2012

Self-Regulation: The Link between Academic Motivation and Executive Function in Urban Youth

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Self-Regulation: The Link between Academic Motivation and Executive Function in Urban Youth

By Sara Ferry Walker

Submitted in Partial Fulfillment of the Requirements of the Degree of Doctor of Psychology

May 2012
PHILADELPHIA COLLEGE OF OSTEOPATHIC MEDICINE
DEPARTMENT OF PSYCHOLOGY

Dissertation Approval

This is to certify that the thesis presented to us by Soura Ferry Walker on the 10 day of May, 2012, in partial fulfillment of the requirements for the degree of Doctor of Psychology, has been examined and is acceptable in both scholarship and literary quality.

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Acknowledgments

I am deeply grateful for my family’s support and encouragement throughout the dissertation process and the entire doctoral program. I am particularly thankful for my parents, Russell and Laura Ferry, Jr., who instilled the value of education in me and provided me with every possible opportunity to accomplish my goals throughout my life. I’d also like to thank my mother for her countless hours of proofreading and babysitting; I do not know how I would have coped without her. This also would not be possible without the support of my husband, Shawn, who has provided much encouragement and inspiration on this journey. He has been patient and has altered his priorities as a result of my educational decisions, and for that I will always be greatly appreciative. Last, I am grateful for my son, Soren, who entered our lives midway through my coursework. I hope that I have and will continue to instill in him the value of education and the joy of learning.

I would like to express my extreme gratitude to the administrators and my colleagues at my school. They not only provided me with the data for this research, but also with great encouragement throughout the past three years. Without their flexibility and assistance, this would not have been possible. Their support is truly appreciated.

I would also like to thank my dissertation chair, Dr. Lisa Hain, for her attentive and thoughtful direction throughout this process. I have learned so much from her and this work would not be complete without her guidance. I am also grateful to my committee members, Dr. George McCloskey and Dr. Amy Pobst, who
also provided much advisement during this process. I truly appreciate their time and effort.
Abstract

The present study investigated the relationship between academic motivation and executive function skills through teacher reports of prototypical students, perceived to lack motivation. Second, the study examined the effect of grade level (i.e., elementary, middle, high) on both teacher-perceived academic motivation and executive function skills for these prototypical students. It was hypothesized that there were significant relationships between executive function processes and academic motivation. It was also hypothesized that due to the decline in academic engagement during adolescence, middle school and high school teachers would perceive higher levels of executive dysfunction and deficits in academic motivation than would elementary teachers. The study used archival data from the Behavior Rating Inventory of Executive Function (BRIEF) and the Motivation subscale of the Academic Competence Evaluation Scales (ACES) completed by teachers in an urban charter school during several faculty meetings. Statistically significant findings were obtained, indicating that teachers’ ratings of the executive function capacities of unmotivated students were consistent with the hypothesis that academic motivation and executive function skills are significantly correlated. Significant correlations were found between academic motivation and the areas of Shift, Emotional Control, the Behavioral Regulation Index, the Metacognition Index, and the Global Executive Composite scales of the BRIEF. Results of the analyses also reveal that high school teachers perceive higher levels of executive dysfunction than do elementary and middle school teachers in the areas of Plan/Organize, Organization of Materials, and on the Metacognition Index of the BRIEF. Additionally, high school teachers...
reported more significant executive function difficulties than elementary school teachers on the Shift, Initiate, Working Memory, Monitor, and Global Executive Composite scales of the BRIEF. Results supported the hypothesis that teacher perceived executive function skills decline as students age; however, motivational deficits did not change as a function of grade level.
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Chapter 1

Introduction

Lack of motivation and effort is a common concern faced by today’s youth and often reported by educators, particularly at the middle and high school levels. It has been well established that a high level of academic motivation is correlated with positive achievement and success in school (Wentzel, 1999, 2002; Wigfield et al., 2006; Linnenbrink & Pintrich, 2002). Hardré et al. (2006) state, “Motivation is among the most powerful determinants of students’ success or failure in school” (p. 200). Students need not only the cognitive skills to perform well on academic tasks, but also an appropriate level of motivation to persevere and complete these tasks (Pintrich & Schunk, 2002). Without motivation, students do not initiate, persist, or progress through school. Therefore, student motivation is commonly reported to be a factor in lack of academic success.

Statement of the Problem

Cleary and Zimmerman (2004) believe that one of the most pressing issues in the area of academic motivation is the fact that motivation typically declines as students age, noting decreases in self-esteem, confidence, and intrinsic interest. Another reason for this decline includes the mismatch between the students’ needs and the environment of the school (Eccles et. al., 1993). As students reach their teenage years, they often yearn for personal control; however, middle schools and high schools do not provide many opportunities for self-control, because curriculum and activities are typically chosen for students by both school administrators and teachers (Eccles et al., 1993). Simultaneously, students are not prepared for the
amount of autonomy that teachers require outside of the classroom in relation to homework and studying. In the middle and high school years, students are often required to perform more tasks independently and exhibit more self-sufficiency, factors which may also contribute to the observed decrease in motivation during this period (Cleary & Zimmerman, 2004). Regardless of the reason for the decline during the teen years, motivation is an important topic to address because of its major impact on student achievement.

The observed lack or decline of motivation in the middle school and high school years may have many causes. Environmental factors, such as poverty, family stressors, and peer influences, may affect one’s motivation in school. Internal factors, such as personal interest and drive, may also contribute to one’s level of motivation in regard to academic tasks.

An internal factor contributing to the lack or decline of academic motivation displayed in youth may be due to weaknesses in executive function processes, specifically in the area of self-regulation. McCloskey, Perkins, and Van Divner (2009) define executive functions as “directive capacities that are responsible for a person’s ability to engage in purposeful, organized, strategic, self-regulated, goal-directed processing of perceptions, emotions, thoughts, and actions” (p. 15). Executive function skills develop over infancy, childhood, and adolescence; they typically are not fully developed until the late twenties (Blakemore & Choudhury, 2006). As a result, school-age children and adolescents may have difficulty with tasks that are high in demand of executive functions, particularly tasks that involve planning, organization, and effort.
Executive function difficulties may have a large impact on academic achievement. Most academic tasks require students to plan, organize, prioritize, self-regulate, and exhibit flexibility; students with executive function weaknesses have particular difficulty in these areas (Meltzer & Krishnan, 2007). All of these weaknesses may present as a deficit in motivation and a sense of apathy in regard to academic tasks, rather than presenting as a lack of self-regulation, a key aspect of executive functions.

Self-regulated learning encompasses motivational processes because students must set goals and follow through with task strategies to achieve success. Motivation is a critical component in self-regulated learning. Gaskins and Pressley (2007) report that students often have the desire to be good students, but frequently lack the self-regulation of effort and motivation required to complete academic tasks. Motivation must be regulated as individuals consciously initiate, maintain, and persist toward completing activities or reaching academic goals (Wolters, 2003).

Therefore, although motivation and executive functions are separate entities, there is a direct relationship between the two. Students with executive function weaknesses may appear to be lacking motivational drive when, in fact, they lack the self-regulatory abilities needed to initiate and complete tasks imposed through external commands. They may also experience difficulties with planning, organizing, decision-making, goal-setting and working memory, any or all of which can directly affect motivation.

