cingulated circuit, and movement disorders to damage of the basal ganglia part of the circuitry. In addition, depression, mania, and obsessive-compulsive disorders have been associated with injury to frontal-subcortical circuits. (p. 12)

Bobik (2010) points out that impairment in executive skills have been observed in relation to a number of disorders (Denckla, 2002; Ozonoff & Jensen, 1999; Pennington & Ozonoff, 1996; Stuss & Alexander, 2000; Temple, 1997). Some examples of impairments in executive skills include Autism Spectrum Disorder, Attention Deficit Hyperactivity Disorder, traumatic brain injury (TBI). Other examples of impairments in executive skills may be related to specific learning disabilities (Denckla, 2002; Temple, 1997). Neuropsychological theories can inform practical intervention and biological research for disorders of executive functions in individuals with disabilities such as Autism Spectrum

Disorder (ASD) and ADHD (Wallace, 2011). Although the behavioral patterns in these disorders vary in severity and specificity, Bobik (2008) points out that,

> Some are more pervasive than others, such as autism, in which executive dysfunction can be observed across multiple areas, whereas other conditions may involve a few specific areas of impairment. However, even in autism, there is wide variability regarding the kinds of executive function impairments that are observed in each case. (p. 20)

Furthermore Ozonoff and Jensen (1999) found that different neurodevelopmental disorders may share the same underlying pattern. However, in-depth examination reveals unique executive functions profiles. This is particularly evident in autistic children who demonstrate severe dysfunction in the areas of flexibility and planning, in contrast to children diagnosed with ADHD, who display inhibitory dysfunction.

Mangeot, Armstrong, Colvin, Yeates, and Taylor (2002), in their study of children with brain injuries using the Behavior Rating Inventory of Executive Function, found that children between the ages of 10 and 19, injured five years earlier, ranging in severity from severe to moderate, showed deficits in working memory that were consistent across groups. The results of this study suggest that children diagnosed with traumatic brain injury (TBI) suffer long-term executive functions deficits.

According to Gioia, Isquith, Guy, Kenworthy and Barton (2002), executive dysfunction is not a unitary disorder. Executive dysfunction is characterized by a variety of behaviors and deficits in one or more areas of executive functioning such as poor impulse control, difficulties monitoring or regulating performance, planning and organizational problems, poor reasoning ability, difficulties generating and/or

implementing strategies, perseveration and mental inflexibility, and reduced working memory (Anderson, 2002). Swanson (1999) and Meltzer and Krishnan (2007) note that children who simultaneously experience difficulties accessing, organizing, and coordinating multiple mental activities in academic areas are characterized as actively inefficient learners. These students are described as being inefficient because they struggle to use self-regulatory strategies such as checking, monitoring, and revising their work (Meltzer & Krishnan, 2007). The recognition that executive functioning has multiple aspects will lead educators to devise more useful, differentiated diagnosis and interventions through more practical approaches in the classroom (Fischer & Daley, 2007). Identifying the executive dysfunction is equally important as determining the nature of the impairment. This determination will greatly influence intervention and treatment plans (Anderson, 2002).

Executive Functions in Urban, Low-Income Children

Limited research has been conducted on executive functions in urban, low income children. However, self-regulation skills as components of executive functioning in children can be seen in the context of the unique contribution of children's competencies to early academic success (McWayne et al., 2004). Children with greater cognitive skills are better able to demonstrate optimal self-regulatory skills through planning, remembering rules, inhibiting impulses, and focusing their attention (Raver et al., 2011). Recent research supports the importance of school-based instruction directed at maintaining or improving early adolescent executive functions skills (Desmond & Hanich, 2014; Jacobsen, Williford, & Pianta, 2010). According to these researchers,

school-based executive functions interventions can lead to improved outcomes for the early adolescents, especially in the transitional year from elementary to middle school.

In their study on the relationship between executive functions and performance on high-stakes testing in children from urban schools, Waber et al. (2006) found that previous studies on executive functions, socioeconomic status, and geographic location, tended to be sparse, due to test developers seeking a diverse distribution of children and research studies typically including SES as a potential covariate in statistical models that focus on other factors. The findings from this study of urban, low-income children indicated that neuropsychological variables, especially executive functions, accounted for 40% of the variance in English scores and 30% in mathematics, and recommended efforts to improve children's academic achievement consider developmental factors as well as curricular content.

Welsh, Pennington, and Groisser (1991) examined the executive functions of children at different ages to determine the level at which adult-level competence is achieved. The researchers found differential developmental trajectories in their study. Three stages of skill integration and maturation became evident at ages six and 10, and during adolescence. Several other smaller studies on executive functions in children found a linear development of working memory, beginning in early childhood to adolescence (Gathercole, Pickering, Ambridge, Wearing, 2004). Bayliss, Gunn, Baddeley and Leigh (2005) found that complex working memory span performance was related to processing efficiency and storage capacity. They concluded that working memory is critical for higher level cognition and that there are considerable age-related variations in processing speed and storage capacity, as well as developmental increases in controlled

attention capacity. Bayliss et al. (2005) concluded that "As children develop, their working memory performance, and consequently, their level of educational achievement will be constrained by the developmental stage that their speed of processing and storage-related abilities have reached" (p. 595).

Self-Regulation Interventions and Low Socioeconomic Status

The development of executive functions skills involves modulating systems of emotion, attention, and behavior in response to a given situation or stimulus (Smith-Donald, Raver, Hayes, & Richardson, 2007). Self-regulatory skills have important implications for preparing children for success in early school readiness skills, particularly when highlighted by effective interventions for children from low socio-economic status (SES) (Rhoades, Warren, Domitrovich, & Greenberg, 2011). A recent study indicated that young children who endure chronic poverty are more prone to be found underperforming compared to their more affluent peers in a variety of school readiness skills, including emotional, behavioral, and academic competence (Rhoades et al., 2011). Furthermore, as supported by research in years preceding the transitional year of middle school, children's development of school readiness skills is consistent with the understanding of executive function as a construct that unites working memory, attention, and inhibitory control for the purposes of planning and executing goal-oriented activity (Blair, 2002).

Several other smaller studies on studies on mindfulness and executive functions identified the need for further investigation of the environmental conditions, such as socio-economic conditions, geographic locations, and parental presence in the household,

on the executive functions and the effects of mindfulness in both children and early adolescents (Desmond, 2009; Hughes, 2011).

On the both local and national fronts, even with the risk of truancy and drop out, associated with these environmental conditions, adolescents, who are generally "less risk averse, more driven by rewards and easily influenced by peers and who may be lacking self-regulation skills" (Desmond & Hanich, 2014), may experience grade retention which is a common practice used by schools to deal with academic underachievement (Bobik, 2008). On both local and national platforms, students and teachers are under pressure due to the increasing demands of the stress experienced in meeting the baseline competencies required by school districts (Hartman, 2012). Some adolescents in poverty experience homelessness, hunger, and lack of home support, all of which might contribute to executive functions deficits and not necessarily the lack of academic skills set. The failure of schools to address the root cause of these problems tends to lead to decline in educational outcomes for children. For this reason, school-based mindfulness awareness practices (MAPs) program, for example, present unique strategic initiatives for schools and promising opportunities, particularly for at-risk children and early adolescents (Desmond & Hanich, 2014). Due to the lack of interventions, students experience failure and lose educational opportunities to invest in living a conceivably productive and meaningful life. Therefore, the decline in educational outcomes of middle school students remains an alarming concern for educators and researchers (Anderman et al., 1999; Bobik, 2008; Jimerson, 2001; Roderick, 1994; Rumberger, 1995). In defining the problem statement, the need for strategic initiatives to serve the target population of early adolescents with disabilities is a call for action for schools.

The sample in the proposed study is representative of the population at risk in light of the plight of many early adolescents in urban schools. Desmond and Hanich (2014) describe the population of the participants in their study:

> Participants in the study included 52 sixth grade students, between 11 and 12 years of age in an urban middle school in its sixth year of Corrective Action II under the regulations of the No Child Left Behind Act in a mid-sized city in Pennsylvania (Pennsylvania Department of Education, 2012). The school is one of four middle schools in a central Pennsylvania school district of approximately 11,000 students of which 75 percent fall below the national poverty level. Of the approximately 550 students in the middle school, approximately 90 percent are economically disadvantaged; 73 percent are Hispanic; 20 percent, African American; and 6 percent, White; with the remaining one per cent from other ethnic or racial groups. Within this population, approximately 24 percent of the children require special education services; approximately 30 percent are identified as English language learners; and approximately 7 percent are identified as homeless. Sixth grade is the transitional year from elementary school for the students in the middle school which includes sixth, seventh, and eighth grades. (p. 8)

Early adolescents in sixth grade—transitioning from elementary school to middle school—are expected to meet the demands of middle school, with the expected educational outcomes that, given the academic demands academic skills sets, may not be traditionally seen as opportunities for executive functions development.

Special education students in elementary, middle, and high school, including those experiencing poverty and other related factors, are expected to meet the demands of high stakes test and school districts' achievement goals, IEP goals, while there is little or no emphasis on training teachers on executive functions and executive functions development for students. As stated earlier, the importance of the developmental trajectories of executive functions from pre-school, Kindergarten, and first grade to fifth grade, become even more important for academic production for early adolescents, especially in the transitional year of sixth grade for early adolescents in poverty and identified with learning disabilities. The lack of interventions by schools in addressing students' executive functions needs remains a problem caused by and exaggerated by the increasing demands, strain, and burden of middle schools. These demands require executive functions skills, which are fundamental for self-regulation, social-emotional learning, and strategies for acquiring academic competence (Bobik, 2008; Hartman, 2012). Lack of training of teachers on the importance of executive functions tends to create a learning environment that may fail to address the overarching needs of early adolescents, especially minority students, most likely African American males (Towns, 1995).

A major problem in providing support for students identified to be eligible for special educations services is that students receive special education services based on only skills deficits. Yet the underlying problem is that, for many of these students, in addition to getting support for skills deficits, they are not provided with school-based interventions for executive functions deficits. It is natural for a human being to pay attention to one thing or another; it is also natural for a human being to monitor, correct

and modulate how she/he perceives, feels, thinks, and acts, according to McCloskey's four areas of involvement (McCloskey et al., 2009). The teaching curriculum in the early years and middle school provides a rich setting for supporting myriad developmental trajectories for student, particularly in the area that deals with a set of control capacities of "executive functions that are responsible for cueing and directing functioning within an all-inclusive domains of sensation and perception, emotion, cognition, and action" (McCloskey et al., p. 40, 2009).

Literacy Skills and Adolescents with Disability

The middle school challenges for early adolescents are typically framed around literacy and academic achievement. Executive function development is conceived as the solution to this problem in light of theoretical and conceptual framework presented in this study. Meeting academic proficiency standards in reading such as decoding, fluency, vocabulary, and comprehension skills is a major challenge for many middle school students (Edmunds et al., 2009). Student success with analytical literacy requires mastery in the skills needed for basic reading, writing, and word problems for middle school mathematics curriculum. Self-regulation skills as components of executive functioning are essential requirements for school readiness, competence, and success from earlier grades. As a result, many adolescents fail to compete at the grade level standards that require EF skills, which in turn leads to underachievement in school. Thus, adolescents with disabilities often have low literacy skills in addition to lack of production, remaining a part of the major concerns that have been raised regarding the decline in educational outcomes with respect to middle school students (Anderman et al., 1999; Bobik, 2008; Jimerson, 2001; Roderick, 1994).

Numerous contextual factors have been associated with low academic performance in relation to children in urban settings, including: poverty, lack of early childhood programming, cultural socialization, high crime rates, lack of employment, and few educational opportunities outside of classroom (Hock et al., 2009; Lee et al., 2003; Leventhal & Brooks-Gunn, 2003; Leventhal et al., 2001; McWayne et al., 2004; Towns, 1995).

Written Language and Executive Functions

According to the McCloskey model, the specific executive functions cues which are involved in writing are perceiving, initiating, focus/select, sustain, flexible/shift, hold, manipulate, organize, foresee/plan, generate, associate, balance, store, retrieve, time, execute and correct (McCloskey et al., 2009). This approach supports students who have limitations in executive functioning. Their apparent difficulties in producing writing products are due to executive functions deficits. Writing and reading tasks pose a problem for many students with Individualized Education Plans (IEPs). The cognitive constructs involved with written languages are known to be related to the prefrontal cortex. Most IEPs are geared for students with skill-set deficits. According to McCloskey, what is lacking is not skill-set deficits, but production deficits. Students with IEPs tend to be unsuccessful in school not necessarily because of the skill-set deficiencies, but due to an area of need in the ability to produce. For this reason, the problems of production (encountered in written language, for example) among students identified with low executive functions, require timely and effective intervention to enable them to improve their need for production, as well as supporting improvement in their skill-set needs. In a study utilizing archival data using the BRIEF to examine teacher

ratings of prototypically academically successful and prototypically unsuccessful students at the item level, the findings supported the hypothesis that academically unsuccessful students demonstrate a number of behaviors that are indicative of executive functions difficulties. Conversely, academically successful students exhibit very few behaviors that are indicative of executive functions difficulties (Hartman, 2012). Students who experience school failure do so as the result of the common practice of schools to ignore executive functions measure in their assessments of student in determining areas of need, instead, the traditional posture of using IEP goals, abound at the detriment of addressing the executive functions deficits of students. Hartman suggests that the mainstream practice devoid of offerings of specific interventions or systemic instruction for the general education populations, amounts to "a disservice to those students that may very well possess the academic skills set to master the curriculum, but fall short of the "producing" end because of executive functions difficulties (Denckla, 2002; Hartman, 2012).

Teachers can provide interventions such as executive functions skills development and support students in the following areas: (a) planning and organizing, (b) implementing skills manipulation and generation of ideas, (c) learning to make associations between ideas, (d) foreseeing and planning in the writing process, (e) demonstrating the capacity to shift thoughts and maintains cognitive flexibility, and (f) use working memory (McCloskey et al., 2009). Students will also employ peer-assisted learning to support each other's executive functions skills development and writing skills improvement.

Neural Correlates for Written Language

Certain areas of the brain and specific cognitive processes (i.e. attention, memory, etc.) are needed to self-organize verbal information in order to produce an output response on paper. Students with executive functions skills deficiency must still deploy executive functions skills in order to follow the steps for writing tasks. The writing process requires the area of the brain region known as the prefrontal cortex. The anterior cingular cortex (ACC) is needed to self-organize verbal information in order to produce an output response on paper. The ACC is the area of the brain responsible for selecting attention, response inhibitions, and monitoring errors.

Cognitive constructs involved with written language with regard to attention include poor planning, uneven tempo, erratic legibility, inconsistent spelling, poor self-monitoring, and impersistence. These are the hallmarks of students with writing difficulties. The area of the brain called the parietal lobe influences spatial learning points. The cognitive constructs involved with written language with regard to spatial production include poor spatial production, poor visualization, poor marginalization, organization problems, uneven spacing, and poor use of lines (McCloskey et al., 2009). In addition, according to McCloskey et al. (2009), the frontal lobe is associated with working memory skills. The prefrontal cortex is associated with sequential processing. The left temporal lobe deals with language and the constructs are poor vocabulary, poor expression, dysphonetic spelling, lack of cohesion, unconventional grammar, and simplistic sentence structure. Given the importance of written language, written expression, and reading during the early years and throughout middle school and high school, students require timely interventions to support them from K-12 grade.

Academic Achievement and Executive Functioning in Middle School Students

A review of the literature found few research studies addressing executive functions difficulties among middle school students in poverty. Individuals identified with learning disabilities at the early stages of pre-school, kindergarten, and the elementary school years tend to be the focus of research studies. For example, Best, Miller, and Jones (2009) note that the developmental trajectories of the components of various EF measures vary. A narrow range of two to five years reflects the focus of the majority of research on the assessment of executive functions (Isquith, Gioia, & Espy, 2004). According to Isquith et al. (2004), there exists no true developmental account of executive functions across childhood and adolescence; despite the large literature base of executive functions.

Poor executive functions can lead to inadequate academic production in the areas of reading, mathematics, and writing (Hartman, 2012). Several other smaller studies found problems in sustaining attention and monitoring the inflow of information, aspects of executive functions, including conceptual flexibility, monitoring, and inhibition, that can have adverse effects on reading comprehension, performing calculations, and producing extended written texts, in addition to, significantly and distinctly, predicting performance on several academic areas reading, mathematics, social studies, and science that the various academic achievement areas (Bobik, 2010; Hartman, 2012; Latzman, Elkovitch, Young, & Clark, 2010).

Many teachers and school administrators raise considerable concerns about the low literacy rates at the national level, while the mainstream approach to academic skill set deficits requires a new solution of providing remediation for competence in order to

help underachievers. Competence, when not viewed as a fixed trait, but as a set of skills that can be remediated, if deficient, should not be treated as an IQ-driven profile, but from the prototype perspective, through which developmentally appropriate executive functions measures can be included by school psychologists in their assessments (Bobik, 2010). According to the Reading Next Report by the Alliance Foundation, approximately eight million students between the fourth and 12th grade levels struggle to read at their grade level (Biancaros & Snow, 2006). Of particular concern for this study is that the growing number of students within minority groups, low-income populations, and disability categories, consistently read well below the literacy proficiency of their peers. As illustrated on the 2013 National Report Card on Reading, there are significant gaps between minority students and White students with regard to reading proficiency; among Black students and Latino students in sixth grade, 44% of Black students scored at the below basic level, and 32% of Latino scored at the below basic level compared to 16% of White students (NCES, 2013).

In the national educational system, given the low literacy levels of this targeted population, these students are clearly high-risk and high need early adolescents. The lowest range of scores on the literacy assessment is represented by below basic, indicating below partial mastery on the test items. Early adolescents in urban schools experience a wide array of difficulties due to poverty. The inevitability of dealing with these challenges are within the scope of the solutions that are possible within the developmentally appropriate executive functions measures that can be identified and assessed by school psychologists, in tandem with relegated supports from teachers, who,

with training in executive functions interventions designed by educators, play an important role in the academic production of middle school students (Bobik, 2010).

In a study that created prototypical profiles of academically successful and academically unsuccessful students from the teacher ratings of the BRIEF items, the results of the analyses indicated that teachers' ratings of the executive function capacities of prototypical successful and unsuccessful students produced BRIEF Scale T-score patterns consistent with the hypothesis that successful students exhibit very few executive function difficulties, while unsuccessful students exhibit executive function difficulties in the clinically significant range (Bobik, 2010). These study, along with several other studies found (Bobik, 2010; Hartman, 2012).

The growing interest in research on executive functions and its effects on early adolescents' academic performance and social behaviors emphasizes the need to respond to the decline in educational outcomes and the challenges faced by early adolescents. In particular, sixth grade, a transitional grade from elementary to middle school (Bobik, 2010; Checa et al., 2008; Desmond & Hanich, 2014; Jacobsen et al., 2010; Pullis, 1985; Rothbart & Jones, 1998). A variety of school-based interventions designed to support children's achievement and social behaviors have been undertaken by researchers to support attention to executive functions as a factor in determining the students' school academic and social outcomes and its importance in children's competent adjustment to middle school (Jensen, 2008; Sylvan & Christodoulou, 2010). One of these interventions is mindfulness practices programs to improve educational outcome of adolescents in poverty.

Desmond and Hanich (2014) conducted a randomized control experiment to examine the effectiveness of a school-based, mindful awareness practices (MAPs) program on the improvement of the executive functions (EF) of 52 sixth-grade children in an urban, public middle school. Based on previous research findings, the researchers hypothesized that children in the MAPs condition would show greater improvement in executive functions skills over the course of the study than children in the control group. The results of their study supported the hypothesis and in summary, revealed that the MAPs improved the executive functions-related ratings of the sample of urban, low income, early adolescents in the prior qualitative study and the BRIEF validated EF ratings in the treatment group of early adolescents in the randomized control study.

The writings and teachings of Kabat-Zinn (2011) have been the inspiration and guidance for many instructors of mindfulness programs. Educators and instructors of mindfulness are including brain-based knowledge into their practices. As evidenced by the work of Desmond and Hanich (2014), a mindfulness awareness program used in their study supported executive functions improvement. Their study examined the effects of a Mindful Awareness Program on the Executive Functions of Early Adolescents in an Urban Middle School. The findings of the domain-specific and composite scores for the treatment and control groups supported the research literature on the continuing plasticity of the early adolescent brain and on the research on school-based interventions for brain development. Several other studies that support social-cognitive theories on self-regulation have found that mindfulness training may have the potential for improving student self-regulation and executive functions (Black & Fernando, 2014; Zelazo & Lyons, 2012; Meiklejohn et al., 2012, Flook et al., 2010).

Neuropsychological studies on executive functions and its effects on early adolescents' academic performance and social behaviors support the importance of executive functions as a factor in determining students' school academic and social outcomes and its importance in children's competent adjustment to middle school, particularly when sixth grade was the transitional grade from elementary school to middle school (Checa et al., 2008; Desmond & Hanich, 2014; Jacobsen et al., 2010; Pullis, 1985; Rothbart & Jones, 1998). According to Diamond and Lee (2011), supporting children's school success through school-curricula-based programs that promote self-regulation and social emotional development are also effective in improving executive functions skills and academic achievement. As mentioned earlier, social neuroscience is "vibrantly interdisciplinary" (Adolphs, 2010, p. 157). Research on executive functions in urban, low-income children requires a concerted transdisciplinary focus of research among prevention scientists, psychologists, educators, developmental psychopathologists and neuroscientists (Greenberg, 2006).

Using the BRIEF as an Assessment Tool

There is no specific test that can adequately measure all executive function capacities and represent the results in all domains (Bobik, 2010). Recent research findings indicate that executive functions spans a vast domain of skills, and thus, have no single consensus of a gold standard test of executive functions (Banich, 2009; Bobik, 2010). Nevertheless, certain standardized neurological tests that have been deemed useful in assessing different aspects of executive functions are as follows: Stroop test, Rey-Osterrieth Test, Verbal Fluency test, Delis-Kaplan Executive Function System (D-KEPS), Trail Making Test, Verbal Fluency Test, Design Fluency Test, Color-Word

Interference, Sorting Test, Twenty Question Test, Word Context Test, Tower Test, and Proverb Test (Bobik, 2010).

Behavior Rating Inventory of Executive Function

According to the Gioia et al. (2002), the Behavior Rating Inventory of Executive Function (BRIEF) was developed to assess executive functions based upon ratings of a child's everyday behaviors. The BRIEF Manual provides instructions for raters to draw on their recollections of the most recent six month period and indicate the frequency of occurrence (1 = Never; 2 = Sometimes; 3 = Often) of the perceptions, feelings, thoughts or actions described in each item. The item organization of each BRIEF version suggests three levels of score interpretation consistent with the test structure: Global Composite Level; Index Level; and Scale Level. The parent and teacher ratings are divided into eight scales which include: inhibit, shift, emotional control, initiate, working memory, plan/organize, organization of materials, and monitoring. These scales and the behaviors resulting from their purported dysfunction are described in the following paragraphs (Hartman, 2012; McCloskey, 2009).

Inhibit - This refers to the ability to resist impulses and to stop one's behavior at the appropriate time. Children with difficulties in this area may display high levels of physical activity, inappropriate physical responses to others, the tendency to interrupt and disrupt group activities, and a general failure to "look before leaping."

Shift - Shifting is the ability to make transitions, tolerate change, problem solve flexibly, and switch or alternate one's attention from one focus or topic to another. Caregivers often describe children who have difficulty with shifting as being somewhat rigid or inflexible, and preferring consistent routines.

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

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

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

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

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

Monitor - This can be viewed as consisting of two components: Task-oriented monitoring (work check habits) reflects a child's ability to check his/her own performance during or shortly after finishing a task to ensure that he/she has accurately or appropriately attained a desired goal. Self-monitoring reflects a child's awareness of the effect that his/her behavior has on others (Gioia et al., 2002).

As suggested by Denckla (2002), researchers should undertake the educational endeavor of seeking convergence among other measures and the clinical utility of the BRIEF. In an attempt to determine if there is convergence between performance-based measures and the Brief in the assessment of executive functions, Toplak, Bucciarelli, Jain and Tannock (2010) examined an adolescent population with a clinical diagnosis of Attention Deficit Hyperactivity Disorder (ADHD) to identify convergence between the BRIEF and the performance-based measures of executive functions. In this study, parents and teachers were provided the Parent and Teacher BRIEF ratings and measures of inhibition, set-shifting, working memory and planning as part of the study. The results indicated that some modest convergence exists between the BRIEF and performance-based measures. This study showed that the BRIEF ratings and parent teacher ratings were better predictors of ADHD status than were performance-based measures.

Item Level Analyses Using the BRIEF

There is scarcity of research on item level analyses using the BRIEF. Previous literature on the importance of executive functions for promoting learning experience for both successful and unsuccessful students is promising, given the interest of educators and researchers to make connections between executive functions and learning. Hartman (2012) conducted a study utilizing shelf-data to examine prototypical teacher ratings on the Behavior Rating Inventory of Executive Functions (BRIEF) at the item level. These prototypical ratings were completed by middle school teachers, who were asked to rate typical characteristics exhibited both by successful and by unsuccessful students.

Hartman's (2012) study was based on prior research (Bobik, 2010) that utilized the data set to identify profiles of performance at the scale and index levels, and thus,

aimed at determining if specific item-level analyses produces distinct patterns based upon the successful/unsuccessful student dichotomy. These were identified specifically to determine those items which were most frequently endorsed, and were specific to student failure (unsuccessful student ratings) and those items which were least likely endorsed for those who are successful. The findings supported the hypothesis that academically unsuccessful students demonstrate a number of behaviors that are indicative of executive function difficulties. Academically successful students exhibit very few behaviors that are indicative of executive function difficulties.

In addition, the findings of this study did not suggest that any particular scale of the BRIEF was more effective than others at differentiating academically successful from academically unsuccessful students in terms of executive functions difficulties. Results of this study suggested that when interpreting teacher ratings of the executive functions difficulties of academically unsuccessful students using the BRIEF, it is best to conduct an item analysis to identify specific items endorsed as occurring often, rather than relying on the BRIEF scale scores to identify areas of difficulty (Hartman, 2012). In this vain, McCloskey et al. (2009) posited that when used in an appropriate manner, individual item interpretation can greatly increase the validity and reliability of the assessment. Given the efficacy of analyses on the item scale, Hartman (2012) suggests that by focusing on individual items, clinicians may have a more comprehensive view of a student's executive functions strengths and weaknesses. Thus, should "identify the individual items that are rated as most problematic for an individual client" (Hartman, 2012, p. 133).

McCloskey et al. (2009) postulate that item level interpretation can be used as a tool for flexibly re-aligning items into clusters of items that appear to be reflecting a

specific pattern of behavior that may have clinical relevance when determining intervention. This is an informal method that involves clustering items, but potentially, the interpretation can greatly increase the validity and reliability of the assessment. The view of McCloskey et al. (2009) is grounded on the fact that, within the BRIEF manual, normative data are not provided for the percentage of raters in the standardization that endorsed the items as occurring never, sometimes, or often for the individual items (Gioia et al., 2002). The researchers note that this normative information is not provided because it is considered psychometrically *less* adequate, and maintains that the information gleaned from examining profiles of raters' endorsements may produce more insights regarding the raters' perceptions about a specific type of behavior conceived to be reflecting difficulties with the use of executive functions (Hartman, 2012).

Furthermore, as noted by Hartman (2012), item level analyses is more likely to increase both the validity and clinical utility of the data collected with the rating scale. According to McCloskey et al. (2009), by realigning items into groupings that reflect a greater degree of consistence and meaning in context of the individual assessment, researchers can explore individual item interpretation with greater efficacy and depth. Item level analyses has a potential of engendering more information that can then be utilized to conduct a quasi-functional behavioral assessment, "whereby the frequency, intensity, and duration of the specific behaviors reflecting the executive difficulties, coupled with an ability to identify the specific domains of functioning and arenas of involvement that are most greatly impacted" (Hartman, 2012, p. 133).

Given the efficacy of analyses on the item scale, Hartman (2012) suggests that "by focusing on individual items, clinicians may have a more comprehensive view of a

student's executive functions strengths and weaknesses, and thus, should identify the individual items that are rated as most problematic for an individual client" (p. 133). This will enable them to tailor a more comprehensive assessment approach based upon item level results in order to test their hypotheses in relation to a student's functioning, and subsequently plan appropriate interventions to address the specific areas of deficit. Furthermore, individual item results could be used in progress monitoring efforts as a means to determine the efficacy of intervention to address the student's executive functions weaknesses.

Conceptual Framework for the Study

The conceptual framework for this study is the fourth theoretical framework of executive functions; McCloskey et al.'s (2009) holarchical model of executive. In this model, as stated earlier, these researchers posit within the conceptual understanding of executive functioning, the varied levels of engagement that an individual may experience in relation to executive functions. These levels of engagement will be discussed in greater detail in the literature review. According to McCloskey et al. (2009), executive functions are responsible for directing four domains of functioning which include action, cognition, perception, and emotion. The researchers postulate that *action* is the executive control of modes of output (including behavior in the external world), and storage and retrieval of internal representations. *Cognition* is the executive control of thoughts and thought processing. *Perception* is the executive control of modes of perceptual input including external sensory stimuli (visual, auditory, kinesthetic) and internal (representational) stimuli. *Emotion* is the executive control of moods, feelings, and the processing of emotions. In addition, a conceptual understanding of the use of these functions in various

arenas is presented, specifically with the view that, dependent on the arena, the four arenas for the engagement and use of these self-regulatory functions can vary. These arenas will be presented in greater detail in the literature review in Chapter II include: *Intrapersonal*, or the ability to control one's own internal state; *interpersonal*, or one's ability to control their reactions in relation to interaction with others; *environmental*, or one's interaction with the environment; and the *symbol system arena*, or the ability to utilize the culturally derived symbol system used to process and share information (i.e., reading and writing) (McCloskey et al., 2009). According to this model, "executive functions comprise many different capacities that operate on numerous levels across independent developmental lines" (Hartman, 2012, p. 12).

With respect to the myriad levels of engagement that an individual may experience in relation to executive functions, McCloskey et al. (2009) describes them as self-activation, self-regulation, self-realization, self-determination, self-generation, and trans-self-integration. Furthermore, he states that self-activation is the initiation and "ramping up" of basic executive functions related to an awakened state of mind. It also assists in overcoming inertia, and presents a definition of self-regulation as a set of control capacities that cue and direct functioning across the domains of sensation/perception, emotion, cognition, and action (McCloskey et al., 2009). The McCloskey Model of Executive Functions posits 31 self-regulation executive functions, a model, in which executive functions can be thought of in terms of 31 areas. These areas include Perceive, Energize, Gauge, Initiate, Focus, Sustain, Stop/Interrupt, Inhibit, Modulate/Adjust, Execute, Sequence, Monitor, Correct, Shift, Flexible, Hold, Manipulate, Store, Retrieve, Anticipate/Foresee, Plan (Short-term), Organize, Generate,

Associate, Analyze, Evaluate/Compare, Choose/Decide, Pace, Sense/Time, Estimate Time, and Balance (McCloskey, 2010). The definitions of these functions are described in Table 1.

Table 1

Description of the McCloskey 31 Self-Regulation Executive Functions

Self-Regulation Executive Function	Description
Analyze	The Analyze function cues the realization of the need to examine more closely perceptions, feelings, thoughts or actions to obtain a greater understanding of a problem or situation.
Anticipate/Foresee	The Anticipate function cues the anticipation of conditions or events in the very near future, such as the consequences of one's own perceptions, feelings, thoughts and/or actions.
Associate	The Associate function cues the realization that associations need to be made between the current problem situation and past problem situations and cues the activation of the resources needed to carry out the required associative problem-solving routines.
Balance	The Balance function cues the regulation of the trade-off between opposing processes or states (e.g., pattern versus detail; speed versus accuracy; humor versus seriousness) to enhance or improve experiencing, learning, or performing.
Choose/Decide	The Choose/Decide function cues the need to achieve closure, i.e., to make a choice among alternatives.
Correct	The Correct function cues the use of appropriate routines for correcting errors of perception, emotion, thought, or action based on feedback from internal or external sources.
Energize	The Energize function cues the channeling of energy and effort into perceiving, feeling, thinking or acting.
Estimate Time	The Estimate Time function cues the use of time estimation routines (e.g., cueing the engagement of mental functions that enable a person to have an internal sense of how long something will take to complete, or how much time is still left in a specific period of time).
Evaluate/Compare	The Compare/Evaluate function cues the realization of the need to make comparisons among, or evaluate the adequacy of, perceptions, feelings, thoughts or actions.
Execute	The Execute function cues the engagement of a well-known series of perceptions, feelings, thoughts, and/or actions, especially in cases in which automated routines have been practiced and used frequently.
Flexible	The Flexible function cues a willingness to alter the frame of reference for the direction and engagement of perceptions, emotions, thoughts or actions in reaction to what is occurring in the internal or external environments.
Focus	The Focus function cues the direction of attention to the most relevant specifics (perceptions, emotions, thoughts, and/or actions) of a given environment, situation, or content and downgrading or ignoring the less relevant elements.

Self-Regulation Executive Function	Description
Gauge	The Gauge function cues identification of the demands (perceptual, emotional, mental, and physical) of a task or situation and cues the activation of the perceptions, emotions, thoughts, or actions needed to engage the task or situation effectively.
Generate	The Generate function cues the realization that a novel solution is required for the current problem, and cues the activation of the resources needed to carry out the required novel problem-solving.
Hold	The Hold function cues activation of the necessary cognitive processes required to maintain information in working memory and continues cueing these processes until the information is manipulated, stored, or acted on as desired.
Inhibit	The Inhibit function cues resistance to, or suppression of urges to perceive, feel, think, or act on first impulse.
Initiate	The Initiate function cues the initial engagement of perceiving, feeling, thinking, or acting.
Manipulate	The Manipulate function cues the use of working memory or other cognitive processes for the manipulation of perceptions, feelings, thoughts, or actions that are being held in mind or being accessed in the environment.
Modulate/Adjust	The Modulate function cues the alteration of perceptions, feelings, thoughts and actions.
Monitor	The Monitor function cues the activation of appropriate routines for checking the accuracy of perceptions, emotions, thoughts, or actions.
Organize	The Organize function cues the use of routines for sorting, sequencing, or otherwise arranging perceptions, feelings, thoughts, and/or actions, to enhance or improve the efficiency of experience, learning, or performance.
Pace	The Pace function cues the awareness of and the regulation of the rate at which perception, emotion, cognition, and action are experienced or performed.
Perceive	The Perceive function cues the use of sensory and perception processes to become aware of (take information in from) the external environment or to tune into “inner awareness” of perceptions, emotions, thoughts or actions as they are occurring.
Plan (Short-term)	The Plan function cues the engagement of the capacities required to identify a series of perceptions, feelings, thoughts, and/or actions that, if carried out, would be most likely to produce a desired outcome in the very near future (within minutes to within several hours).

Self-Regulation Executive Function	Description
Retrieve	The Retrieve function cues the activation of cognitive processes responsible for finding and retrieving previously stored information about perceptions, feelings, thoughts and actions. The more specific the demands or constraints placed on the retrieval task, the greater the requirements for precision of retrieval cues.
Sense/Time	The Sense Time function cues the monitoring of the passage of time (e.g., cueing the engagement of the mental functions that enable a person to have an internal sense of how long he or she has been perceiving, feeling, thinking or acting).
Sequence	The Sequence function cues the orchestration of the proper syntax of a series of perceptions, feelings, thoughts, and/or actions, especially in cases in which automated routines are being accessed or are initially being developed.
Shift	The Shift function cues a relatively quick change in the direction and engagement of perceptions, emotions, thoughts or actions in reaction to what is occurring in the internal or external environments.
Stop/Interrupt	The Stop/Interrupt function cues the sudden, immediate discontinuation of perceiving, feeling, thinking, or acting.
Store	The Store function cues the movement of information about perceptions, feelings, thoughts and actions from the mental processing environment of the present moment into "storage" for possible retrieval at a later time.
Sustain	The Sustain function cues sustained attention to the most relevant specifics (perceptions, emotions, thoughts, and/or actions) of a given environment, situation, or content.

Note. Adapted from McCloskey, unpublished manuscript, 2010.

McCloskey re-organizes executive functions into six clusters, given that the self-regulation categories encompass a wide variety of executive functions: Attention, Engagement, Evaluation, Solution, Efficiency, and Recollection. These six clusters are organized as follows: The first or Attention Cluster comprises the Perceive, Focus/Select, and Sustain functions. This is followed by the Engagement cluster, which includes the Attention cluster, but also the following functions: energize, initiate, inhibit, flexibility, stop/interrupt, shift, and also includes the Evaluation Cluster. Following the Engagement cluster (second cluster) is the Evaluation cluster (third cluster), in which modulate,

balance, monitor, and correct functions are included, as is the Attention cluster. Next is Solution (fourth cluster) which includes these functions: anticipate, gauge, estimate time, analyze, generate, associate, plan, organize, evaluate/compare, choose/decide, in addition to the Recollection and Evaluation Clusters. The Efficiency or fifth cluster includes: sense/time, pace, sequence, execute, and the Evaluation Cluster. The sixth and final cluster is the Recollection cluster comprising the hold, manipulate, store, and retrieve functions as well as the Attention and Evaluation Clusters.

In the MMEFs, the expansion unfolds to the next realm that McCloskey posits– *self-realization*, which directs cognitive processes that engage in self-awareness, self-reflection and self-analysis. According to McCloskey (2010), self-realization cues cognitive processes to access accumulated information about oneself, and to apply it in specific situations to initiate, sustain, or alter behavior, and he further provides a description for each of the following related concepts:

Self-determination includes foresight/long-term planning and goal generation. It directs the use of cognitive processes to construct visions of the future and plans for action over longer periods of time. Further, it directs reflection on the past for purposes of improving or altering behavior and thinking in the future.

Self-generation directs the posing of speculative questions related to the meaning and purpose of life and/or the ultimate source(s) of reality and physical existence, mind-body relationships, spirit, and soul, contemplating existence beyond the physical plane. It also directs the generation of a philosophy of life used to guide self-awareness, self-realization and the other levels of executive function processes, serving as a basis for an ultimate source of intentional behavior direction.

Finally, *Trans-self integration* directs the engagement of mental processes that enable the realization and the experiencing of a trans-self state of ultimate or unity consciousness. This state is considered the highest achievement of human consciousness in most spiritual traditions, and is therefore, "very different from the maladaptive states characteristic of clinical diagnoses of dissociative states" (Hartman, 2012, p. 18).

This study will employ this theoretical foundation and conceptual framework to address the problem, so that students with disabilities can be seen more holistically and appropriately as students with executive functions needs, rather than the historically guiding perspectives of IQ viewed to be associated with "successful and unsuccessful students" (Bobik, 2008). Potentially, this will shift the conversation to lean toward a new paradigm, a new perspective and conceptual framework, in which "executive functions," "school-based mindfulness awareness practices," and "the prototype perspective" serve as a lens to remediate deficits in executive functions, albeit the overriding focus on IQ and IEP goals for students with learning disabilities (Bobik, 2010). The conceptual framework of "executive functions," "school-based mindfulness awareness practices," and "the prototype perspective" postures this study in light of the experience many adolescents are bound to face the overarching demands of middle school that require self-directed and goal-oriented behavior; an academic learning environment in which executive functions are fundamental in acquiring academic competence (Blair, 2002; Bobik, 2008; Desmond & Hanich, 2014; Hartman, 2012; McCloskey et al., 2009).