The problem of low motivation and weaknesses in executive function skills, and the ways in which they contribute to poor school achievement, are particularly
salient in discussing students of color. Research indicates that the academic progress of children and adolescents of color, particularly Hispanic and African-American students, is significantly lower than the progress of Asian American and Caucasian students (Kaylor & Flores, 2007; Okagi, 2006; U.S. Department of Education, 2003). Reasons for this discrepancy are vast and may include economic disadvantage, social isolation, and stressful home and neighborhood factors; however, teachers and other educators often report the lack of motivation of these youth and often attribute this to personal, internal characteristics. What is perceived as low motivation may actually be the result of environmental factors as stated previously, but may also be due to difficulties with executive function skills, particularly in the area of self-regulation. Therefore, this is an important area of concern in the urban population, especially for students of color because of this discrepancy in academic achievement.

**Purpose of the Study**

Few research studies were found that examine the relationship between executive function skills and academic motivation. The current study attempts to contribute to research by examining the relationship between motivation and executive function skills, specifically from the perspective of teachers, in a population of urban youth. The study also seeks to determine the relationship between differing grade levels and the changes in teacher perspective both of motivation and of executive functions.

Understanding the relationship between executive functions and academic motivation may alter teachers’ perceptions of their unsuccessful students. Teachers may better understand student underachievement and be better prepared to address
academic and motivational concerns. Additionally, knowledge about grade level and the onset of executive function and motivational deficits will aid with the implementation of interventions in these areas through various age and grade levels. In particular, individual assessment of concerns will allow for appropriate individualized interventions rather than broad, inappropriate school-wide interventions.

**Research Questions**

Is there a significant relationship between academic motivation and executive function skills, based on teachers’ prototypical ratings of academically unmotivated students? Are executive function skills and motivation significantly different in children across grade level, based on teacher perception?
Chapter 2

Review of the Literature

Motivation

Many definitions of motivation exist. Motivation has been defined as a state in which one exhibits goal-directed behavior and willingly persists at tasks (Hamilton, 1983; Wolters, 2003). Motivation has also been defined as the processes which lead to a state of motivation, including choice, effort, and persistence (Wolters, 2003). Essentially, the word motivation originated from a Latin word meaning to move and encompasses the direction and energy one generates to complete a goal (Pintrich, 2003). Academic motivation, then, refers to the effort and persistence taken in achieving academic goals and completing academic tasks, and thus, performing successfully in school.

Theories of motivation. Numerous theories and considerable research on the inherent qualities and derivation of motivation exist, such as self-efficacy theory, expectancy-value theory, attribution theory, self-determination theory, and goal theory. Intrinsic motivation and extrinsic motivation are also differentiated when discussing academic motivation.

Self-efficacy theory. One of the earliest theories of motivation includes self-efficacy beliefs, which is related to social cognitive theory (Pajares, 2008). Self-efficacy theory maintains that the thoughts that people have about their abilities and the outcomes of their capabilities influence their behavior (Pajares, 2008). This theory relates to academic motivation because students who believe that they are capable of succeeding and excelling in school typically are more highly motivated and put forth
more effort into tasks such as studying, homework completion, and class work completion than do students who do not have confidence in their academic skills (Pintrich, 2003). In addition, these students may engage in more challenging academic tasks and may exert more effort when faced with academic adversity and difficulty (Wigfield & Wentzel, 2007). In essence, those who believe in their academic skills exhibit a higher level of motivation; those who lack confidence in their capabilities tend to lack motivation and give up easily on academic tasks.

**Expectancy-value theory.** Similar to self-efficacy theory, expectancy-value theory proposes that if one believes that he or she will be successful on a task, motivation will increase (Graham, 2004). However, expectancy-value theory also suggests that when a goal is desirable or valued, motivation is further increased (Graham, 2004). Therefore, the combination of what one expects and what one values and wants determines the level of motivation. As part of this theory, Eccles et al. (1983) proposed four different values associated with academic achievement: attainment value, interest value, utility value, and cost value. Attainment value refers to the importance of succeeding on an academic task; interest value refers to the gratification that one experiences from completing the task; utility value is the usefulness of completing the task and how it relates to future goals, and cost value is what one has to delay or neglect in order to complete the task (Wigfield, Hoa, & Klauda, 2008). Expectancy-value theory suggests that these specific values, along with self-efficacy, direct motivation for learning and achievement.

**Attribution theory.** Attribution theory, as it relates to academic motivation,
focuses on students’ views of the causes behind success and achievement (Schunk, 2008). Weiner (1992) suggests that students attribute their academic success to four main factors: ability, effort, task difficulty, and luck. In addition, these factors can be internal or external, stable or instable, and controllable or uncontrollable (Weiner, 1992). Typically, effort is viewed as stable, internal, and controllable but luck is viewed as unstable, external, and uncontrollable (Schunk, 2008). Effort is associated with a higher level of motivation than luck. According to attribution theory, students hypothesize causes for their academic success or failure; their perceived reasons for their academic performance influence their motivation on future similar endeavors.

**Self-determination theory.** Related to attribution theory, self-determination theory stresses the importance of internal and controllable factors in academic motivation. Self-determination theory postulates three motivational needs: competence, autonomy, and relatedness (Ryan & Deci, 2000). The need for competence is the need to master activities; the need for autonomy is the need for one to be in control; and the need for relatedness is the need for group affiliation (Pintrich, 2003). When one meets all needs, his or her motivation is optimized. In addition to self-determination theory, Covington proposed a needs-approach to motivation. According to this theory, there is only one need: personal self-worth (Pintrich, 2003). When one’s self-worth is developed and established, the motivation for a variety of academic tasks increases.

**Goal theory.** Last, another theory of motivation that is relevant to academic achievement includes goals and goal attainment. Most goal theorists suggest that two types of achievement goals exist: performance or ability goals and mastery or
learning goals (Grant & Dweck, 2003). There are two types of performance goals. Performance-approach goals are developed in order to prove one’s proficient ability, but performance-avoidance goals exist to avoid the confirmation of a lack of ability (McGregor & Elliot, 2002). The aim of learning goals is to improve skills or knowledge (Grant & Dweck, 2003). Students who develop performance goals are concerned with how others perceive their abilities, but students who develop learning goals intend to improve their abilities and skills (Elliot & Dweck, 1988).

The literature on these different types of goals overwhelmingly reveals that mastery goals are associated with higher academic achievement and motivation than are performance goals, especially performance-avoidance goals (Ames, 1992; Dweck & Leggett, 1988) Heyman & Dweck, 1992; McGregor & Elliot, 2002). Mastery goals are connected with higher active task engagement, intrinsic motivation, and long-term results (Heyman & Dweck, 1992; McGregor & Elliot, 2002). Performance goals may be detrimental to academic motivation because they may exacerbate an existing state of low confidence (Heyman & Dweck, 1992).

**Extrinsic and intrinsic motivation.** When the topic of academic motivation is discussed, extrinsic motivation and intrinsic motivation are often differentiated. Extrinsic motivation refers to behavior exhibited for an external reason or value (Pintrich & Schunk, 2002). An example of extrinsic motivation may be a high-school student who strives to attain an A in each course because of her parent’s promise of a new car upon meeting this goal. Intrinsic motivation is behavior exhibited for one’s own personal interest and one’s own sake (Pintrich & Schunk, 2002). A student
exploring and researching the art of photography because of his own personal interest would be displaying intrinsic motivation.

The importance of intrinsic motivation is stressed in motivational research because it is associated with positive academic achievement, increased school engagement, a desire to conquer higher level academic challenges, as well as satisfaction with learning (Reeve, Ryan, Deci, & Jang, 2008). When students complete tasks based on intrinsic motivation, it is due to a natural curiosity and high interest. Intrinsic motivation is divided into two types of interest: personal interest and situational interest. Personal interest refers to an individual’s interest in a specific area or content (Hidi & Harackiewicz, 2000). Personal interest is considered stable over time and can reflect one’s personal hobbies or attractions (Pintrich, 2003). In contrast, situational interest reflects an individual’s interest based on the task or context, not the subject matter (Pintrich, 2003). For example, someone who displays situational interest may be interested in watching an historical film in class because of the media involved, not because of the meaning and information conveyed in the film. Therefore, significant levels of intrinsic motivation, in particular personal interest, are associated with higher levels of academic motivation and achievement.

**Race and Culture and Motivation**

The issue of academic motivation and the effect on academic achievement is a particularly important topic in discussing students of color because of the large discrepancy in achievement levels between African-American and Hispanic students versus Caucasian and Asian-American students. African-American and Hispanic students lag behind their Asian-American and Caucasian peers in achievement.
Motivation and Executive Functioning

(Kaylor & Flores, 2007; Okagi, 2006; U.S. Department of Education, 2003). They are also more likely to be identified as having a learning disability, meeting the eligibility requirements for special education services, and dropping out of school (Kaylor & Flores, 2007; Sullivan et. al., 2009).

Teachers often report that African-American and Hispanic students are disengaged with academic learning and are not academically motivated. However, the research cites numerous factors, other than motivation, contributing to the achievement discrepancy between the races (Caraway, Tucker, Reinke, & Hall, 2003; Weinstein, 2002). One of the most common explanations for the achievement gap is poverty and the lack of adequate and appropriate academic resources (Schultz, 1993; Kenny, Walsh-Blair, Blustein, Bempechat, & Selzer, 2010). Stress, neighborhood violence, and home factors often accompany poverty, thus exacerbating low academic achievement and reducing the priority of school tasks.

Additionally, a poor sense of belonging and the lack of social support factors may also contribute to the discrepancy in achievement between races. Goodenow (1992) found that the absence of a sense of school-belonging in urban adolescents impacted motivation, effort, and engagement in academic tasks. This may be particularly significant in schools where students of color are the minority and when students of color attend schools consisting primarily of Caucasian faculty. Other factors that may contribute to the lack of achievement of students of color include racism-related stress. Specifically, minority students who experience or witness racism in their schools tended to demonstrate a lower level of intrinsic motivation (Reynolds, Sneva, & Beehler, 2010). Related to racism-related stress, Steele (1997)
suggested that students of color demonstrate lower levels of academic achievement due to the idea that anxiety is produced as students recognize the possibility that they may confirm negative stereotypes associated with their race and achievement.

Although several factors have been identified as impacting academic motivation and, in turn, contributing to the achievement gap between ethnicity groups, the research suggests that the motivational levels of students of color may vary, based on environmental factors and gender (Long, Monoi, Harper, Knoblauch, & Murphy, 2007). Therefore, race, ethnicity, and culture in and of themselves cannot predict academic motivation; other factors are responsible. In fact, there is existing research which proposes that students of color exhibit a high level of academic motivation. For example, Graham (2004) found that female students of color demonstrated a high level of academic motivation throughout elementary, middle, and high schools; African-American and Hispanic male students’ motivation tends to decline in their adolescent years. In addition, Rouse and Austin (2002) concluded that African-American girls of high ability possessed a higher level of motivation than their Caucasian peers.

**Teacher Perception of Motivation**

As stated previously, there are many reasons for the lack of motivation in students. Regardless of the reason, it is important to understand the teachers’ causal perceptions of their students’ motivation. Teachers’ perceptions of student motivation drive the interventions and strategies that are used in the classroom to motivate students (Hardré & Sullivan, 2008). Ultimately, this affects student progress and influences students’ achievement and success in school. Therefore, the level of
students’ motivation is heavily influenced by the interventions that teachers choose, based on what they believe affects academic motivation.

Hardré al. (2006) found that teachers most often perceive external attributions to students’ motivation. These external factors include the pressure from parents to do well in school, distraction from outside sources, and the stress to do well on assessments (Hardré et al., 2006). In this study, teachers reported that students were motivated by performance goals, rather than learning goals.

Differences have been found in overall teacher reports of student motivation. Martin (2006) found that elementary school teachers, to a greater degree than high school teachers, perceive their students as displaying a high level of motivation. Additionally, male teachers, more than female teachers, tend to perceive higher levels of motivation (Martin, 2006). Also, teachers’ perceptions of student motivation vary based on cultural behaviors (Tyler, Boykin, & Walton, 2006). Tyler et al. (2006) found that teachers perceive students as unmotivated when they exhibit behaviors associated with communalism and verve, behaviors that are often associated with African-American students. They also found that teachers view students as more highly motivated when they display individualistic and competitive behaviors, which are behaviors typically linked to European Americans. These discrepancies occurred even though all students were high achievers and attained high grades (Tyler et al., 2006).

Overall, academic motivation is a pressing and complex issue facing many youth, particularly urban youth, because it is highly related to academic achievement. Motivation is not simply the act of “not trying hard enough,” but an intricate concept
that involves many factors such as environment, stress, support, confidence, beliefs about one’s ability, and values. Therefore, when a student appears unmotivated, uninterested, or lazy, there may be other external factors that impede their success and willingness to engage in academic material.

Additionally, the student may lack the support, confidence, and ability needed in order to organize, prioritize, self-regulate, all of which are instrumental to motivation and the initiation and completion of academic tasks. In line with the final theory of motivation described previously, goal theory, academic motivation can be optimized when students are able to develop academic goals that are designed to improve their skills and abilities in particular areas. The goal-setting and self-regulation behaviors that are needed to fuel motivation are embedded in the concept of executive function.

**Executive Function Skills**

**Definitions of executive functions.** Executive functions are complex capacities that have been defined in a variety of ways. Meltzer (2007) defines executive functioning as “an umbrella term for the complex cognitive processes that serve ongoing, goal-directed behaviors” (p. 1). Meltzer (2007) reports that executive functioning includes various components such as “goal setting and planning, organization of behaviors over time, flexibility, attention and memory systems that guide these processes, and self-regulatory processes such as self-monitoring.” (p.1-2). Gioia et al. (2000) also propose that executive functions refer to an “umbrella construct that includes a collection of inter-related functions that are responsible for purposeful, goal-directed, problem-solving behavior.” (p. 1). They suggest that
executive functions include behaviors such as working memory, shifting, monitoring, and emotional control.