U.S. public schools are replete with immense opportunities for school-based interventions. There are also opportunities for schools to assist with student success, rather than failure. The lens for this proposed study realizes the demographically

rendered population that are often at-risk for failure, namely, adolescents in poverty, for whom, the disparities of executive functions developmental progression, lends the opportunity for interventions and systematic instruction designed to ameliorate and accommodate their academically unsuccessful categorization (i.e., dealing with problem solving, lack of organization, and poor self-monitoring, etc.)" (Hartman, 2012, p. 132). The failure of schools to address executive functions deficits of students who demonstrate low academic performance and underachievement, and the perception of their lack of capacity to produce, highlights the relevance of this study in its attempt to promote better educational outcomes for urban middle school students in poverty, through school-based interventions, for example, MAPs. In addition, the association between learning and executive functions, and the need to increase teachers' awareness of this association, undergirds the lens of this study. This study will also lend support to other interventions that incorporate teacher professional development with training in executive functions skills that are weaved into the curriculum. This allows for sensitivity to the specific needs and trends of early adolescents, whose developmental trajectory, progression, and cultivation of executive functions skills are necessary for the demands of middle school.

This study is similar to Hartman's (2012) study), which sought to expound on recent research through the review of archival data using the BRIEF for the purpose of determining specific item level analyses profiles for academically successful and academically unsuccessful students. This study will utilize shelf-data to examine teacher ratings on the Behavior Rating Inventory of Executive Functions (BRIEF) at the item level for students included in a study of the effectiveness of a mindfulness program used with middle school students. Students in the study were divided into control and

intervention groups. There are inherent difficulties that abound with executive functions that appear to vary across domains, and areas of involvement and employing the statistical procedure at the item level mitigates the barriers to effective interpretation that are evident in the labeling of some of the Scales (McCloskey, 2010). As suggested by Denckla (2002), researchers should undertake the educational endeavor of seeking convergence among other measures and the clinical utility of the BRIEF. In an attempt to achieve the purpose of this study, there will be implications for the research on executive functions of early adolescents in an urban middle school. Subpopulations in the study include bilingual and linguistically diverse students. Given the variables measured, the data analysis techniques that will be used will potentially present clinical and in-depth analyses at the item level from utilizing the shelf data to examine teacher ratings on the Behavior Rating Inventory of Executive Functions (BRIEF). Albeit, at the item level for students included in this study of the effectiveness of a mindfulness program used with middle school students, the inherent difficulties that abound with executive functions that appear tend to vary across domains and areas of involvement.

Existing research employed analyses utilizing the index or scale levels of the BRIEF in comparison with more direct assessments of executive function (Hartman, 2012). In a comparative study conducted by Bobik (2010), the prototype of a successful student based on the characteristics judged to be important by teachers for academic learning in middle school was created. The study also created a prototypical profile of an unsuccessful student based on characteristics judged by teachers to be obstacles to learning in middle school. This study utilized scale analyses to determine clusters of performance based on prototypical teacher ratings of successful and unsuccessful

students. The researcher's findings indicated that teachers' ratings of prototypical students exhibited very few executive function difficulties, as evidenced by T-Scores. However, unsuccessful students exhibited executive functions difficulties in the clinically significant range on multiple scales. The study's findings are consistent with previous and recent research examining academic success and executive function (Bull, Espy, & Weibe, 2008; Hartman, 2012; Latzman et al., 2010).

This study has potential significance in promoting item level analysis to contribute to the literature on neuroplasticity of early adolescents, and on school based interventions for brain development of adolescents in poverty. It will highlight the importance of MAPs and other school-based based interventions designed to support the improvement of EF for elementary and middle school students, early adolescents, and adolescents in poverty. Existing research employed analyses utilizing the index or scale levels of the BRIEF in comparison with more direct assessments of executive function (Bull et al., 2008; Hartman, 2012; Latzman et al., 2010). This study proposes to utilize item level analyses in an attempt to answer a primary research question on which specific items of the Behavior Rating Inventory of Executive Function (BRIEF) were most frequently endorsed as problematic for the students in the control and intervention groups prior to the start of the intervention program.

This study will use this procedure to determine the specific behaviors that are most likely endorsed by successful students. Conversely, those specific behaviors which are most likely endorsed for unsuccessful students will hopefully yield important information that was not readily representable in the "findings of the domain-specific and composite scores for the treatment and control groups" (Desmond & Hanich, 2014). This

study will contribute to the growing research concerning the plasticity of the early adolescent brain, and the research on school-based interventions for brain development. This study will extend existing research in executive functions aimed at increasing teachers' awareness of the disparities among the developmental progression and maturation of the frontal lobe (Bobik, 2010; Desmond & Hanich, 2014; Hartman, 2012; McCloskey et al., 2009). This study will also highlight the importance of increasing teachers' awareness about executive function–including the role executive function plays in social-emotional and academic learning.

For many adolescents today, being successful or unsuccessful often comes with the stigma of being perceived by peers as "smart," "not smart," "cool," or "not cool." Literacy skills, proficiency, intelligence, and achievement are easily associated with Intelligence Quotient (IQ) in early adolescent social interactions. Traditionally, "an IQ score on a psychometric test has been the means by which school psychologists usually define the potential for competence in academic learning" (Bobik, 2008, p. 92). The perceived capability and expectations to be a successful student is commonly correlated with high IQ scores (above a certain percentile) and conversely, "those students whose IQ scores fall below that percentile are perceived as less capable and at-risk for school failure" (Bobik, 2006, p. 92). Bobik purports that her prototype perspective attempts to define competence as a category that embodies the typical features possessed by successful students. On the other hand, unsuccessful students are those who have significantly less numbers of those attributes that are shared by successful learners. The findings from her study show that these features consist of executive functions skills that are believed to play an important role in academic learning.

The proposed study will utilize shelf-data to examine teacher ratings on the Behavior Rating Inventory of Executive Functions (BRIEF) at the item level for students included in a study of the effectiveness of a mindfulness program used with middle school students. It will seek to expound on the shelf data of existing research, an educational endeavor aimed at helping both successful and unsuccessful students from diverse backgrounds, particularly, "helping underachieves succeed in school because competence is not viewed as a fixed trait, but as a set of skills that can be remediated if deficient" (Bobik, 2008, p. 93).

Inferences for Forthcoming Study

There is a gap in the literature with regard to the effects of school-based mindfulness awareness programs on the executive functions of early adolescents in poverty. There is limited research that applies to executive functions interventions on adolescents in poverty. In addition, there is a scarcity of research on how executive functions on the item level for early adolescents may change based on interventions. By applying analyses on the item level, this current study will help to fill the gap in literature and provide useful resources lacking in the field. Shelf-data was used to examine teacher ratings on the Behavior Rating Inventory of Executive Functions (BRIEF) at the item level for students included in a study of the effectiveness of a mindfulness program used with middle school students.

Inferences for the study were drawn from existing research to highlight the importance of the problem of not addressing executive functions deficits of early adolescents and the overarching difficulties that are manifest within the range of domains of involvement (McCloskey et al., 2009). Statistically viable information is readily

accessible to researchers through scale level interpretation in their attempt to determine difficulties with executive functioning. However, there are barriers to effective interpretation as a result of the labeling of the Scales (Hartman, 2012; McCloskey et al., 2009). McCloskey points out that the difficulties with the use of various executive functions (Modulate and/or Inhibit) in the emotion domain are associated with all of the Emotional Control Scale. One example is that the BRIEF Inhibit Scale, actually is composed of items representing inhibition (for example, blurts things out), modulation (for example, acts wilder than others), and stopping (for example, unable to stop when asked to do so). Furthermore, the Organization of Materials Scales are distinguished from Plan/Organize Scales chiefly by the domains of function and areas of involvement reflected in item descriptions, rather than by the specific executive functions difficulties. The Plan/Organize and Organization of Materials Scales represent a constellation of uniquely diverse functions rather than a rigid/narrow set involving the Plan/Organize function. The Working Memory Scale is named for the way in which information is handled within a time frame of reference, rather than the Hold, Sustain, and Manipulate executive functions that would be involved. The behavior description of only one item on the Working Memory Scale could be linked to the Manipulate function thought to be critical to the effective processing of information in the extended time frame, typically referred to as working memory. For this reason, the non-specificity of the Scale item composition poses challenges for researchers and clinicians to "move beyond a simple statement of the presence or absence of elevated scores for each scale and a comparison of these score elevations across multiple raters" (Hartman, 2012, p. 28).

Although Scale level interpretations can offer valuable information, researchers who seek greater clarification of the executive functions difficulties are most likely to be represented by BRIEF results that favor a more extended interpretation to the item level (Hartman, 2012; McCloskey et al., 2009). This study followed a research paradigm and methodology that analyzed the shelf-data to examine teacher ratings on the Behavior Rating Inventory of Executive Functions (BRIEF) at the item level for students included in a study of the effectiveness of a mindfulness program used with middle school students. Additionally, this study applied new methodology to examine positive and negative change in teachers' ratings at the item level.

There is paucity of literature with regard to specific, direct intervention with students identified with low executive functions skills within the school environment. Executive functions skills are the self-regulatory skills required for children's academic and social-emotional functioning. Intervention aimed at remediating executive functions deficits are necessary to support students with skills to meet the challenges of sixth grade, the transitional year from elementary to the middle school setting (Desmond & Hanich, 2014). Along these lines, Blair (2002) conceptualized readiness as the execution of cognitive tasks and self-regulatory skills that underlie much of the behavior and attributes associated with successful school adjustment. Supporting children with effective executive functions, self-regulation assessment tools, and timely interventions to ensure school success at all levels is supported by current research.

Emphasis on the importance of self-regulation is supported by research focusing on how children can be successful in school from the onset. Children need interventions and programs that support their academic goals and social-emotional needs. Researchers

have found that effective programs have been shown to help children be prepared for school success, particularly in the preceding years. For children initially identified with the poorest executive functions, skills improved the most (Diamond & Lee, 2011). Furthermore, the researchers' findings indicated that lower income, lower-working-memory span, and ADHD children showed the greater improvement from the programs. Diamond and Lee (2011) emphasize the following: (a) early executive functions training is critical in leveling the playing field and reducing the achievement gap between more- and less-advantaged children; (b) executive functions predict later academic performance, and (c) executive functions skills development is correlated to school readiness and academic achievement. There are many areas of executive functions deficits that early adolescents may face in their transitional year. Strategic interventions may address one or more of the commonly considered areas of executive functioning, namely: response inhibition; cognitive flexibility; setting and achieving goals; task initiation; planning, organization, and time management; abstract reasoning/concept formation; working memory; attention control; controlling emotions and social behaviors; and self-monitoring and regulation/metacognition (Desmond & Hanich, 2014). To this end, the executive functions intervention with children is paramount in understanding the comprehensive supports for children in their transitional year of middle school.

Adding to research in pursuing promising strategies for the target population of students in need of executive functions remediation and support, this study engenders new interpretation from the existing study and extend the optimism for further educational endeavors. In a study utilizing archival data (Bobik, 2010), using the BRIEF to examine teacher ratings of prototypically academically successful and prototypically

unsuccessful students at the item level, the findings supported the hypothesis that, from a teacher's perspective, academically unsuccessful students demonstrate a number of behaviors that are indicative of executive functions difficulties. Also, academically successful students exhibit very few behaviors that are indicative of executive functions difficulties Hartman (2012). Students who experience school failure do so as a result of the common practice of schools to ignore executive functions measure in their assessments of students in determining areas of need. As a result, the IEP goals of students with disabilities typically do not address the issue of executive functions deficits. Hartman suggests that the mainstream practice devoid of offering specific executive functions interventions or systemic instruction for the general education populations, amounts to "a disservice to those students that may very well possess the academic skills set to master the curriculum, but fall short of the 'producing' end because of executive functions difficulties" (Hartman, 2012, p. 12).

Decline in educational outcomes among students in middle school is a growing concern in that it is exacerbated by grade retention, which is a practice used across schools in dealing with academic underachievement (Bobik, 2010; Hartman, 2012; Herzog & Balfanz, 2006; Roderick, 1994). This study highlighted the importance of executive functions development from elementary to middle school. This study is a subset of an original study by Desmond and Hanich (2014). Their finding supported the importance of school-based instruction directed at maintaining or improving early adolescent EF skills, thereby, increasing the likelihood of improved school outcomes for the early adolescents, especially in the transitional year from elementary to middle school.

This study aimed to utilize item level analysis, a different statistical procedure from the original study, to contribute to the literature on neuroplasticity of early adolescents and on school-based interventions for brain development of adolescents in poverty. The original study highlighted the importance of MAPs designed to support the improvement of EF for middle school students, early adolescents and adolescents in poverty. While existing research employed analyses utilizing the index or scale levels of the BRIEF in comparison with more direct assessments of executive function (Bull et al., 2008; Hartman, 2012; Latzman et al., 2010), this study utilized item level analyses to answer a primary research question: Which specific items of the Behavior Rating Inventory of Executive Function (BRIEF) showed differences in ratings of students in the treatment group compared with students in the control group?

This study employed five questions in the use of an item level analytic procedure for determining differences in ratings of students in the treatment group compared with students in the control group. This statistical approach was designed to yield important information that was not represented or identified in the original research findings regarding the domain-specific and composite scores for the treatment and control groups (Desmond & Hanich, 2014).

This study utilized shelf-data on teachers' ratings to expound on educational endeavor aimed at helping both successful and unsuccessful students from diverse backgrounds, particularly, "helping underachieves succeed in school because competence is not viewed as a fixed trait, but as a set of skills that can be remediated if deficient" (Bobik, 2008, p. 93). The findings of this research are promising and contribute to the growing body of literature on implications of executive functions and academic

production. Specifically, the focus on brain development of early adolescents in poverty through school-based interventions that support the improvement of executive functions and the social-emotional and academic production of early adolescents in urban middle school settings will be considered. The study highlighted the importance of executive functions development for children's social-emotional and academic production as a basis for providing a solid foundation for young adolescents throughout the life span.

This research employed the review of literature that expounds on the need for executive function skills development that marks the importance for school preparedness and executive functioning as platforms for later grades, including the middle school years of early adolescence.

Summary of Literature Review

A description and critique of scholarly literature reflecting an organization of the review from general to specific entailed a six-fold review beginning with research on the conceptualization of the critical elements of executive functions was presented. Second, the review presented a research on executive functions in urban, low-income children. Third, the review presented a discussion on literacy skills and adolescents with disability. Fourth, another review presented research on Academic Achievement and Executive Functioning. Next, a fifth review focused on research using BRIEF as an assessment tool. A final and sixth review focused on research on item analyses and using the BRIEF.

Researchers have postulated the association between learning and executive function skills, the conceptualization of children's functioning at school entry and transitional year from elementary to middle school, and the effects of school-based

mindfulness awareness programs on the improvement of executive functions of early adolescents (Blair, 2002; Bobik, 2008; Desmond & Hanich, 2014).

There is a logical point spread across past and current research that, since "traditional intelligence tests lack the sensitivity to detect executive function impairments in children, school psychologists can include developmentally appropriate executive function measures in their assessment of students to determine areas of need" (Bobik, 2008, p. 93).

The current study examined teacher ratings on the Behavior Rating Inventory of Executive Functions (BRIEF) at the item level for students included in a study of the effectiveness of a mindfulness program used with middle school students.

Research Questions

Research Question 1: Which specific items of the Behavior Rating Inventory of Executive Function (BRIEF) were most frequently endorsed as problematic for the students in the control and intervention groups prior to the start of the intervention program?

Research Question 2: Are there any significant differences between teacher BRIEF item rating changes from Time 1 to Time 2 for the control group compared to teacher BRIEF item rating changes from Time 1 to Time 2 for the intervention group?

Research Question 3: To what extent did teacher BRIEF item ratings change from Time 1 to Time 2 for the control group and from Time 1 to Time 2 for the intervention group?

Research Question 4: When BRIEF items are organized based on the BRIEF Scale structure, which cluster of executive function item ratings showed the most change from Time 1 to Time 2 for the control group and the intervention group?

Research Question 5: When BRIEF items are reorganized using the McCloskey Model of Executive Functions, which cluster of executive function item ratings showed the most change from Time 1 to Time 2 for the control group and the intervention group?

Chapter III: Methodology

The Original Study and Data Set

The original research project collected data for 57 subjects, 52 of which were used in an initial analysis of the data. Participants in this project by Desmond and Hanich (2014) included 52 sixth grade students between 11 and 12 years of age in an urban middle school in its sixth year of Corrective Action II under the regulations of the No Child Left Behind Act in a mid-sized city in Pennsylvania (Pennsylvania Department of Education, 2012). The school is one of four middle schools in a central Pennsylvania school district of approximately 11,000 students of which 75% fall below the national poverty level. Of the approximately 550 students in the middle school, approximately 90% are economically disadvantaged; 73% are Hispanic; 20% African American; and 6% White; with the remaining 1% from other ethnic or racial groups. Within this population, approximately 24% of the children require special education services; approximately 30% are identified as English language learners; and approximately 7% are identified as homeless. Sixth grade is the transitional year from elementary school for the students in the middle school which includes sixth, seventh, and eighth grades.

From a numerically coded list of the 52 sixth-grade students, ages 11-12, whose parents had provided permission to participate in the study, the principal blindly and randomly assigned 26 students to the treatment group and 26 students to the control group. Treatment students received MAPs instruction for 45 minutes, once a week, for a total of 10 weeks over a period of three months, beginning the first week in November and finishing in mid-January as a result of holiday vacations. Fifteen students persisted in the treatment group and completed all sessions of the 10 week study. The other 10

students in the initial treatment group attended less than six or fewer treatment sessions due to tardiness and absenteeism. The control students had 10 sessions of independent reading supervised by a teacher, but received no direct instruction. Core classroom teachers released both groups of students from their respective homeroom periods to participate in the study, but were not informed as to which group a student was assigned.

Core classroom-homeroom teachers (n = 8) for each of the 52 children's primary content areas (e.g. communication arts, mathematics, science, and social studies) completed two BRIEF questionnaires for each of the control and treatment students who were in their respective homeroom classrooms, immediately before and following the 10-week period. On the BRIEF teacher form, items were scored on a three-point scale indicating whether the behavior was observed "never (3)", "sometimes (2)" or "often (1)". Raw scores on the scale were converted to t-scores prior to data analysis.

Procedures and Materials for MAPs

Mindful Awareness Practices (MAPs). According to the principal investigators (Desmond & Hanich, 2014), the MAPs is a mindful awareness health and wellness program developed and conducted by Kinder Associates, *Wellness Works (WW) in Schools*^{TM}. Created in 2001, the program has been presented, refined and expanded in response to the recognition of the nature and needs of contemporary education and society. Engaging in lessons selected from WW school-based curricula, students have the opportunity to experience active classroom learning environments using mindful awareness principles and approaches. Each weekly class (generally 10 – 20 sessions) is sequenced, age appropriate, and customized to the individual classroom and students' needs. The overriding goal is to fortify the students' focus, attention, and concentration,

and strengthen their inner locus of control to address important self and life management issues, including but not limited to stress, mental health, emotional balance, self-regulation, resilience and learning readiness (Kinder, 2008, pp. 1-2).

As described by its developers, the MAPs program uses "focused awareness and self-regulation practices and curricula to promote positive neurological system function and behavioral expression" (Kinder, 2008, pp. 1-2). Each lesson for the treatment group included: (a) a preliminary group discussion of selected emotional, physical and social behavioral topics, (e.g. handling challenging emotions such as anger or sadness, mental fitness, and inner and outer physical, cognitive, and emotional regulation), (b) the practice of skills on MAPs, including self-attention, concentration, planning and organization, and emotional control, where the student focus shifts from external stimuli to internal awareness to sort out thoughts, emotions and physical behaviors in a non-reactive way, healthy breathing to promote slowing down and reflection, and physical movements with cognitive connection to release tension and stress, and (c) closing group reflections to allow students the opportunity for inquiry and comment.

In an earlier qualitative study on the WW-MAPS, with both district and university institutional review boards approval, one of the authors conducted a series of 17 observations; 45 minutes in duration of two classrooms, of the cognitive, social and emotional behaviors of three emotional support students, grades 7-8, in one classroom and three learning support children, grades 7-8, in the second classroom, over a period of six months. The instructors for the treatment group were two teachers were formally trained in the MAPs teaching practices, had previously taught in the elementary feeder

school to the middle school, and had been teaching in the MAPs program in this and other school districts for two to three years.

The original project used a behavioral rating scale designed by the principal investigator to measure the incidences of positive and negative cognitive, social and emotional behaviors for each of the six students as they participated in the MAPS instruction during each observation. Behavioral indicators on the scale were descriptive terms and had been screened by school staff for clarity of the indicators' meaning; a graduate student co-scored five of the observations to provide inter-rater reliability of the behavioral ratings. A plus indicated an observed positive behavior; a minus, an observed negative behavior. Examples of positive behaviors included participation in the exercise, volunteered responses to questions, focused attention on the teacher, quiet attention while another student took a turn or responded; examples of negative behavior included refusal to participate, shouting out, physical touching of another student, loud bodily noises, etc. Over the length of the study, all six students increased the incidence of positive behaviors during instruction with a reduction in negative behaviors. However, the three emotional support students showed the highest increase in the demonstration of positive behaviors and a decrease in the number of negative behaviors for each student. The study was limited by the small sample of students observed in each of the MAPs classrooms, the potential of rater-bias regarding student behaviors, and the absence of data on whether the changes in students' behaviors transferred to their behaviors in their regular, special education classroom with their regular teacher.

To address the limitations of the earlier study and to assess the impact of the WW program on the EF of the early adolescents, the researchers used *The Behavior Rating*

Inventory of Executive Functions, (BRIEF), as developed by Gioia et al., (2002). The eight domains of EF assessed in the BRIEF are (a) inhibiting, (b) shifting, (c) emotional control, (d) initiating, (e) working memory, (f) planning and organizing,(g) organizing of materials, and (h) monitoring. Two broad composites are scored across the eight domains: Behavioral Regulation Index and Metacognition Index, which are combined to yield an overall Global Executive Composite. The Behavioral Regulation Index is comprised of the inhibit, shift, and emotional control subscales and the Metacognition Index is comprised of the initiate, working memory, plan/organize, organization, and monitor subscales. Lower scores on the BRIEF are measures of higher levels of EF behaviors. Psychometric properties of the BRIEF are strong (internal consistencies 0.80 - 0.98) (Desmond & Hanich, 2014).

Summary of Findings of the Original Research

The original research study used a quasi-experimental design with quantitative methodologies, including Repeated measures analysis of variance (RMANOVA) and multiple regression analyses, as primary data analytic procedures. The findings indicated that the MAPs improved the EF-related ratings of the sample of urban, low income, early adolescents in the qualitative study and the BRIEF validated EF ratings in the treatment group of early adolescents in the randomized control study (Desmond & Hanich, 2014).

Overview of Research Design for the Current Study

It is worthy to note that the conversations the researcher engaged in with the principal investigators were very informative and guided the approach to utilizing the shelf-data. The researcher's discussions with the principal investigators led to their recommendations that were intended to hopefully yield deeper interpretations of the

research through item level analyses, particularly, given the new focus of analysis on the item level. This study involved a secondary analysis of an existing data set and the item analyses were different from the original research study, which used a quasi-experimental design with quantitative methodologies, including repeated measures analysis of variance (MANOVA) and multiple regression analyses that were the primary data analytic procedures of the principal investigators. Their reflective outlook on this current study supported the researcher as they collaborated with a statistical consultant on the item level procedure. The statistical consultant determined that the researcher's current study is the best way to use the shelf-data.

Research Design of the Current Study

The current study involved a secondary analysis of an existing data set that utilized shelf-data to examine teacher ratings on the Behavior Rating Inventory of Executive Functions (BRIEF) at the item level for students included in a study of the effectiveness of a mindfulness program used with middle school students. Students in the study were divided into control and intervention groups. The original research project collected data for 57 subjects, 52 of which were used in an initial analysis of the data. Some of the subjects were not rated by a teacher at the end of the intervention program. However, for the purposes of the current research study, it is necessary that only subjects for whom both pre-intervention and post-intervention data was collected be included in the study. As a result of this requirement, 12 cases were removed from the data set, making the total number of cases to be analyzed in this study 45. Of these 45 case data sets, 18 were from students who received the intervention program, and 27 are from students in a control group that did not receive the program.

The research questions for this secondary analyses, which is a subset of an original study by Desmond and Hanich (2014), reflects the item data analytic procedures with respect to the use of archival study data, which was retrieved from the data files of the principal investigator of the original Mindfulness program study. Teacher BRIEF individual item ratings from the original BRIEF forms along with the demographic data variable listed in Table, was entered into an Excel file and later converted to an SPSS file for analyses. There was no contact between the student researcher and the students or teachers who participated in the original study.

Frequency distributions of Time 1 and Time 2 teacher BRIEF item ratings of students in the control and intervention groups were generated and used to conduct analyses to answer the questions posed for this study.

Research Questions

Research Question 1: Which specific items of the Behavior Rating Inventory of Executive Function (BRIEF) were most frequently endorsed as problematic for the students in the control and intervention groups prior to the start of the intervention program?

The frequency distributions of Time 1 teacher BRIEF item ratings of students in the control and intervention groups were examined to identify those item most frequently endorsed as problematic (ratings of Often).

Research Question 2: Are there any significant differences between teacher BRIEF item rating changes from Time 1 to Time 2 for the control group compared to teacher BRIEF item rating changes from Time 1 to Time 2 for the intervention group?

Time 1 and Time 2 teacher BRIEF item ratings of students in the control and intervention groups were used to generate Time 2 – Time 1 difference scores. Time 2 – Time 1 difference scores will be recoded using the conditional logic in Table 2 below. This recoding enabled difference scores to be classified into 4 separate categories (positive stasis, positive change, negative stasis, negative change) as shown in Table 2. Frequency distributions of the difference score categories were generated and examined for each BRIEF item to identify the extent to which item ratings changed from Time 1 to Time 2 for the control and the intervention groups.

Research Question 3: To what extent did teacher BRIEF item ratings change from Time 1 to Time 2 for the control group and from Time 1 to Time 2 for the intervention group?

The recoded item difference scores were transformed into change scores using the recoding logic in Table 2. This transformation allowed for the quantification of change status categories. The change status category scores for each BRIEF item were subjected to a t-test to determine if there is a significant difference between the mean of the item difference scores of the control group and the intervention group.

Table 2

Recoding of Item Difference Scores into Change Status Categories and Change Scores

Post-Intervention BRIEF Item Rating	Pre-Intervention BRIEF Item Rating	Difference Score	Change Status Category	Change Score
1 (Never)	1 (Never)	0	Positive Stasis	0
1 (Never)	2 (Sometimes)	-1	Positive Change	-1
1 (Never)	3 (Often)	-2	Positive Change	-2
2 (Sometimes)	3 (Often)	-1	Positive Change	-1
2 (Sometimes)	2 (Sometimes)	0	Negative Stasis	1
3 (Often)	3 (Often)	0	Negative Stasis	1
3 (Often)	2 (Sometimes)	1	Negative Change	2
3 (Often)	1 (Never)	2	Negative Change	3
2 (Sometimes)	1 (Never)	1	Negative Change	2

Research Question 4: When BRIEF items are organized based on the BRIEF Scale structure, which cluster of executive function item ratings showed the most change from Time 1 to Time 2 for the control group and the intervention group? To answer this question, data in Tables 24-32 presented in Chapter IV were used in the following way:

1. Calculate the Positive Change Ratio separately for the Control and the Treatment Groups.
    a. For the Control Group: Calculate the potential for positive change which is the total percent minus the Positive Stasis percent (100 – Pos Stasis %) Item 1 example: 27 – 6 = 21. This is the percent of students who have the potential to change because they were originally rated as Sometimes or Often demonstrating the problem. The research subtracted the Positive Stasis percent from the total possible percent because the positive stasis group already was receiving a rating of Never exhibiting the negative

behavior. If a participant isn't exhibiting the behavior in the first place, there is no potential for positive change, so we are subtracting these students out of the pool to derive the percent of students that have the potential to change (100 – Positive Stasis).

b. For the Control Group: the actual positive change value was used, which is the Pos Change percent and use it with the Positive Change Potential percent to form a ratio as follows: Positive Change Percent/Potential Positive Change Percent.

c. Using item 1 of the Emotional Control data in Table 12, the positive change ratio would be calculated as follows: Positive Change Percent 15/Potential for change 100 – Positive Stasis 22; 15/100 – 22 = 15/78 = 19%.

d. Repeat A and B for the Treatment Group; using item 1 of the emotional Control data in Table 12, the positive change ratio is 17/100 – 44 = 17/56 = 30%.

2. Calculate the Negative Change Ratio separately for the Control and the Treatment Groups.

   a. For the Control Group, add the negative change and the negative stasis percentage to get the negative outcome value.

   b. Use the Potential for Positive Change value from the Positive Change analysis.

   c. Calculate the Negative Change Ratio as follows: Negative Change + Negative Stasis/Possible Positive Change.

d. Using Item 1 of the Emotional Control Scale, the negative change ratio would be calculated as follows: 26 + 37 /78 = 63/78 = 81%.

e. Repeat a-c for the Treatment Group. Using item 1 of the Emotional Control data in Table 12, the negative change ration for the treatment group is 22+17 / 78 = 39/78 = 50%.

Research Question 5: When BRIEF items are reorganized using the McCloskey Model of Executive Functions, which cluster of executive function item ratings showed the most change from Time 1 to Time 2 for the control group and the intervention group? The data table for Question 5 will be reorganizing the data from research question 4. Tables 33 through 41, presented in Chapter IV, reflect the answers to Research Question 5 for the BRIEF scale items organized by the 6 clusters of the MMEF model and the 33 self-regulation executive functions within the clusters.

According to the MMEF, items from the BRIEF can be assigned to one or more of the 33 self-regulation executive functions using a rational behavior analysis framework as applied in the work of Hartman (2012) as shown in Table 3. This assignment yields the following breakdown according to the categories: Anticipate (1 items); Balance (1 item); Correct (2 items); Estimate time (2 items); Execute (2 items); Flexible (3 items); Generate (3 items); Hold (5 items); Inhibit (9 items); Initiate (4 items); Manipulate (1 item); Modulate (17 items); Monitor (11 items); Organize (4 items); Plan (1 item); Retrieve (4 items); Shift (3 items); Stop/Interrupt (4 items); and Sustain (8 items).

Sampling and Description of Population

The current study is a secondary analysis of an existing data set that utilized shelf-data to examine teacher ratings on the Behavior Rating Inventory of Executive Functions

(BRIEF) at the item level for students included in a study of the effectiveness of a mindfulness program used with middle school students. The sampling and description of population is presented in the overview of the original study in Chapter III.

Research Procedures

This secondary analysis of an existing data set utilized shelf-data to examine teacher ratings on the Behavior Rating Inventory of Executive Functions (BRIEF) at the item level for students included in a study of the effectiveness of a mindfulness program used with middle school students. Students in the study were divided into control and intervention groups. The original research project presented at the beginning of Chapter III, collected data for 57 subjects, 52 of which were used in an initial analysis of the data. Some of the subjects were not rated by a teacher at the end of the intervention program. However, for the purposes of the current research study, it is necessary that only subjects for whom both pre-intervention and post-intervention data was collected be included in the study. As a result, of this requirement, 12 cases will be removed from the data set, making the total number of cases to be analyzed in this study 45. Of these 45 case data sets, 18 are from students who received the intervention program, and 27 are from students in a control group that did not receive the program.

Each student was rated by a classroom teacher at Time 1 prior to the start of the Mindfulness program instruction with the intervention group and at Time 2 after the end of the mindfulness program instruction with the intervention group. The students in the control group were rated by their teachers at Time 1 and Time 2, but were not exposed to the Mindfulness program. The students in the intervention group participated in varying numbers of mindfulness instruction sessions shortly after being rated at Time 1. The

students were rated again at Time 2, shortly after the end of the Mindfulness program instruction. For the purposes of this study, only the students in the intervention group that participated in six or more Mindfulness program sessions were included in the intervention group.

Research Design Measures

The BRIEF is an 86-item standardized questionnaire that according to the manual, takes approximately 15 minutes to complete (Gioia et al., 2002). Each item response reflects the rater's perception of everyday behavioral manifestations of executive functions in children. The BRIEF items are negative indicators, meaning higher scores equate to lower levels of functioning. Items are scored as: 1 = Never, 2 = Sometimes, and 3 = Often. Functioning is measured based on a teachers' 3-point rating of the observance of the target behaviors being problematic. Each item is related to a specific domain of executive functioning. These include the Inhibit, Shift, Emotional Control, Initiate, Working Memory, Plan/Organize, Organization of Materials, and Monitor scales. Raw scores were obtained using the three point scale and were then converted to T scores with corresponding percentiles, as an indication of the child's level of functioning, or lack thereof. These T scores (mean of 50, standard deviation of 10) reflect an individual's score in relation to the scores of others in the standardization sample. According to the manual (Gioia, 2000), a T score of 65 is suggestive of being clinically significant; the higher the score above the cutoff of 65, the greater the dysfunction in specific executive functioning. BRIEF scores are standardized according to age and gender. The BRIEF possesses strong psychometric properties. Internal consistency ranged from 0.84 to 0.98 using Cronbach's alpha statistic. According to the manual (Gioia, 2000), test-retest

correlation ranged from 0.83 to 0.92 over an approximate three-week period. Factor analyses supported a two-factor model of executive function showing high correlations with other instruments that measure similar constructs and lower correlations where associations are not expected.

As mentioned previously, the BRIEF provides global, index, and scale score based upon ratings. At the composite level, the Global Executive Composite (GEC), scaled T-scores reflect an overall level of functioning. The instrument is then broken down into two factors based upon factor analyses, which demonstrated high correlation to other instruments measuring similar constructs, and lower correlations when association with those measures were not expected. The metacognitive index is built upon the Initiate, Working Memory, Plan-Organize, Organization of Materials, and Monitor scales. The Behavioral Regulation Index is comprised of the Inhibit, Shift, and Emotional Control scales.

Table 3

BRIEF Items Reclassified According to the McCloskey Model of Executive Functions

MEFS	Item	Scale	Item
anticipate	75	plor	doesn't associate future with present (grades with homework)
Balance	29	plor	overfocuses on details and misses the big picture
Correct	68	omat	leaves things lying around
Correct	71	omat	leaves messes
Esttime	41	plor	underestimates time needed for task completion
Esttime	49	plor	initiates effort at the last minute
Execute	78		poor handwriting
Flexible	5	shift	resist different way to solve a problem
Flexible	24	shift	resists changes in routines
Flexible	30	shift	can't get used to new situations
focus/sel	2	Wm	difficulty holding more than 1 of three things
generate	19	initiate	not creative in problem-solving efforts
generate	34	initiate	trouble generating different ways of solving a problem
generate	70	initiate	has trouble generating a different way to solve problems
Hold	25	Wm	difficulty holding information about tasks that have more than one step
Hold	31	Wm	difficulty holding information about what he/she was doing
Hold	32	Wm	difficulty holding information when sent to get something
Hold	60	Wm	trouble holding information even for a few minutes
Inhibit	38	inhibit	no thought before action
Inhibit	42	inhibit	interrupts others
Inhibit	43	inhibit	is impulsive
Inhibit	59	inhibit	trouble if unsupervised
Inhibit	69	inhibit	no thought before action
Inhibit	74	inhibit	trouble waiting turn
Inhibit	79	inhibit	require close supervision
Inhibit	81	inhibit	fidgety

MEFS	Item	Scale	Item
Inhibit	83	inhibit	blurts things out
Inhibit	85	inhibit	talks at wrong time
Initiate	3	initiate	not a self starter
Initiate	10	initiate	must be told to start tasks even those of great interest
Initiate	50	initiate	trouble getting started on homework or chores
Initiate	63	initiate	doesn't take initiative
manipulate	17	plor	can generate ideas but can't get them on paper
modulate	1	emo	overreacts to small problems
modulate	6	shift	upset by new situations
modulate	7	emo	has explosive outbursts
modulate	13	shift	upset by change in plans
modulate	14	shift	disturbed by changes (teacher, class, etc.)
modulate	26	emo	outbursts for little reason
modulate	27	emo	frequent changes in mood
modulate	37	plor	overwhelmed by large assignments
modulate	47	inhibit	gets out of control more than friends
modulate	48	emo	reacts more strongly to situations than peers
modulate	51	emo	mood is easily influenced by situation
modulate	55	mon	talks or plays too loudly
modulate	57	inhibit	acts too wild or out of control
modulate	62	shift	can't stop being disappointed
modulate	64	emo	intense outbursts end suddenly
modulate	66	emo	small events triggers big reaction
modulate	72	emo	gests upset too easily
monitor	15	mon	makes careless errors
monitor	22	mon	makes careless errors
monitor	23	plor	forgets to hand in homework, even when it is completed
monitor	33	mon	unaware of own behavior's effect on others
monitor	36	mon	doesn't finish work
monitor	44	mon	unaware of own behavior's causing negative reactions
monitor	45	inhibit	leaves seat at wrong time

MEFS	Item	Scale	Item
monitor	46	mon	unaware of own behavior's in a group
monitor	54	mon	poor awareness of own strengths and weaknesses
monitor	61	mon	sloppy work products
monitor	65	mon	unaware of own behavior's causing negative reactions
organize	20	omat	disorganized backpack
organize	52	plor	doesn't plan ahead for assignments
organize	56	plor	poorly organized written expression
organize	73	omat	disorganized closet or desk
Retrieve	11	omat	can't find things
Retrieve	12	plor	doesn't bring home things from school
Retrieve	16	omat	can't find things at home
Retrieve	35	plor	can generate ideas but doesn't sustain effort to complete tasks
Retrieve	67	omat	can't find things at school
Shift	40	shift	thinks too much about a topic
Shift	53	shift	gets stuck on one topic or activity
Shift	80	shift	trouble shifting from one activity to another
stop/int	4	shift	can't stop being disappointed
stop/int	9	inhibit	must be told to stop
stop/int	58	inhibit	trouble stopping actions
stop/int	84	shift	repeats same things over and over
Sustain	8	Wm	short attention span
Sustain	18	Wm	trouble concentrating on tasks
Sustain	21	Wm	easily distracted by sensory stimuli
Sustain	28	Wm	needs help to stay on task
Sustain	39	Wm	trouble finishing tasks
Sustain	82		can't sustain focus on a single topic when talking
Sustain	86		unprepared for class

Human Participants and Ethics Precautions

The researcher is not the principal investigator of the original study, and therefore, had no contact with the participants for the purpose of this current study.

Ethical Concerns and Risks

As noted earlier, the researcher utilized shelf-data and had no contact with the participants in the previous study. The shelf data had no identifiers and confidentiality was maintained in the acquisition of the shelf data set that will be used for the Excel and SPSS analyses. With observance of strict confidentiality, the principal investigators provided access to the data sets devoid of identifiers and contacts information. As required by the Institutional Review Board (IRB) approval and the School District's conditions for approval of the principal investigator's research, the ethical considerations regarding parental consent and individual participants were followed. Any bias that might have existed in the original study was considered. The current study was determined to be exempt from review by The George Washington University's Institutional Review Board.

Chapter IV: Results

The results of this study highlight some new findings from the item level analysis. This section presented the data analysis of the teacher BRIEF ratings at the item level for the students in the control and intervention groups prior to the start of the intervention program, including frequency counts for teacher endorsements of the items, cumulative percentage and difference scores for endorsement of individual items for the students in the control and intervention groups prior to the start of the intervention program. The purpose of this study was to examine the frequency of occurrence for individual items on the BRIEF in order to elucidate those items which were most frequently endorsed for the students in the control and treatment groups. Further, the study sought to identify those items that were most discriminative of students in the control group versus students in the intervention group, based upon teacher ratings.

Demographic Data

Archival study data was retrieved from the data files of the principal investigator of the original Mindfulness program study. The original research project collected data for 57 subjects, 52 of which were used in an initial analysis of the data. Some of the subjects were not rated by a teacher at the end of the intervention program. However, for the purposes of the current research study, only subjects for whom both pre-intervention and post-intervention data was collected were included in the study. As a result, of this requirement, 12 cases were removed from the data set, making the total number of cases to be analyzed in this study 45. Of these 45 case data sets, 18 are from students who received the intervention program, and 27 are from students in a control group that did not receive the program.