The McCloskey Model of Executive Functions is a holarchical model that includes five tiers (McCloskey et al., 2009). In the first tier, Self-Control: Self-Activation, executive functions are aroused from slumber (McCloskey et al., 2009). The second tier, Self-Control: Self-Regulation, includes twenty-three executive functions that are needed to complete daily tasks (McCloskey et al., 2009). These executive functions include, but are not limited to, initiate, gauge, sustain, modulate/effort, monitor, correct, and execute (McCloskey et al., 2009). These executive functions may vary, depending on the specific sensation/perception, cognition, emotion, or action experienced (McCloskey et al., 2009). The third tier is separated into two parts: Self-Realization and Self-Determination (McCloskey et al., 2009). Self-Realization refers to awareness of the executive function processes that are needed, as well as the ability to analyze one’s use of executive function skills, and Self-Determination includes the development of goals and involves planning (McCloskey et al., 2009). Self-Generation is the fourth tier; it encompasses the greater mental and physical implications that exist (McCloskey et al., 2009). Specifically, it poses questions regarding the purpose of life and the purpose behind behaviors. Last, Trans-Self Integration is the highest tier of executive functions and incorporates spirituality (McCloskey et al., 2009). McCloskey’s Model of Executive Functions also proposes that executive functions occur within “arenas of involvement;” these include intrapersonal, interpersonal, environment, and symbol system (McCloskey et al., 2009).
Metacognition has also been associated with executive functions (Efklides, 2008). The term metacognition can be defined as, “cognition of cognition that serves two basic functions, namely, the monitoring and control of cognition” (Efklides, 2008, p. 278). Essentially, metacognition is thinking about thinking. Eslinger (1996) identifies the metacognitive components and specific use of strategies as executive function capacities. However, Denckla (2007) cautions against using the word “metacognition” because she reports that executive function skills are developmental and exist throughout each one’s lifetime and therefore, should not be associated solely with higher order thinking.

Weaknesses in executive functions have been associated with many disorders, such as Attention Deficit Hyperactivity Disorder, Learning Disabilities, Depression, Bipolar Disorder, Generalized Anxiety Disorder, Tourette’s Syndrome, Obsessive Compulsive Disorder, Autism, Conduct Disorder, and Oppositional Defiant Disorder (McCloskey et al., 2009). Executive function weaknesses are also identified in students who have learning disabilities (Meltzer & Krishnan, 2007). These students may have difficulty prioritizing, organizing, self-regulating, and initiating academic tasks; they also may have particular difficulty with independent tasks that require greater use of executive functions.

Overall, the term executive functions does not refer simply to cognitive processes, but instead to the regulations which direct cognition. Although many definitions and theories of executive function exist, it is clear that executive functions are important in organizing, planning, and initiating everyday tasks as well as long-term ventures, and therefore, are crucial to academic achievement.
Development of executive functions. Executive function processes typically originate during infancy stages and continue to develop throughout one’s lifetime; however, individual courses of executive function development are unique for each person (McCloskey et al., 2009). As early as three months, infants exhibit self-regulation in the area of visual processing, because they make decisions about what to fix their gaze on during this age (Eliot, 1999). In toddlers, executive functions continue to grow, because many children between the ages of eighteen months and thirty months are able to inhibit behavior as well as to exhibit goal-directed actions (Isquith, Gioia, & Espy, 2004; Ruff & Rothbart, 1996). Various other aspects of executive function begin to develop during childhood; working memory, inhibition, problem solving, and planning begin to improve during the childhood phase (Isqith et al., 2004).

Executive functions skills show the most noticeable amount of growth from childhood to adolescence (McCloskey et. al., 2009). During adolescence, self-regulation, self-awareness, and self-reflection are improved (Blakemore & Choudhury, 2006). These changes are evidenced by structural changes in the brain. From childhood to adolescence, there are increases in white matter, decreases in grey matter, and a decline in synaptic density (Blakemore & Choudhury, 2006). The brain, along with executive function skills, continues to grow and develop well past adolescence into adulthood with some research indicating that the brain reaches completion in the late twenties (Blakemore & Choudhury, 2006).

Therefore, adolescents are often expected to be self-sufficient and independent in terms of academic tasks; however, it is clear that their executive function skills
have not reached their optimal performance. As a result, adolescents may exhibit deficits in their executive functions skills; many of these deficits may appear to be motivational in nature. Instead of simply labeling students as “unmotivated” or “lazy,” identifying and intervening with students who may lack executive function skills will lead to more successful outcomes.

**Executive function and academic achievement.** As noted above, executive functions play a major role in academic achievement. Executive functions are particularly important when students are required to produce class work, assignments, and projects that require them to organize and structure many academic tasks (Meltzer & Krishnan, 2007). The effects of executive function difficulties are most apparent in the areas of reading comprehension, written expression, studying, test taking, and completion of long-term projects, because these areas require quick and constant access to executive functions (Meltzer & Krishnan, 2007).

A study completed by St Clair-Thompson and Gathercole (2006) also provides further evidence for the impact that executive functions have on learning and achievement. This study evaluated the shifting, updating, inhibition, and working memory aspects of executive functions on students’ achievement. Students were given executive function tasks, specifically in the area of working memory, and these results were correlated with the students’ progress on scholastic attainment tests in the areas of reading, writing, spelling, mathematics, and handwriting. This study confirmed hypotheses of associations between executive functions and academic progress in the areas of mathematics, English, and science.
Other research has also demonstrated the link between executive function skills and academic achievement. Diamantopoulou et al. (2007) concluded that the deficits in executive functions predicted school functioning and special education placement. Biederman et al. (2004) also found that executive functioning deficits also caused difficulty in academic functioning in the areas of reading and math, and predicted grade retention as well. Clark, Pritchard, and Woodward (2010) found that executive functions skills, particularly shifting and inhibition, in preschool children, predicted later achievement in mathematics.

Given the complex definition, as well as the purpose of executive functions, it is understandable that students who lack these skills may be labeled as “lazy” and “unmotivated.” These students may have an average ability or high ability and may be able to demonstrate proficiency in the classroom; however, when required to complete independent assignments and long-term projects, these students may suffer, because they do not know how to study, initiate tasks, plan, set goals, or organize their materials. Thus, executive function deficits have a negative impact on academic achievement, and may present as a low level of motivation.

The Relationship between Executive Functions and Motivation

Executive functions skills and academic motivation are linked together by self-regulation, a process that includes the initiation of tasks, goal-setting, and self-monitoring. Self-regulation is a key aspect of executive functions and is included in many definitions of executive functions; academic motivation is needed when self-regulating for support and ideal outcomes.
Definition of self-regulation. Schunk and Zimmerman (2008) define self-regulation or self-regulated learning as “the process by which learners personally activate and sustain cognitions, affects, and behaviors that are systematically oriented toward the attainment of learning goals” (p. vii). Zimmerman (2008) further explains that self-regulation is a “proactive process that students use to acquire academic skill, such as setting goals, selecting and deploying strategies, and self-monitoring one’s effectiveness, rather than a reactive event that happens to students due to impersonal forces” (p. 166-167). Essentially, when the students exhibit self-regulated learning, they demonstrate initiative, perseverance, and focused behaviors in order to meet their self-designed goals for learning and academic tasks. Use of self-regulated learning is associated with academic success, because students are involved and active in the learning process (Cleary, Platten, & Nelson, 2008). When students use self-regulation strategies, they are able to set realistic and attainable goals, monitor these goals and their behaviors during learning, exhibit more persistence and effort, and make use of learning strategies (Zimmerman & Schunk, 2008).