Each student was rated by a classroom teacher at Time 1 prior to the start of the Mindfulness program instruction with the intervention group, and at Time 2 after the end of the mindfulness program instruction with the intervention group. The students in the control group were rated by their teachers at Time 1 and Time 2, but were not exposed to the Mindfulness program. The students in the intervention group participated in varying numbers of mindfulness instruction sessions shortly after being rated at Time 1. The students were rated again at Time 2, shortly after the end of the Mindfulness program instruction. For the purposes of this study, only the students in the intervention group that participated in six or more Mindfulness program sessions were included in the intervention group. Frequency distributions of Time 1 and Time 2 teacher BRIEF item ratings of students in the control and intervention (treatment) groups was generated and used to conduct analyses to answer the five questions posed for this study.

Research Question 1

Research Question 1: Which specific items of the Behavior Rating Inventory of Executive Function (BRIEF) were most frequently endorsed as problematic for the students in the control and intervention groups prior to the start of the intervention program?

The frequency distributions of Time 1 teacher BRIEF item ratings of students in the control and intervention groups were examined to identify those item most frequently endorsed as problematic (ratings of Often). Frequency counts were collected based upon teacher ratings for the 86 items of the BRIEF. Tables 4 through 12 show the frequency of teacher endorsements for BRIEF Teacher form items of each BRIEF Scale for the

students in the control and intervention groups prior to the start of the intervention program.

Emotional Control Scale. Cumulative percentages of teacher ratings of the items of the Emotional Control scale are shown in Table 4. Item ratings of "Sometimes" or "Often" were much more frequent for the students in the control than for the intervention group for 7 of the 9 items of the Emotional Control Scale.

Table 4

Percentage of Teacher Endorsement of "Never" "Sometimes" and "Often" for the Control and Treatment Groups for the BRIEF Emotional Control Scale

Emotional Control Scale EMO-PR	*Control*				*Treatment*			
	N	*S*	*O*	*S+O*	*N*	*S*	*O*	*S+O*
01: Overreacts to small problems	37	33	30	63	55	22	22	44
07: Has explosive, angry outbursts	63	22	15	37	72	11	17	28
26: Has outbursts for little reason	63	18	19	37	66	5	28	33
27: Mood changes frequently	40	41	18	59	61	11	28	39
48: Reacts more strongly to situations than other children	52	22	26	48	56	17	28	45
51: Mood is easily influenced by the situation	30	44	26	70	50	17	33	50
64: Angry or tearful outbursts are intense but end easily	67	26	7	33	67	11	22	33
66: Small events trigger big reactions	48	37	15	52	50	17	33	50
72: Becomes upset too easily	59	15	26	41	56	17	28	45

Initiate Scale. Table 5 displays the cumulative percentages of teacher endorsements for the items of the Initiate scale. On this scale, teacher ratings reflected higher percentage levels of endorsement of frequency of occurrence of problematic behavior for students in the control group than for students in the intervention group for six of the seven items.

Table 5

Percentage of Teacher Endorsement of "Never" "Sometimes" and "Often" for the Control and Treatment Groups for the BRIEF Initiate Scale

Initiate Scale INI: PR	*Control*				*Treatment*			
	N	*S*	*O*	*S+ O*	*N*	*S*	*O*	*S+ O*
03: Is not a self-starter	26	41	33	74	39	28	33	61
10: Needs to be told to begin a task even when willing	11	63	26	89	33	44	22	66
19: Does not show creativity in solving a problem	26	63	11	74	28	50	22	72
34: Has problems coming up with new ways of solving a problem	11	67	22	89	33	39	28	67
50: Has trouble getting started on homework or chores	22	56	22	78	33	28	39	67
63: Does not take initiative	22	56	22	78	39	33	28	61
70: Has trouble thinking of a different to solve a problem when stuck	26	52	22	74	22	50	28	78

Shift Scale. Table 6 reflects the cumulative percentages of teacher endorsements for items of the Shift Scale of the BRIEF. For the Shift scale of the BRIEF, cumulative percentages of teacher endorsements of "Sometimes" and "Often" reflected higher percentage ratings of problematic behavior for students in the control group than for students in the intervention group on all items.

Table 6

Percentage of Teacher Endorsement of "Never" "Sometimes" and "Often" for the Control and Treatment Groups for the BRIEF Shift Scale

Shift Items SFT-PR	*Control*				*Treatment*			
	N	*S*	*O*	*S+O*	*N*	*S*	*O*	*S+O*
04: Cannot get a disappointment, scolding, or insult off his/her mind	29	33	37	70	50	33	17	50
05: Resists or has trouble accepting a different way to solve a problem	37	37	25	62	50	33	17	50
06: Becomes upset with new situations	52	22	26	48	67	22	11	33
13: Acts upset by a change in plans	48	33	19	52	72	11	16	27
14: Is disturbed by a change of teacher or class	44	48	7	55	72	17	11	28
24: Resists change of routines	52	37	11	48	67	11	22	33
30: Has trouble getting used to new situations (classes, groups, friends)	37	41	22	63	50	28	22	50
40: Thinks too much about the same topic	52	22	26	48	67	11	22	33
53: Gets stuck on one topic or activity	44	44	11	55	50	22	28	50
62: After having a problem, will stay disappointed for a long time	30	33	37	70	50	22	28	50

BRIEF Inhibit Scale. Teacher endorsements of the items of the Inhibit Scale are displayed in Table 7. Nine of the 10 items was rated to be more problematic as reflected by teacher endorsements of "Sometimes" and "Often" for students in the Control group than students in the Intervention group.

Table 7

Percentage of Teacher Endorsement of "Never" "Sometimes" and "Often" for the Control and Treatment Groups for the BRIEF Inhibit Scale

Inhibit Scale Items INH- PR	*Control*				*Treatment*			
	N	*S*	*O*	*S+ O*	*N*	*S*	*O*	*S+ O*
09: Needs to be told to "no" or "stop that"	33	37	30	67	44	33	22	55
38: Does not think before doing	22	56	22	78	33	44	22	66
42: Interrupts others	37	41	22	63	39	28	33	61
43: Is impulsive	33	37	30	67	44	22	33	55
45: Gets out of seat at wrong time	37	41	22	63	44	22	33	55
47: Gets out of control more than friends	67	11	22	33	61	6	33	39
57: Acts too wild or "out of control"	59	19	22	41	67	5	28	33
58: Has trouble putting the brakes on his/her actions	30	44	26	70	50	17	33	50
59: Gets in trouble if not supervised by an adult	33	41	26	67	44	28	28	56
69: Does not think of consequences before acting	33	41	26	67	39	28	33	61

Working Memory Scale. As shown in Table 8, cumulative percentages of teacher endorsements for specific items of the Working Memory Scale of the BRIEF reflected that six of 10 items were rated as more problematic more frequently for students in the Control group than for students in the Intervention group.

Table 8

Percentage of Teacher Endorsement of "Never" "Sometimes" and "Often" for the Control and Treatment Groups for the BRIEF Working Memory Scale

Working Memory Items WM-PR	*Control*				*Treatment*			
	N	*S*	*O*	*S+O*	*N*	*S*	*O*	*S+O*
02: When given three things to do, remembers only the first or last	41	30	29	59	39	44	17	61
08: Has a short attention span	30	37	33	70	33	39	28	67
18: Has trouble concentrating on chores, schoolwork, etc.	19	56	26	82	28	44	28	72
21: Is easily distracted by noises, activity, sights, etc.	22	52	26	78	33	33	33	66
25: Has trouble with chores or tasks that have more than one step	33	48	19	67	39	44	17	61
28: Needs help from an adult to stay on task	15	55	30	85	39	33	28	61
31: Forgets what he/she was doing	52	33	15	48	39	33	28	61
32: When sent to get something, forgets what he/she is supposed to get	63	22	15	37	55	22	22	44
39: Has trouble finishing tasks (chores of homework)	26	48	26	74	39	22	39	61
60: Has trouble remembering things, even for a few minutes	41	48	11	59	33	44	22	66

Organization of Materials Scale. The cumulative percentages of teacher ratings for successful and unsuccessful students on the Organization of Materials Scale are shown in Table 9. On this scale, teacher ratings reflected higher percentage levels of endorsement of frequency of occurrence of problematic behavior for students in the control group than for students in the intervention group for two of the seven items and the same for the control and intervention groups for three of the seven items. However, teacher ratings reflected higher percentage levels of endorsement of frequency of

occurrence of problematic behavior for students in the treatment group than for students in the intervention group for two of the seven items.

Table 9

Percentage of Teacher Endorsement of "Never" "Sometimes" and "Often" for the Control and Treatment Groups for the BRIEF Organization of Materials Scale

Organization of Materials Scale OMAT-PR	*Control*				*Treatment*			
	N	*S*	*O*	*S+ O*	*N*	*S*	*O*	*S+ O*
11: Loses lunch box, lunch money, permissions slips, homework, etc.	48	33	19	52	44	44	11	55
16: Cannot find clothes, glasses, shoes, books, and pencils, etc.	52	26	22	48	56	28	17	45
20: Backpack is disorganized	22	44	33	77	33	33	33	66
67: Cannot find things in room or school desk	59	19	22	41	44	33	22	55
68: Leaves a trail of belongings wherever he/she goes	56	19	26	45	61	17	22	39
71: Leaves messes that others have to clean up	44	37	18	55	39	39	22	61
73: Has a messy desk/closet	56	22	22	44	56	22	22	44

Plan and Organize Scale. Table 10 reflects the cumulative higher percentages of teacher endorsements for items of the BRIEF Plan and Organize Scale in 8 of 10 items problematic ratings by for students in the control than students in the intervention group.

Table 10

Percentage of Teacher Endorsement of "Never" "Sometimes" and "Often" for the Control and Treatment Groups for the BRIEF Plan/Organize Scale

Plan/Organize Scale PLOR: PR	*Control*				*Treatment*			
	N	*S*	*O*	*S+O*	*N*	*S*	*O*	*S+O*
12: Does not bring home homework, assignment sheets, materials, etc.	37	37	26	63	33	50	17	67
17: Has good ideas but cannot get them on paper	19	59	22	81	33	34	22	66
23: Forgets to hand in homework, even when completed	41	22	33	55	28	39	33	72
29: Gets caught up in details and misses the big picture	19	56	26	82	50	28	22	50
35: Has good ideas but does not get the job done (lacks follow-through)	15	59	26	85	33	44	22	66
37: Becomes overwhelmed by large assignments	22	52	26	78	27	50	22	72
41: Underestimates time needed to finish tasks	22	52	26	78	28	44	28	72
49: Starts assignments or chores at the last minute	26	55	19	74	39	39	22	61
52: Does not plan ahead for school assignments	26	48	26	74	39	33	28	61
56: Written work is poorly organized	26	48	26	74	39	33	28	61

Monitor Scale. Cumulative percentages for teacher endorsements of items on the Monitor scale of the BRIEF are displayed in Table 11. Teacher ratings revealed more frequent ratings of problematic behaviors as occurring "Sometimes" or "Often" for students in the Control group than for students in the Intervention group for nine out of 10 items of the Monitor Scale.

Table 11

Percentage of Teacher Endorsement of "Never" "Sometimes" and "Often" for the Control and Treatment Groups for the BRIEF Monitor Scale

Monitor Scale MON: PR	*Control*				*Treatment*			
	N	*S*	*O*	*S+O*	*N*	*S*	*O*	*S+O*
15: Does not check work for mistakes	19	41	40	81	27	39	33	72
22: Makes careless errors	4	67	30	97	28	44	28	72
33: Is unaware of how his/her behavior affects or bothers others	26	63	11	74	39	39	22	61
36: Leaves work incomplete	26	52	22	74	28	44	28	72
44: Does not notice when his/her behavior causes negative reactions	33	44	22	26	33	50	17	67
46: Is unaware of own behavior when in a group	22	56	22	78	39	39	22	61
54: Has poor understanding of own strengths and weaknesses	30	44	26	70	33	33	33	66
55: Talks or plays too loudly	37	41	22	63	61	11	28	39
61: Work is sloppy	19	55	26	81	39	44	17	61
65: Does not realize that certain actions bother others	22	63	15	78	39	28	33	61

BRIEF Extra Items. Cumulative percentages of teacher endorsements for those items that are part of the BRIEF but not included in any of the aforementioned scales are displayed in Table 10. For the Extra Items scale of the BRIEF, cumulative percentages of teacher endorsements of "Sometimes" and "Often" reflected higher percentage ratings of problematic behavior for students in the control group than for students in the intervention group in 10 of the 13 items, the same for both groups in two of the 13 items, and higher for students in the treatment group than students in the control group in one of the 13 items.

Table 12

Percentage of Teacher Endorsement of "Never" "Sometimes" and "Often" for the Control and Treatment Groups for the Extra Items of the BRIEF

Extra Items NA	*Control*				*Treatment*			
	N	*S*	*O*	*S+O*	*N*	*S*	*O*	*S+O*
74: Has trouble waiting for turn	39	42	19	51	56	38	6	44
75: Doesn't connect doing tonight's homework with grades	39	39	22	63	44	50	6	56
76: Tests poorly even when knows correct answers	30	42	27	69	33	47	20	67
77: Does not finish long-term project	27	46	27	73	53	40	7	47
78: Has poor handwriting	39	42	19	61	53	35	11	46
79: Has to be closely supervised	54	19	27	46	59	23	18	41
80: Has trouble moving from one activity to another	26	52	22	74	39	44	17	61
81: Is fidgety	48	22	30	52	53	33	13	46
82: Cannot stay on the same topic when talking	59	22	19	41	80	13	7	20
83: Blurts things out	37	37	26	63	66	20	13	33
84: Says the same thing over and over	70	7	22	29	87	7	6	13
85: Talks at the wrong time	22	52	25	77	43	44	12	66
86: Does not come prepared for class	41	37	22	39	36	38	25	63

Research Question 2

Are there any significant differences between teacher BRIEF item rating changes from Time 1 to Time 2 for the control group compared to teacher BRIEF item rating changes from Time 1 to Time 2 for the intervention group?

The recoded item difference scores were transformed into change scores using the recoding logic in Table 13. This transformation allowed for the quantification of change

status categories. The change status category scores for each BRIEF item was subjected to a t-test to determine if there is a significant difference between the mean of the item difference scores of the control group and the intervention group.

Table 13

Recoding of Item Difference Scores into Change Status Categories and Change Scores

Post-Intervention BRIEF Item Rating	Pre-Intervention BRIEF Item Rating	Difference Score	Change Status Category	Change Score
1 (Never)	1 (Never)	0	Positive Stasis	0
1 (Never)	2 (Sometimes)	-1	Positive Change	-1
1 (Never)	3 (Often)	-2	Positive Change	-2
2 (Sometimes)	3 (Often)	-1	Positive Change	-1
2 (Sometimes)	2 (Sometimes)	0	Negative Stasis	1
3 (Often)	3 (Often)	0	Negative Stasis	1
3 (Often)	2 (Sometimes)	1	Negative Change	2
3 (Often)	1 (Never)	2	Negative Change	3
2 (Sometimes)	1 (Never)	1	Negative Change	2

The second set of data analysis tables labeled Independent Sample Test that lists the t values and the significance levels and other data was used. The Levine's Test data about equal variances assumed test values was used. If the significance of the Equal Variances Assumed F value (sig) is less than or equal to .01, then it is assumed the variances are equal; thereby, using the first line of data for the table, taking the mean difference, t value and significance levels associated with that t value. If the *Equal Variances Assumed* test value is greater than .01, then the *Equal Variances Not Assumed* in a second line of data for the table was used. The mean difference was recorded, including the t value and significance values for each item. Tables 14 to 22 display the results of the t test analysis. t value. Table 14 shows the results of the t test analysis of the Mean change and score

difference between Control and Treatment groups each item the BRIEF Emotional Control Scale. Results indicated no significant difference between the control and the treatment groups for Mean difference scores and for any of the items of the Emotional Control Scale.

Table 14

Comparison of Control and Treatment Group Mean Difference Scores for the BRIEF Emotional Control Scale Items

Emotional Control Scale Item EMO1DO9 to EMO72DO9	Mean Difference	t-Value	Significance Level
1: Overreacts to small problems	.519	1.045	.302
7: Has explosive, angry outbursts	.648	1.404	.168
26: Has outbursts for little reason	1.111	2.394	.021
27: Mood changes frequently	.870	2.014	.050
48: Reacts more strongly to situations than other children	1.037	2.164	.036
51: Mood is easily influenced by the situation	.463	.944	.350
64: Angry or tearful outbursts are intense but end easily	.981	1.862	.070
66: Small events trigger big reactions	.463	.982	.332
72: Becomes upset too easily	.611	1.127	.267

Table 15 shows the results of the t test analysis of the Mean change and score difference between Control and Treatment groups for each item in the BRIEF Monitor Scale. Results indicated no significant difference between the control and treatment groups for Mean difference scores, and for any items in the Monitor Scale.

Table 15

Comparison of Control and Treatment Group Mean Difference Scores for the BRIEF Monitor Scale Items

Monitor Scale Item	Mean Difference	t-Value	Significance Level
15: Does not check work for mistakes	-.389	-.841	.405
22: Makes careless errors	-.426	-1.006	.320
33: Is unaware of how his/her behavior affects or bothers others	.130	.274	.786
36: Leaves work incomplete	.093	.224	.824
44: Does not notice when his/her behavior causes negative reactions	.111	.235	.815
46: Is unaware of own behavior when in a group	-.241	-.545	.589
54: Has poor understanding of own strengths and weaknesses	-.185	-.421	.676
55: Talks or plays too loudly	.426	.918	.364
61: Work is sloppy	-.019	-.035	.972
65: Does not realize that certain actions bother others	.241	.491	.626

Table 16 shows the results of the t test analysis of the Mean change and score difference between Control and Treatment groups for each item in the BRIEF Initiate Scale. Results indicated no significant difference between the Control and the Treatment groups for Mean difference scores and for any of the items of the Initiate Scale.

Table 16

Comparison of Control and Treatment Group Mean Difference Scores for the BRIEF Initiate Scale Items

Initiate Scale Item	Mean Difference	t-Value	Significance Level
3: Is not a self-starter	.130	.236	.815
10: Needs to be told to begin a task even when willing	-.574	-1.338	.188
19: Does not show creativity in solving a problem	-.222	-.475	.637
34: Has problems coming up with new ways of solving a problem	.000	.000	1.000
50: Has trouble getting started on homework or chores	.019	.040	.968
63: Does not take initiative	-.611	-1.250	.218
70: Has trouble thinking of a different to solve a problem when stuck	-.167	-.333	.741

Table 17 shows the results of the t test analysis of the Mean change and score difference between Control and Treatment groups for each item the BRIEF Organization of Materials Scale. Results indicated no significant difference between the Control and the Treatment groups for Mean difference scores and for any of the items of the Organization of Material Scale.

Table 17

Comparison of Control and Treatment Group Mean Difference Scores for the BRIEF Organization of Materials Scale Items

Organization of Materials Scale Item	Mean Difference	t-Value	Significance Level
11: Loses lunch box, lunch money, permissions slips, homework, etc.	-.704	-1.384	.174
16: Cannot find clothes, glasses, shoes, books, and pencils, etc.	-.019	-.037	.970
20: Backpack is disorganized	.093	.178	.860
67: Cannot find things in room or school desk	.167	.353	.726
68: Leaves a trail of belongings wherever he/she goes	-.333	-.682	.499
71: Leaves messes that others have to clean up	1.019	2.051	.047
73: Has a messy desk/closet	.222	.437	.665

Table 18 shows the results of the t test analysis of the Mean change and score difference between Control and Treatment groups for each item in the BRIEF Plan/Organize Scale. Results indicated no significant difference between the Control and the Treatment groups for Mean difference scores and for any of the items of the Plan Organize Scale.

Table 18

Comparison of Control and Treatment Group Mean Difference Scores for the BRIEF Plan/Organize Scale Items

Plan/Organize Scale Item	Mean Difference	t-Value	Significance Level
Becomes overwhelmed by large assignments			
12: Does not bring home homework, assignment sheets, materials, etc.	-.444	-.940	.353
17: Has good ideas but cannot get them on paper	-.481	-.964	.341
23: Forgets to hand in homework, even when completed	-.481	-.955	.345
29: Gets caught up in details and misses the big picture	-.463	-.949	.349
35: Has good ideas but does not get the job done (lacks follow-through)	-.074	-.164	.871
37: Becomes overwhelmed by large assignments	-.148	-.324	.747
41: Underestimates time needed to finish tasks	.056	.120	.905
49: Starts assignments or chores at the last minute	.019	.041	.967
52: Does not plan ahead for school assignments	-.148	-.337	.737
56: Written work is poorly organized	.241	.484	.631

Table 19 shows the results of the t test analysis of the Mean change and score difference between the Control and Treatment groups for each item in the BRIEF Shift Scale. Results indicated no significant difference between the Control and the Treatment groups for Mean difference scores, and for any of the items of the Shift Scale.

Table 19

Comparison of Control and Treatment Group Mean Difference Scores for the BRIEF Shift Scale Items

Shift Scale Item	Mean Difference	t-Value	Significance Level
04: Cannot get a disappointment, scolding, or insult off his/her mind	-.019	-.035	.972
05: Resists or has trouble accepting a different way to solve a problem	-.130	-.275	.785
06: Becomes upset with new situations	-.148	-.353	.726
13: Acts upset by a change in plans	.444	1.018	.314
14: Is disturbed by a change of teacher or class	.204	.430	.670
24: Resists change of routines	.463	.943	.352
30: Has trouble getting used to new situations (classes, groups, friends)	.352	.678	.502
40: Thinks too much about the same topic	-.019	-.029	.977
53: Gets stuck on one topic or activity	.611	1.175	.247
62: After having a problem, will stay disappointed for a long time	.815	1.547	.130

Table 20 shows the results of the t test analysis of the Mean change and score difference between the Control and Treatment groups for each item in the BRIEF Working Memory Scale. Results indicated no significant difference between the Control and Treatment groups for Mean difference scores, and for any of the items of the Working Memory Scale.

Table 20

Comparison of Control and Treatment Group Mean Difference Scores for the BRIEF Working Memory Scale Items

Working Memory Scale Item	Mean Difference	t-Value	Significance Level
02: When given three things to do, remembers only the first or last	-.796	-1.666	.103
08: Has a short attention span	.000	.000	1.000
18: Has trouble concentrating on chores, schoolwork, etc.	.111	.226	.822
21: Is easily distracted by noises, activity, sights, etc.	.389	.947	.349
25: Has trouble with chores or tasks that have more than one step	-.704	-1.498	.142
28: Needs help from an adult to stay on task	.593	1.342	.188
31: Forgets what he/she was doing	.204	.442	.661
32: When sent to get something, forgets what he/she is supposed to get	.056	.122	.904
39: Has trouble finishing tasks (chores of homework)	-.204	-.460	.648
60: Has trouble remembering things, even for a few minutes	.074	.153	.879

Note. (WM18DIF has F value of .000 < .01.)

Table 21 shows the results of the t test analysis of the Mean change and score difference between the Control and Treatment groups for each item in the BRIEF Inhibit Scale. Results indicated no significant difference between the Control and the Treatment groups for the Mean difference scores, and for any of the items of the Inhibit Scale.

Table 21

Comparison of Control and Treatment Group Mean Difference Scores for the BRIEF Inhibit Scale Items

Inhibit Scale Item	Mean Difference	t-Value	Significance Level
9: Needs to be told to "no" or "stop that"	-.111	-.258	.798
38: Does not think before doing	.259	.558	.580
42: Interrupts others	.481	.993	.327
43: Is impulsive	.981	2.072	.045
45: Gets out of seat at wrong time	.352	.726	.472
47: Gets out of control more than friends	.741	1.489	.144
57: Acts too wild or "out of control"	.167	.327	.745
58: Has trouble putting the brakes on his/her actions	.630	1.346	.186
59: Gets in trouble if not supervised by an adult	.130	.307	.760
69: Does not think of consequences before acting	.556	1.197	.239

Table 22 shows the results of the t test analysis of the Mean change and score difference between the Control and Treatment groups for each item in the BRIEF Extra Item Scale. Results indicated no significant difference between the Control and Treatment groups for the Mean difference scores, and for any of the items of the Inhibit Scale.

Table 22

Comparison of Control and Treatment Group Mean Difference Scores for the BRIEF

Extra Items	Mean Difference	t-Value	Significance Level
74: Has trouble waiting for turn	-.764	-1.574	.131
75: Doesn't connect doing tonight's homework with grades	-.745	-1.545	.131
76: Tests poorly even when knows correct answers	-.956	-1.952	.059
77: Does not finish long-term project	-.297	-.577	.568
78: Has poor handwriting	-.034	-.069	.945
79: Has to be closely supervised	.054	.125	.901
80: Has trouble moving from one activity to another	-.537	-1.282	.207
81: Is fidgety	-.370	-.782	.440
82: Cannot stay on the same topic when talking	-.304	-.556	.582
83: Blurts things out	-.230	-.476	.637
84: Says the same thing over and over	-.237	-.500	.620
85: Talks at the wrong time	-.229	-.529	.600
86: Does not come prepared for class	-.250	-.532	.598

Research Question 3

To what extent did teacher BRIEF item ratings change from Time 1 to Time 2 for the control group and from Time 1 to Time 2 for the intervention group?

Time 1 and Time 2 teacher BRIEF item ratings of students in the control and intervention groups were used to generate Time 2 and Time 1 difference scores. Time 2 and Time 1 difference scores was recoded using the conditional logic in Table 23. This recoding enables difference scores to be classified into four separate categories (Positive Stasis, Positive Change, Negative Stasis, Negative Change) as shown in Table 23. Frequency distributions of the difference score categories were generated and examined

for each BRIEF item to identify the extent to which item ratings changed from Time 1 to Time 2 for the control and the intervention groups.

The third research question examined to what extent the teacher BRIEF item ratings changed from Time 1 to Time 2 for the control group and from Time 1 to Time 2 for the intervention group, and for the extra items not included in any of the scales. Tables 24-32 present the cumulative percentages of the differences between teacher ratings of students in the control group and students in the Intervention group, for each item of the respective scale of the BRIEF. Table values indicate differences between teacher ratings of students in the control group and students in the intervention group as follows:

Table 23

Recoding of Item Difference Scores into Change Status Categories and Change Scores

Post-Intervention BRIEF Item Rating	Pre-Intervention BRIEF Item Rating	Difference Score	Change Status Category	Change Score
1 (Never)	1 (Never)	0	Positive Stasis	0
1 (Never)	2 (Sometimes)	-1	Positive Change	-1
1 (Never)	3 (Often)	-2	Positive Change	-2
2 (Sometimes)	3 (Often)	-1	Positive Change	-1
2 (Sometimes)	2 (Sometimes)	0	Negative Stasis	1
3 (Often)	3 (Often)	0	Negative Stasis	1
3 (Often)	2 (Sometimes)	1	Negative Change	2
3 (Often)	1 (Never)	2	Negative Change	3
2 (Sometimes)	1 (Never)	1	Negative Change	2

Emotional Control Scale. Table 24 shows the percentage of *Positive Change*, *Positive Stasis*, *Negative Change*, and *Negative Stasis* based on teacher pre- and post-ratings of the BRIEF Emotional Control Scale Items. The intervention group showed

higher percentages of positive change for four of nine items. The percentage of positive change was roughly equivalent to the treatment and control groups for three of the nine items, and positive change was greater for control than the treatment group for one of the nine items. For Positive Stasis, the results are as follows: in eight of the nine items, there was greater positive stasis percentage for the treatment group than control group; Negative Change: in eight of the nine items there was greater negative percentage for the control than for the treatment group; Negative Stasis: in six of the nine items, there was greater negative stasis for the control than for the treatment group.

Table 24

Pre to Post Item Rating Changes by Percent for the Control and Treatment Groups for the BRIEF Emotional Control Scale

	Control				Treatment			
Emotional Control Scale Item:	Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis	Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis
1: Overreacts to small problems	15	22	26	37	17	44	22	17
7: Has explosive, angry outbursts	18	37	30	15	16	61	17	6
26: Has outbursts for little reason	22	30	41	7	22	61	6	11
27: Mood changes frequently	26	26	26	22	28	56	6	11
48: Reacts more strongly to situations than other children	22	22	33	22	28	50	11	11
51: Mood is easily influenced by the situation	33	15	26	26	22	44	11	22
64: Angry or tearful outbursts are intense but end easily	11	37	23	19	22	57	17	6
66: Small events trigger big reactions	22	30	33	15	17	44	6	33
72: Becomes upset too easily	15	44	19	22	33	39	17	11

Monitor Scale. Table 25 shows the percentage of Positive Change, Positive Stasis, Negative Change, and Negative Stasis based on teacher pre- and post- ratings of the BRIEF Monitor Scale Items. The control group showed higher percentages of positive change for 10 of 10 items greater than the treatment group. For Positive Stasis, the results are as follows: in 10 of the 10 items, there was greater positive stasis percentage for the treatment group than the control group. Negative Change: in three of the 10 items, there was greater negative change for the control group than for the treatment group. Negative Stasis: in eight of the 10 items, there was greater negative stasis for the treatment than for the control group.

Table 25

Pre to Post Item Rating Changes by Percent for the Control and Treatment Groups for the BRIEF Monitor Scale

	Control				Treatment			
Monitor Scale Item	Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis	Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis
15: Does not check work for mistakes	33	11	26	30	11	17	17	56
22: Makes careless errors	30	0	22	48	6	17	22	56
33: Is unaware of how his/her behavior affects or bothers others	22	11	26	41	11	28	22	39
36: Leaves work incomplete	15	11	30	44	6	22	11	61
44: Does not notice when his/her behavior causes negative reactions	22	19	26	33	17	28	17	39
46: Is unaware of own behavior when in a group	26	15	18	41	6	33	22	39
54: Has poor understanding of own strengths and weaknesses	29	15	22	44	11	17	22	50
55: Talks or plays too loudly	26	22	30	22	11	56	11	22
61: Work is sloppy	41	4	19	37	17	33	17	33
65: Does not realize that certain actions bother others	26	15	22	37	17	28	11	44

Initiate Scale. Table 26 shows the percentage of Positive Change, Positive Stasis, Negative Change, and Negative Stasis based on teacher pre- and post- ratings of the BRIEF Initiate Scale Item. The intervention group showed higher percentages of positive change for four of nine items. The percentage of positive change was roughly equivalent to the treatment and control groups for three of the nine items and positive change was greater for control than treatment group for one of the nine items. For Positive Stasis, the results are as follows: in eight of the nine items, there was a greater positive stasis percentage for the treatment group than control group. Negative Change: in eight of the nine items there was a greater negative percentage for the control than for the treatment group; Negative Stasis: in six of the nine items. There was greater negative stasis for the control than for the treatment group.

Table 26

Pre to Post Item Rating Changes by Percent for the Control and Treatment Groups for the BRIEF Initiate Scale

	Control				Treatment			
Initiate Scale Item	Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis	Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis
3: Is not a self-starter	33	7	22	37	28	17	22	33
10: Needs to be told to begin a task even when willing	37	15	7	41	11	29	6	56
19: Does not show creativity in solving a problem	30	7	26	37	11	17	22	50
34: Has problems coming up with new ways of solving a problem	30	4	19	48	22	17	22	39
50: Has trouble getting started on homework or chores	22	11	26	41	11	22	11	56
63: Does not take initiative	41	7	30	22	11	22	28	39
70: Has trouble thinking of a different to solve a problem when stuck	41	7	30	22	11	22	28	39

Organization of Materials Scale. Table 27 shows the percentage of Positive Change, Positive Stasis, Negative Change, and Negative Stasis based on teacher pre- and post- rating of the BRIEF Organization of Materials Scale Item. The intervention group showed higher percentages of positive change for four of nine items. The percentage of positive change was roughly equivalent for the treatment and control groups for three of

the nine items, and positive change was greater for control than treatment group for one of the nine items. For Positive Stasis, the results are as follows: in eight of the nine items, there was greater positive stasis percentage for the treatment group than control group. Negative Change: in eight of the nine items there was greater negative percentage for the control than for the treatment group. Negative Stasis: in six of the nine items, there was greater negative stasis for the control than for the treatment group.

Table 27

Pre to Post I6tem Rating Changes by Percent for the Control and Treatment Groups for the BRIEF Organization of Materials Scale

	Control				Treatment			
Organization of Materials Scale Item	Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis	Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis
11: Loses lunch box, lunch money, permissions slips, homework, etc.	33	26	26	15	11	28	22	28
16: Cannot find clothes, glasses, shoes, books, and pencils, etc.	22	33	19	26	17	44	22	19
20: Backpack is disorganized	41	7	22	30	22	28	11	39
67: Cannot find things in room or school desk	19	44	22	15	22	39	11	28
68: Leaves a trail of belongings wherever he/she goes	30	41	19	11	11	50	17	22
71: Leaves messes that others have to clean up	33	22	27	19	50	33	11	6
73: Has a messy desk/closet	30	37	19	15	28	44	17	11

Plan/Organize Scale. Table 28 shows the percentage of Positive Change, Positive Stasis, Negative Change, and Negative Stasis based on teacher pre- and post- ratings of

the BRIEF Plan/Organize Scale Items. The intervention group showed higher percentages of positive change for four of nine items. The percentage of positive change was roughly equivalent for the treatment and control groups for three of the nine items, and positive change was greater for control than treatment group for one of the nine items. For Positive Stasis, the results are as follows: in eight of the nine items, there was greater positive stasis percentage for the treatment group than control group. Negative Change: in eight of the nine items and there was greater negative percentage for the control than for the treatment group. Negative Stasis: in six of the nine items, there was greater negative stasis for the control than for the treatment group.

Table 28

Pre to Post Item Rating Changes by Percent for the Control and Treatment Groups for the BRIEF Plan/Organize Scale

	Control				Treatment			
Plan/Organize Scale Item	Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis	Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis
12: Does not bring home homework, e.tc.	22	22	22	33	6	33	22	39
17: Has good ideas but cannot get them on paper	37	7	19	37	17	17	28	39
23: Forgets to hand in homework, even when completed	33	30	15	22	22	28	11	39
29: Gets caught up in details and misses the big picture	30	7	19	44	17	17	44	22
35: Has good ideas but does not get the job done (lacks follow-through)	26	15	15	44	11	33	11	44
37: Becomes overwhelmed by large assignments	22	7	26	44	11	17	22	50
41: Underestimates time needed to finish tasks	15	15	26	44	17	17	33	44
49: Starts assignments or chores at the last minute	19	15	22	44	11	28	17	44
52: Does not plan ahead for school assignments	26	19	11	44	11	33	11	44
56: Written work is poorly organized	22	11	15	52	17	28	17	29

Shift Scale. Table 29 shows the percentage of Positive Change, Positive Stasis, Negative Change, and Negative Stasis based on teacher pre- and post- ratings of the

BRIEF Inhibit Scale Item. The intervention group showed higher percentages of positive change for four of nine items. Percentage of positive change were roughly equivalent for the treatment and control groups for three of the nine items, and positive change was greater for control than treatment group for one of the nine items. For Positive Stasis, the results are as follows: in eight of the nine items, there was a greater positive stasis percentage for the treatment group than control group. Negative Change: in eight of the nine items there was greater negative percentage for the control than for the treatment group. Negative Stasis: in six of the nine items, there was greater negative stasis for the control than for the treatment group.

Table 29

Pre to Post Item Rating Changes by Percent for the Control and Treatment Groups for the BRIEF Shift Scale

	Control				Treatment			
Shift Scale Item	Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis	Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis
04: Cannot get a disappointment, scolding, or insult off his/her mind	33	19	22	26	28	28	22	22
05: Resists or has trouble accepting a different way to solve a problem	30	19	26	26	6	39	17	39
06: Becomes upset with new situations	26	37	22	15	0	61	11	28
13: Acts upset by a change in plans	11	41	15	33	17	56	22	6
14: Is disturbed by a change of teacher or class	11	41	19	30	17	50	28	6
24: Resists change of routines	15	41	22	22	17	56	22	6
30: Has trouble getting used to new situations (classes, groups, friends)	26	22	19	33	28	33	22	17
40: Thinks too much about the same topic	30	15	40	15	17	28	44	11
53: Gets stuck on one topic or activity	19	19	33	30	17	39	22	22
62: After having a problem, will stay disappointed for a long time	28	19	19	26	46	39	11	6

Working Memory Scale. Table 30 shows the percentage of Positive Change, Positive Stasis, Negative Change, and Negative Stasis based on teacher pre- and post-ratings of the BRIEF Working Memory Scale Item. The intervention group showed higher percentages of positive change for four of nine items. The percentage of positive change was roughly equivalent for the treatment and control groups for three of the nine items, and positive change was greater for control than the treatment group for one of the nine items. For Positive Stasis, the results are as follows: in eight of the nine items, there was greater positive stasis percentage for the treatment group than control group. Negative Change: in eight of the nine items there was greater negative percentage for the control than for the treatment group. Negative Stasis: in six of the nine items, there was greater negative stasis for the control than for the treatment group.

Table 30

Pre to Post Item Rating Changes by Percent for the Control and Treatment Groups for the BRIEF Working Memory Scale

	Control				Treatment			
Working Memory Scale Item	Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis	Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis
02: When given three things to do, remembers only the first or last	33	15	26	26	6	17	28	50
08: Has a short attention span	22	22	19	37	11	33	11	44
18: Has trouble concentrating on chores, schoolwork, etc.	26	11	15	48	22	17	17	44
21: Is easily distracted by noises, activity, sights, etc.	15	19	22	44	11	33	6	50
25: Has trouble with chores or tasks that have more than one step	22	26	15	37	11	17	22	39
28: Needs help from an adult to stay on task	19	15	22	44	22	33	11	33
31: Forgets what he/she was doing	29	26	23	22	11	33	6	50
32: When sent to get something, forgets what he/she is supposed to get	22	48	15	15	17	50	6	28
39: Has trouble finishing tasks (chores of homework)	26	15	19	41	6	28	11	50
60: Has trouble remembering things, even for a few minutes	26	30	22	22	17	33	6	44

Inhibit Scale. Table 31 shows the percentage of Positive Change, Positive Stasis, Negative Change, and Negative Stasis based on teacher pre- and post- rating of the BRIEF Inhibit Scale Item. The intervention group showed higher percentages of positive change for four of nine items. The percentage of positive change was roughly equivalent for the treatment and control groups for three of the nine items and positive change was greater for control than treatment group for one of the nine items. For Positive Stasis, the results are as follows: in eight of the nine items, there was greater positive stasis percentage for the treatment group than control group. Negative Change: in eight of the nine items there was greater negative percentage for the control than for the treatment group. Negative Stasis: in six of the nine items, there was greater negative stasis for the control than for the treatment group.

Table 31

Pre to Post Item Rating Changes by Percent for the Control and Treatment Groups for the BRIEF Inhibit Scale

	Control				Treatment			
Inhibit Scale Item	Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis	Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis
9: Needs to be told to "no" or "stop that"	15	26	19	41	11	28	22	39
38: Does not think before doing	26	11	22	41	17	33	17	33
42: Interrupts others	19	22	37	22	17	33	11	39
43: Is impulsive	19	22	26	33	33	39	11	17
45: Gets out of seat at wrong time	26	26	30	19	22	39	11	28
47: Gets out of control more than friends	15	41	33	11	28	44	17	11
57: Acts too wild or "out of control"	26	33	30	11	11	50	17	22
58: Has trouble putting the brakes on his/her actions	19	15	26	41	27	39	11	33
59: Gets in trouble if not supervised by an adult	30	26	19	26	17	44	0	39
69: Does not think of consequences before acting	22	19	19	41	22	33	6	39

Extra Items Scale. Table 32 shows the percentage of Positive Change, Positive Stasis, Negative Change, and Negative Stasis based on teacher pre- and post- rating of the BRIEF Extra Item Scale Item. The intervention group showed higher percentages of positive change for four of nine items. The percentage of positive change was roughly equivalent for the treatment and control groups for three of the nine items, and positive change was greater for control than treatment group for one of the nine items. For Positive Stasis, the results are as follows: in eight of the nine items. There was greater positive stasis percentage for the treatment group than control group. Negative Change: in eight of the nine items there was greater negative percentage for the control than for the treatment group. Negative Stasis: in six of the nine items, there was greater negative stasis for the control than for the treatment group.