Zimmerman (2000) developed a cyclical model for self-regulation as it pertains to academic functioning. This model includes three cyclical phases. The first phase is the forethought phase and includes planning and goal-setting; this phase occurs prior to learning and prepares the student for academic engagement (Zimmerman, 2000). The second phase is the performance control phase (Zimmerman, 2000). During this phase the student is actively involved in learning or engaging in an academic task and requires self-control and self-observation to optimize his or her experience (Zimmerman, 2000). The third and final phase of
Zimmerman’s cyclical model is the self-reflection phase (Zimmerman, 2000). This phase encompasses self-evaluation and self-reactions that will guide future learning tasks (Zimmerman, 2000).

**Relationship between self-regulation and executive functions.** A large range of definitions concerning the functioning of executive function exists and vary in their incorporation of the concept of self-regulation. Some researchers differentiate between executive functions and self-regulation, yet others include self-regulation into the description of executive function (Eslinger, 1996; Garner, 2009). For example, Eslinger (1996) defines executive function as including self-regulatory processes such as planning and self-monitoring. McCloskey, Hewitt, Henzel, and Eusebio (2009) also include self-regulation as a core concept into the definition and model of executive functions skills. Garner (2009) proposes to “consider executive functions and self-regulated learning as two groups of overlapping constructs, with areas of convergence and areas of separation.” (p. 421). Lezak (1993) includes volition as a core component of executive functions and defines volition as “including capacities for awareness of one’s self and surround and motivational state” (p. 25), which may also be interpreted as an aspect of self-regulation.

Consequently, executive functions and self-regulation are not synonymous terms; however, there is a strong relationship and connection between the two concepts. If one describes executive functions skills as an umbrella term encompassing the directive roles for purposeful and goal-related behavior, then self-regulation is clearly included, especially for academic-related tasks. As a result, self-regulation may be described as a key component of executive function skills.
**Relationship between self-regulation and motivation.** An abundant amount of research reveals that students who utilize self-regulation strategies effectively display a higher level of academic motivation, as well as achievement (Cleary & Zimmerman, 2004). For example, Ning & Downing (2010) found that students’ use of self-regulation strategies predicted their levels of academic motivation. In particular, students who used the self-regulation strategies of time management, concentration, testing strategies, and monitoring exhibited higher levels of academic motivation. Bartels & Magun-Jackson (2009) also note the relationship between the use of metacognitive strategies and motivation.

Zimmerman and Schunk (2008) indicate that motivation is linked to self-regulation in several ways. Motivation can be a precursor to self-regulation because it can fuel interest in learning and in the use of self-regulation strategies. It can also be a mediator of self-regulation because motivation can increase the likelihood that one would use self-regulation in tasks. In addition, motivation can also be a concomitant of self-regulated learning outcomes because students become more interested in academic tasks as their skills improve. Last, motivation can be an outcome of self-regulated learning.

 Garner (2009) also notes the interrelationship between executive functions, in the area of self-regulation and motivation, stating:

Because self-regulatory processes lead to the attainment of a sometimes distant goal that may be at odds with one’s immediate desires, delay of gratification, impulse control, and inhibition capabilities are required.

Motivation is needed to fuel these processes and maintain effective progress
when experiencing challenges to the learning process. Motivational constructs known to be of relevance to self-regulated learning include not only simple extrinsic and intrinsic forms of motivation but also goal orientation, task value, and self-efficacy. (p. 410)

Overall, motivation and self-regulated learning are intertwined concepts that have a corresponding relationship. Throughout the learning and task completion processes, they work together to facilitate these processes. Motivation and self-regulation are positively correlated; that is, a higher level of the use of self-regulation strategies is often related to a high level of motivation, but a deficit of self-regulation is in many cases associated with the lack of academic motivation.

**Neuroanatomy of executive functions and motivation.** Executive functions and motivation are further linked together through neuroanatomy. Executive functions are often associated with the areas of the frontal lobes, specifically the prefrontal cortex, which are believed to direct aspects of behavior and planning (Rose & Rose, 2007; Maricle, Johnson, & Avirett). The link between executive functions and the frontal lobes has been determined primarily by research involving frontal lobe lesions and damage (Stuss & Alexander, 2000). However, due to the broad range of executive function skills, other areas of the brain are also involved in aspects of executive functioning (Reynolds & Horton, 2008).

The frontal lobe is connected to several subcortical regions of the brain that are also involved in executive function processes. Specifically, the basil ganglia, consisting of the caudate nucleus and the putaman, the thalamus, and the cerebellum are often associated with executive function activities (Powell & Voeller, 2004).
Although the frontal lobe is responsible for the regulation of cognition and higher-level functioning, other aspects of the brain are responsible for the actual completion of the executive functioning behavior (Reynolds & Horton, 2008).

Three major frontal circuits flow through the frontal lobes and through the subcortical regions, connecting these two areas. Generally, these circuits flow between the frontal cortex, the striatum, the globus pallidus/substantia nigra, and the thalamus, as well as to the areas reported above (Lichter & Cummings, 2001). The dorsolateral circuit is responsible for the regulation of the cognitive functions such as shifting, attention, planning, organization, and multi-tasking (Marcicle, Johnson, & Avirett). This circuit is most often associated with executive functions in research (Alvaraz & Emory, 2006). The orbital prefrontal circuit regulates emotions and assists with decision-making (Powell & Voeller, 2004; Marcicle, Johnson, & Avirett). Social behavior is also regulated by the orbital prefrontal circuit (Bronstein & Cummings, 2001).

Last, the anterior cingulate circuit, also called the inferior cingulate circuit and the ventromedial circuit, is associated with self-monitoring, initiating, and arousal (Alvarez & Emory, 2006; Hale & Fiorello, 2004; Bronstein & Cummings, 2001). Also regulated by this circuit is motivation (Alvaraez & Emory, 2006). This circuit flows between the prefrontal cortex and the nucleus accumbens, globus pallidus, and the thalamus (Lichter & Cummings, 2001). The nucleus accumbens plays a key role in motivation, particularly related to making choices and decisions and creating goals (Shiflett & Balleine, 2010. The anterior cingulate circuit controls “executive control,
divided attention, error detection, response monitoring, and the initiation and maintenance of appropriate ongoing behaviors” (Powell & Voeller, 2004).

Weaknesses in the anterior cingulate circuit present as a lack of interest, low perseverance, and a low level of motivation (Maricle, Johnson, & Avirett). Impairment in this circuit “produces apathy with reduced interest, motivation, and engagement” (Bronstein & Cummings, 2001, p. 61) and has been coined “abulia” (Mendoza & Foundas, 2008). It has been noted that the lack of motivation, or apathy, may present as motoric, cognitive, or emotional deficits (Bronstein & Cummings, 2001). Another condition associated with damage to the anterior cingulate is “akinetic mutism” (Miller, 2007). Akinetic mutism is characterized by severe apathy and may manifest in motor, speech, and behavioral deficits (Miller, 2007). Cognitive apathy may present as a lack of interest and a lack of drive in regard to educational tasks. People with deficits in the anterior cingulate circuit may have a difficult time creating and attaining long-term and short-term goals.

The relationship between motivation and executive functions is also apparent through analyses of brain functioning. Taylor et al. (2004) found an interaction between motivation and working memory in the dorsolateral prefrontal cortex and the right lateral prefrontal cortex in an analysis of functional magnetic resonance imaging. In this study, subjects were instructed to perform working memory tasks and were granted monetary rewards for positive performance. Kouneiher, Charron, and Koechlin (2009) also found that the medial frontal cortex regulates motivation and the lateral prefrontal cortex regulates cognitive control. They found through functional magnetic resonance imaging, that the medial frontal cortex engages the lateral
prefrontal cortex, thereby creating a relationship between motivation and decision-making.

Through all of these areas of the frontal lobes, frontal circuits, subcortical areas, including the limbic system, the relationship between motivation and executive function processes is further emphasized. Students who lack deficits in executive functions, particularly as these relate to the area of the cingulate gyrus and the anterior cingulate circuit, may not necessarily lack motivation alone, but instead have neurological weaknesses that prevent them both from initiating and from persevering through academic tasks. For the purpose of the current study, which was conducted with predominately Hispanic students, it is important to note that there are very minimal racial and ethnic differences in regard to genetics or intelligence (Gould, 1996). This suggests that brain development, and as a result, also executive function development, may be adaptive and should not vary between ethnicities and races.

**Assessments of motivation and executive functions.** When assessing the executive functions and academic motivation of students, various methods are available. For the assessment of executive function, Powell (2004) recommends a thorough multidisciplinary approach including a psychological evaluation, consisting of cognitive, academic, and social-emotional batteries; a neuropsychological evaluation, consisting of batteries such as attention and concentration, learning, and memory; a psychiatric evaluation made up of interviews with the student and family and a record review; a neurological evaluation completed by a pediatric neurologist, and neuroimaging studies consisting of EEGs, MRIs. Such a comprehensive evaluation may not be feasible in school settings for every student suspected of
difficulties with motivational and executive functions. School psychologists and other school staff members, however, may employ several methods of assessment. These assessments may include indirect informal techniques (interviews, record reviews, and process-oriented approaches), indirect formal methods (rating scales), direct informal methods (observations and process-oriented approach), and direct formal methods (norm-referenced assessments) (McCloskey, Perkins, & Divner, 2009).

**Rating scales and questionnaires.** Rating scales are available for completion by teachers, parents, and students. One of the most widely used assessment of executive functioning is the Behavior Rating Inventory of Executive Function (BRIEF), which assesses the areas of Inhibit, Shift, Emotional Control, Initiate, Working Memory, Plan/Organize, Organization of Materials, and Monitor (Gioia, Isquith, Guy, & Kenworthy, 2000). The Metacognitive Awareness System (MetaCOG) is another rating scale to be completed by parents, students, and teachers (Meltzer, Roditi, Pollica, Steinberg, & Krishnan 2004). The MetaCOG consists of three student rating scales, Motivation and Effort Survey, Strategy Use Survey, and Metacognitive Awareness Questionnaire. It also consists of two teacher questionnaires, Teacher Perceptions of Student Effort and the Teacher Information Questionnaire. Finally, it includes the Parents Perceptions of Student Effort. The MetaCOG may be particularly useful for students with suspected executive functions difficulties when there is a motivational concern, because effort and motivation are specifically assessed by many of the scales.

Other indirect formal assessments are also available for use to assess executive functions and motivation. The Motivated Strategies for Learning
Questionnaire (MSLQ) rate motivation and self-regulated learning using a Likert scale with eighty-one items (Pintrich et al., 1991). The MSLQ consists of fifteen subscales including, but not limited to, intrinsic and extrinsic goal orientation, organization, time and study environment, effort regulation, and control over learning beliefs (Pintrich et al., 1991).

Several other rating scales measure solely motivation. The Reiss School Motivation Profile (RSMP) is a questionnaire developed to assess motivation for school related tasks (Reiss, 2009). The RSMP consists of thirteen subscales; one subscale, the Order Scale, specifically assesses organization, preparation, and attention to detail (Reiss, 2009). The Order Scale may be very useful with students who lack motivation due to specific executive function weaknesses. The School Motivation and Learning Strategies Inventory (SMALSI), another rating scale, identifies students’ levels of motivation, from the perspective of the student (Stroud & Reynolds, 2007). The Student Motivation and Engagement Scale is another rating scale that assesses students’ levels of motivation on academic tasks (Martin, 2001).

The Academic Competence Evaluation Scales (ACES) measures motivation, among many other academic constructs, from the teacher’s perspective (DiPerna & Elliott, 2000). Motivation is considered an “enabler” which affects students’ progress and achievement (DiPerna & Elliott). Hardré et al. (2008) also developed the Perceptions of Student Motivation questionnaire, which assesses both the levels of student motivation and the possible causes of student motivation from the teachers’ perspective.
Motivation and Executive Functioning

Although rating scales and questionnaires provide valuable information and are relatively easy to administer, they do come with disadvantages (Hoff, Doepke, & Landau, 2002). Rating scales reflect the rater’s personal perception of the individual’s behavior; many factors may affect the rater’s views of the student’s behavior, such as mood and his or her personal feelings about the student (Hoff, Doepke, & Landau, 2002). Results of rating scales may also be dependent on the rater’s perception of what it is that constitutes disruptive and dysfunctional behavior, as well as what it is that constitutes appropriate behavior. Additionally, extra caution should be used when using a scale for executive functioning, such as the Behavior Rating Inventory of Executive Function (BRIEF), because the rating scale does not measure aspects of executive function, but instead assesses what the teacher or parent observe to be strengths and weaknesses of behavior related to executive functioning (Maricle, Johnson, & Avirett, 2010).

Additionally, interobserver reliability is typically low with rating scales (Reid & Maag, 1994; Sattler, 2002). Interobserver reliability, also called interobserver agreement, is the degree to which two or more observers report the same behavior about an individual (Sattler, 2002). Many things affect interobserver reliability. For example, raters may interpret the scale values differently. Many rating scales use frequency scales of Never, Sometimes, Often, and Always; these scales may be defined differently by different observers, resulting in a range of scores (Reid & Maag, 1994). Furthermore, the halo effect may cause raters to rate all behaviors as present when only one type of behavior is observed (Reid & Maag, 2002). Last, some raters tend to provide scores that are in the middle range, rather than report extreme
behaviors or the lack of behaviors (e.g. they may report *Often* and *Sometimes* rather than *Never* and *Always*) (Sattler, 2002). Therefore, rating scales take little time to administer and are convenient; however, there are some limitations to their use.

**Standardized assessments for executive functions.** Direct methods of executive function assessment include norm-referenced assessments. Two of the more common assessments of executive functions, typically considered neuropsychological assessments, are the Developmental Neuropsychological Assessment (NEPSY) and the Delis-Kaplan Executive Function System (D-KEFS) (Korkman, Kirk, & Kemp, 1998; Delis, Kaplan, & Kramer, 2001). Specific subscales of these assessments measure a variety of executive function processes such as cognitive flexibility, selective attention, working memory, planning, organization, goal setting, self-monitoring, and prioritizing (Korkman, Kirk, & Kemp, 1998; Delis, Kaplan, & Kramer, 2001).

The Wisconsin Card Sorting Test (WCST) is also a widely used assessment for executive functions (Heaton, 1981). The WCST is a sorting task that allows for the assessment of organization, planning, shifting, and directing behavior toward a goal (Heaton, 1981). The Rey Complex Figure Test is also a widely used assessment that can be used for the analysis of executive functions (Myers & Myers, 1995). In addition to visual-perceptual and fine-motor skills, the Rey Complex Figure also assesses planning, monitoring, working memory, and goal orientation (Myers & Myers, 1995). McCloskey et al. (2009) report that these norm-referenced assessments specifically assess self-regulation functions in the symbol system arena (distinct codes, such as language, mathematics, and computers). McCloskey cautions against
using these norm-referenced tests as the sole measure of executive functions because they do not fully assess all areas of executive function.