Table 32

Pre to Post Item Rating Changes by Percent for the Control and Treatment Groups for the Extra Items of the BRIEF

	Control				Treatment			
Extra Item	Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis	Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis
74: Has trouble waiting for turn	35	19	35	19	0	31	31	38
75: Doesn't connect doing tonight's homework with grades	31	27	23	19	6	31	25	38
76: Tests poorly even when knows correct answers	39	19	19	23	7	27	27	30
77: Does not finish long-term project	31	19	15	35	13	40	27	20
78: Has poor handwriting	35	27	19	19	12	53	18	18
79: Has to be closely supervised	11	35	19	35	0	47	12	41
80: Has trouble moving from one activity to another	30	22	15	33	6	28	11	56
81: Is fidgety	19	33	26	22	7	33	20	40
82: Cannot stay on the same topic when talking	26	30	37	7	7	47	40	7
83: Blurts things out	20	22	30	22	0	47	20	33
84: Says the same thing over and over	20	56	15	4	7	73	13	7
85: Talks at the wrong time	19	15	15	52	6	25	25	44
86: Does not come prepared for class	26	22	22	30	13	25	13	50

Research Question 4

When BRIEF items are organized based on the BRIEF Scale structure, which cluster of executive function item ratings showed the most change from Time 1 to Time 2 for the control group and the intervention group?

The fourth research question examined which cluster of executive function item ratings showed the most change from Time 1 to Time 2 for the control group and the intervention group, when BRIEF items are organized based on the BRIEF Scale structure. Tables 33-41 present the results from 1): calculating the Positive Change Ratio separately for the Control and the Treatment Groups, and 2): calculating the Negative Change Ratio separately for the Control and the Treatment Groups.

Emotional Control Scale. Table 33 shows the BRIEF Emotional Control Scale items organization based on the BRIEF Scale structure and which cluster of executive functions item ratings showed the most change from Time 1 to Time 2 for the control group and the intervention group.

Table 33

Positive Change and Negative Change Ratios *from Time 1 to Time 2* for the Control and Treatment Groups for the BRIEF Emotional Control Scale

	Positive Change Ratio		Negative Change Ratio	
Emotional Control Item	Control Group	Treatment Group	Control Group	Treatment Group
1: Overreacts to small problems	19%	30%	81%	50%
7: Has explosive, angry outbursts	29%	41%	71%	37%
26: Has outbursts for little reason	31%	56%	69%	24%
27: Mood changes frequently	35%	64%	65%	23%
48: Reacts more strongly to situations than other children	28%	56%	71%	28%
51: Mood is easily influenced by the situation	39%	39%	61%	39%
64: Angry or tearful outbursts are intense but end easily	17%	51%	67%	37%
66: Small events trigger big reactions	31%	30%	69%	56%
72: Becomes upset too easily	27%	54%	73%	50%

Monitor Scale. Table 34 shows the BRIEF Monitor Scale items organization based on the BRIEF Scale structure and which cluster of executive functions item ratings showed the most change from Time 1 to Time 2 for the control group and the intervention group.

Table 34

Positive Change and Negative Change Ratios *from Time 1 to Time 2* for the Control and Treatment Groups for the BRIEF Monitor Scale

	Positive Change Ratio		Negative Change Ratio	
Monitor Item	Control Group	Treatment Group	Control Group	Treatment Group
15: Does not check work for mistakes	37%	13%	63%	82%
22: Makes careless errors	30%	7%	70%	78%
33: Is unaware of how his/her behavior affects or bothers others	25%	15%	75%	69%
36: Leaves work incomplete	17%	8%	83%	81%
44: Does not notice when his/her behavior causes negative reactions	27%	24%	73%	69%
46: Is unaware of own behavior when in a group	31%	9%	69%	72%
54: Has poor understanding of own strengths and weaknesses	34%	13%	78%	85%
55: Talks or plays too loudly	33%	25%	67%	42%
61: Work is sloppy	43%	25%	58%	52%
65: Does not realize that certain actions bother others	31%	24%	69%	65%

Initiate Scale. Table 35 shows the BRIEF Initiate Scale items organization based on the BRIEF Scale structure and which cluster of executive functions item ratings showed the most change from Time 1 to Time 2 for the control group and the intervention group.

Table 35

Positive Change and Negative Change Ratios *from Time 1 to Time 2* for the Control and Treatment Groups for the BRIEF Initiate Scale

	Positive Change Ratio		Negative Change Ratio	
Initiate Item	Control Group	Treatment Group	Control Group	Treatment Group
3: Is not a self-starter	35%	34%	63%	59%
10: Needs to be told to begin a task even when willing	44%	15%	56%	73%
19: Does not show creativity in solving a problem	32%	13%	68%	77%
34: Has problems coming up with new ways of solving a problem	31%	27%	70%	64%
50: Has trouble getting started on homework or chores	25%	14%	75%	75%
63: Does not take initiative	44%	14%	56%	72%
70: Has trouble thinking of a different to solve a problem when stuck	32%	20%	69%	83%

Organization of Materials Scale. Table 36 shows the BRIEF Organization of Materials Scale items organization based on the BRIEF Scale structure and which cluster of executive functions item ratings showed the most change from Time 1 to Time 2 for the control group and the intervention group.

Table 36

Positive Change and Negative Change Ratios from Time 1 to Time 2 for the Control and Treatment Groups for the BRIEF Organization of Materials Scale

	Positive Change Ratio		Negative Change Ratio	
Organization of Materials Item	Control Group	Treatment Group	Control Group	Treatment Group
11: Loses lunch box, lunch money, permissions slips, homework, etc.	45%	15%	55%	68%
16: Cannot find clothes, glasses, shoes, books, and pencils, etc.	33%	30%	67%	61%
20: Backpack is disorganized	44%	31%	56%	54%
67: Cannot find things in room or school desk	34%	36%	66%	70%
68: Leaves a trail of belongings wherever he/she goes	51%	22%	51%	66%
71: Leaves messes that others have to clean up	42%	75%	59%	22%
73: Has a messy desk/closet	48%	50%	54%	44%

Plan/Organize Scale. Table 37 shows the BRIEF Plan/Organize Scale items organization based on the BRIEF Scale structure and which cluster of executive functions item ratings showed the most change from Time 1 to Time 2 for the control group and the intervention group.

Table 37

Positive Change and Negative Change Ratios *from Time 1 to Time 2* for the Control and Treatment Groups for the BRIEF Plan/Organize Scale

	Positive Change Ratio		Negative Change Ratio	
Plan/Organize Item	Control Group	Treatment Group	Control Group	Treatment Group
12: Does not bring home homework, assignment sheets, materials, etc.	28%	9%	71%	78%
17: Has good ideas but cannot get them on paper	40%	20%	60%	72%
23: Forgets to hand in homework, even when completed	47%	31%	53%	71%
29: Gets caught up in details and misses the big picture	32%	20%	68%	71%
35: Has good ideas but does not get the job done (lacks follow-through)	31%	16%	69%	65%
37: Becomes overwhelmed by large assignments	24%	13%	75%	77%
41: Underestimates time needed to finish tasks	18%	20%	82%	91%
49: Starts assignments or chores at the last minute	22%	15%	78%	72%
52: Does not plan ahead for school assignments	32%	16%	68%	68%
56: Written work is poorly organized	25%	24%	75%	52%

Shift Scale. Table 38 shows the BRIEF Shift Scale items organization based on the BRIEF Scale structure and which cluster of executive functions item ratings showed the most change from Time 1 to Time 2 for the control group and the intervention group.

Table 38

Positive Change and Negative Change Ratios *from Time 1 to Time 2* for the Control and Treatment Groups for the BRIEF Shift Scale

	Positive Change Ratio		Negative Change Ratio	
Shift Item	Control Group	Treatment Group	Control Group	Treatment Group
04: Cannot get a disappointment, scolding, or insult off his/her mind	41%	39%	59%	54%
05: Resists or has trouble accepting a different way to solve a problem	37%	10%	64%	69%
06: Becomes upset with new situations	41%	3%	59%	62%
13: Acts upset by a change in plans	19%	39%	81%	47%
14: Is disturbed by a change of teacher or class	19%	34%	83%	58%
24: Resists change of routines	25%	39%	75%	47%
30: Has trouble getting used to new situations (classes, groups, friends)	33%	42%	67%	50%
40: Thinks too much about the same topic	35%	24%	65%	65%
53: Gets stuck on one topic or activity	23%	28%	78%	54%
62: After having a problem, will stay disappointed for a long time	35%	75%	56%	21%

Working Memory Scale. Table 39 shows the BRIEF Working Memory Scale items organization based on the BRIEF Scale structure and which cluster of executive functions item ratings showed the most change from Time 1 to Time 2 for the control group and the intervention group.

Table 39

Positive Change and Negative Change Ratios *from Time 1 to Time 2* for the Control and Treatment Groups for the BRIEF Plan/Organize Scale

	Positive Change Ratio		Negative Change Ratio	
Working Memory Item	Control Group	Treatment Group	Control Group	Treatment Group
02: When given three things to do, remembers only the first or last	39%	7%	61%	92%
08: Has a short attention span	28%	16%	72%	71%
18: Has trouble concentrating on chores, schoolwork, etc.	29%	27%	71%	69%
21: Is easily distracted by noises, activity, sights, etc.	19%	16%	81%	69%
25: Has trouble with chores or tasks that have more than one step	30%	13%	70%	82%
28: Needs help from an adult to stay on task	22%	33%	78%	52%
31: Forgets what he/she was doing	39%	16%	61%	76%
32: When sent to get something, forgets what he/she is supposed to get	42%	34%	58%	65%
39: Has trouble finishing tasks (chores of homework)	31%	8%	71%	72%
60: Has trouble remembering things, even for a few minutes	37%	25%	63%	71%

Inhibition Scale. Table 40 shows the BRIEF Inhibition Scale items organization based on the BRIEF Scale structure and which cluster of executive functions item ratings showed the most change from Time 1 to Time 2 for the control group and the intervention group.

Table 40

Positive Change and Negative Change Ratios *from Time 1 to Time 2* for the Control and Treatment Groups for the BRIEF Inhibit Scale

	Positive Change Ratio		Negative Change Ratio	
Inhibition Item	Control Group	Treatment Group	Control Group	Treatment Group
9: Needs to be told to "no" or "stop that"	20%	15%	81%	82%
38: Does not think before doing	29%	25%	71%	56%
42: Interrupts others	24%	25%	76%	64%
43: Is impulsive	24%	54%	76%	36%
45: Gets out of seat at wrong time	35%	36%	66%	53%
47: Gets out of control more than friends	25%	50%	75%	47%
57: Acts too wild or "out of control"	39%	22%	61%	58%
58: Has trouble putting the brakes on his/her actions	22%	44%	79%	54%
59: Gets in trouble if not supervised by an adult	41%	30%	61%	53%
69: Does not think of consequences before acting	27%	33%	74%	56%

Extra Item Scale. Table 41 shows the BRIEF Extra Item Scale items organization based on the BRIEF Scale structure and which cluster of executive functions item ratings showed the most change from Time 1 to Time 2 for the control group and the intervention group.

Table 41

Positive Change and Negative Change Ratios *from Time 1 to Time 2* for the Control and Treatment Groups for the Extra Items of the BRIEF

	Positive Change Ratio		Negative Change Ratio	
Extra Item	Control Group	Treatment Group	Control Group	Treatment Group
74: Has trouble waiting for turn	43%	1%	67%	85%
75: Doesn't connect doing tonight's homework with grades	42%	9%	58%	86%
76: Tests poorly even when knows correct answers	48%	10%	52%	70%
77: Does not finish long-term project	38%	22%	62%	58%
78: Has poor handwriting	48%	26%	52%	49%
79: Has to be closely supervised	17%	2%	83%	82%
80: Has trouble moving from one activity to another	38%	8%	62%	86%
81: Is fidgety	28%	10%	72%	90%
82: Cannot stay on the same topic when talking	37%	13%	63%	67%
83: Blurts things out	26%	2%	67%	68%
84: Says the same thing over and over	45%	26%	43%	45%
85: Talks at the wrong time	22%	8%	79%	81%
86: Does not come prepared for class	33%	17%	67%	81%

Research Question 5

When BRIEF items are reorganized using the McCloskey Model of Executive Functions which cluster of executive functions item ratings showed the most change from Time 1 to Time 2 for the control group and the intervention group?

Tables 42 through 47 display cumulative frequencies of teacher ratings of the BRIEF items and the corresponding the seven clusters of the McCloskey Model. These Tables show which BRIEF items represent the 33 self-regulation executive functions of the MMEF. Difference scores show BRIEF items reorganization using the McCloskey

Model of Executive Functions and which cluster of executive function item ratings showed the most change from Time 1 to Time 2 for the control group and the intervention group.

Teacher Item Rating Differences by MEFS Category within the Attention Cluster. Table 42 reflects the cumulative percentages of difference scores for teacher ratings of each item of the Attention Cluster. Difference scores show BRIEF items reorganization using the McCloskey Model of Executive Functions and which cluster of executive functions item ratings showed the most change from Time 1 to Time 2 for the control group and the intervention group.

Table 42

Frequency of Teacher BRIEF Ratings showing the most change from Time 1 to Time 2 for the control group and the intervention group and Organized by the MEFS Category within the Attention Cluster

			Positive Change Ratio		Negative Change Ratio	
Attention Cluster Items			Control Group	Treatment Group	Control Group	Treatment Group
	MEFS Category	BRIEF Scale				
Has trouble concentrating on chores, schoolwork, etc.	SUSTAIN	WM	30	13	18	82
Has trouble finishing tasks	SUSTAIN	WM	29	27	71	69
Is easily distracted by noises, activity, sights, etc.	SUSTAIN	WM	19	16	81	69
Needs help from an adult to stay on task	SUSTAIN	WM	22	33	78	52
Has a short attention span	SUSTAIN	WM	28	16	72	71
Has good ideas but does not get the job done (lacks follow-through)	SUSTAIN	PLOR	31	16	69	65
Does not finish long-term projects	SUSTAIN	N/A	38	22	62	58
Cannot stay on the same topic when talking	SUSTAIN	N/A	37	13	63	67

Note. This table includes any BRIEF item that is labeled as Perceive, Focus or Sustain in the MMEF model.

Teacher Item Rating Differences by MEFS Category within the Engagement Cluster. Table 43 reflects the cumulative percentages of difference scores for teacher ratings of each item of the Engagement Cluster. Difference scores show BRIEF items reorganization using the McCloskey Model of Executive Functions and which cluster of

executive functions item ratings showed the most change from Time 1 to Time 2 for the control group and the intervention group.

Table 43

Frequency of Teacher BRIEF Ratings showing the most change from Time 1 to Time 2 for the control group and the intervention group and Organized by the MEFS Category within the Engagement Cluster

			Positive Change Ratio		Negative Change Ratio	
Engagement Cluster Items	MEFS Cluster	BRIEF Scale	Control Group	Treatment Group	Control Group	Treatment Group
Blurts things out	INHIBIT	N/A	26	2	67	68
Needs to be told to begin a task even when willing	INITIATE	INITIATE	44	15	56	73
Gets in trouble if not supervised by an adult	INHIBIT	INHIBIT	41	30	61	53
Is not a self-starter	INITIATE	INITIATE	35	34	63	59
Has trouble getting started on homework or chores	INITIATE	INITIATE	25	14	56	72
Says the same thing over and over	SHIFT	N/A	45	26	43	45
Does not take initiative	INITIATE	INITIATE	44	14	56	72
Has trouble waiting for turn	INHIBIT	N/A	43	1	67	85
Has trouble putting the brakes on his/her actions	STOP/INT	INHIBIT	22	44	79	
Is fidgety	INHIBIT	N/A	28	10	72	70
Interrupts others	INHIBIT	INHIBIT	24	25	76	64
Needs to be told to stop that	STOP/INT	INHIBIT	20	15	81	82
Is impulsive	INHIBIT	INHIBIT	24	54	76	36

			Positive Change Ratio		Negative Change Ratio	
Engagement Cluster Items	MEFS Cluster	BRIEF Scale	Control Group	Treatment Group	Control Group	Treatment Group
Has trouble moving from one activity to another	SHIFT	N/A	38	8	62	86
Has to be closely supervised	INHIBIT	N/A	17	2	83	82
Resists or has trouble accepting a different way to solve a problem	FLEXIBLE	SHIFT	37	10	64	69
Talks at the wrong time	INHIBIT	N/A	22	8	79	81
Does not think of consequences before acting	INHIBIT	INHIBIT	27	33	74	56
Thinks too much about the same topic	STOP/INT	SHIFT	35	24	65	65
Has trouble getting used to new situations (classes, groups, friends)	FLEXIBLE	SHIFT	33	42	67	50
Cannot get a disappointment, scolding, or insult off his/her mind	STOP/INT	SHIFT	41	39	59	54
Gets stuck on one topic or activity	SHIFT	SHIFT	23	28	78	54
Resists change of routines	FLEXIBLE	SHIFT	25	39	75	47

Note. This table includes any BRIEF item that is labeled as Initiate, Effort (Energize), Inhibit, Stop, Interrupt/Pause, Flexible, Shift in the MMEF model.

Teacher Item Rating Differences by MEFS Category within the Efficiency Cluster.

Table 44 shows the cumulative percentage of differences for items within the Efficiency Cluster. The two items composing this cluster showed higher degrees of difference in

teacher ratings of students in the control and treatment group. Table 44 reflects the cumulative percentages of difference scores for teacher ratings of items in this cluster.

Table 44

Frequency of Teacher BRIEF Ratings showing the most change from Time 1 to Time 2 for the control group and the intervention group and Organized by the MEFS Category within the Efficiency Cluster

			Positive Change Ratio		Negative Change Ratio	
Efficiency Cluster Items	MEFS	BRIEF	Control Group	Treatment Group	Control Group	Treatment Group
Tests poorly even when knows correct answers	EXECUTE	N/A	48	10	52	70
Has poor handwriting	EXECUTE	N/A	48	26	52	49

Note. This table includes any BRIEF item that is labeled as Sense Time, Pace, Sequence, Execute (Use Routines) in the MMEF model.

MEFS Category within the Memory cluster. Table 45 shows the cumulative frequencies of teacher ratings of the BRIEF items and the corresponding McCloskey Model Recollection cluster of executive functions. Difference scores show BRIEF items reorganization using the McCloskey Model of Executive Functions and which cluster of executive functions item ratings showed the most change from Time 1 to Time 2 for the control group and the intervention group.

Table 45

Frequency of Teacher BRIEF Ratings showing the most change from Time 1 to Time 2 for the control group and the intervention group and Organized by the MEFS Category within the Memory Cluster

			Positive Change Ratio		Negative Change Ratio	
Memory Cluster Items	MEFS Category	BRIEF Scale	Control Group	Treatment Group	Control Group	Treatment Group
Does not bring home, homework, assignment sheets, etc.	RETRIEVE	PLOR	28%	9 %	71%	78%
Cannot find things at home	RETRIEVE	OMAT	39%	7%	61%	92%
When given three things to do, remembers only the first or last	HOLD	WM	34%	36%	66%	70%
Has trouble with chores or tasks that have more than one step	HOLD	WM	30%	13%	70%	82%
Cannot find things in room or school desk	RETRIEVE	OMAT	34%	36%	66%	70%
Forgets what he/she was doing	HOLD	WM	39%	16%	61%	76%
Has trouble remembering things, even for a few minutes	HOLD	WM	37%	25%	63%	71%
Loses things	RETRIEVE	OMAT	45%	15%	55%	66%
Has good ideas but cannot get them on paper	MANI-PULATE	PLOR	40	20	60	72
When sent to get something, forgets what he/she is supposed to get	HOLD	WM	42	34	58	65

Note. This table includes any BRIEF item that is labeled as Hold, Manipulate, Store, Retrieve in the MMEF model.

Teacher Item Rating Differences by MEFS Category within the Optimization Cluster. Table 46 reflects the cumulative percentages of difference scores for teacher ratings of each item of the Optimization Cluster. Difference scores show BRIEF item reorganization using the McCloskey Model of Executive Functions, and which cluster of executive function item ratings showed the most change from Time 1 to Time 2 for the control group and the intervention group.

Table 46

Frequency of Teacher BRIEF Ratings showing the most change from Time 1 to Time 2 for the control group and the intervention group and Organized by the MEFS Category within the Optimization Cluster

Optimization Cluster	MEFS	BRIEF	Positive Change Ratio		Negative Change Ratio	
	Category	Scale	Control Group	Treatment Group	Control Group	Treatment Group
Leaves work incomplete	MONITOR	MON	17	8	83	81
Has poor understanding of own strengths and weaknesses	MONITOR	MON	34	13	78	85
Gets out of control more than friends	MODULATE	INHIBIT	25	50	75	47
Makes careless errors	MONITOR	MON	30	7	70	78
Becomes overwhelmed by large assignment	MODULATE	PLOR	24	13	75	77
Does not check work for mistakes	MONITOR	MON	37	13	63	82

Optimization Cluster	MEFS	BRIEF	Positive Change Ratio		Negative Change Ratio	
	Category	Scale	Control Group	Treatment Group	Control Group	Treatment Group
Forgets to hand in homework, even when completed	MONITOR	PLOR	47	31	53	71
Work is sloppy	MONITOR	MON	43	25	58	52
Gets out of seat at wrong time	MONITOR	INHBIT	35	36	66	53
Gets upset too easily	MODULATE	EMO	27	54	73	50
Acts too wild or out of control	MODULATE	INHIBIT	22	30	61	53
Is unaware of how his behavior affects or bothers other	MONITOR	MON	25	15	83	81
Reacts more strongly to situations than other children	MODULATE	EMO	28	56	71	28
Has outbursts for little reason	MODULATE	EMO	31	56	69	24
Mood is easily influenced by the situation	MODULATE	EMO	39	39	61	39
Does not realize that certain actions bother others	MONITOR	MON	31	24	69	65
Small events trigger big reactions	MODULATE	EMO	31	30	69	56

Optimization Cluster	MEFS	BRIEF	Positive Change Ratio		Negative Change Ratio	
	Category	Scale	Control Group	Treatment Group	Control Group	Treatment Group
Talks or plays too loudly	MODULATE	MON	33	25	67	42
After having a problem, will stay disappointed for a long time	MODULATE	SHIFT	35	75	56	21
Is unaware of own behavior when in a group	MONITOR	MON	31	9	69	42
Gets caught up in details and misses big picture	BALANCE	PLOR	32	20	68	71
Mood changes frequently	MODULATE	EMO	35	64	65	23
Overreacts to small problems	MODULATE	EMO	19	30	81	37
Does not notice when his/her behavior causes negative reactions	MONITOR	MON	27	24	73	69
Has explosive, angry outbursts	MODULATE	EMO	29	41	71	37
Leaves messes that others have to clean up	CORRECT	OMAT	42	75	59	22
Leaves a trail of belongings wherever he/she goes	CORRECT	OMAT	51	22	51	66

Optimization Cluster	MEFS	BRIEF	Positive Change Ratio		Negative Change Ratio	
	Category	Scale	Control Group	Treatment Group	Control Group	Treatment Group
Becomes upset with new situations	MODULATE	SHIFT	41	3	59	62
Angry or tearful outoutbursts are intense but end easily	MODULATE	EMO	17	51	67	37
Is disturbed by change of teacher/class	MODULATE	SHIFT	19	34	83	58
Acts upset by a change in plans	MODULATE	SHIFT	19	39	81	47

Note. This table includes any BRIEF item that is labeled as Monitor, Modulate, Balance, Correct in the MMEF model.

MEFS Categories within the Solution Cluster. Table 47 shows the cumulative frequencies of teacher ratings of the BRIEF items and the corresponding McCloskey Model Solution Cluster of executive functions. Difference scores show BRIEF items reorganization using the McCloskey Model of Executive Functions and which cluster of executive functions item ratings showed the most change from Time 1 to Time 2 for the control group and the intervention group.

Table 47

Frequency of Teacher BRIEF Ratings showing the most change from Time 1 to Time 2 for the control group and the intervention group and Organized by the MEFS Category within the Solution Cluster

Solution Cluster Items			Positive Change Ratio		Negative Change Ratio	
	MEFS	BRIEF	Control Group	Treatment Group	Control Group	Treatment Group
Does not plan ahead for assignments	PLAN	PLOR	32	16	68	68
Does not connect doing tonight's homework with grades	ANTICIPATE	N/A	42	9	58	86
Does not think before doing	ANTICIPATE	INHIBIT	29	25	71	56
Starts assignments or chores at the last minute	ESTTIME	PLOR	22	15	68	72
Does not show creativity in solving a problem	GENERATE	INITIATE	32	13	68	77
Has problems coming up with new ways of solving a problem	GENERATE	INITIATE	32	20	60	83
Has trouble thinking of a different way to solve a problem when stuck	GENERATE	INITIATE	31	27	70	64
Backpack is disorganized	ORGANIZE	OMAT	44	31	56	54
Underestimates time needed to finish tasks	EST TIME	PLOR	18	20	82	91
Does not come prepared for class	ORGANIZE	N/A	33	17	67	81
Has a messy closet	ORGANIZE	OMAT	48	50	54	44
Written work is poorly organized	ORGANIZE	PLOR	25	24	75	52

Note. This table includes any BRIEF item that is labeled as Generate, Associate, Prioritize, Plan, Organize, Decide in the MMEF model.

Table 48

Pre to Post Item Rating Changes by Percent for the Control and Treatment Groups for the BRIEF items organized by the MEFS Category within the Attention Cluster

Attention Cluster Items		Control				Treatment			
BRIEF		Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis	Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis
Has trouble concentrating on chores, schoolwork, etc.	WM	26	11	15	48	22	17	17	44
Has trouble finishing tasks	WM	26	15	19	41	6	28	11	50
Is easily distracted by noises, activity, sights, etc.	WM	15	19	22	44	11	33	6	50
Needs help from an adult to stay on task	WM	19	15	22	44	22	33	11	33
Has a short attention span	WM	22	22	19	37	11	33	11	44
Has good ideas but does not get the job done (lacks follow-through)	PLOR	26	15	15	44	11	33	11	44
Does not complete long-term projects	NA	31	19	15	35	13	40	27	20
Cannot stay on the same topic when talking	NA	26	30	37	7	7	37	40	7

Note. This table includes any BRIEF item that is labeled as Perceive, Focus or Sustain in the MMEF model.

Table 49

Pre to Post Item Rating Changes by Percent for the Control and Treatment Groups for the BRIEF items organized by the MEFS Category within the Engagement Cluster

Engagement Cluster Items	BRIEF	Control				Treatment			
		Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis	Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis
Blurts things out	N/A	20	22	30	22	0	47	20	33
Needs to be told to begin a task even when willing	Initiate	37	15	7	41	11	29	6	56
Gets in trouble if not supervised by an adult	Inhibit	30	26	19	26	17	44	0	39
Is not a self-starter	Initiate	33	7	22	37	28	17	22	33
Has trouble getting started on homework or chores	Initiate	22	11	26	41	11	22	11	56
Says the same thing over and over	N/A	20	56	15	4	7	73	13	7
Does not take initiative	Initiate	41	7	30	22	11	22	28	39
Has trouble waiting for his/her turn	N/A	35	19	35	19	0	31	31	38
Has trouble putting the brakes on his/her actions	Inhibit	19	15	26	41	27	39	11	33
Is fidgety	N/A	19	33	26	22	7	33	20	40
Interrupts others	Inhibit	19	22	37	22	17	33	11	39
Needs to be told “stop that”	Inhibit	15	26	19	41	11	28	22	39
Is impulsive	Inhibit	19	22	37	22	17	33	11	39
Has trouble moving from one activity to another	N/A	30	22	15	33	6	28	11	56
Has to be closely supervised	N/A	11	35	19	35	0	47	12	41
Resists or has trouble accepting a different way to solve a problem	SHIFT	30	19	26	26	6	39	17	39
Talks at the wrong time	N/A	19	15	15	52	6	25	25	44
Does not think of consequences before acting	Inhibit	22	19	19	41	22	33	6	39
Thinks too much about the same topic	SHIFT	30	15	40	15	17	28	44	11
Has trouble getting used to new situations (classes, groups, friends)	SHIFT	26	22	19	33	28	33	22	17
Cannot get a disappointment, scolding, or insult off his/her mind	SHIFT	33	19	22	26	28	28	22	22
Gets stuck on one topic or activity	SHIFT	33	19	22	26	28	28	22	22
Resists change of routines	SHIFT	15	41	22	22	17	56	22	6

Note. This table includes any BRIEF item that is labeled as Initiate, Effort (Energize), Inhibit, Stop, Interrupt/Pause, Flexible, Shift in the MMEF model.

Table 50

Pre to Post Item Rating Changes by Percent for the Control and Treatment Groups for the BRIEF items organized by the MEFS Category within the Efficiency Cluster

Efficiency Cluster Items	BRIEF	Control				Treatment			
		Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis	Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis
Tests poorly even when knows correct answers	N/A	39	19	19	23	7	27	27	30
Has poor handwriting	N/A	35	27	19	19	12	53	18	18

Note. This table includes any BRIEF item that is labeled as Sense Time, Pace, Sequence, Execute (Use Routines) in the MMEF model.

Table 51

Pre to Post Item Rating Changes by Percent for the Control and Treatment Groups for the BRIEF items organized by the MEFS Category within the Memory Cluster

Memory Cluster Items	BRIEF	Control				Treatment			
		Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis	Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis
Does not bring home, homework, assignment sheets, etc.	PLOR	22	22	22	33	6	33	22 39	39
Cannot find things at home	OMAT	22	33	19	26	17	44	22	19
When given three things to do, remembers only the first or last	WM	33	15	26	26	6	17	28	50
Has trouble with chores or tasks that have more than one step	WM	22	26	15	37	11	17	22	39
Cannot find things in room or school desk	OMAT	19	44	22	15	22	39	11	28
Forgets what he/she was doing	WM	29	26	23	22	11	33	6	50
Has trouble remembering things, even for a few minutes	WM	26	30	22	22	17	33	6	44
Loses things	OMAT	33	26	26	15	11	28	22	28
Has good ideas but cannot get them on paper	PLOR	26	15	15	44	11	33	11 44	44
When sent to get something, forgets what he/she is supposed to get	WM	22	48	15	15	17	50	6	28

Note. This table includes any BRIEF item that is labeled as Hold, Manipulate, Store, Retrieve in the MMEF model.

Table 52

Pre to Post Item Rating Changes by Percent for the Control and Treatment Groups for the BRIEF items organized by the MEFS Category within the Optimization Cluster

Optimization Cluster Items	BRIEF	Control				Treatment			
		Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis	Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis
Leaves work incomplete	MON	15	11	30	44	6	22	11	61
Has poor understanding of own strengths and weaknesses	MON	29	15	22	44	11	17	22	50
Gets out of control more than friends	INHIBIT	15	41	33	11	28	44	17	11
Makes careless errors	MON	30	0	22	48	6	17	22	56
Becomes overwhelmed by large assignments	PLOR	22	7	26	44	11	17	22	50
Does not check work for mistakes	MON	33	11	26	30	11	17	17	56
Forgets to hand in homework, even when completed	PLOR	33	30	15	22	22	28	11	39
Work is sloppy	MON	41	4	19	37	17	33	17	33
Gets out of seat at wrong time	INHIBIT	26	26	30	19	22	39	11	28
Gets upset too easily	EMO	15	44	19	22	33	39	17	11
Acts too wild or out of control	INHIBIT	26	33	30	11	11	50	17	22
Is unaware of how his behavior affects or bothers other	MON	22	11	26	41	11	28	22	39
Reacts more strongly to situations than other children	EMO	22	22	33	22	28	50	11	11
Has outbursts for little reason	EMO	22	30	41	7	22	61	6	11
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Optimization Cluster Items	BRIEF	Control	Treatment	Optimization Clust	BRIEF	Control	Treatment	Optimization Clust	BRIEF
Does not realize that certain actions bothers others	MON	26	15	22	37	17	28	11	44
Small events trigger big reactions	EMO	22	30	33	15	17	44	6	33
Talks or plays too loudly	MON	26	22	30	22	11	56	11	22
After having a problem, will stay disappointed for a long time	SHIFT	28	19	19	26	46	39	11	6
Is unaware of own behavior when in a group	MON	26	15	18	41	6	33	22	39
Gets caught up in details and misses big picture	PLOR	30	7	19	44	17	17	44	22
Mood changes frequently	EMO	26	26	26	22	28	56	6	11
Overreacts to small problems	EMO	15	22	26	37	17	44	22	17
Does not notice when his/her behavior causes negative reactions	MON	22	19	26	33	17	28	17	39
Has explosive, angry outbursts	EMO	18	37	30	15	16	61	17	6
Leaves messes that others have to clean up	OMAT	33	22	27	19	50	33	11	6
Leaves a trail of belongings wherever he/she goes	OMAT	30	41	19	11	11	50	17	22
Becomes upset with new situations	SHIFT	26	37	22	15	0	61	11	28
Angry or tearful outbursts are intense but end easily	EMO	11	37	23	19	22	57	17	6
Is disturbed by a change of teacher or class	SHIFT	11	41	19	30	17	50	28	6
Acts upset by a change in plans	SHIFT	11	41	15	33	17	56	22	6

Note. This table includes any BRIEF item that is labeled as Monitor, Modulate, Balance, Correct in the MMEF model.

Table 53

Pre to Post Item Rating Changes by Percent for the Control and Treatment Groups for the BRIEF items organized by the MEFS Category within the Solution Cluster

Solution Cluster Items	BRIEF	Control				Treatment			
		Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis	Pos Chnge	Pos Stasis	Neg Chnge	Neg Stasis
Does not plan ahead for assignments	PLOR	26	19	11	44	11	33	11	44
Does not connect doing tonight's homework with grades	N/A	31	27	23	19	6	31	25	38
Does not think before doing	INHIBIT	26	11	22	41	17	33	17	33
Starts assignments or chores at the last minute	PLOR	19	15	22	44	11	28	17	44
Does not show creativity in solving a problem	INITIATE	30	7	26	37	11	17	22	50
Has problems coming up with new ways of solving a problem	INITIATE	30	4	19	48	22	17	22	39
Has trouble thinking of a different way to solve a problem when stuck	INITIATE	41	7	30	22	11	22	28	39
Backpack is disorganized	OMAT	41	7	22	30	22	28	11	39
Underestimates time needed to finish tasks	PLOR	15	15	26	44	17	17	33	44
Does not come prepared for class	N/A	26	22	22	30	13	25	13	50
Has a messy closet	OMAT	30	37	19	15	28	44	17	11
Written work is poorly organized	PLOR	22	11	15	52	17	28	17	29

Note. This table includes any BRIEF item that is labeled as Generate, Associate, Prioritize, Plan, Organize, Decide in the MMEF model.

Chapter V: Interpretations, Conclusions and Recommendations

Opening

Executive functions, including self-regulation skills, are essential for children's school readiness at all levels of learning, particularly early adolescents in middle schools, who are identified with learning disabilities. American public schools are increasingly populated with students in poverty who are placed at risk for truancy or dropout, especially in the urban setting, with higher enrollment of students who are African Americans and bilingual and linguistically diverse. Students who receive special education services receive specialized instruction based on an Individualized Education Plan (IEP). The lack of interventions that address executive functions in remediating academic skills for students receiving special education services is gaining attention in the nation. For example, as indicated in the current study in an urban middle school, ninety percent of students in the sample come from homes that fall below the poverty level and ninety-four percent of the students are from Hispanic or African American backgrounds (Desmond & Hanich, 2014). With increasing diversity of Hispanic, African American, and Asian students in urban middle schools, this challenge is exaggerated given that students with IEPs have goals aimed at improving their skills deficits rather than executive functions development.

Over the past years, the problem has gotten worse and the reason for this is that academic goals created for students with disabilities do not address the executive functions deficits, which are more likely to be addressed by the development of executive functions skills geared for academic production in reading and writing (McCloskey et al., 2009). On the both local and national fronts, even with the risk of truancy and drop out,

adolescents, who are generally "less-risk averse, more driven by rewards and easily influenced by peers," and who may be lacking self-regulation skills, may experience grade retention used as a common practice by schools to deal with academic underachievement (Bobik, 2010; Desmond & Hanich, 2014). On both local and national platforms, students and teachers are under pressure due to the increasing demands of the stress experienced in meeting the baseline competencies required by school districts. Decline in the educational outcomes of middle school students remain an alarming concern for educators and researchers (Anderman et al., 1999; Bobik, 2010; Jimerson, 2001; Roderick, 1994; Rumberger, 1995).

From this study, potentially, there are educational implications with regard to closing the achievement gap for adolescents in poverty, particularly, as represented in current research on special populations enrolled in urban high schools, from diverse, impoverished cultural backgrounds (Desmond & Hanich, 2014). For example, in their study, Desmond and Hanich (2014) noted that ninety percent of students in their study were from families come that fall below the national poverty level and 94% of the students were from Hispanic or African American backgrounds.

Discussion of Findings: Summary of Results

Research Question 1: Which specific items of the Behavior Rating Inventory of Executive Function (BRIEF) were most frequently endorsed as problematic for the students in the control and intervention groups prior to the start of the intervention program?

Review of Control and Treatment group teacher pre-treatment ratings of the frequency of Never, Sometimes, Often for each item was helpful in understanding how

teachers perceived these students prior to the start of the program. It is important to note the frequency with which students were rated as Never demonstrating the negative behaviors prior to the start of the study, as this will indicate the potential for change from negative to positive during the treatment phase. The potential for change is inversely proportional to the degree of absence of negative behaviors at the start. When a high percentage of students are rated as Never exhibiting the behavior, the potential for change is reduced. Table 54 below summarizes the potential for change within the Control and Treatment groups for the items of each of the eight BRIEF Scales and the additional items included on the BRIEF but not assigned to any Scale.

Table 54

Summary of the potential for change within the Control and Treatment Groups for the Items of each of the 8 BRIEF Scales and the Additional Items included on the BRIEF but not assigned to any Scale

Scale	Pre-Treatment Item Ratings Comparison of Treatment with Control			Number of Items with Frequency of Never Rating GTE 50% at Pre-Treatment Rating	
	T > C	C > T	T = C +/- 5 percentage points	Treatment Group	Control Group
Emotional Control	4	0	5	10	5
Initiate	5	0	2	0	0
Shift	10	0	0	10	3
Inhibit	8	1	1	3	2
Working Memory	5	3	2	1	2
Org of Materials	2	2	3	3	4
Plan/Organize	8	1	1	1	0
Monitor	7	1	2	1	0
Extra Items Not Included in any Scale	8	0	5	8	1

This table shows that for a large majority of the items included on the 8 BRIEF Scales (49 of 74), the Treatment group had a larger proportion of students already being rated as Never exhibiting the behavior than the Control group. The Control group had a larger proportion of students already being rated as Never exhibiting the behavior than the Treatment group for only nine of 74 items. This means that in a majority of cases there was greater potential for change among the students of the Control group than among the students in the Treatment group. Furthermore, the frequency of Never ratings among the Treatment group was greater than or equal to 50% of the group for 29 of the 74 items while the frequency of Never ratings among the Control group was greater than or equal to 50% of the group for only 16 of the 74 items. From the outset, it was less likely that the treatment group would show greater change in teacher ratings than the control group simply because there was less potential for change based on pre-test ratings.

Research Question 2: Are there any significant difference between teacher BRIEF item rating changes from Time 1 to Time 2 for the control group compared to teacher BRIEF item rating changes from Time 1 to Time 2 for the intervention group?

None of the items reflected a significant difference between treatment and control group pre and post treatment difference scores. These results are consistent with the findings of the earlier study. The adjustment of difference scores to reflect a positive weight for positive stasis and a negative weight for negative stasis did not result in any findings different from those of the original statistical analysis.