**Process-oriented approach for executive functions.** Indirect and direct informal methods of assessment of executive functions include a process-oriented approach to assessment. This approach to assessment is not concerned with the ultimate score of the assessments, but focuses on how the student attained that score (McCloskey et al., 2009). This approach involves careful assessment observations and the re-administration of specific tasks after formal assessment in order to determine executive function strengths and weaknesses (McCloskey et al., 2009). The Survey of Problem-Solving and Educational Skills (SPES) is an example of a criterion-referenced measure used to identify the processes and strategies used by students as they complete visual problem-solving and academic tasks (Meltzer, 1986). Process-oriented approaches may be beneficial when motivation is a concern, because it allows for careful observation and monitoring of a student’s effort during assessment.

As described previously, multiple assessment methods and tools are available for use to measure both motivation and executive functions. As with all assessments, limitations are present for many of these tools. A comprehensive assessment of motivation and executive functions would include incorporating many of the types of assessment described previously, including direct formal and informal methods, as well as indirect formal and informal methods.
**Interventions for Motivation and Executive Functioning Weaknesses.**

After executive function difficulties are determined yet the student and presents as lacking motivation, interventions to address both executive functions and motivation problems can be implemented. Research on interventions to address these areas is vast and interventions range from large school-wide interventions to individualized interventions. Because of the close relationship between motivation and self-regulatory skills described above, the emphasis of the interventions should focus on the motivational aspect of self-regulation.

The Talent Development Middle School program is a school-wide intervention geared toward urban youth (Balfanz, Herzog, & Mac Iver). The program involves instructional support in core academic areas and the development of small learning communities to increase student engagement. Teacher training and support is also included. The High Performance Learning Communities Project (Project HiPlace/The Project) was developed to include small learning communities (Felner et al., 2007). Project HiPlace also embeds social support into the program to assist with student motivation and engagement. Additionally, Guthraie, McRae, and Klauda created the Concept-Oriented Reading Instruction (CORI) program, which attempts to improve elementary students’ motivation for reading by teaching specific strategies and emphasizing intrinsic motivation, self-efficacy, perceived autonomy, social interaction, and goal setting (Guthrie, McRae, & Klauda, 2007).

The Self-Regulation Empowerment Program (SREP) is a school-based program geared toward increasing students’ motivation by teaching strategies of self-regulation (Clearly & Zimmerman, 2004). Clearly & Zimmerman (2004) state that
“the Self-Regulation Empowerment Program (SREP) seeks to empower middle-school students by cultivating positive self-motivational beliefs, increasing their knowledge base of learning strategies, and helping them apply these strategies to academic-related tasks in a self-regulated manner” (p. 539). This program is divided into two components: assessment and development of the self-regulated learner, both of which involve a self-regulated learning coach (SRC). The assessment phase consists of record reviews, structured interviews, and semi-structured interviews to determine not only those academic strategies that students use, but also how they use them. The second component of the SREP involves increasing students’ awareness of their strategic errors, improving their study and learning strategies, and teaching students how to apply these skills to new academic goals. The SREP has been noted to be an effective program to improve academic and self-regulatory functioning in an urban high-school setting (Clearly, Platten, & Nelson, 2008).

Individualized interventions targeting motivation and self-regulation are also successful in addressing these issues. Cognitive-behavioral therapy may be a useful intervention because it creates awareness of self-regulating functions and teaches students how to control their behaviors, emotions, and perceptions (McCloskey, Perkins, & Van Divner, 2009). Marlowe (2000) described a cognitive-behavioral approach to teaching skills for metacognition. This model includes a problem-solving approach to metacognition and involves teaching students to think routinely and systematically (Marlowe, 2000). In this model, students are taught verbally to meditate, plan, make decisions, prioritize, and use time estimation strategies (Marlowe, 2000).
Wolters (2003) describes a variety of specific strategies that may be taught to and used by students to assist in the regulation of their motivation. These strategies include:

- **Self-Consequating:** The student provides self-consequences for his or her own behavior by using rewards and punishments.
- **Goal-Oriented Self-Talk:** The student subvocalizes his or her goals while completing academic tasks.
- **Interest Enhancement:** The student modifies academic work and gears it towards his or her own interests and desires.
- **Environmental Structuring:** The student controls his or her environment, for example, reducing distractions in order to increase on-task behavior.
- **Efficacy Management:** This includes proximal goal setting (breaking large tasks into smaller, more feasible steps), defensive pessimism (student anxiety which helps increase preparation), and efficacy self-talk (using positive, subvocal statements while performing academic tasks).
- **Emotional Regulation:** The student’s control of his or her emotions in order to assist with the completion of academic assignments.

Overall, a variety of school-wide and individual interventions may be implemented to assist with motivation and the self-regulation component of executive function. Many of these interventions explicitly teach self-regulation strategies in hopes that motivation, self-regulation, and academic performance will be improved.
Prototype Theory

The present study examined academic motivation and executive function skills on prototypical students, based on teachers’ perceptions. Teachers identified these students, based on their perceptions of what constitutes low academic motivation. Use of a prototype approach was used in this study because teachers identified students based on their definition of motivation and on the characteristics that they believe encompass an unmotivated learner.

A prototype is a “generic representation of the common attributes of the category taken as a whole” (Hampton, 1995, p. 686). Prototype theory states that prototypes are assessed by similarity to a specific concept in order to evaluate whether or not the prototype belongs to the same category as the concept (Hampton, 1995). Essentially, when one hears a word, cognitive representations are made (Rosch, 1975). According to Tversky, an assessment of similarity is then conducted through feature matching and it is determined whether or not common features are present between two objects (1977).

Prototypes are often associated with objects; however, they may also refer to definitions and characteristics such as in the current study. In rating “unmotivated students,” teachers must first define motivation and then evaluate those students who belong in the category of “unmotivated student.” They must also determine those students who most closely fit into this specific category. The use of prototype theory will be implemented in the current study to gain knowledge of teacher perspective and to collect data regarding multiple students from various age and grade levels.
Summary of Literature Review

Lack of motivation and executive function difficulties are common struggles faced by many middle and high school students. This is particularly significant for students of color, specifically African-American and Hispanic students, because they often perform much lower academically than their Caucasian and Asian-American peers. These students may mistakenly be labeled as unmotivated when, instead, they encounter challenges with the self-regulation component of executive functions.

Academic motivation is a complex issue that can be affected by confidence, values, stress, available support, beliefs about one’s ability, and environmental factors. Goals are also an important aspect of motivation, because goal development and goal attainment, and thus academic achievement, are greatly affected by one’s level of motivation. Executive function skills also contribute greatly to academic success. Executive function processes are responsible for directing the cognitive functions that are needed to manage purposeful and goal-directed behavior. Executive function processes include initiation, working memory, organization, planning, and self-regulation.

Both motivation and executive functions have a great impact on academic achievement. These two functions are interrelated through the concept of self-regulation. Self-regulation is a key component of executive function skills; motivation is required when one engages in self-regulation. The use of self-regulation strategies is often associated with a higher level of motivation. Therefore, when students are taught and coached to use self-regulation strategies effectively, their motivational levels may increase. Students may not be lacking in effort, perseverance,
and motivation when their academic achievement is less than optimal; instead, they may have deficits in their executive function skills, specifically in the component of self-regulation.