Research Question 3: To what extent did teacher BRIEF item ratings change from Time 1 to Time 2 for the control group and from Time 1 to Time 2 for the intervention group?

Table 55 below portrays a Summary of Pre to Post Item Rating Changes by Percent for the Control and Treatment Groups. This summary was helpful in understanding the extent of the change. By leaving out comparisons where the T group is equal to the C group or the difference between the two is 5 points or less (calling these equivalent performance levels), only table percentages where T > C by 6 or more points and C > T by 6 or more points, are recorded.

Table 55

Summary of Pre to Post Item Rating Changes by Percent for the Control and Treatment Groups

	Positive Change		Positive Stasis		Negative Change		Negative Stasis	
Scale	T > C	C > T	T > C	C > T	T > C	C > T	T > C	C > T
Emotional Control	1	1	8	0	0	7	1	6
Initiate	0	7	7	0	0	0	5	1
Shift	3	2	9	0	2	5	2	6
Inhibit	3	3	8	0	0	8	4	4
Working Memory	0	7	6	1	0	7	7	1
Org of Materials	1	3	3	0	0	4	4	1
Plan/ Organize	0	7	8	0	3	0	3	2
Monitor	0	9	8	0	0	4	10	0
Extra Items	0	13	12	0	2	4	9	1

This table shows that for a large majority of the items included on the 8 BRIEF Scales (9 of 74), there were Treatment group had a potential for positive change than the

control group. The Control group had a larger proportion of potential for change greater than the Treatment group for 39 of 74 items. This means that in a minority of cases there was greater potential for change among the students of the Control group than among the students in the Treatment group. In most of the items, the Treatment group has higher percentages of positive change and lower percentages of negative change and negative stasis than the Control group. These are the items that performed the best in terms of reflecting changes in the treatment group that occurred less frequently in the control group. These items should be looked at in terms of the behaviors that they were measuring and link those behaviors to expected positive outcomes of the treatment.

Furthermore, 58/74 items indicate there was greater positive stasis in the treatment group than in the control group. Positive Stasis matters less in this analysis since it indicates that students started positive anyway and stayed there. The treatment focuses on emotional self-regulations. Some of the activities are in transition. In the original study, the finding was that that there was statistical significance in shifting (Desmond & Hanich, 2014). From a classroom teacher's perspective, a student's capacity to maintain a positive behavior over time is a positive effect for either the control or intervention because a child can learn positive or negative behavior from peers. For example, the classroom behaviors such "blurts things out," is internal self-regulation—one of similar items linked to expected positive outcomes of the treatment.

Research Question 4: When BRIEF items are organized based on the BRIEF Scale structure, which cluster of executive functions item ratings showed the most change from Time 1 to Time 2 for the control group and the intervention group?

Table 56 portrays the analysis that emphasizes the point of how the pre-test ratings affect the outcome of the study. The relevance of the positive change ratio and the negative change ratio are reflected in this table. By taking into account initial pre-treatment ratings, the potential for change was quantified and then making a comparison of the actual change to potential change both positively and negatively.

Table 56

Summary of BRIEF items organized based on the BRIEF Scale structure identifying which cluster of Executive Functions item ratings showed the most change from Time 1 to Time 2 for the Control Group and the Intervention Group

	Positive Change Ratio		Negative Change Ratio	
Scale	T > C	C > T	T > C	C > T
Emotional Control	7	0	0	9
Initiate	0	5	4	1
Shift	4	3	0	6
Inhibit	4	2	0	8
Working Memory	1	7	5	2
Org of Materials	1	3	2	3
Plan/Organize	0	8	3	2
Monitor	0	10	3	2
Extra Items	0	13	4	0

From this summary in Table 56, all of the Emotional Control items showed a positive effect of treatment and a negative effect of lack of treatment; the Shift and Inhibit Scales, also, had a number of items that showed the ideal pattern. These findings reveal that the BRIEF items where positive change T>C and negative change C>T are the best items to include on a scale that will be sensitive to treatment effects.

Research Question 5: When BRIEF items are reorganized using the McCloskey Model of Executive Functions, which cluster of executive functions item ratings showed the most change from Time 1 to Time 2 for the control group and the intervention group?

Table 57 summarizes the results of the BRIEF items when reorganized using the McCloskey Model of Executive Functions in order to determine which cluster of executive functions item ratings showed the most change from Time 1 to Time 2 for the control group and the intervention group. A majority of the MEFS categories show a high concentration of items with the positive T>C and negative C>T ratio pattern. The findings indicate that moving the items show greater concentrations than the BRIEF Scales. This table shows that by having separate descriptors for specific behaviors help to better understand the kind of items that reflected positive change and the kind of items that did not reflect positive change.

Table 57

Summary of BRIEF items reorganized using the McCloskey Model of Executive Functions, indicating which cluster of Executive Functions item ratings showed the most change from Time 1 to Time 2 for the Control Group and the Intervention Group based on Positive and Negative Change Ratios

	Positive Change Ratio		Negative Change Ratio	
Scale	T > C	C > T	T > C	C > T
Attention	1	5	1	2
Engagement	5	13	6	11
Efficiency	0	1	0	2
Memory	2	8	10	0
Optimization	13	10	7	20
Solution	1	9	5	5

Table 58

Summary of BRIEF items reorganized using the McCloskey Model of Executive Functions, indicating which cluster of Executive Functions item ratings showed the most change from Time 1 to Time 2 for the Control Group and the Intervention Group based on Positive and Negative Change and Stasis Percentages

	Positive Change		Positive Stasis		Negative Change		Negative Stasis	
Scale	T > C	C > T	T > C	C > T	T > C	C > T	T > C	C > T
Attention	1	8	8	0	2	5	5	3
Engagement	1	15	20	0	2	12	16	7
Efficiency	0	2	2	0	1	1	1	1
Memory	1	9	6	3	1	6	7	1
Optimization	9	19	28	1	3	22	12	12
Solution	0	11	11	0	1	5	5	3

Table 58 shows Summary of BRIEF items reorganized using the McCloskey Model of Executive Functions, indicating which cluster of executive functions item ratings showed the most change from Time 1 to Time 2 for the control group and the intervention group based on Positive and Negative Change and Stasis Percentages. The findings on the data from Tables 48-53 indicate positive stasis in the treatment group greater than the control group in all six of the MMES.

Table 59 shows that the majority of the BRIEF Items by HMEF Self-regulation category were most effective in reflecting the positive outcomes of the mindfulness intervention.

Table 59

BRIEF Items by HMEF Self-regulation category that was most effective in reflecting the Positive Outcomes of the Mindfulness Intervention

Optimization Cluster	MEFS	BRIEF
	Category	Scale
Leaves work incomplete	MONITOR	MON
Has poor understanding of own strengths and weaknesses	MONITOR	MON
Gets out of control more than friends	MODULATE	INHIBIT
Makes careless errors	MONITOR	MON
Becomes overwhelmed by large assignment	MODULATE	PLOR
Does not check work for mistakes	MONITOR	MON
Forgets to hand in homework, even when completed	MONITOR	PLOR
Work is sloppy	MONITOR	MON
Gets out of seat at wrong time	MONITOR	INHBIT
Gets upset too easily	MODULATE	EMO
Acts too wild or out of control	MODULATE	INHIBIT
Is unaware of how his behavior affects or bothers other	MONITOR	MON
Reacts more strongly to situations than other children	MODULATE	EMO
Has outbursts for little reason	MODULATE	EMO
Mood is easily influenced by the situation	MODULATE	EMO
Does not realize that certain actions bother others	MONITOR	MON
Small events trigger big reactions	MODULATE	EMO
Talks or plays too loudly	MODULATE	MON
After having a problem, will stay disappointed for a long time	MODULATE	SHIFT
Is unaware of own behavior when in a group	MONITOR	MON
Gets caught up in details and misses big picture	BALANCE	PLOR
Mood changes frequently	MODULATE	EMO
Overreacts to small problems	MODULATE	EMO
Does not notice when his/her behavior causes negative reactions	MONITOR	MON

Optimization Cluster	MEFS	BRIEF
	Category	Scale
Has explosive, angry outbursts	MODULATE	EMO
Leaves messes that others have to clean up	CORRECT	OMAT
Leaves a trail of belongings wherever he/she goes	CORRECT	OMAT
Becomes up- set with new situations	MODULATE	SHIFT
Angry or tearful out-outbursts are intense but end easily	MODULATE	EMO
Is disturbed by change of teacher/class	MODULATE	SHIFT
Acts upset by a change in plans	MODULATE	SHIFT

Note. This table includes any BRIEF item that is labeled as Monitor, Modulate, Balance, Correct in the MMEF model.

Implications of Findings

In the past 12 years, more research has been done in terms of identifying executive functions specific behaviors or indicators. Research findings from this study are helping to establish a basis for a more sound methodology for assessing change in studies of the effects of mindfulness on executive functions. Basically, these findings imply a refinement of the item pool to produce more valid sub-sets of indicators of positive change in order to create a Scale based on the findings of this study, considering that an intervention study is set up in order to determine if positive change is occurring. For this reason, in choosing a test to measure sensitivity to specific kinds of behaviors, it expected those items to have changed throughout the treatment. Thus, the findings point to the relevance of selecting items from the BRIEF, because it is helpful to match interventions or programs that are sensitive to the kinds of changes that are expected or hypothesized. In hindsight, it appears the findings imply the entire BRIEF Scales might not have been the best test of measure. This implies that it would have been better to

hypothesize which of the BRIEF items were likely to reflect change and use those for the study. Therefore, this implies the use of raw scores instead of t scores from the BRIEF.

Nevertheless, the findings show that some BRIEF Scales indicate that school interventions can have a positive impact on students and is reflected in the findings of this study directed with indicators of executive functions. The item analysis in this study was able to confirm the findings from research questions 1 and 2 in accord with the original research. Research question 2 provided stronger support in two of the Scales that was not substantiated by the original study. Because of the difference in potential for change in the control and intervention groups, this may have had an effect on the statistical analysis of the original study. The current study's findings at the item level were able to find positive change in three of the Scales (Emotional Control Scale, Monitor Scale, and Inhibit Scale). This lens supports the use of the BRIEF at the item level statistical procedure for the control and intervention groups. There is value in this study given that the rating instrument was not sensitive to the intervention with regard to certain items on the BRIEF that are classroom behaviors and not sensitive to self-regulation measures.

Scholarly Significance

The findings of the item level analysis for the treatment and control groups support the research literature on the continuing plasticity of the early adolescent brain and the research on school-based interventions for brain development. It also supports the extensive social-cognitive theories on self-regulation and in the MMEFs. Moreover, as indicated in the scholarly significance from the original study, the current study's findings support the effects of MAPs on specific executive functions skills. Rather than

having students do the same skill-based problems in math, for example, executive functions skills and mindfulness awareness training should be, at least, a large part of the focus to support academic and social-emotional learning of students.

Reflection on Implications of Findings for Mindfulness and Learning

The findings from this study also support the importance of providing executive functions skills development for at-risk students, especially in the urban setting through school-based instruction on mindfulness and learning directed at maintaining or improving early adolescent executive functions skills. Human beings have the capacity for executive functions regardless of culture and by seeing executive functions skills as not necessarily a deficit, but a room for development of those "unlearned" skills, perceptions and attitudes toward students will change for the better. Educating teachers about the importance of executive functions and the impact of brain research on executive functions development will increase the likelihood of improved school outcomes for the early adolescents, especially in the transitional year from elementary to middle school.

Table 60 lists characteristics of the three types of plasticity: Experience Independent, Experience Expectant, and Experience Dependent.

Table 60

Types of Plasticity

Experience Independent Plasticity	Experience Expectant Plasticity	Experience Dependent Plasticity
Experience is not required to "wire" up the system • Systems that are similar across species • Examples? • Brainstem • Some aspects of the visual system • Mechanism • Gene expression	• A particular experience that is expected in the environment contributes to wiring of system. • Most members of the species have that experience • Examples? • Language • Ocular Dominance Columns • Mechanism • Redundant connections in the brain	Experience Dependent Plasticity • Specific to experience • Different by individual • Based upon individual experience • Examples? • Memory • Stressful life events? • Formation of new connections? • Mechanism • Likely LTP or similar mechanism

Note. Adapted from Integrative Theoretical and Conceptual Framework (Wallace, 2011).

The current study strengthens the findings of the original study and its implications. The original study was conducted in an urban middle school; ninety percent of students in our sample come from homes that fall below the national poverty level and 94% of the students are from Hispanic or African American backgrounds. The achievement gap widens considerably for adolescents in urban schools from impoverished backgrounds and from populations of color. Instruction in executive functions and self-regulation processes and strategies at this developmental stage has the potential of maintaining and improving school academic and behavioral outcomes and potentially, the resilience of early adolescents as they continue into high school. Furthermore, teachers can be trained to in mindfulness awareness and aspects of MAPs and executive functions skills and practice and use them in the classroom. Figure 1 represents an overview of mindfulness and its relevance to academic settings.

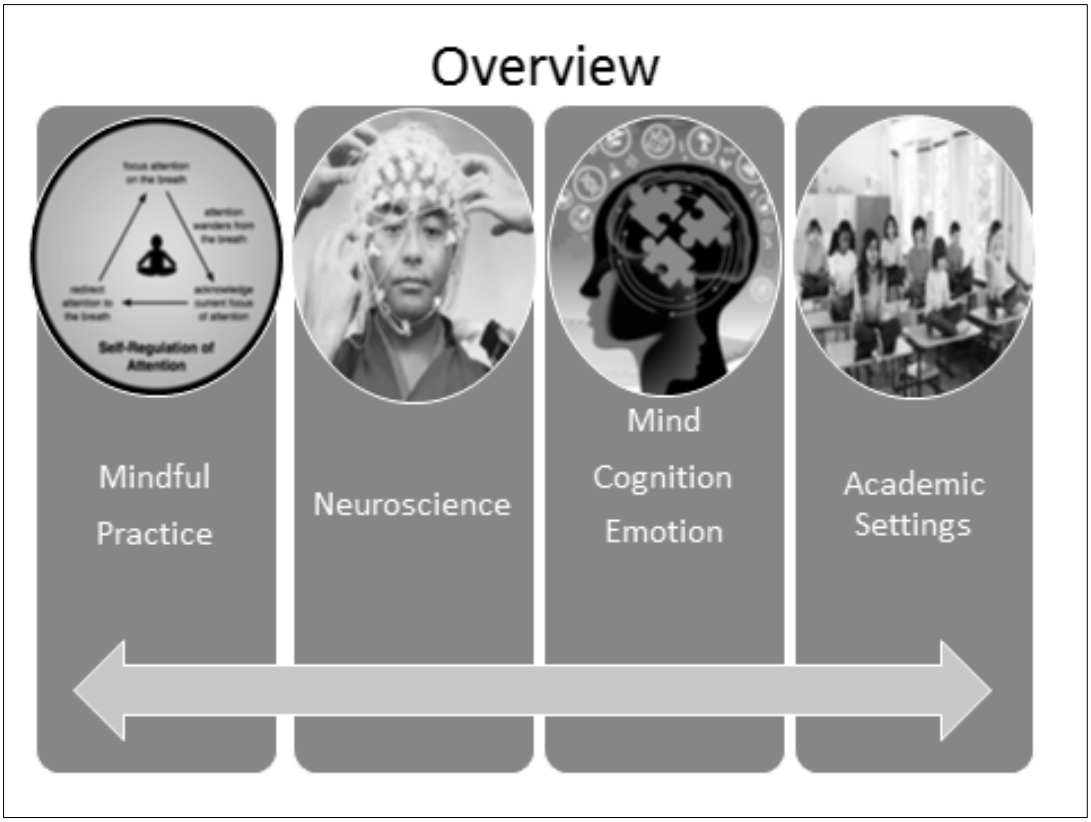

Figure 1. Overview of mindfulness and its relevance to academic settings.

Table 61 portrays the essential definitions of mindfulness. The implications suggest the need for increasing teachers' awareness about mindfulness and executive functions as reflected in Table 1.

Table 61

Essential Definitions of Mindfulness

Source	Definition	Authors
Buddhist Tradition	Buddhist: From the Pali word sati…which means memory, but is translated as "to be mindful" rather than the mindfulness.	Grossman & Van Dam (2011)
General, Western Psychology	" . . . an approach for increasing awareness and responding skillfully to mental processes that contribute to emotional distress and maladaptive behavior."	Bishop et al. (2004)
Operational Definition for the study of Mindfulness.	"… a process of regulating attention in order to bring a quality of nonelaborative awareness to current experience and a quality of relating to one's experience within an orientation of curiosity, experiential openness, and acceptance . . . a process of gaining insight into the nature of one's mind . . . "	Bishop et al. (2004)
Practice of Mindfulness vs. its results.	Mindfulness is a practice. Patience, trust, calmness, compassion, and wisdom are possible correlates or goals of the practice.	Bishop et al. (2004)
Kabat-Zinn's Operational Definition	". . . the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment."	Kabat-Zinn (2003)
Universal Definition	"There is nothing particularly Buddhist about it. We are all mindful to one degree or another, moment by moment. It is an inherent human capacity." Buddhist thought, and dharma, in particular are at the heart of mindfulness, but even the "Buddha was not a Buddhist".	Kabat-Zinn (2003)
Mindfulness-Based Stress Reduction	An "intervention is designed to teach participants to become more aware of, and relate differently to thoughts, feelings, and body sensations. MBSR helps participants cultivate a nonjudging yet discerning observation of all the stimuli that enter their field of awareness moment by moment. Mindfulness practice allows for greater awareness of the "here and now," as the practitioner learns to let go of ruminations about the past and fears regarding the future."	Shapiro et al. (2005)

Limitations of the Study

Blind Review and Random Assignment: Random assignment of the students in the original study was conducted by the school personnel. The administrators had knowledge of students by name and had a positive regard for the MAPs program. This regard was due to its implementation in the school in the previous year and provided the funding for the program. The principal investigators conducted a random sample based on the school assignment of participants. They did not have control over the random assignment of the students. Therefore, there is a possibility that the school personnel's presence impeded the random assignment; there might have been a bias. If participants were randomized, it did not appear to have an effect.

The teachers were blind to the assignments and had no knowledge of the placement of the students when they completed the pretest. Teachers may have discerned overtime who was in which group based on students' statements given where students were going during classes. Only one of the 8 teachers had training about MAPs. Furthermore, no introduction on the instructions of the BRIEF was provided to the teachers about the rating Scales when they were informed about the study because it was self-evident for the scoring. Lack of more consistency on the rating was limitations given its importance for the pretest and posttest scoring. Furthermore, there are limitations with using "Never," "Sometimes," and "Often" ratings compared to other types of ratings or Scales.

Attrition: In the original research, additional procedures including multiple imputations were used for accounting for and handling missing data arising from attrition (e.g., loss of power, biased estimates) (Desmond & Hanich, 2014; Enders, 2013; Little &

Rubin, 2002). The original study was intended to commence at the end of September and conclude at the end of December. Due to a delay in the schedule of the dual class times, the study began later in October and ended in late January. The Christmas holidays interrupted the consistency of the treatment sessions.

Treatment Sessions: Also, the number of treatment sessions may not have been sufficient due to limitations. The earlier qualitative study was conducted over a six-month period of weekly sessions (Desmond, 2009).

Bias: The BRIEF instrument was published in 2002 and based upon on research on executive functions to that date. Subsequently, there have been additions to the research on executive functions. There may be bias given that the BRIEF is a school-based instrument based on teacher ratings and perceptions. Teachers rate students based on the behaviors they know of students. The BRIEF may have limitations because it looks at classroom behaviors and academic behaviors and the MAPs intervention provides self-regulation interventions that are part of the executive functions skills.

Cultural Bias: The BRIEF instrument is not deemed to have any cultural biases. However, cultural responsiveness with regard to teacher perceptions may at play in their interpretations of certain descriptors. Teacher's perceptions on students' behaviors may harbor cultural bias that may reflect teacher's interpretations based on the wording of the specific BRIEF items. Teacher's cultural background may influence their rating of students' behaviors. Given these limitations, caution must be used in generalizing to other school contexts, demographic groups, geographic regions, and other age groups.

Conclusions

It is worth noting that in switching research questions 3 and 2, the logical flow of the questions indicated that, while there was no statistical significance in questions 1 and 2, the findings confirming the original study, the item analysis in questions 3 and 4, showed items that are likely to be sensitive to change in future studies, and therefore will be good candidates. In addition, the findings of this study provide support for school-based intervention on MAPs for school-based interventions. The item level analyses serve as a sharper lens to examine teacher ratings of the BRIEF and explore a richer understanding of certain components of the BRIEF Scales. These points to promising outcomes for mindfulness practices that can support individuals regardless of cognitive capacity to be able to better regulate their social emotional behaviors. The BRIEF measures school-bound behaviors. In certain societies and cultures, certain BRIEF items may not be valued at all. Self-regulation and executive functions skills development are important for children's brain development, in that, they are readily beneficial in and outside of the classroom settings and for life skills throughout the life span. Previous research suggests that executive functions (EF), including self-regulation skills, are essential for children's school readiness and academic production in school, particularly early adolescents in middle schools, who are identified with learning disabilities (Bobik, 2010; Hartman, 2012; Desmond & Hanich, 2014). This study provides a promising outlook for school-based interventions for early adolescents in the earlier and middle school years.

Recommendations for Research

For this study, statistic treatments were not used to compare differences between the treatment and control groups. A Chi Square analysis was not done since the potential for change was determined based on systematically comparing data on "often" and "sometimes" categories from the treatment and control groups. However, for future research, in order to strengthen a similar study, running Chi Square analysis is highly recommended to compare differences between the treatment and control groups. Such statistic treatments will indicate comparisons that are significant.

Findings suggest that further consideration is needed to identify which of the prevalent items in the treatment group make conceptual sense, or are behaviors that are not likely to change because of exposure to the treatment. This leads to the argument that these items should be pulled out of the BRIEF and used to develop a scale that would be more likely to be sensitive to the effects of treatment. For future research, certain items of the BRIEF could be summed to create a raw score that could be analyzed to see if treatment group was significantly better than control for this group of items.

From the summary in Table 56, the findings indicated that all of the Emotional Control items showed a positive effect of treatment and a negative effect of lack of treatment; the Shift and Inhibit Scales, also, had a number of items that showed the ideal pattern. A recommendation for future research is that the BRIEF items where positive change T > C and negative change C > T are the best items to include on a scale that will be sensitive to treatment effects. It is recommended for the end of the study that future research should apply a scale based that shows the specific types of items most likely to be sensitive to changes based on treatment, supported by McCloskey and Perkins (2012).

The BRIEF has been criticized for being based on classroom work habits (e.g. work that is sloppy or incomplete work; difficulty getting started on chores) which are not self-regulation items. Executive functions are an umbrella for how a number of the skills are defined. How closely aligned some of the BRIEF items are with psychological indicators of executive functions will be important for future research. It is recommended that future research aligns psychological indicators with BRIEF Scales in order to have research bearing on executive functions. The next rating Scale should be aligned to more current research on the behavior indicators that are used to delineate executive functions.

The treatment focused on emotional self-regulations. Some of the activities in this study were in the transition periods. In the original study the finding was that that there was statistical significance in shifting (Desmond & Hanich, 2014). From a classroom teacher's perspective, a student's capacity to maintain a positive behavior over time is a positive effect for either the control or intervention because a child can learn positive or negative behavior from peers. For example, the classroom behavior of raising one's hand is an internal self-regulation item. If mindfulness helps students to exhibit a positive change, this is a positive effect. Future research should focus on alternative ways of integrating mindfulness into the curriculum.

Additional research should be done with early adolescents and in urban schools in spite of the limitations. Students exhibit risky behavior during the critical years of adolescence. Skill-based mathematics and standardized testing for reading and writing put demands on students to achieve. If school high-stakes testing goals are intended to have a positive impact on the lives of students, they need to support their executive function development, as well as be aligned with academic achievement and the

curriculum. There needs to be a movement to harness the effective implementations of executive functions development, as well as innovative programs such as the emerging "yoga in schools" movement for children.

The more we understand about the brain research, especially the cortical areas of executive functions, Figure 2, the more we can better able to understand how research on the brain impacts education.

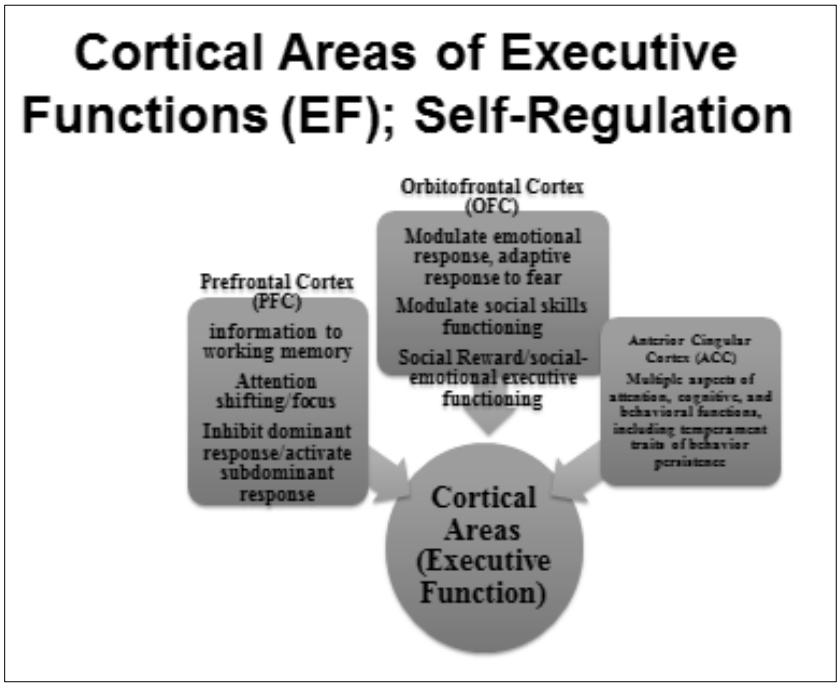

Figure 2. Cortical areas of executive function—Integrative theoretical and conceptual framework (Wallace, 2011).

Recommendations for Practice

Training is needed for teachers, administrators and parents to understand the role and importance of executive functions interventions. Students should be provided with opportunities in the early years to embrace executive functions skills development as useful for school and home experiences and the implicit benefits of executive functions through the lifespan. Teacher education will improve the lives of children by creating disciplines for social-emotional learning specialists and executive functions specialists in

public schools. The communities of practice will expand to include forums with parents, teachers, administrators, and students, to work for a meaningful understanding of education (Dewey, 1933).

The more we understand about executive functions and their relevance to whole child education (Kochhar-Bryant & Skalski, 2011), the more we can include all communities of practice, interagency coordination of academic and social-emotional supports f or student with disabilities. The more we understand research on executive functions and its implication for whole child education, the zero tolerance approach to discipline in schools will be addressed differently on local levels by administrators and school districts. Urban schools with police presence can better work with principals, school administrators, parents, teachers, and student advocacy groups to incorporate executive functions training and mindfulness awareness practices in addressing students' behaviors and disciplinary issues. Literacy skills difficulties in reading and writing for students with disabilities tend to be some of the reasons students are perceived by teachers to have behavior and disciplinary issues. Literacy skills in reading and writing require executive functions skills. As noted by Robinson, (2003), "a disposition for independence can be fostered while teaching students to read" (p.64). This independence in reading requires executive functions skills at home and in the classroom.

Literacy skills for adolescents with disabilities require executive functions skills both in the classroom and home. Teachers and parents can provide executive functions interventions to support students in their daily tasks and responsibilities as part of a whole child education that includes social and emotional learning aimed at improving low academic performance (Kochhar-Bryant & Skalski, 2011). Student with executive

functions difficulties can improve their learning goals by applying personal responsibility across four domains (four areas of involvement) for how he/she perceives, feels, thinks, and acts (McCloskey et al., 2009). Young adolescence students identified with executive functions difficulties experience multiple concerns related to academic achievement, and the pressing need to develop the executive functions skills required in middle school. The remediation of these skills through school-based interventions on executive will yield benefits to both students and teachers along the path of supporting successful students in school. For example, when students monitor themselves and apply self-regulation skills, they are able to pay attention to the executive functions skills required to deal with demands of goal-oriented and self-directed school expectations. Students with executive functions skills deficiency have to deploy executive function skills in order to avoid academic failure and effectively be responsive to developing new ways of addressing their executive functions difficulties.

Recommendation for practice include the training of a new breed of social-emotional specialists, working in public schools, as part of teacher training aligned with graduate schools focused on core courses on neuroscience and the importance of executive functions. School psychologists and social-emotional specialists can work in tandem to support the training of teachers and administrators on EF improvement goals.

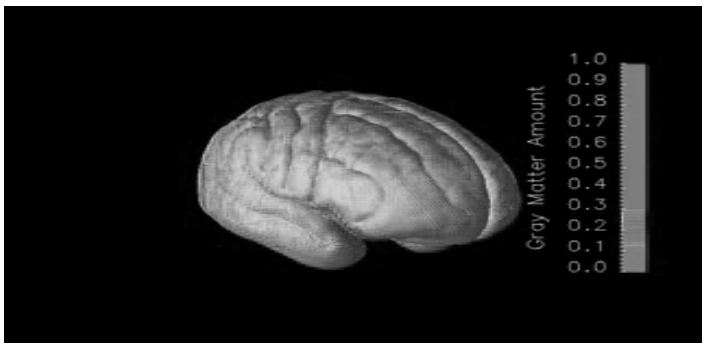

Figure 3. Pre-frontal cortex.

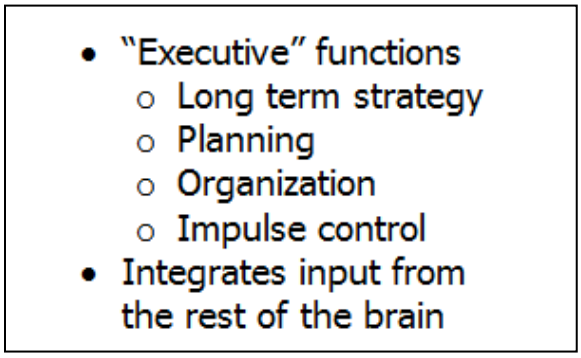

Figure 4. Integrative theoretical and conceptual framework (Wallace, 2011).

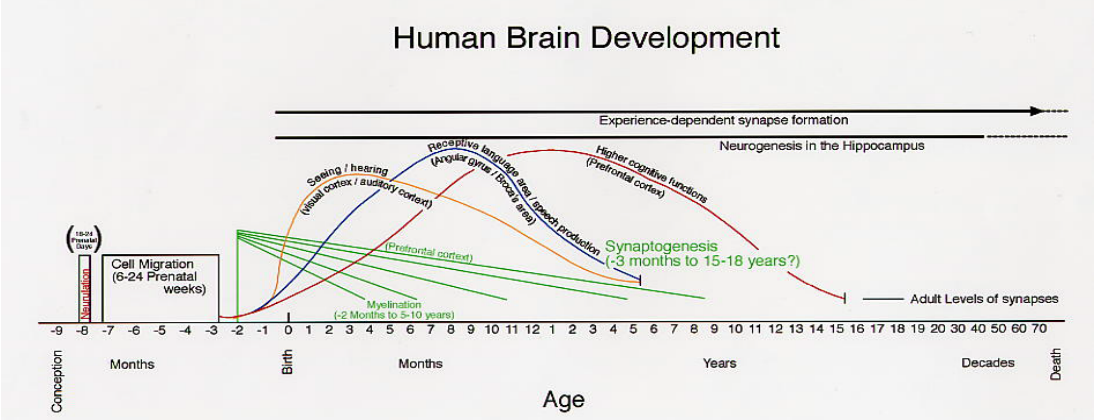

Figure 5. Human brain development (Integrative theoretical and conceptual framework, Wallace, 2011).

Figure 6. Integrative theoretical and conceptual framework construction (Wallace, 2011).

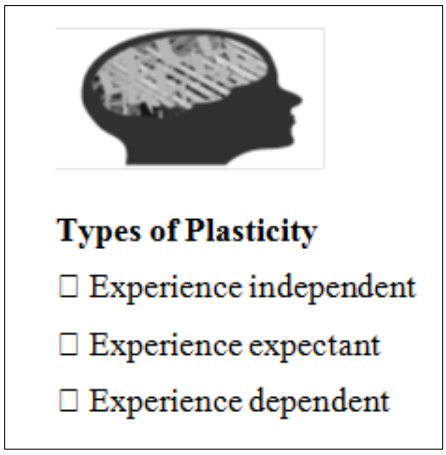

Figure 7. Types of plasticity.

The early years are particularly important, because experiences affect the architecture of the maturing brain. As it emerges, the quality of that architecture establishes either a sturdy or a fragile foundation for all subsequent development and behavior getting things right at the beginning is easier than trying to fix them later. Nevertheless, brain plasticity during adulthood is well documented (Wallace, 2011).

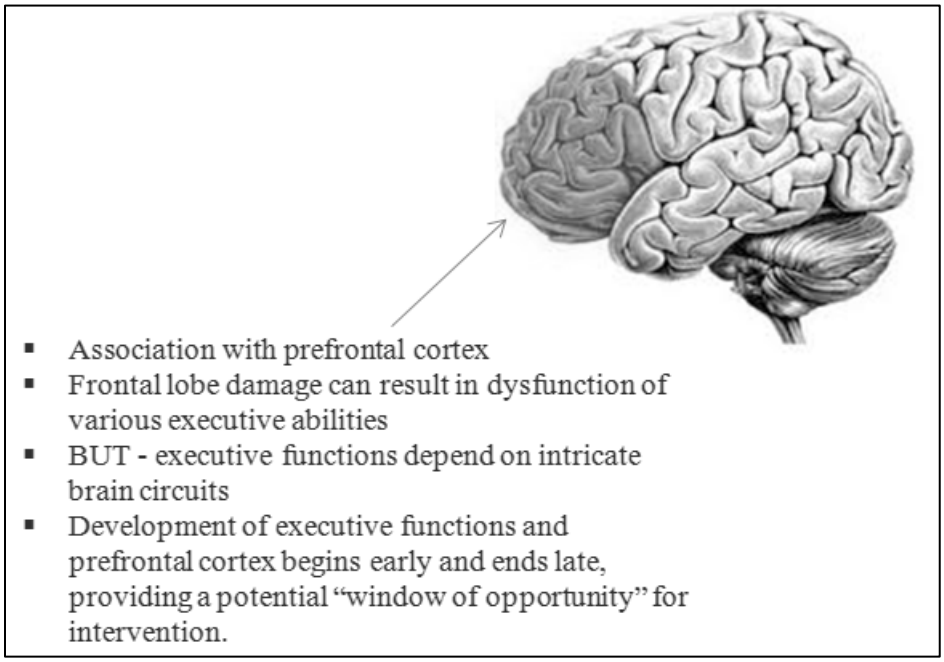

Figure 8. Neuroanatomic organization of executive functions. [Adapted from integrative theoretical and conceptual framework (Wallace 2011)]. Neuropsychological theories of autism spectrum disorder (ASD). Neuropsychological theories form a bridge between biology and behavior.

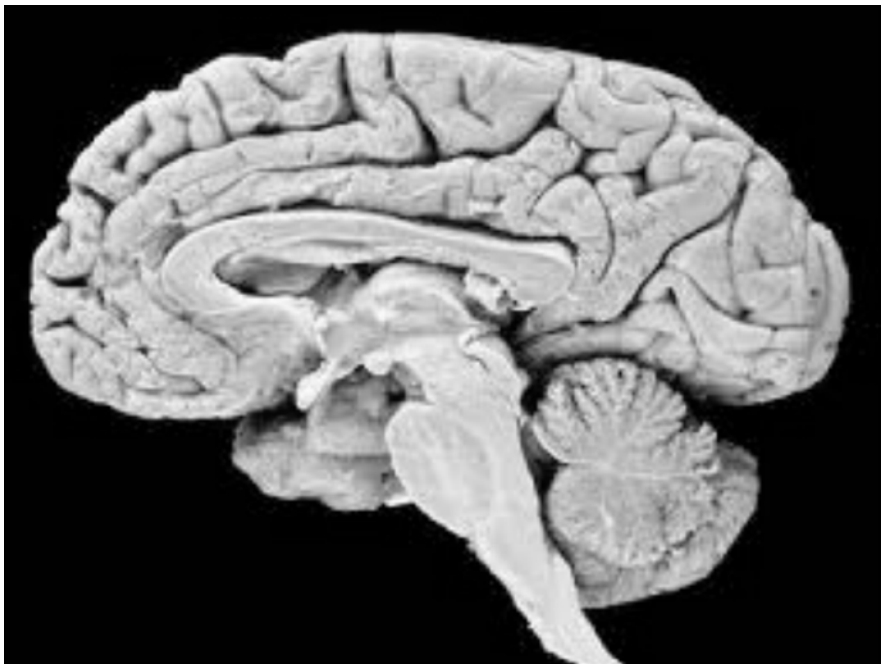

Figure 9. The brain—Integrative theoretical and conceptual framework (Wallace, 2011).

Figure 10. Mind/Cognition (Integrative theoretical and conceptual framework, Wallace, 2011).

Figure 11. Behavior—neuropsychological theories can inform practical intervention and biological research (Integrative theoretical and conceptual framework, Wallace 2011).

Recommendations for Policy

There appears to be insufficient research on executive functions and early adolescents in poverty to make recommendations for policy. However, recommendations for practice can be applied on local levels through the reflective practice of policy makers of local school districts and interagency coordinators, who will improve the impact of whole child education in the learning environments of students with disabilities. There is need for policy makers to incorporate the importance of executive functions development and mindfulness awareness from the early years to high school. Professional development for teachers and administrators can be a part of the curriculum and instruction courses for teacher certification and education. Communities of practice, including educators, school psychologists, neuroeducational researchers, can collaborate in their efforts to make recommendations to policy makers about the importance of executive functions interventions alongside existing research on social-emotional leaning in the early years.

Decline in the educational outcomes of middle school students remains an alarming concern for educators and researchers (Anderman et al., 1999; Bobik, 2010; Jimerson, 2001; Roderick, 1994; Rumberger, 1995). Policy makers need the collaborative research among educators, psychologists, neuroscientists, and researchers, to implement policies that support practice and research on mindfulness and learning. Symposium on mindfulness and learning, such as the Mindfulness and Learning Research Symposium (MLRS) and the National Kids Yoga Conference and Symposium (2014) are creative ways to invite policy makers and stakeholders to make the change in legislations that support students with disabilities and all children from K-12 grades. Mindfulness in education is for all individuals who practice and learn from insights generated at MLRS. The collaboration of researchers from public health, education, business, and the medical fields enrich communities of practice and expand the creative imagination that enable targeted populations to thrive.

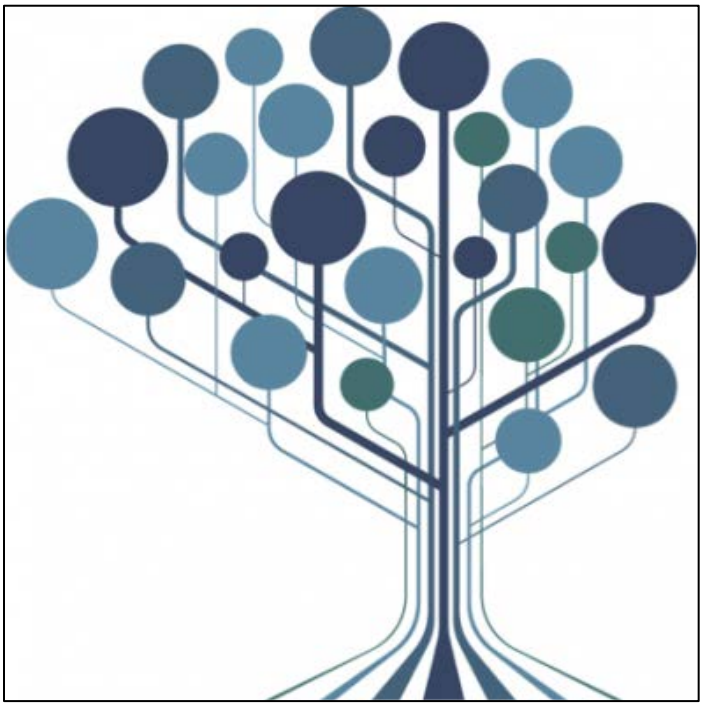

Figure 12. Mindfulness and Learning Research Symposium; The Johns Hopkins Science of Learning Institute.

Table 62

Mindfulness and Learning Research Symposium, The Johns Hopkins Science of Learning Institute

Mindfulness and Learning Research Symposium Topics	
What are Mindfulness practices?	A growing body of research suggests that mindfulness practices (those that promote intentional cultivation of moment-by-moment non-judgmental attention and awareness) reduce psychological distress and increase attention, memory, and learning in children, youth, and adults. Despite these findings, rigorous implementation and evaluation of such interventions in schools are still extremely rare.
What are the benefits of mindfulness practices	How do mindfulness practices—such as meditation, breathing techniques, and yoga postures—affect brain function, executive functions (e.g., attention, memory), mental health (e.g., anxiety, depression, coping), and overall well-being?
What do mindfulness practices look like in real-life settings?	How is mindfulness applied in educational and clinical settings to address barriers to learning? How do such practices vary across different K-12 groups and populations with special needs (e.g., at-risk, gifted students)?
What are the next steps in research and evaluation?	What are the most fruitful areas for future basic and applied sciences research? What challenges do researchers face in the implementation and measurement of mindfulness interventions? How can they overcome such challenges?

Note. Researchers from the Johns Hopkins Schools of Education, Medicine, and Public Health hosted the Mindfulness and Learning Research Symposium, September 29, 2014to synthesize cutting-edge scientific research and showcase what is known and currently unknown on mindfulness and learning. (Retrieved from http://mindfulnessandlearning.com/)

Concluding Thoughts

There is dearth of research on the impact of mindfulness awareness programs on the EF skills of early adolescents on poverty. There is need for additional research on the school-based interventions for the executive functions development of middle school students. The neuroplasticity of early adolescents through school-based interventions are essential for whole child education that includes both academic and social emotional learning. Executive functions training for teachers as both educators and practitioners is a

to call for action for school-districts to pay attention in their professional development for teachers, as well as the recognition of the relationship between students' academic success in high stakes testing and the rudimentary processes that are inherent in the day-to-day executive functions development.

For many adolescents with learning disabilities academic goals do not target the EF deficits, which are more likely to be addressed by the development of EFs geared for academic production in reading, writing, and mathematics (Denckla, 2002; Hartman, 2012; McCloskey et al., 2009). Research on the brain development of young children and related cognitive processes, in particular, EF and self-regulation skills, has provided increasingly strong evidence for their role in children's school readiness and in later years (Blair, 2002; Diamond & Lee, 2011). Furthermore, significant evidence concerning the genetic and environmental conditions underlying the wide-range of changes experienced by the early adolescent during the critical development stage is supported by research on the brain—development of adolescent and related cognitive processes, particularly EFs (Caskey & Ruben, 2007; Desmond & Hanich, 2014; Dorman et al., 1985; Jensen, 2008; Kellough & Kellough, 2008; Manning, 2002; Sylvan & Christodoulou, 2010). Findings from these researchers have supported a variety of school-based interventions designed to support children's achievement and social behaviors (Desmond & Hanich, 2014).

School-based EF interventions designed to support and improve classroom behavior is more likely to be embraced by teachers and administrators, especially interventions that are contextually-based because they are implemented in school and at home, the contexts in which a child uses EF skills interventions. Students with disabilities including those diagnosed with autism spectrum disorder present opportunities for

specific interventions. This is highlighted in a recent study investigating whether Unstuck and On Target (UOT; Cannon, Kenworthy, Alexander, Werner, & Anthony, 2011) reduces insistence on sameness, improves flexibility, and/or increases organized, goal-oriented behavior in children with an autism spectrum disorder (ASD) and age-appropriate basic language skills (Kenworthy et al. 2014). The data supported the effectiveness of the first contextually based EF intervention for children with ASD. The findings indicated that UOT improved classroom behavior, flexibility, and problem-solving in children with ASD. UOT is a cognitive-behavioral school-based intervention that targets specific executive functions (EF) related with flexibility, big picture thinking, and planning that have previously been found to be deficient in ASD. According to the researchers, this unique EF intervention for children with ASD targets insistence on sameness, flexibility, goal-setting, and planning through a cognitive-behavioral program of self-regulatory scripts, guided/faded practice, and visual/verbal cueing. UOT is contextually-based because it is implemented in school and at home, the contexts in which a child uses EF skills. Similar studies aimed at supporting and improving classroom behavior will be helpful in filling the need for EF development of children in schools, particularly if they included mindfulness in education programs. It is promising to examine creative ways to explore how every child thrives when mindfulness in education is conceived as a birth right, regardless of socio-economic status.

Limited research has investigated school-based interventions utilizing mindfulness to improve executive functions and academic production in middle school for early adolescents, particularly those in poverty. To address the gaps in literature, this study of secondary analyses of an existing data set examined teacher ratings on the

BRIEF at the item level for students included in the original study, offers new interpretations for a more refined methodology on mindfulness research for early adolescents.

The emerging ideas in neuroscience illuminate the importance of neural integration and neuroplasticity, which undergirds the understanding of the development of executive function skills necessary for academic production in the classroom. This research sheds light on the improvement of executive functions for early adolescents in poverty, enrolled in middle schools, through mindfulness awareness program and points to the impact of mindfulness awareness program on the executive functions of students in the urban setting, specifically, the implications of executive functions and academic production. The mind image (Figure 12) and the essential questions in Table 62 serve as the overarching concluding thoughts that remain worthy of reflective practice. These provoking questions align with the promise of new discoveries about mindfulness in education and the impact of research on the brain plasticity for early adolescents from K-12th grade in their integral quest for EF improvement throughout the life span.

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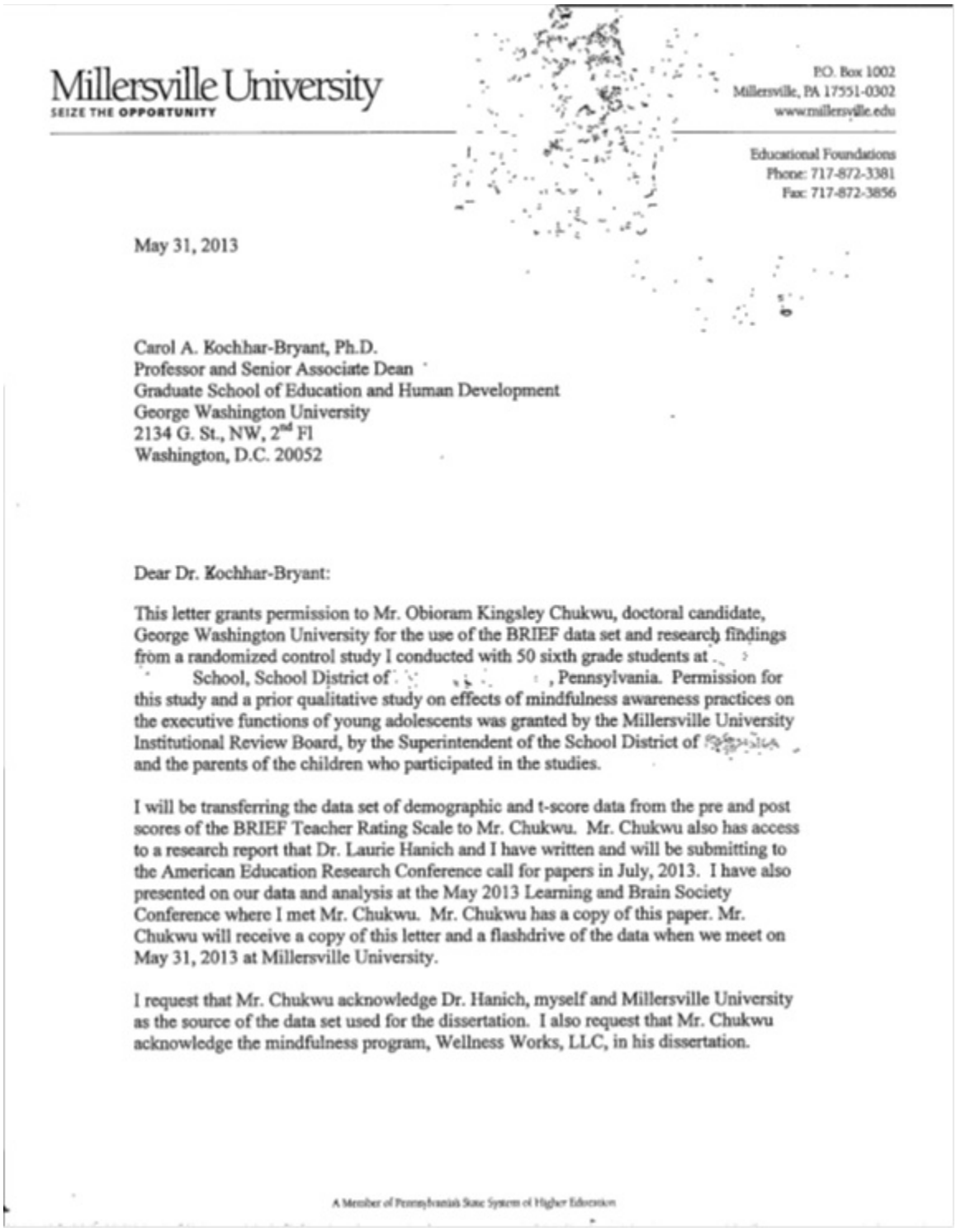
Appendices

Appendix A: Permission Letter from Original Researcher



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May 31, 2013

Carol A. Kochhar-Bryant, Ph.D.
Professor and Senior Associate Dean
Graduate School of Education and Human Development
George Washington University
2134 G. St., NW, 2nd Fl
Washington, D.C. 20052

Dear Dr. Kochhar-Bryant:

This letter grants permission to Mr. Obioram Kingsley Chukwu, doctoral candidate, George Washington University for the use of the BRIEF data set and research findings from a randomized control study I conducted with 50 sixth grade students at School, School District of , Pennsylvania. Permission for this study and a prior qualitative study on effects of mindfulness awareness practices on the executive functions of young adolescents was granted by the Millersville University Institutional Review Board, by the Superintendent of the School District of and the parents of the children who participated in the studies.

I will be transferring the data set of demographic and t-score data from the pre and post scores of the BRIEF Teacher Rating Scale to Mr. Chukwu. Mr. Chukwu also has access to a research report that Dr. Laurie Hanich and I have written and will be submitting to the American Education Research Conference call for papers in July, 2013. I have also presented on our data and analysis at the May 2013 Learning and Brain Society Conference where I met Mr. Chukwu. Mr. Chukwu has a copy of this paper. Mr. Chukwu will receive a copy of this letter and a flashdrive of the data when we meet on May 31, 2013 at Millersville University.

I request that Mr. Chukwu acknowledge Dr. Hanich, myself and Millersville University as the source of the data set used for the dissertation. I also request that Mr. Chukwu acknowledge the mindfulness program, Wellness Works, LLC, in his dissertation.

A Member of Pennsylvania's State System of Higher Education

Permission Letter from Original Researcher (cont'd.)

We are pleased that Mr. Chukwu will be able to use and continue this research on mindfulness awareness practices and their effects on the executive functions of young adolescents.

Sincerely,

Cheryl T. Desmond

Cheryl T. Desmond, Ph.D.,
Professor, Educational Foundations & Leadership for Teaching and Learning
Millersville University
Millersville, PA 17551,
cheryl.desmond@millersville.edu
717 390-0759

Appendix B: Sample BRIEF Letter from Original Researcher

Millersville University
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Cheryl T. Desmond, Ph.D.
xxxxxxxxx Avenue
xxxxxxxxx
June 22, 2013

Educational Foundations
Phone: 717-872-3381
Fax: 717-872-3856

Dear Mr. Chukwu:

In the enclosed attachment, I am sending a sample of the BRIEF inventory, the Memorandum of Understanding from the school district and the approval by the Millersville University Institutional Review Board.

Please understand that the school district or middle school can NOT be named in any dissertation, research, or publication resulting from your use of the data I submitted to you on the EF and MAPS research. I trust you will comply with this request.

Sincerely,

Cheryl T. Desmond, Ph.D.
Professor
Millersville University

Cc: Dr. Carol A. Kochhar-Bryant, Professor and Senior Associate Dean

Appendix C: University-Approved IRB

Millersville University
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August 15, 2009

Dr. Cheryl Desmond

Educational Foundations

Dear Dr. Desmond,

The Millersville University Institutional Review Board (MUIRB) has determined that the ongoing research project on the effectiveness of the Wellness.Works program qualifies as "minimal risk" and is approved for the 2009-2010 academic year.

Sincerely,

Christine Anthony

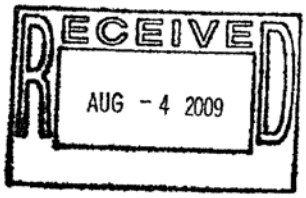
Dr. Christine Anthony

Chair, MU Institutional Review Board

Stayer 301

717 872-3391

Appendix D: Memorandum of Understanding (MOU)



Memorandum of Understanding

SCHOOL DISTRICT OF
(SCHOOL) AND
MILLERSVILLE UNIVERSITY

I. Purpose:
This Memorandum of Understanding (MOU) is created to set forth the responsibility of the parties with respect to the protection of students and data relating to students that is provided to Millersville University through the School District of (SD) and teachers from the Kinder Association's Wellness Works program during a research study on the impact of the program.

II. Duration of Agreement:
This MOU becomes effective on the date signed and shall end on November 30, 2009.

III. Confidentiality: Millersville University and Kinder Associates, in order to fulfill their responsibilities under this MOU, have a legitimate educational interest in randomly surveying forty (40) participating students.

Millersville University and Kinder Associates agree to comply with the Family Educational Rights and Privacy Act ("FERPA"), Protection of Pupil Rights Act ("PPRA"), the State Board of Education Guidelines, the Health Insurance Portability and Accountability Act ("HIPAA"), and any other applicable federal, state, and/or local legislation regarding Student Information.

Millersville University and Kinder Associates further agree that personally identifiable student information will be kept confidential and that except as required by law not to disclose any personally identifiable student information to any third party in any manner whatsoever without the express written permission of the SD and the parent/guardian of the student. Millersville University and Kinder Associates shall be responsible for assuring that its employees or representatives adhere to the terms hereof to the same extent as if they were parties hereto.

Memorandum of Understanding (MOU) (cont'd.)

IV. Responsibilities:
In consideration of the educational goals of the parties of this Agreement and in recognition of the public benefit derived from the study, the SD[illegible] the parties agree that their responsibilities under this Agreement shall be as follows:

A. **The School District of** [illegible] will:
- Provide access to the forty (40) participating students in the Wellness Works Program for purposes of the research study and a pre/post survey administration, once informed parent permission slips are signed and received.

B. **Millersville University and Kinder Associates** will:
- Adhere to the obligations under this MOU and not release student names or other identifiable student data to any third party without the express written permission of the SD[illegible] and the parent/guardian. Strict instructions must be given to the teachers completing the forms to use coded numbers instead of student names and other identifiable student information.
- Provide SD[illegible] with a copy of the outcomes of the study.

V. Effective Administration and Execution of this MEMORANDUM OF UNDERSTANDING:

Effective execution of this MOU can only be achieved through continuing communication and dialogue between parties. It is the intent of this MOU that the channel of communication will be used to resolve questions or concerns that may arise that are not specifically addressed within the MOU.

Memorandum of Understanding (MOU) (cont'd.)

Signature Authority:

Superintendent, School District of Lancaster — Date

Cheryl T. Desmond, PhD. Professor, Educational Foundations, Millersville University — Date 7/31/09

Wynne Kinder, Kinder Associates, LLC — Date 7/31/09

Date Reviewed _____ by Larry Hand

Appendix E: Informed Consent Form (English)

Informed Consent Form

Title:
Wellness Works Strategies to Improve Student Behavior in the Middle School

Involvement:

This study will investigate the effects of the Wellness Works program on classroom behaviors of students in selected classrooms during the September – December, 2009. Dr. Cheryl Desmond, Millersville University Professor will conduct the study. For more information, contact Dr. Desmond, 717-871-2002.

Overview:

This study will assess whether the program, Wellness Works, has a positive effect on your child's behavior.

Student participation is voluntary.

A student may decide to withdraw from the study at any time.

There are no known risks to the student.

Confidentiality is ensured.*
All student identification information will be coded by number. The coded list will be known only by the principal and the teacher.

All information on each student will be recorded anonymously

*This study has been approved by the Millersville University Institutional Review Board.

Please fill in below and return:

Name of Student _____

Parent/Guardian Signature _____

Date _____

Appendix F: Informed Consent Form (Spanish)

Formulario de Consentimiento Informado

Titulo:
La Salubridad Trabaja Técnicas para Mejorar el Comportamiento del Estudiante adentro dellos Grados en las Escuela Intermedia.

Participación:

Dra. Cheryl Desmond, profesora de la Universidad de Millersville, va a conducir un estudio de los efectos del programa Lad Salud Trabaja sobre los comportamientos de los estudiantes en los salones seleccionados en las Escuela Intermedia Edward Hand durante el año escolar Septiembre-Diciembre, 2009. Para más información, póngase en contacto con Dra. Cheryl Desmond al 717-871-2002.

Preexpectativa:

Este studio va a asesar si el programa, La Salubridad Trabaja tiene un efecto positive en el comportamiento de su hijo.

La participación del estudiante en este studio, es voluntario.

El estudiante puede salir del studio a cualquier momento

No hay riesgos conocidos para el estudiante.

Se asegura confidencialidad.

Toda información de indentificación sera en clave por número. Solo el principal y escuela professor sabrá la lista de los que tienen claves.

Toda la infurmación de cada estudiantes sera documentado anónimamente.

Este proyecto asido aprobado por La Mesa Institucional para la Protección de Sujetos Humanos de La Universidad de Millersville.

Por Favor:

Nombre del Estudiante _____

Firma del Padre/Tutor _____

Fecha _____

Appendix G: Behavior Rating Inventory of Executive Function (BRIEF) Teacher Form

BRIEF®

Behavior Rating Inventory of Executive Function®

TEACHER FORM

Gerard A. Gioia, PhD, Peter K. Isquith, PhD, Steven C. Guy, PhD, and Lauren Kenworthy, PhD

Instructions

On the following pages is a list of statements that describe children. We would like to know if the student has had problems with these behaviors over the past 6 months. Please answer all the items the best that you can. Please DO NOT SKIP ANY ITEMS. Think about the student as you read each statement and circle your response:

N	if the behavior is	**Never** a problem
S	if the behavior is	**Sometimes** a problem
O	if the behavior is	**Often** a problem

For example, if the student **never** has trouble completing class work on time, you would circle N for this item:

Has trouble completing class work on time (N) S O

If you make a mistake or want to change your answer, DO NOT ERASE. Draw an "X" through the answer you want to change, and then circle the correct answer:

Has trouble completing class work on time (X) (S) O

Before you begin answering the items, please fill in the student's name, gender, grade, age, birth date, your name, and the date this form was completed in the spaces provided at the top of the next page. Also, please check the box next to the response that best describes your relationship to the student, indicate the class (if applicable), check the box that indicates how well you know the student, and indicate how long you have known the student.

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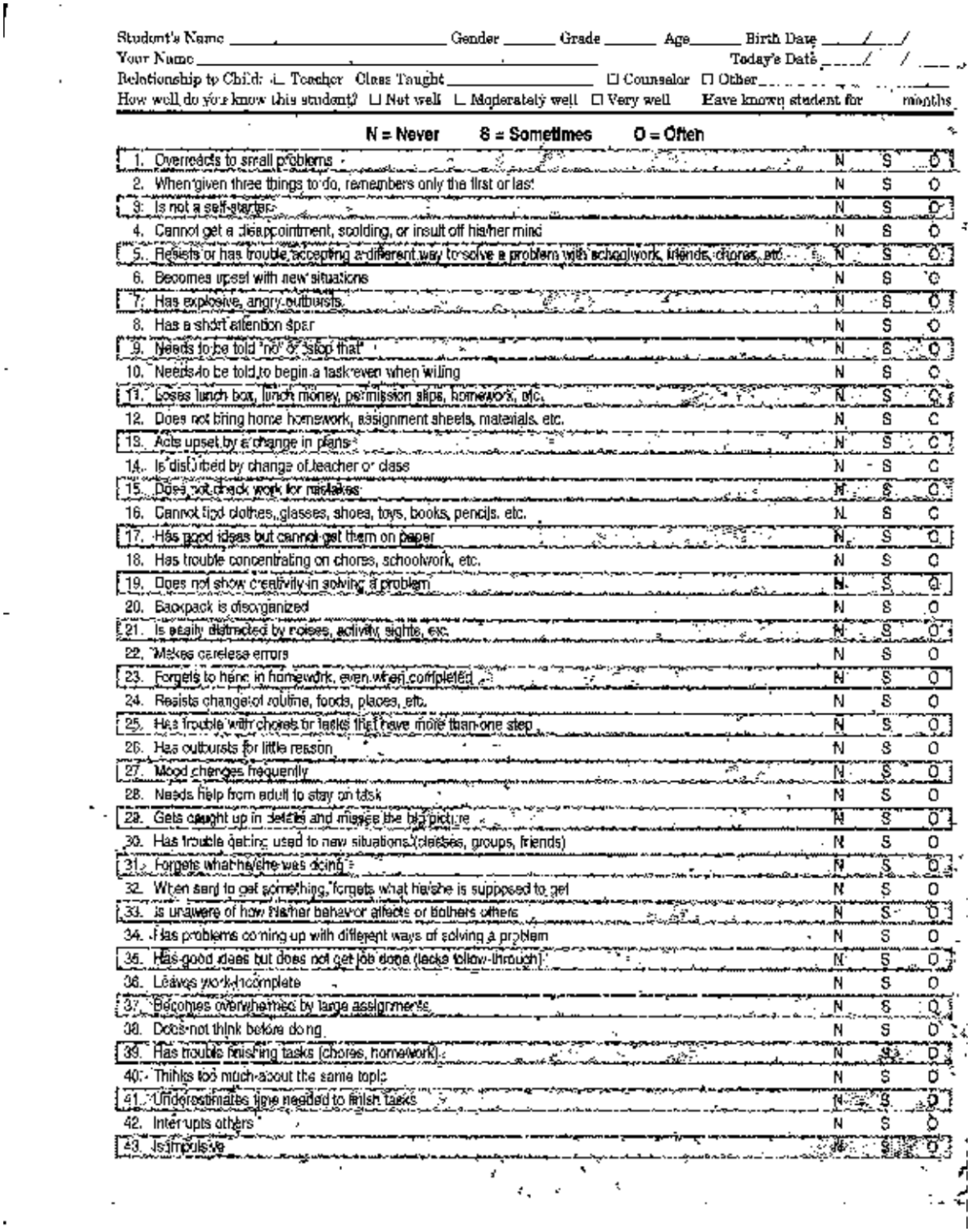
Appendix H: Behavior Rating Inventory of Executive Function (BRIEF) Teacher Form, Items 1-43



Student's Name _____ Gender _____ Grade _____ Age_____ Birth Date ____/____/____
Your Name _____ Today's Date ____/____/____
Relationship to Child: ☐ Teacher Class Taught _____ ☐ Counselor ☐ Other _____
How well do you know this student? ☐ Not well ☐ Moderately well ☐ Very well Have known student for _____ months

	N = Never	S = Sometimes	O = Often
1. Overreacts to small problems	N	S	O
2. When given three things to do, remembers only the first or last	N	S	O
3. Is not a self-starter	N	S	O
4. Cannot get a disappointment, scolding, or insult off his/her mind	N	S	O
5. Resists or has trouble accepting a different way to solve a problem with schoolwork, friends, chores, etc.	N	S	O
6. Becomes upset with new situations	N	S	O
7. Has explosive, angry outbursts	N	S	O
8. Has a short attention span	N	S	O
9. Needs to be told "no" or "stop that"	N	S	O
10. Needs to be told to begin a task even when willing	N	S	O
11. Loses lunch box, lunch money, permission slips, homework, etc.	N	S	O
12. Does not bring home homework, assignment sheets, materials, etc.	N	S	O
13. Acts upset by a change in plans	N	S	O
14. Is distracted by change of teacher or class	N	S	O
15. Does not check work for mistakes	N	S	O
16. Cannot find clothes, glasses, shoes, toys, books, pencils, etc.	N	S	O
17. Has good ideas but cannot get them on paper	N	S	O
18. Has trouble concentrating on chores, schoolwork, etc.	N	S	O
19. Does not show creativity in solving a problem	N	S	O
20. Backpack is disorganized	N	S	O
21. Is easily distracted by noises, activity, sights, etc.	N	S	O
22. Makes careless errors	N	S	O
23. Forgets to hand in homework, even when completed	N	S	O
24. Resists change of routine, foods, places, etc.	N	S	O
25. Has trouble with chores or tasks that have more than one step	N	S	O
26. Has outbursts for little reason	N	S	O
27. Mood changes frequently	N	S	O
28. Needs help from adult to stay on task	N	S	O
29. Gets caught up in details and misses the big picture	N	S	O
30. Has trouble getting used to new situations (classes, groups, friends)	N	S	O
31. Forgets what he/she was doing	N	S	O
32. When sent to get something, forgets what he/she is supposed to get	N	S	O
33. Is unaware of how his/her behavior affects or bothers others	N	S	O
34. Has problems coming up with different ways of solving a problem	N	S	O
35. Has good ideas but does not get job done (lacks follow-through)	N	S	O
36. Leaves work incomplete	N	S	O
37. Becomes overwhelmed by large assignments	N	S	O
38. Does not think before doing	N	S	O
39. Has trouble finishing tasks (chores, homework)	N	S	O
40. Thinks too much about the same topic	N	S	O
41. Underestimates time needed to finish tasks	N	S	O
42. Interrupts others	N	S	O
43. Is impulsive	N	S	O

Behavior Rating Inventory of Executive Function (BRIEF) Teacher Form, Items 44-86 (cont'd.)

N = Never S = Sometimes O = Often			
44. Does not notice when his/her behavior causes negative reactions	N	S	O
45. Gets out of seat at the wrong times	N	S	O
46. Is unaware of own behavior when in a group	N	S	O
47. Gets out of control more than friends	N	S	O
48. Reacts more strongly to situations than other children	N	S	O
49. Starts assignments or chores at the last minute	N	S	O
50. Has trouble getting started on homework or chores	N	S	O
51. Mood is easily influenced by the situation	N	S	O
52. Does not plan ahead for school assignments	N	S	O
53. Gets stuck on one topic or activity	N	S	O
54. Has poor understanding of own strengths and weaknesses	N	S	O
55. Talks or plays too loudly	N	S	O
56. Written work is poorly organized	N	S	O
57. Acts too wild or "out of control"	N	S	O
58. Has trouble putting the brakes on his/her actions	N	S	O
59. Gets in trouble if not supervised by an adult	N	S	O
60. Has trouble remembering things, even for a few minutes	N	S	O
61. Work is sloppy	N	S	O
62. After having a problem, will stay disappointed for a long time	N	S	O
63. Does not take initiative	N	S	O
64. Angry or tearful outbursts are intense but end suddenly	N	S	O
65. Does not realize that certain actions bother others	N	S	O
66. Small events trigger big reactions	N	S	O
67. Cannot find things in room or school desk	N	S	O
68. Leaves a trail of belongings wherever he/she goes	N	S	O
69. Does not think of consequences before acting	N	S	O
70. Has trouble thinking of a different way to solve a problem when stuck	N	S	O
71. Leaves messes that others have to clean up	N	S	O
72. Becomes upset too easily	N	S	O
73. Has a messy desk	N	S	O
74. Has trouble waiting for turn	N	S	O
75. Does not connect doing tonight's homework with grades	N	S	O
76. Tests poorly even when knows correct answers	N	S	O
77. Does not finish long-term projects	N	S	O
78. Has poor handwriting	N	S	O
79. Has to be closely supervised	N	S	O
80. Has trouble moving from one activity to another	N	S	O
81. Is fidgety	N	S	O
82. Cannot stay on the same topic when talking	N	S	O
83. Blurts things out	N	S	O
84. Says the same things over and over	N	S	O
85. Talks at the wrong time	N	S	O
86. Does not come prepared for class	N	S	O

Behavior Rating Inventory of Executive Function (BRIEF) Teacher Form

(Back Cover)

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Appendix I: Behavior Rating Inventory of Executive Function (BRIEF) Teacher Form Scoring Summary-Pretest

Student 12 — PRE

BRIEF™ Teacher Form Scoring Summary

Date 10 / 06 / 09

Student's Name [redacted] Gender F Rater's Name [redacted]

Grade 6 Age 11

Scoring Instructions

1. Remove the perforated stub and detach the top part of the carbonless answer sheet to reveal the scoring sheet.
2. Transfer the circled item score for each item to the box provided in that item row.
3. Sum the item scores in each column and enter the subtotal in the box at the bottom of the column.
4. Transfer the scale subtotals for items 1-49 to the appropriate box in the row for Subtotals at the bottom of this facing page.
5. Sum the two Subtotals for each scale and enter the total in the Total Scale raw scores box beneath the scale name.
6. Transfer the Total raw score for each scale to the Raw score column in the Scoring Summary Table below.
7. Sum the raw scores for Inhibit, Shift, and Emotional Control to obtain the raw score for the Behavioral Regulation Index (*BRI*).
8. Sum the raw scores for Initiate, Working Memory, Plan/Organize, Organization of Materials, and Monitor to obtain the raw score for the Metacognition Index (*MI*).
9. Sum the raw scores for the two Indexes (*BRI* and *MI*) to obtain the raw score for the Global Executive Composite (*GEC*).
10. Locate the appropriate normative comparison group in the Appendix tables of the BRIEF Professional Manual. Find the raw score for each scale, Index, or *GEC* in the raw score column, then move across the row to the corresponding *T* score and percentile. Enter the *T* score and percentile in the appropriate boxes in the Scoring Summary Table. Locate the Confidence Interval (CI) value for each scale, index, and *GEC* at the bottom of the appropriate column, calculate the high end (add the CI value to the *T* score) and low end (subtract the CI value from the *T* score) of the interval, and enter in the spaces provided under the heading 90% CI.

Scoring Summary Table

Scale/Index	Raw score	*T* score	%ile	90% CI
Inhibit	13	57	85	90 - 80
Shift	10	81	97	102 - 92
Emotional Control	13	61	90	95 - 85
BRI	35	69	95	99 - 91
Initiate	13	65	91	94 - 86
Working Memory	15	61	88	93 - 83
Plan/Organize	10	70	97	99 - 89
Organization of Materials	7	46	30	67 - 53
Monitor	16	63	90	97 - 83
MI	70	64	90	93 - 87
GEC (*BRI* + *MI*)	115	67	95	98 - 92

Negativity Scale

1. Locate the first Negativity item (indicated with a boxed N in the margin of the Scoring Sheet). For each Negativity item with a score of 3, circle that item number in the column to the right.
2. Count the number of circled items to determine the **Negativity score.**
3. Circle the appropriate Protocol classification based on that score.

Negativity score	Cumulative percentile	Protocol classification
≤4	≤94	Acceptable
5 to 6	95 - 98	Elevated
≥7	>98	Highly elevated

Item no.
13.
14.
24.
32.
64.
68.
71.
82.
84.

Negativity score (Range = 0 to 9): 0

Inconsistency Scale

For each item pair:

1. Transfer the item score for each item (marked (I) in the margin of the Scoring Sheet) to the appropriate item pair box.
2. Subtract the lesser number from the greater number and enter the result in the *Difference* column.
3. Sum the numbers in the *Difference* column to obtain the Inconsistency score.
4. Circle the appropriate Protocol classification based on that score:

Inconsistency score	Cumulative percentile	Protocol classification
≤7	≤98	Acceptable
8	99	Questionable
≥9	>99	Inconsistent

Item no.	Score	Item no.	Score	Difference
27.	3	26.	1	2
36.	1	39.	3	2
42.	2	43.	4	2
45.	1	9.	1	0
46.	2	65.	2	0
47.	1	58.	1	0
48.	1	66.	2	1
55.	1	57.	3	2
67.	1	49.	2	1
69.	1	63.	2	

Inconsistency score (Range = 0 to 20): 5

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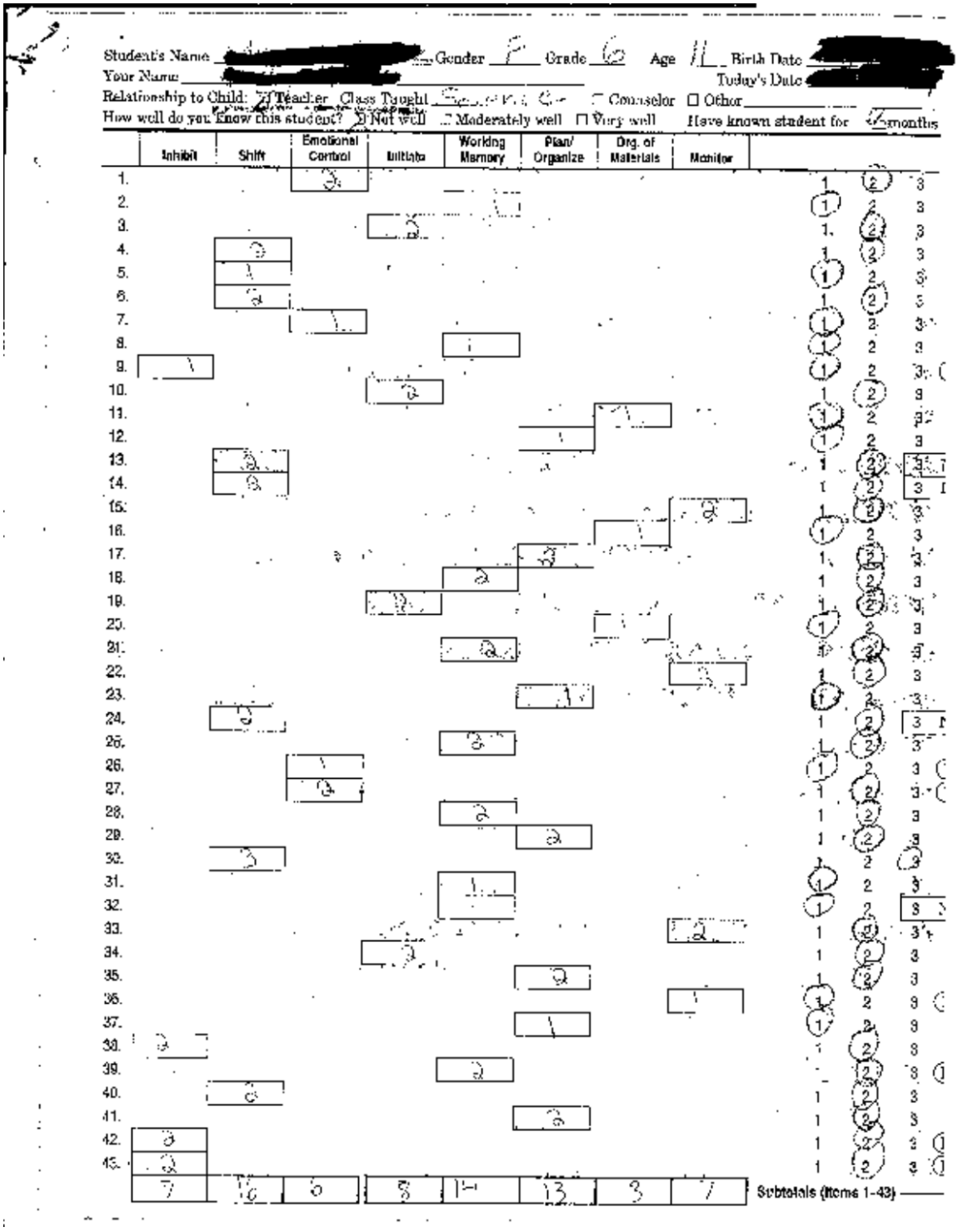
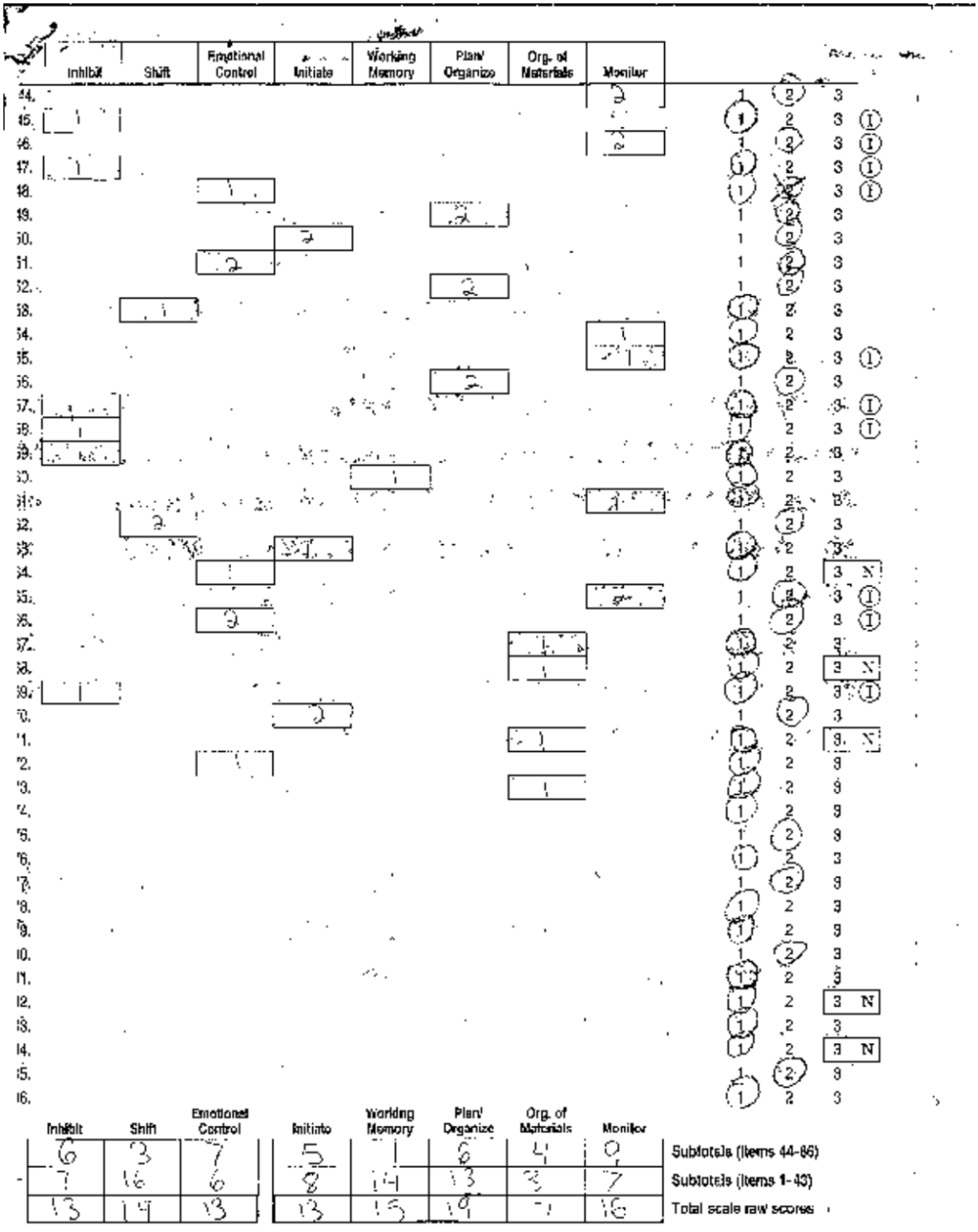
10% -C

Appendix J: BRIEF Teacher Form Scoring Summary-Pretest (Items 1-43)



BRIEF Teacher Form Scoring Summary-Pretest (Items 44-86) (cont'd.)



Appendix K: BRIEF Teacher Form Scoring Summary-Posttest

Post

BRIEF Teacher Form Scoring Summary

Date 1/25/10

Rater's Name [redacted]

Student's Name [redacted] Gender F Grade 6 Age

Scoring Instructions

1. Remove the perforated stub and detach the top part of the carbonless answer sheet to reveal the scoring sheet.
2. Transfer the circled item score for each item to the box provided in that item row.
3. Sum the item scores in each column and enter the subtotal in the box at the bottom of the column.
4. Transfer the scale subtotals for items 1-48 to the appropriate box in the row for Subtotals at the bottom of the facing page.
5. Sum the two Subtotals for each scale and enter the total in the Total Scale raw scores box beneath the scale name.
6. Transfer the Total raw score for each scale to the Raw score column in the Scoring Summary Table below.
7. Sum the raw scores for Inhibit, Shift, and Emotional Control to obtain the raw score for the Behavioral Regulation Index (*BRI*).
8. Sum the raw scores for Initiate, Working Memory, Plan/Organize, Organization of Materials, and Monitor to obtain the raw score for the Metacognition Index (*MI*).
9. Sum the raw scores for the two Indexes (*BRI* and *MI*) to obtain the raw score for the Global Executive Composite (*GEC*).
10. Locate the appropriate normative comparison group in the Appendix tables of the *BRIEF Professional Manual*. Find the raw score for each scale, index, or *GEC* in the raw score column, then move across the row to the corresponding *T* score and percentile. Enter the *T* score and percentile in the appropriate boxes in the Scoring Summary Table. Locate the Confidence Interval (CI) value for each scale, index, and *GEC* at the bottom of the appropriate column, calculate the high end (add the CI value to the *T* score) and low end (subtract the CI value from the *T* score) of the interval, and enter in the spaces provided under the heading 90% CI.

Scoring Summary Table

Scale/Index	Raw score	*T* score	%ile	90% CI
Inhibit	20	85	98	103 - 93
Shift	20	85	98	103 - 93
Emotional Contro	23	81	99	104 - 94
BRI	63	96	98	102 - 94
Initiate	15	73	97	102 - 92
Working Memory	17	89	93	96 - 88
Plan/Organize	20	73	95	100 - 90
Organization of Materials	13	75	96	103 - 89
Monitor	19	73	96	103 - 89
MI	83	76	97	100 - 94
GEC (BRI + MI)	145	85	98	101 - 95

Negativity Scale

1. Locate the first Negativity item (indicated with a boxed N in the margin of the Scoring Sheet). For each Negativity item with a score of 3, circle that item number in the column to the right.
2. Count the number of circled items to determine the **Negativity score.**
3. Circle the appropriate Protocol classification based on that score.

Negativity score	Cumulative percentile	Protocol classification
≤4	≤94	Acceptable
5 to 6	95 – 98	Elevated
≥7	>98	Highly elevated

Item no.
13.
14.
24.
32.
64.
68.
71.
82.
84.

Negativity score (Range = 0 to 9): 0

Inconsistency Scale

For each item pair:

1. Transfer the item score for each item (marked (I) in the margin of the Scoring Sheet) to the appropriate item pairs box.
2. Subtract the *lesser* number from the *greater* number and enter the result in the Difference column.
3. Sum the numbers in the *Difference* column to obtain the **Inconsistency score.**
4. Circle the appropriate Protocol classification based on that score:

Inconsistency score	Cumulative percentile	Protocol classification
≤7	<98	Acceptable
8	98	Questionable
≥9	>98	Inconsistent

Item no.	Score	Item no.	Score	Difference
27.	2	26.	3	1
36.	3	39.	3	0
42.	3	43.	3	0
45.	2	9.	2	0
48.	2	65	2	0
47.	1	58	2	1
40.	2	66.	3	1
55.	2	57	2	0
57.	2	46.	2	0
69.	2	65	2	0

Inconsistency score (Range = 0 to 23): 3

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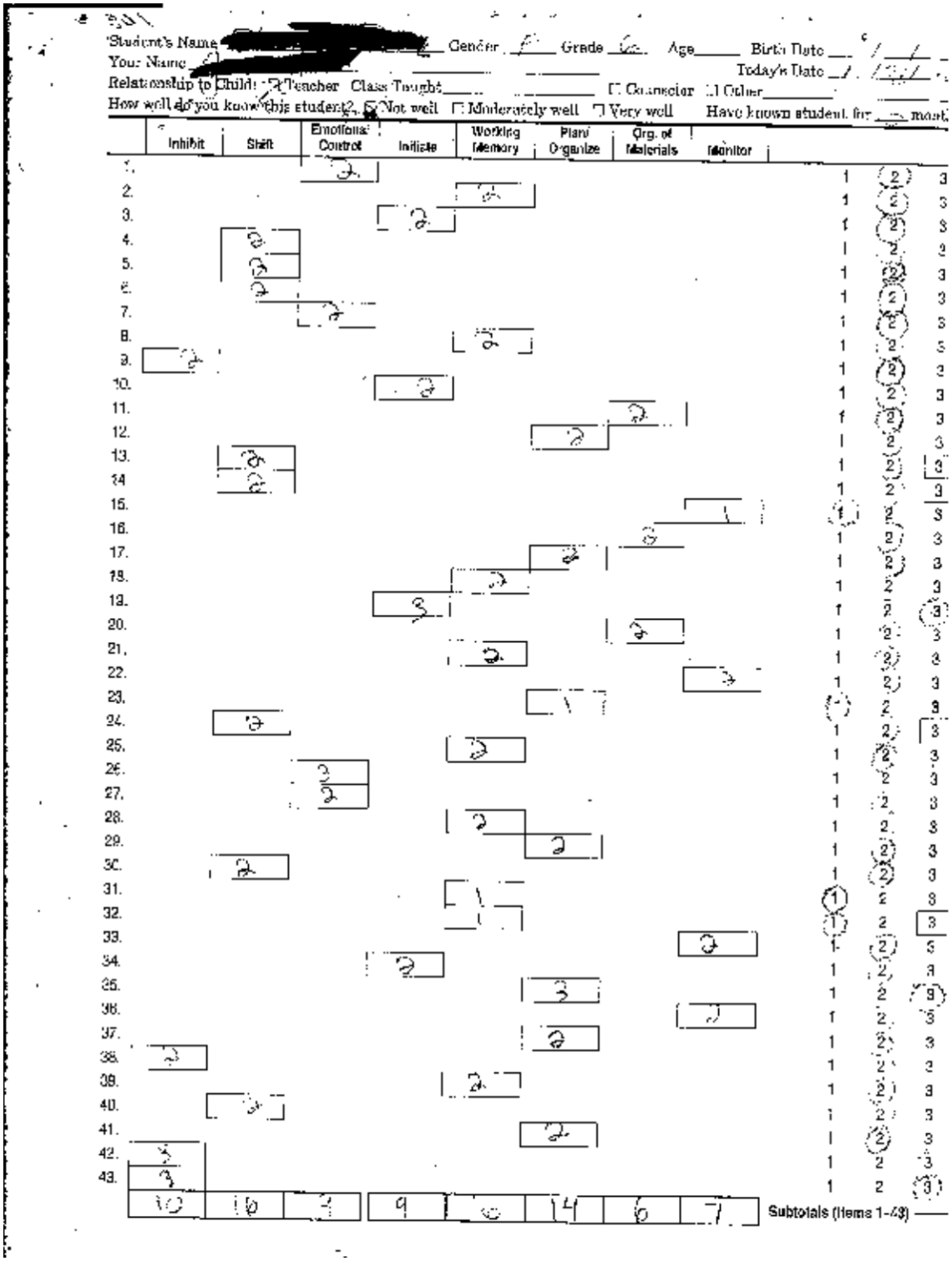
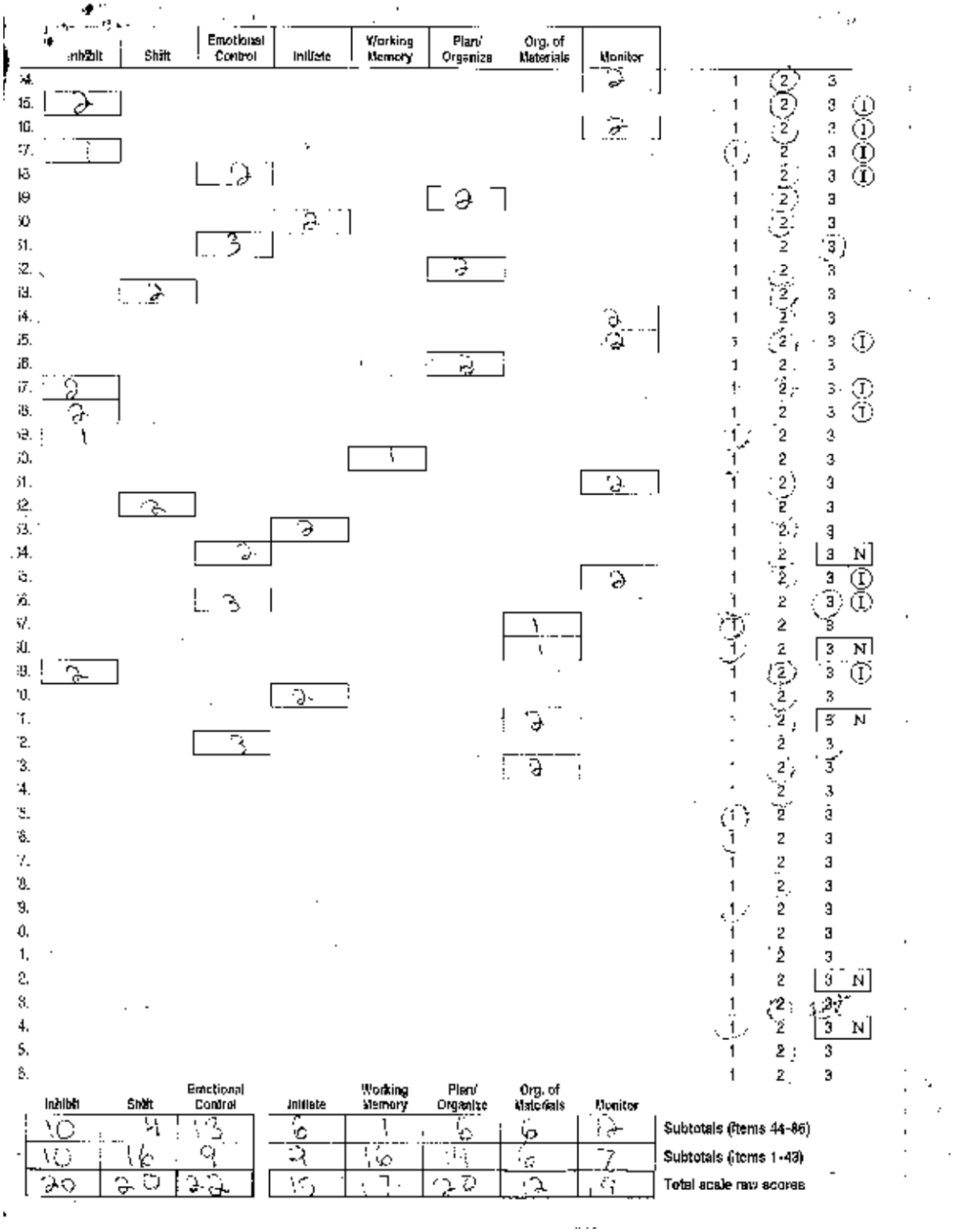
BRIEF Teacher Form Scoring Summary-Posttest (Items 1-43) (cont'd.)



BRIEF Teacher Form Scoring Summary-Posttest (Items 44-86) (cont'd.)



Appendix L: BRIEF Table D3 (Teacher Form Scale Scores: Girls Ages 9 to 13)

Table D3

Teacher Form Scale Scores: Girls Ages 9 to 13 Years

Scale raw score	Inhibit T score	Inhibit %ile rank	Shift T score	Shift %ile rank	Emotional Control T score	Emotional Control %ile rank	Initiate T score	Initiate %ile rank	Working Memory T score	Working Memory %ile rank	Plan/Organize T score	Plan/Organize %ile rank	Org. of Materials T score	Org. of Materials %ile rank	Monitor T score	Monitor %ile rank	Scale raw score
30	124	99	125	99					113	99	104	99			112	99	30
29	120	99	121	99					109	99	101	99			109	99	29
28	116	99	117	99					106	99	98	99			105	99	28
27	112	99	113	99	117	99			102	99	95	99			102	99	27
26	108	99	109	99	113	99			99	99	92	99			98	99	26
25	105	99	105	99	109	99			96	99	89	99			94	99	25
24	101	99	101	99	105	99			92	99	85	99			91	99	24
23	97	99	97	99	101	99			89	98	82	99			87	99	23
22	93	99	93	99	97	99			85	98	80	98			84	99	22
21	89	99	89	99	93	99	96	99	82	98	77	97	129	99	80	98	21
20	85	98	85	98	89	99	92	99	78	97	73	95	123	99	77	97	20
19	81	97	81	97	85	99	88	99	75	96	70	94	117	99	73	96	19
18	77	96	77	96	81	98	85	99	72	95	67	92	111	99	70	95	18
17	73	95	73	95	77	97	81	99	68	93	64	89	105	99	66	93	17
16	69	94	69	94	73	96	77	98	65	91	61	87	99	99	63	90	16
15	65	92	65	92	69	95	73	97	61	88	58	80	93	99	59	86	15
14	61	90	61	90	65	93	69	95	58	86	55	78	87	99	56	83	14
13	57	87	57	85	61	90	65	91	54	78	52	74	81	98	52	70	13
12	53	83	53	76	57	84	62	85	51	72	49	68	75	96	49	60	12
11	49	65	49	65	54	80	58	80	47	65	46	58	69	95	45	45	11
10	45	50	45	50	50	65	54	75	44	50	43	45	63	94	42	30	10
9					46	50	60	66					57	88			9
8							46	58					52	50			8
7							43	45					46	60			7
90% CI	±5		±5		±5		±6		±5		±5		±7		±7		90% CI

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BRIEF Table D3 (Teacher Form Scale Scores: Girls Ages 9 to 13) (cont'd.)

Table D3 (continued)

Teacher Form Global Executive Composite Scores: Girls Ages 9 to 13 Years

Total raw score	T score	%ile rank	Total raw score	T score	%ile rank	Total raw score	T score	%ile rank	Total raw score	T score	%ile rank
229	129	99	182	107	99	145	85	92	109	63	90
228	125	99	181	106	99	144	84	90	107	63	90
227	127	99	180	106	99	143	84	90	106	62	89
226	127	99	179	106	99	142	83	87	105	61	89
225	126	99	178	106	99	141	83	87	104	61	88
224	126	99	177	105	99	140	82	87	103	60	87
223	126	99	176	103	99	139	81	87	102	60	86
222	124	99	175	103	99	138	81	87	101	59	84
221	124	99	174	103	99	137	80	87	100	59	83
220	123	99	173	101	99	136	80	87	99	58	82
219	123	99	172	101	99	135	79	87	98	57	80
218	122	99	171	100	99	134	78	87	97	57	79
217	121	99	170	100	99	133	78	86	96	56	79
216	121	99	169	99	99	132	77	86	95	56	78
215	120	98	168	98	99	131	77	86	94	55	76
214	120	98	167	98	99	130	76	86	93	54	74
213	119	98	166	97	99	129	76	86	92	54	74
212	119	98	165	97	99	128	75	86	91	53	73
211	118	98	164	96	99	127	74	86	90	53	71
210	117	98	163	95	99	126	73	86	89	52	70
209	117	98	162	95	99	125	73	86	88	52	70
208	116	98	161	94	99	124	73	86	87	51	69
207	116	98	160	94	99	123	72	86	86	50	68
206	115	98	159	93	99	122	72	86	85	50	65
205	114	98	158	93	99	121	71	86	84	49	63
204	114	98	157	92	98	120	70	86	83	48	63
203	113	98	156	92	98	119	70	86	82	48	63
202	113	98	155	91	98	118	69	86	81	47	63
201	112	98	154	90	98	117	68	86	80	47	63
200	111	98	153	90	98	116	68	86	79	46	60
199	111	98	152	89	98	115	67	86	78	45	59
198	110	98	151	88	98	114	67	86	77	45	59
197	110	98	150	88	98	113	66	86	76	44	59
196	109	98	149	87	98	112	66	86	75	44	58
195	108	98	148	87	98	111	65	86	74	43	58
194	108	98	147	86	98	110	64	86	73	43	58
193	107	98	146	86	98	109	64	86			
90% CI	±3			±3			±3			±3	90% CI

BRIEF Table D3 (Teacher Form Scale Scores, Girls Ages 9 to 13) (cont'd.)

Table D3 (continued)
Teacher Form Index Scores: Girls Ages 9 to 13 Years

Index raw score	Behavioral Regulation T score	Behavioral Regulation %ile rank	Metacognition T score	Metacognition %ile rank	Index raw score	Behavioral Regulation T score	Behavioral Regulation %ile rank	Metacognition T score	Metacognition %ile rank	Index raw score	Behavioral Regulation T score	Behavioral Regulation %ile rank	Metacognition T score	Metacognition %ile rank
132			118	99	97			88	99	62	94	98	58	80
131			117	99	96			87	98	61	92	98	57	79
130			116	99	95			86	98	60	91	98	56	78
129			115	99	94			85	98	59	89	98	55	77
128			114	99	93			84	98	58	88	98	54	75
127			113	99	92			83	98	57	86	97	53	73
126			112	99	91			82	98	56	85	97	52	72
125			112	99	90			82	98	55	83	97	52	70
124			111	99	89			81	98	54	82	97	51	68
123			110	99	88			80	98	53	80	97	50	66
122			109	99	87	131	99	79	98	52	79	97	49	64
121			108	99	86	130	99	78	98	51	77	97	48	62
120			107	99	85	128	99	77	97	50	76	97	47	60
119			106	99	84	127	99	76	97	49	75	96	46	57
118			106	99	83	125	99	76	97	48	73	96	46	50
117			105	99	82	124	99	75	96	47	72	96	45	44
116			104	99	81	122	99	74	96	46	70	96	44	40
115			103	99	80	121	99	73	96	45	69	96	43	33
114			102	99	79	119	99	72	96	44	67	95	42	25
113			101	99	78	118	99	71	95	43	66	94		
112			100	99	77	116	99	70	95	42	64	93		
111			100	99	76	115	99	70	94	41	63	92		
110			99	99	75	113	99	69	94	40	61	90		
109			98	99	74	112	99	68	93	39	60	88		
108			97	99	73	110	99	67	93	38	58	87		
107			96	99	72	109	99	66	92	37	57	86		
106			95	99	71	107	99	65	91	36	55	85		
105			94	99	70	106	99	64	90	35	54	82		
104			94	99	69	104	99	64	88	34	52	78		
103			93	99	68	103	99	63	88	33	51	75		
102			92	99	67	101	99	62	87	32	49	70		
101			91	99	66	100	99	61	87	31	48	65		
100			90	99	65	98	99	60	85	30	46	60		
99			89	99	64	97	99	59	84	29	45	50		
98			88	99	63	96	99	58	81					
90% CI			±3			±4		±3			±4		±3	90% CI

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Appendix M: BRIEF Table C3 (Teacher Form Scale Scores: Boys Ages 9 to 13)

Table C3

Teacher Form Scale Scores: Boys Ages 9 to 13 Years

Scale raw score	Inhibit T score	Inhibit %ile rank	Shift T score	Shift %ile rank	Emotional Control T score	Emotional Control %ile rank	Initiate T score	Initiate %ile rank	Working Memory T score	Working Memory %ile rank	Plan/Organize T score	Plan/Organize %ile rank	Org. of Materials T score	Org. of Materials %ile rank	Monitor T score	Monitor %ile rank	Scale raw score
30	89	99	98	99					90	99	85	99			88	99	30
29	87	99	96	99					88	99	83	99			86	99	29
28	84	99	93	99					85	99	81	98			83	98	28
27	82	98	90	99	100	99			83	99	79	97			81	98	27
26	80	97	87	99	97	99			81	99	77	96			78	97	26
25	78	96	85	98	94	99			79	98	74	95			76	97	25
24	75	96	82	99	91	99			76	97	72	94			74	96	24
23	73	94	79	98	88	99			74	94	70	93			71	95	23
22	71	93	77	97	85	99			71	93	68	93			69	94	22
21	69	92	74	96	81	99	84	99	69	92	66	92	90	99	67	93	21
20	66	91	71	95	78	98	81	98	66	90	64	90	86	99	64	90	20
19	64	90	68	93	75	97	78	97	64	89	62	88	83	98	62	87	19
18	62	88	66	92	72	94	75	96	62	88	60	82	80	97	60	86	18
17	60	85	63	88	69	90	72	95	59	85	57	80	77	96	57	83	17
16	57	83	60	86	66	90	69	94	57	81	55	78	73	95	55	80	16
15	55	80	58	85	63	87	66	92	55	79	53	75	70	93	53	70	15
14	53	78	55	80	60	85	63	89	52	74	51	70	67	92	50	65	14
13	51	76	52	70	57	83	60	84	50	70	49	66	64	89	48	57	13
12	48	66	49	65	54	81	57	81	48	65	47	58	60	87	46	49	12
11	46	60	47	60	51	77	54	72	45	55	45	50	57	85	43	38	11
10	44	43	44	50	48	70	51	67	43	45	43	41	54	80	41	25	10
9					45	55	48	56					51	75			9
8							45	50					48	68			8
7							42	40					44	65			7
90% CI	±4		±5		±5		±5		±4		±4		±4		±5		90% CI

BRIEF Table C3 (Teacher Form Scale Scores: Boys Ages 9 to 13) (cont'd.)

Table C3 (continued)
Teacher Form Index Scores: Boys Ages 9 to 13 Years

Index raw score	Behavioral Regulation		Metacognition		Behavioral Regulation		Metacognition		Behavioral Regulation		Metacognition	
	T score	%ile rank	T score	%ile rank	Index raw score	T score	T score	%ile rank	Index raw score	T score	T score	%ile rank
132									62	76	52	68
131									61	73	51	63
130									59	74	51	63
129									59	73	50	64
128									58	72	50	58
127									57	71	49	62
126									56	70	49	61
125									55	69	48	60
124									54	68	47	58
123									53	67	47	57
122					99	99	66	99	52	66	46	54
121					99	99	66	99	51	65	46	51
120					99	99	64	95	50	64	45	49
119					98	98	63	97	49	62	45	46
118					97	98	63	97	48	62	44	42
117					96	99	63	97	47	61	44	50
116					95	99	63	97	46	60	43	53
115					94	99	62	97	45	59	42	39
114					93	99	62	97	44	58	42	43
113					92	99	62	97	43	57	41	31
112					91	99	61	97	42	56	41	28
111					90	99	60	97	41	55	40	27
110					89	99	60	97	40	54	40	26
109					88	99	59	97	39	53	39	24
108					87	99	59	97	38	52	38	23
107					86	99	58	97	37	51	38	22
106					85	99	58	97	36	51	37	21
105					84	99	57	97	35	50	36	20
104					83	99	57	97	34	49	35	19
103					82	99	56	97	33	48	34	18
102					81	99	55	97	32	47	33	17
101					80	99	55	97	31	46	32	16
100					79	99	54	97	30	45	31	15
99					78	99	53	97	29	44	30	14
98					77	99	52	97	28	43	29	13
90% CI	±4		±4		±2		±4		±3		±4	

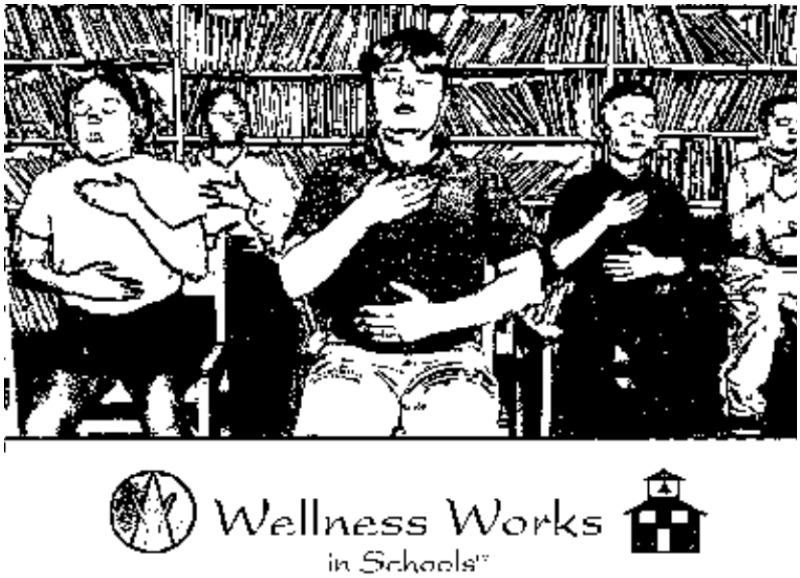
BRIEF Table C3 (Teacher Form Scale Scores: Boys Ages 9 to 13) (cont'd.)

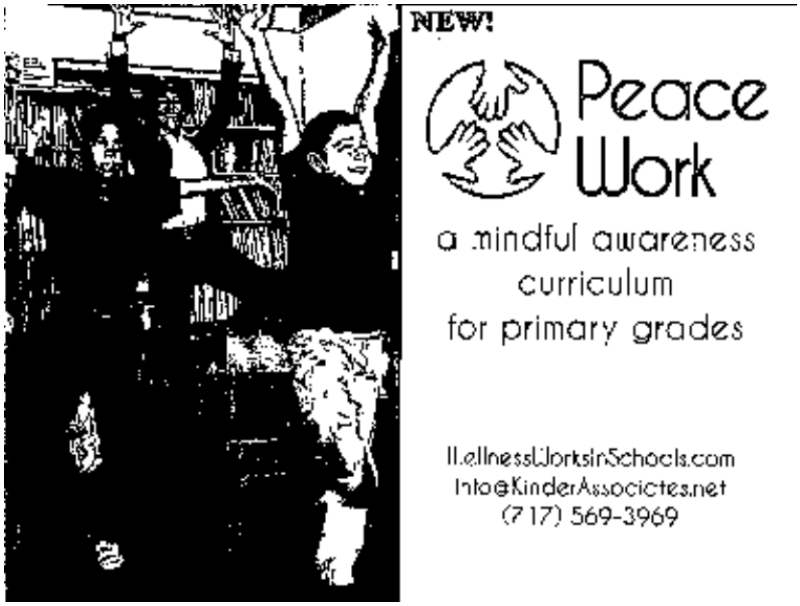
Table C3 (continued)

Teacher Form Global Executive Composite Scores: Boys Ages 9 to 13 Years

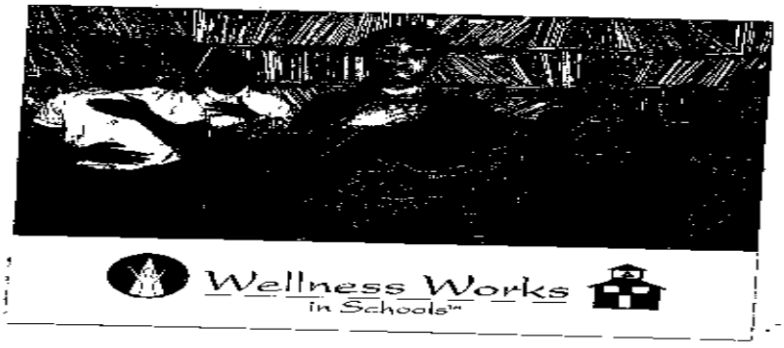
Total raw score	T score	%ile rank	Total raw score	T score	%ile rank	Total raw score	T score	%ile rank	Total raw score	T score	%ile rank
219	97	99	182	83	98	145	69	93	108	55	79
218	97	99	181	83	98	144	69	93	107	55	78
217	96	99	180	82	98	143	68	92	106	54	77
216	96	99	179	82	98	142	68	92	105	54	76
215	96	99	178	82	98	141	68	91	104	54	75
214	95	99	177	81	98	140	67	91	103	53	74
213	95	99	176	81	98	139	67	90	102	53	73
212	94	99	175	80	98	138	66	90	101	52	72
211	94	99	174	80	98	137	66	89	100	52	71
210	94	99	173	80	98	136	66	89	99	52	70
209	93	99	172	79	98	135	65	89	98	51	69
208	93	99	171	79	98	134	65	88	97	51	67
207	93	99	170	79	98	133	65	88	96	51	66
206	92	99	169	78	98	132	64	88	95	50	62
205	92	99	168	78	97	131	64	88	94	50	61
204	91	99	167	77	97	130	63	87	93	49	59
203	91	99	166	77	97	129	63	87	92	49	59
202	91	99	165	77	97	128	63	87	91	49	58
201	90	99	164	76	97	127	62	86	90	48	58
200	90	99	163	76	97	126	62	86	89	48	57
199	90	99	162	76	97	125	62	86	88	48	57
198	89	99	161	75	97	124	61	86	87	47	56
197	89	99	160	75	96	123	61	86	86	47	55
196	88	99	159	74	96	122	60	86	85	46	53
195	88	99	158	74	96	121	60	85	84	46	52
194	88	99	157	74	96	120	60	85	83	46	49
193	87	99	156	73	96	119	59	85	82	45	47
192	87	99	155	73	95	118	59	85	81	45	44
191	87	99	154	73	95	117	59	85	80	45	43
190	86	98	153	72	95	116	58	85	79	44	41
189	86	98	152	72	95	115	58	84	78	44	39
188	85	98	151	71	95	114	57	84	77	43	36
187	85	98	150	71	95	113	57	84	76	43	32
186	85	98	149	71	95	112	57	83	75	43	27
185	84	98	148	70	94	111	56	82	74	42	20
184	84	98	147	70	94	110	56	81	73	42	15
183	83	98	146	69	94	109	56	80			
90% CI	±2			±2			±2			±2	90% CI

Appendix N: Wellness Works in Schools; Peace Work–A Mindful Awareness Curriculum





Wellness Works in Schools; Peace Work–A Mindful Awareness Curriculum (cont'd.)



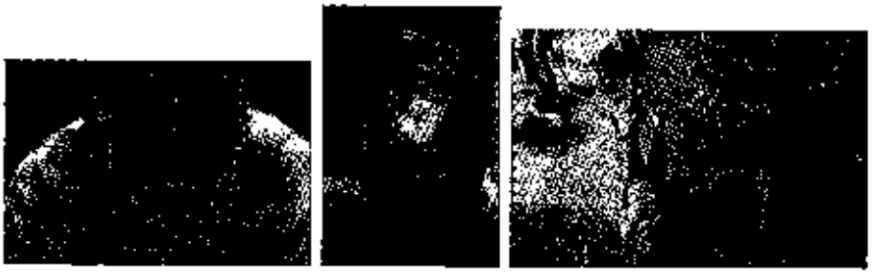
Wellness Works in Schools; Peace Work–A Mindful Awareness Curriculum

(cont'd.)

Wellness Works in Schools™

Introduction

Created by Kinder Associates LLC in 2001, *Wellness Works in Schools*™ is an innovative health and wellness program based on mindfulness principles and practices. Taught by our five teachers in numerous, diverse educational and community settings, the program responds to contemporary educational challenges by helping students develop the needed skills to address important issues like: stress, mental health, emotional balance, behavior, learning readiness and academic performance.



Program Objectives / Philosophy

Wellness Works in Schools™ is designed to motivate, educate, and support students, teachers and families in developing **mental, emotional, physical** and **social competencies** needed to handle life's challenges healthfully, across school, home, work and community. *Wellness Works* embraces a whole person/whole child perspective and is grounded on universal health and wellness principles validated by contemporary medical and science-based research.

Mindfulness-Based Program

Mindfulness defined:

- To be **Mindful**…is to be aware or to be conscious in the present moment, nonjudgmentally with compassion.
- **Mindfulness** approaches (e.g. focused awareness, healthy breathing, mindful movement and relaxation) strengthen skills of awareness, attention, focus and concentration.
- By establishing an **inner locus of control**, we foster greater mental fitness, emotional intelligence, and physical well-being to relate and respond to life's challenges…healthfully.

Wellness Works in Schools; Peace Work–A Mindful Awareness Curriculum

(cont'd.)

Scientific Support for *Wellness Works*

The contemporary fields of medicine, neuroscience and psychotherapy are focusing on the mind (nervous system and brain) as a significant influence on total mindbody health and wellness.

Wellness Works presents mindful awareness practices and curriculums to promote positive nervous system function and behavioral expression. At the core of these practices are skills in attention training and self-regulation which have potential impact across one's entire life experience.

Student Program

Wellness Works in the Classroom (K-12) is generally presented in a series of sessions, 45- 50 minutes each, with sequenced lessons (according to grade level and readiness). Students explore emotions, intentions, goals, resilience, and problem-solving skills. While appropriate for all students, the program effectively targets students with academic and behavioral issues (alternative and special education settings, including students on the autism spectrum).

Student Curriculum

Wellness Works objectives are reached through a series of active-learning group sessions where students experience various expressions of the following components:

- **Group discussion** of selected mindbody health and wellness topics e.g. handling challenging emotions, mental fitness, strength (inner and outer), the nature of anger, resiliency, hope, courage and more
- **Mindfulness skills** (focused awareness, attention, and concentration) shift one's focus from external stimuli to internal awareness and address thoughts, emotions and impulses in a non-reactive way
- **Healthy breathing** promotes slowing down, calming and becoming present
- **Mindful movements** strengthen the mindbody connection by releasing tension and stress
- **Relaxation** promotes balance and stability
- **Group reflection** allow students an opportunity for inquiry and comment

Participation in mindful movement (sitting and standing) is voluntary, but students may not distract from the teaching or the learning of others.

Wellness Works in Schools; Peace Work–A Mindful Awareness Curriculum

(cont'd.)

Results and Research

Over the course of the past 11 years, we have conducted and refined our *Wellness Works* curriculums in schools and classrooms serving a wide range of grades (K-12), demographics and educational needs. Of late, our focus has been with at-risk students assigned to special education and alternative education classrooms in the diverse inner-city districts of the School District of Lancaster, Reading School District, and Harrisburg School District, as well as the shelter and detention areas of the Lancaster County Youth Intervention Center.

Two ground-breaking research studies were conducted by Cheryl Desmond, PhD, Professor, Educational Foundations, *Millersville University*, on the effectiveness of a school-based program of mindful awareness (Wellness Works in Schools™) on students in an urban, low income public middle school in Lancaster, PA (findings are posted on our website www.wellnessworksthschools.com).

- Observational Study of Middle School Special Education Students, 2008 – 2009 The study examined six students' behavioral responses during a series of seven to nine lessons of mindful awareness practices of Wellness Works lessons. The findings "...strongly support the positive effects of mindful awareness teaching (Wellness Works) on student cognitive, physical and social behavior".

- Randomized Control Study of Sixth Grade Students, 2009 – 2010 This research project evaluated the effectiveness of the school-based program of mindful awareness on the self-regulation and the executive functions skills of 40 sixth grade students in an urban middle school in Lancaster. The study findings concluded "...treatment students (participated in ten Wellness Works sessions) maintained or improved executive function skills while the skills of control students regressed."

Administrators and teachers report that *Wellness Works* is "well organized, well taught, relevant and beneficial to students of all ages." Further noted with supporting data, participating students are more focused, performing better in the classroom, and exhibiting more positive behavior. Students respond very favorably, indicating that they: gain self-awareness; notice positive changes in how they feel about themselves; understand and can use these skills to handle challenging emotions; and learn ways to manage stress.

Comments from Educators

- "The *Wellness Works* program has a clear focus and purpose. The program and instructors helped students to develop healthy mental, emotional, physical and social behaviors."
  ~ *Principal, Elementary School*
- "I do not know of any program which works so quickly with students for them to begin to take control of their lives and begin developing an internal locus of control. It seems so much common sense that something as simple as controlling your breathing, posture and mental imagery would help you begin to control other aspects of your behavior."
  ~ *Principal, Middle School*
- "*Wellness Works* helps each student begin to develop essential intrapersonal survival skills. Those skills are so invaluable in today's culture of change that without them a person's very being can stand vulnerable to tomorrow's unforeseen changes."
  ~ *Consultant, Alternative Education & Director*

Wellness Works in Schools; Peace Work–A Mindful Awareness Curriculum

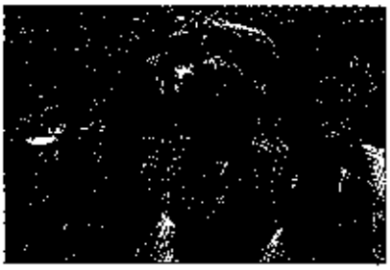
(cont'd.)

Teacher Training Programs

- ***Wellness Works Professional Development Workshops*** (generally 2-3 hours) provide an introduction to mindful awareness principles and approaches that will strengthen the classroom teacher's skills to respond to their own stress and challenges.
- ***Wellness Works: Classroom Integration Teacher Training™*** *(CITT)* consists of a series of sessions (8 hours) designed to assist teachers in deepening understanding and strengthening mindfulness skills to more fully integrate ***Wellness Works*** into their classrooms. We offer an additional 4-hour training emphasizing Resilience.

Family Programs

- ***Wellness Works for Families*** provides an in-school orientation to health and wellness experiences as expanded support in the home, school and community.
- ***Wellness Works for Mindful Parenting*** offers family members the opportunity to learn and experience mindful awareness practices specifically related to parenting.
- ***Individual Wellness Works Instruction*** allows youth and/or families an opportunity to practice in their own home and to create a personal practice that strengthens coping skills to address stress, anxiety, behavior, and learning readiness.



Kinder Associates, LLC

Midge Kinder, MAT, RYT and **Rick Kinder, MBA, RYT** formed *Kinder Associates LLC* to bring mindfulness principles and practices to community, educational and organizational settings. Collectively, we offer a wealth of classroom teaching experience in urban and suburban classrooms as well as professional training and teaching of mindfulness approaches: **Wynne Kinder, BA,** lead instructor and partner; **Christen Coscia, BSE,** and **Michele Zerbey, RYT.**

Kinder Associates LLC, consultants in mindbody health
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Appendix O: Kinder Associates LLC, Health & Wellness Consultants

Rick Kinder

From: Rick Kinder [rick@kinderassociates.net]
Sent: Sunday, May 12, 2013 12:52 PM
To: rick@kinderassociates.net
Subject: Kinder Associates Wellness Works Newsletter - Spring/Summer 2013

Kinder Associates LLC
Health & Wellness Consultants

KINDER ASSOCIATES WELLNESS WORKS NEWSLETTER Spring/Summer 2013

IN THIS ISSUE

KINDER ASSOCIATES' *WELLNESS WORKS IN SCHOOLS™*

School-Based Initiatives 2012/2013

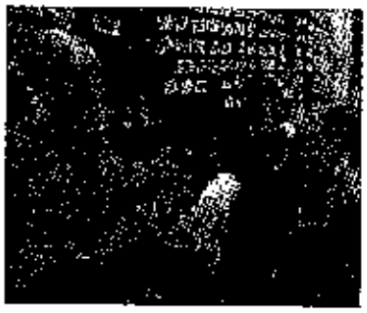
- *Wellness Works in Schools™* often targets children and adolescents with academic and behavioral issues. Considered innovative, relevant, and timely in addressing deeply rooted educational issues, *Wellness Works* incorporates mindful awareness, neuroscience, and executive function approaches to optimize student achievement and behavior. As we conclude this our twelfth year of conducting *Wellness Works* programs, we have reached more than 1300 students and over 200 classroom teachers during the 2012 - 2013 school year.

- School District of Lancaster - Under our year-long master agreement with the School District of Lancaster (www.lancaster.k12.pa.us), we have conducted:

  - 10 weekly *Wellness Works* sessions in emotional support special education classrooms in seven elementary schools, three middle schools and one alternative education school.

Kinder Associates LLC, Health & Wellness Consultants (cont'd.)

- 10 weekly *Wellness Works* sessions in three early elementary special education classrooms for children on the autism spectrum and one supporting children with multiple disabilities. To address the uniqueness of the special needs students, we designed and introduced new mindful awareness curriculums ("I Can Be Calm™" and "I Can Be Mindful™") with developmentally appropriate use of tangibles, sound and movement.



- The responses of the children and teachers were phenomenal. One Autistic Support teacher related (which is reflective of feedback from the other classroom teachers and support staff):

"I just wanted to say thank you so much for providing your services to my students. They do things I have never seen them do before. We practice the strategies you bring to my classroom outside the time you are here. It's really remarkable to see them try to focus on their breathing while they're closing their eyes, yawning and just taking time for themselves to relax. Even though they can't say it, I know they appreciate it."

- 10 weekly *Wellness Works* sessions for targeted 3rd - 5th grade students and another nine sessions for all third grade classrooms in an urban elementary school.

- 6 - 10 weekly *Wellness Works* sessions in all of the 6th, 7th and 8th grade classrooms (nearly 200 sessions) in a large urban middle school. The program continues through the school year and includes a two hour leadership workshop for select 8th grade students and a three-hour professional development workshop for all classroom teachers and staff.

- Professional development workshops for teachers at SDL's Washington Elementary School in December and February.

- *Wellness Works* will be taught this summer in SDL's JUMP Program - designed to support incoming ninth graders prepare for the transition to high school.

- Lancaster County Youth Intervention Center - Seven *Wellness Works* sessions continue on a weekly basis for all male and female adolescents assigned to the Youth Intervention Center's (www.lcyic.com) Shelter (longer term) and Detention (shorter term) Units throughout the school year. The *Wellness Works* program will continue for all residents as part of their 8-week 2013 Summer School Program.

- Octorara Area School District - We continue to conduct weekly *Wellness Works* sessions in three special education classrooms at the District's (www.octorara.org) middle and high school.

- Training for Kinder Associates' Instructors - Wynne Kinder, Lead Instructor, and Christen Coscia received training in Trauma Sensitive Yoga through the Trauma Center at the

Justice Resource Institute at a week-long conference at Kripalu Institute in April.

Community-Based Initiatives

- Kinder Associates continues to provide *Wellness Works* programs in support of community organizations:

  - Clare House - Monthly workshops on self care, stress management and mindful parenting are shared with residents at Clare House, a provider of shelter and life skills programs for homeless women and children. www.clarehouselancaster.org

  - Lancaster Cancer Center - Midge and Rick conducted a mini series of four Mindful Yoga Classes for patients, caregivers, and the general public in March and April. Another series is planned for Tuesday evenings on October 1, 8, 15, and 22, 2013 (see www.lancastercancercenter.com for details and registration)

  - Crispus Attucks Community Center - *Wellness Works* sessions are planned for the Center's Summer Science Camp involving 60 students (K- 5th grade). www.crcc-lancaster.org

- Individual *Wellness Works* Sessions - Kinder Associates' instructors offer individual *Wellness Works* sessions to assist children and adolescents develop skills to address their personal stress, anxiety, learning readiness, and behavior. We have formed a referral alliance with the Eden Park Pediatric Associates in Lancaster. Those interested in securing more information can contact Christen Coscia at (717) 575-8592 or email christen@kinderassociates.net.

Research Findings on *Wellness Works* Classroom Programs

- On our website www.wellnessworksinschools.com, you will find two ground-breaking research projects by Cheryl Desmond, PhD, Professor, Educational Foundations with Millersville University on the impact of mindful awareness school-based programs (*Wellness Works in Schools™*) on the executive function skills, including self-regulation, of students attending an urban, low income public middle school in Lancaster, PA. Both the initial observational study (2009) with emotional support students and the randomized control group research study (2010) with 6th grade students confirmed the positive effects of teaching mindful awareness (*Wellness Works*) on students' cognitive, physical and social behavior.

- Dr. Cheryl Desmond presented at the Learning and Brain Society's Conference on Executive Skills for School Success: Enhancing Self-Regulation, Reasoning and Working Memory held in Washington, D.C. May 3 - 5, 2013 on research completed by Dr. Desmond, Dr. Laurie Hanich, and Wynne Kinder on the "Effects of a Mindful Awareness Program on the Executive Functions of Early Adolescents in an Urban Middle School."

FUTURE MINDFULNESS IN EDUCATION TRAINING PROGRAMS

- Yoga Service Conference - Omega Institute, Rhinebeck, NY (June 7 - 9, 2013). This will be the organization's second annual conference. See www.yogaservicescouncil.org and www.eomega.org

- Sharing Yoga and Mindfulness with At-Risk Youth Omega Institute, Rhinebeck, NY (June 23-28, 2013). See www.eomega.org

- Brain Development and Learning - Vancouver, BC (July 24 - 28, 2013). This is their 4th annual conference. See www.braindevelopmentandlearning.com

- Mindfulness in Education Teacher Training - Omega Institute, Rhinebeck, NY (August 11 - 18, 2013). See www.eomega.org

- Garrison Institute Education Retreat - Garrison, NY (August 9 - 15, 2013). Garrison Institute will be conducting their sixth annual "CARE for Teachers: Cultivating Awareness and Resilience in Education Summer Retreat." See www.garrisoninstitute.org

PERTINENT ARTICLES ON MINDFULNESS AND MINDBODY HEALTH

- "The Power of Concentration", New York Times, December 15, 2012

  - "While mindfulness has been around for years and the benefits known, researchers are now learning that the benefits may reach further. Even in small doses, mindfulness can effect impressive changes in how we feel and think—and it does so at a basic neural level. In 2011, researchers from the University of Wisconsin demonstrated that daily meditation-like thought could shift frontal brain activity toward a pattern that is associated with what cognitive scientists call positive, approach-oriented emotional states—states that make us more likely to engage the world rather than to withdraw from it."

  - "It has further been learned that mindfulness can help with the plague of modern existence: multitasking. When we multitask, we shift our attention rapidly from task to task, not devoting much attention to any one thing and sacrifice quality of attention. When we are mindful, some of that attentional flightiness disappears. We are able to stay on task longer and switch between tasks less frequently."

  - "Mindfulness has been shown to improve connectivity inside our brain's attentional network resulting in our attention networks communicating better and with fewer interruptions. New evidence suggests that the structure of the brain can continue to change and develop, previously thought susceptible to cognitive decline as humans aged."

- "Sacrificing Sleep Makes for Run-Down Teens — and Parents", NPR, March 1, 2013

  - "All of the data suggest that teenagers need 8 ½ to 9 ¼ hours of sleep per night," explains sleep expert Helene Emsellem, Medical Director of the Center for Sleep & Wake Disorders. When teens don't get enough sleep, there are consequences: negative influence on appetite, nudging a person to reach for carbohydrates and sugar; store more fat, reduced insulin sensitivity-- setting the stage for a range of metabolic problems, including type 2 diabetes and weight gain. Another consequence of being poorly rested promotes cognitive disorder of focus, attention, and concentration. The forgetfulness and distraction that's so common among teens, she says, may result partly from sleepiness."

- "Understanding How Children Develop Empathy", New York Times, December 10, 2012

  - "The capacity to notice the distress of others and to be moved by it can be a critical component of what is called pro-social behavior, actions that benefit others: individuals, groups or society as a whole. Psychologists, neurobiologists and even economists are finding the ingredients to be complex and varied. There are two broad theories emerging to explain pro-social behavior: 1) it feels good to help others, and 2) the recognition that other people have needs and goals. The two theories are not mutually exclusive: Cognitive understanding accompanied by motivation reward reinforces pro-social behavior."

- "Daily Stress Gets in the Way of Life", New York Times, December 10, 2012

  - For some, anxiety is a way of life, chronic and life-crippling, constantly leaving them awash in fears that prevent them from making moves that could enrich their lives according to Dr. Tamar Chansky, psychologist and author of "Freeing Yourself From Anxiety." She notes you will be in much better shape to cope with real calamities if you don't entertain extraneous catastrophes. By extraneous, she means the many stresses that pile up in the course of daily living that don't really deserve so much of our emotional capital -the worrying and fretting we spend on things that won't change or simply don't matter much. To emerge from paralyzing anxiety when faced with a monumental task, Dr. Chansky suggests staying in the present—it doesn't help to be in the future. When we are stuck with negative thinking, we feel out of options, so to exit out of that we need to be reminded of all the options we do have. Another tip when feeling pressured, she suggests that we walk away for a few minutes, and take a breathing break, inhaling and exhaling calmly and intentionally. Also, doing something physical helps shift the moment in positive directions. "

We continue to update our website to include information on our programs, newly released YOGATORIALS™ on health topics and more.

Lynn Johnson, photo journalist (www.lynnjohnsonphoto.com) - For years, we have had the unique opportunity to share in our e-newsletters and website Lynn's incredible photos of our *Wellness Works* program and participating students. At the National Geographic's annual photography seminar, her peers recognized Lynn by awarding her the 3rd Annual National Geographic Photographer's Photographer Award. The presenter noted: "She has photographed celebrities and famous people, but is best known for stories revealing the lives of ordinary people in extraordinary circumstances." Congratulations, Lynn and thank you.

Warmly,
Midge and Rick Kinder

Teacher Associates: Wynne Kinder, Christen Coscia, Michele Zerbey

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info@kinderassociates.net, www.kinderassociates.net and www.wellnessworksinschools.com

Appendix P: Breathing Room - Wellness Works Article

INTELLIGENCER JOURNAL
LANCASTER, PA.
TUESDAY, JU[NE] 24, 200

Breathing room

Wellness works wonders for SDL

Jeff Ruppenthal / Lancaster Newspapers photos

Student Jalisa Johns takes a Wellness Works class at McCaskey East High School this summer. School District of Lancaster was mentioned in a New York Times article about a handful of districts using mindfulness training to improve students' discipline, self-esteem and grades.

BY SUSAN E. LINDT
Intelligencer Journal Staff

The teacher walks in. Her T-shirt message in tiny letters, "Life is good," seems to mock her students' situation: It's June. The sun's blazing outside -- it is summer vacation.

But they're in here, a dark, overly air-conditioned room at McCaskey East, making up for earlier grade infractions.

Class has just started, and the students are restless, itching to get out, visibly unimpressed when teacher Wynne Kinder whips out her tiny Tibetan chimes and kindly smiles in spite of their snickers.

Disaster impends. They might have Kinder for lunch and be done with it. And that's before she even starts her pitch about "breathing."

Teachers Wynne Kinder and Christen Coscia of Kinder Associates lead a summer class at McCaskey East High School, where students are learning self-discipline through focused breathing and stretching.

"They roll their eyes at us sometimes, but they try it," Kinder said of her growing list of students at School District of Lancaster. "There are some tough characters in some of these classes. We work really hard to connect with kids. We try to learn their names by the first class."

The curriculum is called "Well-

Breathing Room - Wellness Works Article (cont'd.)

Jeff Ruppenthal / Lancaster Newspapers

Student Anthony Bryan buys into the principles behind his Wellness Works class at McCaskey East High School, although he said most students aren't likely to admit focused breathing and stretching can make a difference in their lives.

Wellness

Continued from A1

ness Works" — teachers were told by an SDL superintendent not to use the words "yoga" or "meditation" — but many of the concepts overlap.

"We use many approaches to positive mental health: Tibetan chimes, breathing, consciousness, physical flexibility," Kinder said. "We get them sitting up, tall and dignified. It's amazing how many of these kids are fighting every system in their lives, and then they try this. We just tell them, 'This posture can change your attitude, your outlook, your focus.'"

Kinder Associates' teacher Christen Cuscia leads a Wellness Works session at McCaskey East High School, where classes include focused breathing and stretching to strengthen self-discipline.

Appendix Q: The New York Times Article on Quieting the Mind

The New York Times

SATURDAY, JUNE 16, 2007

In the Classroom, a New Focus on Quieting the Mind

By PATRICIA LEIGH BROWN

OAKLAND, Calif., June 12 — The lesson began with the striking of a Tibetan singing bowl to induce mindful awareness.

With the sound of their new school bell, the fifth graders at Piedmont Avenue Elementary School here closed their eyes and focused on their breathing, as they tried to imagine "loving kindness" on the playground.

"I was losing at baseball and I was about to throw a bat," Alex Menton, 11, reported to his classmates the next day. "The mindfulness really helped."

As summer looms, students at dozens of schools across the country are trying hard to be in the present moment. This is what is known as mindfulness training, in which stress-reducing techniques drawn from Buddhist meditation are wedged between reading and spelling tests.

Mindfulness, while common in hospitals, corporations, professional sports and even prisons, is relatively new in the education of squirming children. But a small but growing number of schools in places like Oakland and Lancaster, Pa., are slowly embracing the concept — as they did yoga five years ago — and institutions, like the psychology department at Stanford University and the Mindfulness Awareness Research Center at the University of California, Los Angeles, are trying to measure the effects.

During a five-week pilot program at Piedmont Avenue Elementary, Miss Megan, the "mindful" coach, visited every classroom twice a week, leading 15 minute sessions on how to have "gentle breaths and still bodies." The sound of the Tibetan bowl reverberated at the start and finish of each lesson.

The techniques, among them focused breathing and concentrating on a single object, are loosely adapted from the work of Jon Kabat-Zinn, the molecular biologist who pioneered the secular use of mindfulness at the University of Massachusetts in 1979 to help medical patients cope with chronic pain, anxiety and depression. Susan Kaiser Greenland, the founder of the InnerKids Foundation, which trains schoolchildren and teachers in the Los Angeles area, calls mindfulness "the new ABC's — learning and leading a balanced life."

At Stanford, the psychology department is assessing the feasibility of teaching mindfulness to families. "Parents and teachers tell kids 100 times a day to pay attention," said Philippe R. Goldin, a researcher. "But we never teach them how."

The experiment at Piedmont, whose student body is roughly 58 percent black, 18 percent Latino and includes a large number of immigrants, is financed by Park Day School, a nearby private school (prompting one teacher to grumble that it was "Cloud Nine-groovy-hippie-liberals bringing 'enlightenment' to inner city schools").

But Angeld Haick, the principal of Piedmont Avenue, said she was inspired to try it after observing a class at a local middle school.

"If we can help children slow down and think," Dr. Haick said, "they have the answers within themselves."

It seemed alternately loved and ignored, as students in Ms. Graham's fifth-grade class tried to pay attention to their breath, a calming technique that lasted 30 seconds. Then their coach asked them to "cultivate compassion" by reflecting on their emotions before lashing out at someone on the playground.

Tyron Williams defined mindfulness as "not hitting someone in the mouth."

"He doesn't know what to do with his energy," his mother, Towana Thomas, said at a session for parents. "But one day after school he told me, 'I'm taking a moment.' If it works in a child's mind — with so much going on — there must be something in it."

Asked their reactions to the sounds of the singing bowl, Yvaine Seiloo, a third grader, wrote that it made her feel "calm, like something on Oprah." Her classmate Corey Jackson wrote that "it feels like when a bird cracks open its shell."

Dr. Amy Saltzman, a physician in Palo Alto, Calif., who started the Association for Mindfulness in Education three years ago, thinks of mindfulness education as "talk yoga." Practitioners are prone to use sticky-sweet buzzwords like "being present" and "cultivating compassion," while avoiding anything spiritual.

Dr. Saltzman said the initial findings at Stanford, where she teaches, showed increased control of attention and "less negative internal chatter — what one girl described as 'the gossip inside my head: I'm stupid, I'm fat or I'm going to fail math,'" Dr. Saltzman said.

A recent study of teenagers by Kaiser Permanente in San Jose, Calif., found that meditation techniques helped improve mood disorders, depression, and self-harming behaviors like suicidal and bulimia.

Dr. Susan L. Smalley, a professor of psychiatry at U.C.L.A. and director of the Mindful Awareness Research Center there, which is studying the effects on schoolchildren, said one 4-year-old noticed her mother succumbing to road rage while stuck in traffic. "She said, 'Mommy, Mommy, you have to sing the breathing song,'" Dr. Smalley said.

Although some students take naturally to mindfulness, it is "not a magic bullet," said Diana Winston, the director of mindfulness education at the U.C.L.A. center. She said the research thus far was "inconclusive" about how effective mindfulness was for children who suffered from trauma-related disorders, for example. It is "a slow process," Ms. Winston added. "Just because kids sit and listen to the bell doesn't necessarily mean they'll be more kind."

Glenn Heuser, who teaches a combined fourth- and fifth-grade class at Piedmont, said one student started crying about a dead grandparent and another may melted in balm. "It tapped into a very emotional space for them," Mr. Heuser said. "They struggled with, 'Is it O.K. to go there?'"

Although mindful education may seem like a New Yorker caricature of West Coast life, the school district with possibly the best experience has been Lancaster, Pa., where mindfulness is taught in 55 classes a week at eight schools. The district has a substantial poverty rate, with 75 percent of students qualifying for free lunch.

Midge Kador, a yoga teacher, and her husband, Rick, started the program six years ago at George Ross Elementary, where their daughter Wynne taught.

Camille Hopkins, the principal, said initially she was skeptical. Growing up in South Philadelphia, "I was never told to take an elevator breath" — a way of breathing in stages, taught in yoga — "or hear the signals of chimes to cool down," Ms. Hopkins said.

But the stresses today are greater, she conceded, particularly on students who lived with the threat of violence. "A lot of things we watched on TV are part of their everyday life," she said. "It's 'Did you know so-and-so got shot over the weekend.'"

In after-school detention, children are asked to "check in with their feelings," Ms. Hopkins said. "How are you really changing behavior if they're just sitting there?"

Yolanda Steel, a second-grade teacher at Piedmont, said she was hopeful that the training would help an attention-deficit generation better manage a barrage of stimuli, including PlayStations and text messages. "American children are overstimulated," Ms. Steel said. "Some have difficulty even closing their eyes."

But she said that some students tapped pencils and drummed on desks instead of closing their eyes and listening to the bell. "The premise is nice," Ms. Steel concluded. "But mindfulness can't do it all."

The New York Times Article on Quieting the Mind (cont'd.)

On this June day, it's hard to tell what's sinking in with six students reluctantly going along with the breathing exercises Kinder leads with Darry Starliper. They're both with Kinder Associates, a Lancaster wellness consultation firm Wynne Kinder runs with her parents, Midge and Rick Kinder. The kids seem to want to try it, even if they have to come up with a cool excuse to do what might be deemed uncool by their peers: "I gotta try this one! It's like skateboarding!"

Kinder doesn't ask the students to succeed — she knows that approach might even turn off some kids. She just asks them to give the motions a chance to have calming effects. It hardly seems possible such a sublime approach could make a dent, but as Kinder asks students to visualize a wave receding over a beach to a blue ocean as they concentrate on their breathing, the class cool kid mumbles, "Does anyone have a pillow?"

No one laughs — the others are engaged by Kinder's beach scene. The cool kid's eyes meet Kinder's glance — he's dying to know if he rattled her with his pillow comment. She doesn't miss a beat as she puts an index to her lips for his silence.

The cool kid isn't mad. In fact, within a few seconds, his eyes are closed and he's falling into blissful silence under the air conditioner's white noise.

Kinder has 16 years' classroom experience, which serves her well in these situations. Still, she's baffled by how simple exercises mysteriously calm kids hypercharged from hours with computers, Mp3 players, TVs, video games, cell phones and a million other real-time distractions.

"I don't know how it works, but it works," she said. "By the end of class, they don't even have half the frenetic behavior they came in with. But the real test comes for these kids later, when they meet up with someone who's trying to mess with them. Can they step back and take control? We've taught them something valuable that society hasn't even caught onto yet."

Kinder Associates' Wynne Kinder begins and ends each Wellness Works class with the clear resonating tone of Tibetan chimes — a sort of analogy for clarity in action and thought that can be learned with training.

Kinder's parents were teaching yoga workshops at a local health campus years ago when two school principals in the class asked if they'd consider developing a pilot program to ease SDL students' tension during days of state-mandated testing. Six years later, the Wellness Works curriculum is taught by Kinder Associates instructors in more than 25 sessions a week at eight schools, including special education, emotional and learning support classes; detention and suspension programs; and targeted student groups, such as student parents or young men needing anger management. Some classes even include training for students' parents.

In fact, SDL's investment in mindfulness training is so far ahead of the curve that a recent New York Times article about its use in schools identified Lancaster as one of the nation's most successful leaders.

"We've had good results here. You have to actually see it to believe the kind of changes that can take place in students," said Bland Middle School Principal Larry Mays. "This year, we saw more than a 30 percent increase in grades across the board and a decrease in discipline problems. This has helped tremendously with our students. Sometimes we have to give students the tools to show them they can respond and behave in a proper way."

Kinder Associates' instructor Darry Starliper was a physical education teacher for seven years in Lancaster schools before joining the Kinders. He admits he was skeptical when he first met them — they'd come to teach Wellness Works at SDL's Phoenix Academy, an alternative education program for students at risk of dropping out.

"Can you imagine the distance between these students and these teachers?" Starliper said. "But the students took it in, and they got so much from it. There's a truth to it and an honesty that it's going to be beneficial. I can't explain it more than that except to say it happens in every school we go to — not to every student, but every time."

Last month, as Wynne Kinder packed up her Tibetan chimes and her six students filed out of class, they were poker-faced — hardly a ringing endorsement for focused breathing.

"I want to do this more often," someone mumbled very quietly.

Pressed, junior Anthony Brydn stepped up. "It was cool. It helps you relax .... No one will admit that," he said, "but it's true."

As it was for so many programs, funding for Wellness Works was cut at Bland Middle School. But Mays said he's looking for grants and fellowships to make up the difference.

"If I could expand it to have a teacher whose sole responsibility is to work with students a few times a week, I would do it," Mays said. "I know that might sound radical to the general public, but I would train all my teachers if I could. I really believe it has the potential to change the entire school culture."

E-mail: slipa@lnpnews.com

Appendix R: Take a Deep Breath; Kids Learn Ways to Calm the Mind

Kids learn ways to calm the mind

Attention: sit still. Focus. Who hasn't heard those words and wondered, "Okay, how?" Grace Kramer, 10, says her school, Fritz Elementary, in Lancaster, Pennsylvania, is teaching her the way.

Grace's school participates in Wellness Works, a program in which students receive "mindfulness training." Kids learn deep breathing, visualization, movement and relaxation techniques. This school year, Wellness Works's instructors will teach 15 classes a week at five schools in Lancaster.

Fritz Elementary is just one of a growing number of schools across the country to introduce programs in mindfulness training. A 2005 study by the Garrison Institute, a nonprofit group that promotes reflective practices, highlighted similar programs in Colorado, Massachusetts and Washington.

Steve Reidman, a fourth-grade teacher at Toluca Lake Elementary, near Los Angeles, California, says he's a "firm believer" in the benefits of mindfulness training. His students take a class with InnerKids.

The program "is all about stress reduction, anger management and focus," Reidman told TFK. He says it has also helped students do better on "high-stakes tests."

"Kids feel the pressure to perform," says Fritz Elementary principal Colleen Hovance. She hopes mindfulness training will help students on standardized tests and in daily life. So far, "it's working," she says. "I'm seeing the payoff."

Grace is seeing results too. "I would get fed up with math," she says. "Now, I don't get overstressed about one little problem."

—By Jaime Joyce

Dear TFK,

It is great that someone is spreading the word about black history ["Holding On to History," 2/8]. I'd love to visit the courthouse where Avery Clayton is displaying his mom's collection of African-American artifacts.

Meghan C., 11
New York

Redesigning a penny that already costs 1.67 cents to produce is a waste of money ["A Penny's Worth," 2/8].

We can celebrate Lincoln's 200th birthday in a different way, such as painting a mural in Washington, D.C.

Jahnae R., 11
Virginia

Jared Doutt was lucky to have been chosen to deliver the game ball for Super Bowl XLII ["He's Carrying the Ball," 2/8]. That must have been an honor for him.

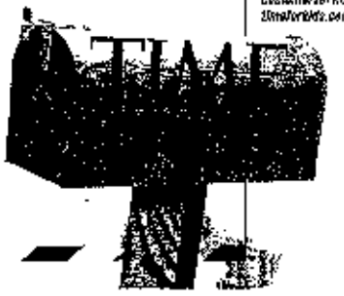
Robert D., 10
Nebraska

It was so smart of Hannah Haas to create Bubble Wrap wallpaper to calm autistic kids ["Bubbling to the Top," 2/8]. I cannot believe that no one had thought of this before.

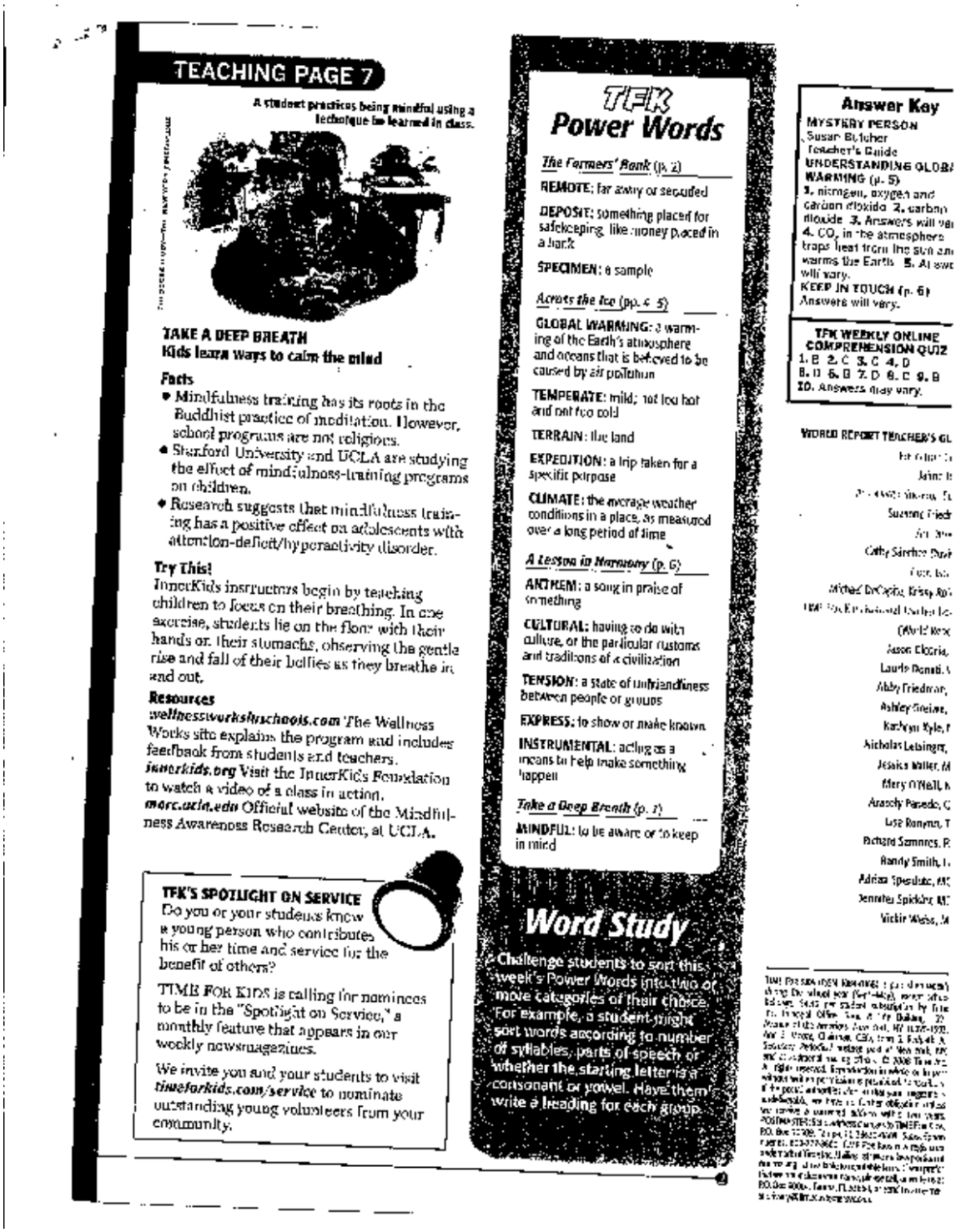
Ellie S., 10
Missouri

Write to TFK at TIME For Kids, 2nd floor, 1271 Sixth Ave., New York, NY 10020, or send e-mail to emailbag@timeforkids.com.

If you have a question about your subscription, send a message to customerservice@timeforkids.com.



Take a Deep Breath; Kids Learn Ways to Calm the Mind (cont'd.)



TEACHING PAGE 7

A student practices being mindful using a technique he learned in class.

TAKE A DEEP BREATH
Kids learn ways to calm the mind

Facts

- Mindfulness training has its roots in the Buddhist practice of meditation. However, school programs are not religious.
- Stanford University and UCLA are studying the effect of mindfulness-training programs on children.
- Research suggests that mindfulness training has a positive effect on adolescents with attention-deficit/hyperactivity disorder.

Try This!
InnerKids instructors begin by teaching children to focus on their breathing. In one exercise, students lie on the floor with their hands on their stomachs, observing the gentle rise and fall of their bellies as they breathe in and out.

Resources
wellnessworksbyschools.com The Wellness Works site explains the program and includes feedback from students and teachers.
innerkids.org Visit the InnerKids Foundation to watch a video of a class in action.
marc.ucla.edu Official website of the Mindfulness Awareness Research Center, at UCLA.

TFK'S SPOTLIGHT ON SERVICE
Do you or your students know a young person who contributes his or her time and service for the benefit of others?

TIME FOR KIDS is calling for nominees to be in the "Spotlight on Service," a monthly feature that appears in our weekly newsmagazines.

We invite you and your students to visit ***timeforkids.com/service*** to nominate outstanding young volunteers from your community.

TFK Power Words

The Farmers' Bank (p. 2)

REMOTE: far away or secluded

DEPOSIT: something placed for safekeeping, like money placed in a bank

SPECIMEN: a sample

Across the Ice (pp. 4–5)

GLOBAL WARMING: a warming of the Earth's atmosphere and oceans that is believed to be caused by air pollution

TEMPERATE: mild; not too hot and not too cold

TERRAIN: the land

EXPEDITION: a trip taken for a specific purpose

CLIMATE: the average weather conditions in a place, as measured over a long period of time

A Lesson in Harmony (p. 6)

ANTHEM: a song in praise of something

CULTURAL: having to do with culture, or the particular customs and traditions of a civilization

TENSION: a state of unfriendliness between people or groups

EXPRESS: to show or make known

INSTRUMENTAL: acting as a means to help make something happen

Take a Deep Breath (p. 7)

MINDFUL: to be aware or to keep in mind

Word Study

Challenge students to sort this week's Power Words into two or more categories of their choice. For example, a student might sort words according to number of syllables, parts of speech or whether the starting letter is a consonant or vowel. Have them write a heading for each group.

Answer Key

MYSTERY PERSON
Susan Butcher
Teacher's Guide
UNDERSTANDING GLOBAL WARMING (p. 5)
1. nitrogen, oxygen and carbon dioxide 2. carbon dioxide 3. Answers will vary. 4. CO_2 in the atmosphere traps heat from the sun and warms the Earth. 5. Answers will vary.
KEEP IN TOUCH (p. 6)
Answers will vary.

TFK WEEKLY ONLINE COMPREHENSION QUIZ
1. B 2. C 3. C 4. D
5. B 6. B 7. D 8. C 9. B
10. Answers may vary.

WORLD REPORT TEACHER'S GU

Appendix S: Child Mind Institute; Mindfulness in the Classroom

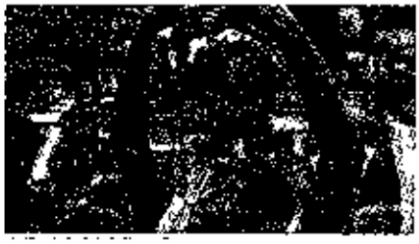
CHILD MIND INSTITUTE

ADVICE & SUPPORT

HOT TOPIC

Mindfulness in the Classroom

How it helps kids regulate behavior and focus on learning



By Jillian Storey

HAVE A STORY TO SHARE?

MENTAL HEALTH GUIDE

SYMPTOM CHECKER

Child Mind Institute; Mindfulness in the Classroom (cont'd.)

The Power of Mindfulness

Appendix T: Child Mind Institute; The Power of Mindfulness

CHILD MIND INSTITUTE

ADVICE & SUPPORT

- Hot Topics
- Ask an Expert
- Real Stories
- Brainstorm Blog

HOT TOPIC

The Power of Mindfulness

How a meditation practice can help kids with ADHD, anxiety, autism and depression

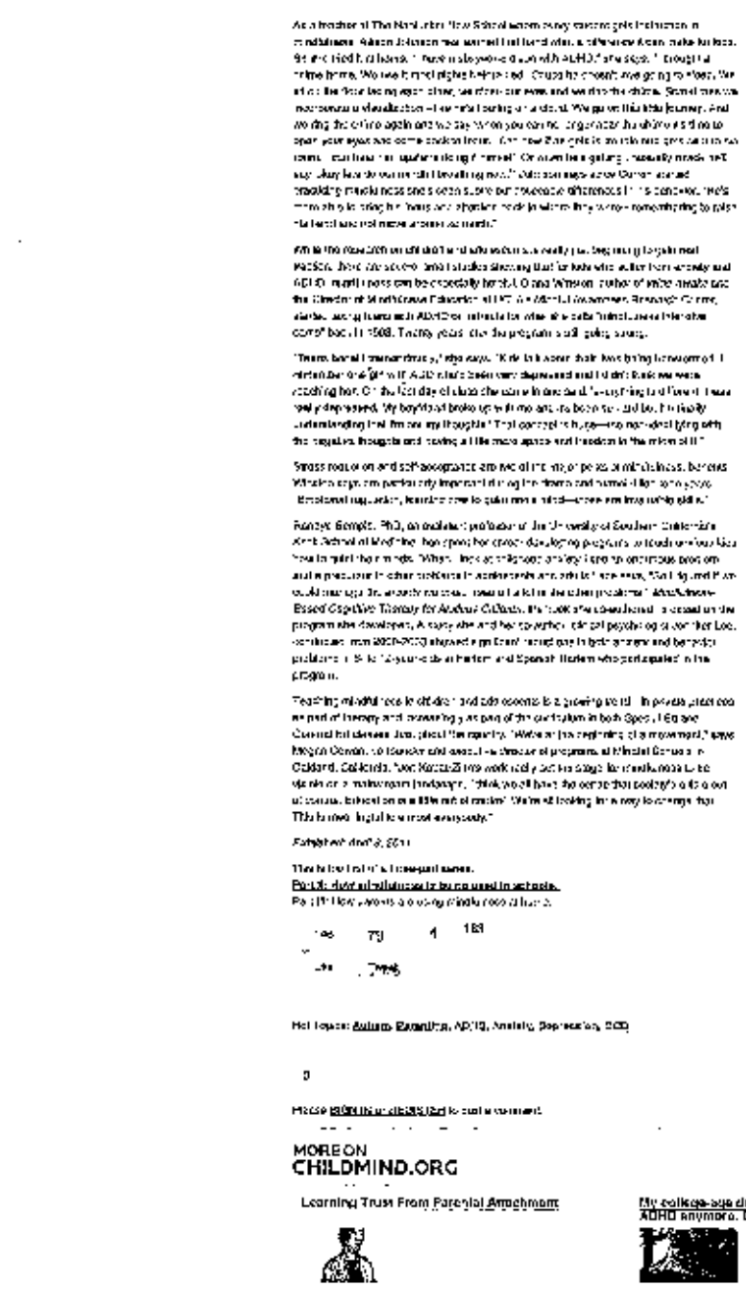
By William Gaylord

HAVE A STORY TO SHARE?

MENTAL HEALTH GUIDE

SYMPTOM CHECKER

Child Mind Institute; The Power of Mindfulness (cont'd.)



Appendix U: Child Mind Institute Mindful Parenting; How to Take Stress and Anxiety Out of Raising Kids

CHILD MIND INSTITUTE

DONATE

ADVICE & SUPPORT

Hot Topics

Ask an Expert

Real Stories

HOT TOPIC

Mindful Parenting

How to take stress and anxiety out of raising kids

By J. Hana Carey

[illegible]

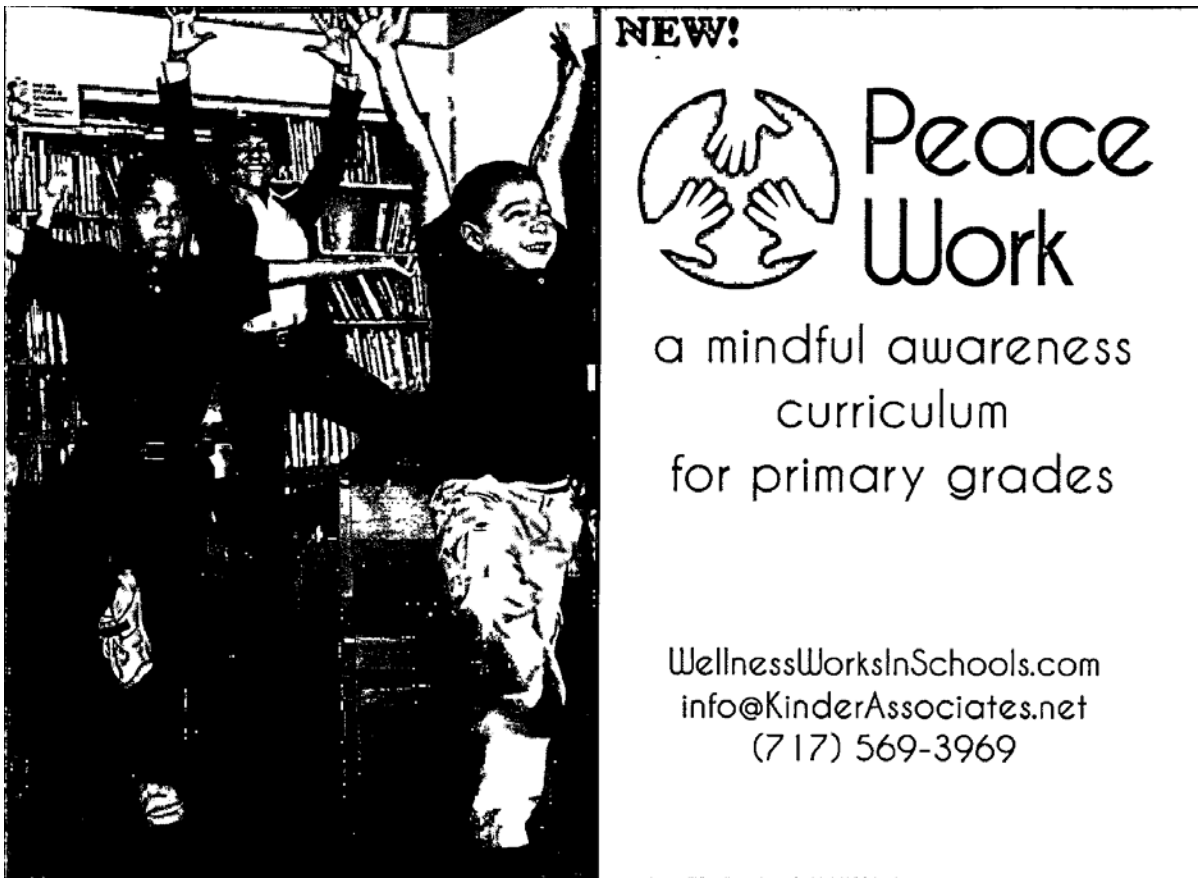
HAVE A STORY TO SHARE?

MENTAL HEALTH GUIDE

SYMPTOM CHECKER

Child Mind Institute Mindful Parenting; How to Take Stress and Anxiety Out of Raising Kids (cont'd.)

Appendix V: Wellness Works Photos–Peace Work



Appendix W: Wellness Works in Schools Photos