Assessments of motivation and executive functions skills vary. Rating scales from the teacher and the student perspective are most often used to assess motivation. Rating scales, standardized assessments, and a process-oriented approach to assessments are used to test executive functions. Interventions implemented when a deficit in executive function and a lack of academic motivation are found, may range from school-wide reform programs to individually based therapy. The current study uses a prototype approach in examining academic motivation and executive functions skills based on teacher perspective.

**Research Questions and Hypotheses**

Is there a significant relationship between academic motivation and executive function skills based on teachers’ prototypical ratings of academically unmotivated students? Are executive function skills and motivation significantly different in students across grades, based on teacher perception?

Given the interrelationship between academic motivation and self-regulation, it is hypothesized that there is a significant relationship between executive function skills and academic motivation. It is also hypothesized that due to the decline in academic engagement during adolescence, middle school and high school teachers will perceive higher levels of executive dysfunction and lower levels of academic motivation than elementary teachers.
Chapter 3

Methods

Source of Data

The source for data was an archived data file at an urban charter school. The data file contained rating scales completed by teachers employed by this charter school. Teachers completed rating scales as part of educational planning purposes during several faculty meetings during the summer of 2011. A total of sixty-five teachers from K through 12 completed these rating scales; they were representative of the lower school, which consists of kindergarten through fourth grades ($n = 25$); the middle school, which consists of fifth grade through eighth grades ($n = 13$); and the upper school, which consists of ninth through twelfth grades ($n = 27$). One teacher’s rating scales were not used due to incomplete answers on the BRIEF. Additionally, three of the BRIEF ratings were considered "elevated" on the negativity scale; one was rated as "highly elevated" on the negativity scale, and one was rated as "questionable" on the inconsistency scale. All five of these scales were used in the final sample.

Approximately 88.6% of the teachers were of Caucasian descent, 4.3% of African-American descent, 4.3% of Hispanic descent, and 2.9% of Asian-American descent. Gender was disproportionate, with 20% of teachers employed by this school identifying as male and 80% identifying as female. These teachers ranged in the variety of subjects they taught as well as grade levels, because the school ranges in grade from kindergarten through twelfth grade.
One thousand two hundred and five students were enrolled in this charter school at the time of the study. Students are chosen by lottery for admittance and all students within the city limits may enter the lottery. Approximately 76% of students are Hispanic; 15% of students are African-American; 2% are Asian; 2% are Caucasian, and 5% are multiracial. Forty-eight percent of the students are from a two-parent home and fifty-two percent are from a single-parent home. Seventy-one percent of student population is considered to be economically disadvantaged and these students qualify for free or reduced-priced lunch.

Demographic information from the teachers was not collected; demographic information regarding the prototypical students was limited to gender, age, and grade. The final sample of sixty-five prototypical students ranged in age from 5 to 18 (\(M = 12.18, SD = 3.869\)) and ranged in grade from kindergarten to twelfth grade (\(M = 6.49, SD = 3.804\)). Ninety-one percent were male and nine percent were female. The majority of participants were in the fifth grade \((n = 8)\), ninth grade \((n = 8)\), and eleventh grade \((n = 8)\). The lowest number of students was in the sixth grade \((n = 1)\). Table 1 displays descriptive information of these prototypical students.
Table 1

Basic Demographic Characteristics of Prototypical Students

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<td>7.7</td>
</tr>
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<td>8</td>
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</tr>
<tr>
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<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>4.6</td>
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<td>12.3</td>
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<tr>
<td>12</td>
<td>4</td>
<td>6.2</td>
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<table>
<thead>
<tr>
<th>Age</th>
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<th>%</th>
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</thead>
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<td>3</td>
<td>4.6</td>
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Note. Table continues on following page.
Motivation and Executive Functioning

<table>
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<th>n</th>
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<td>6</td>
<td>9.2</td>
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<tr>
<td>17</td>
<td>6</td>
<td>9.2</td>
</tr>
<tr>
<td>18</td>
<td>5</td>
<td>7.7</td>
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</tbody>
</table>

Measures

Two rating scales were used in this study. One of the measures was the Behavior Rating Inventory of Executive Function (BRIEF), which assesses executive functioning. The second measure was the Academic Competency Evaluation Scales (ACES), which was used as a measure of academic motivation.

Behavior Rating Inventory of Executive Function. The BRIEF is administered as a measure of executive functioning; parents and teachers evaluate school-age children and adolescents from five to eighteen years of age on their perceptions of each student’s executive function skills (Gioia, Isquith, Guy, & Kentworth, 2000). These parent and teacher ratings aid the professional in identifying behaviors related to executive functions both in the school and in the home settings (Gioia et al., 2000). The BRIEF questionnaire contains eighty-six questions that are rated the frequency of the behaviors (Gioia, et al., 2000). Teachers and parents rate
the frequency of the behaviors based on three ratings, Never (N), Sometimes (S), and Often (O) (Gioia et al., 2000). Teachers and parents are able to complete the BRIEF in approximately ten to fifteen minutes (Gioia et al., 2000). Raw scores are then converted into T scores and percentiles (Gioia et al., 2000). T scores have a mean of 50 and a standard deviation of 10; T scores of 65 and above are interpreted as clinically significant (Gioia et al., 2000). The BRIEF also assesses whether or not the rater answers similar questions inconsistently on the Inconsistency Scale and whether or not the rater answers questions in an extremely negative way on the Negativity Scale (Gioia et al., 2000).

The BRIEF assesses several areas of executive functioning including: Inhibit, Shift, Emotional Control, Initiate, Working Memory, Plan/Organize, Organization of Materials, and Monitor (Gioia et al., 2000). The Inhibit, Shift, and Emotional Control scales combine to form the Behavioral Regulation Index (BRI); the Initiate, Working Memory, Plan/Organize, Organization of Materials, and Monitor scales combine to form the Metacognition Index (MI) (Gioia et al., 2000). Additionally, all scales combine to form the Global Executive Composite (GEC) (Gioia et al., 2000).

The following is a list of the areas of executive functioning that are assessed by the BRIEF as well the descriptions for these areas as defined by Gioia, Isquith, Guy, and Kentworthy (2000).

1. Inhibit: assesses inhibitory control (i.e., the ability to inhibit, resist, or not act on an impulse) and the ability to stop one’s own behavior at the appropriate time.
2. Shift: assesses the ability to move freely from one situation, activity, or aspect of a problem to another as the circumstances demand.

3. Emotional Control: addresses the manifestation of executive functions within the emotional realm and assesses a child’s ability to modulate emotional responses.

4. Initiate: contains items relating to beginning a task or activity, as well as independently generating ideas, responses, or problem-solving strategies.

5. Working Memory: measures the capacity to hold information in mind for the purpose of completing a task.

6. Plan/Organize: measures the child’s ability to manage current and future-oriented task demands.

7. Organization of Materials: measures orderliness of work, play, and storage spaces (e.g., such as desks, lockers, backpacks, and bedrooms).

8. Monitor: assesses work-checking habits (i.e., whether or not a child assesses his or her own performance during or shortly after finishing a task to ensure appropriate attainment of a goal).

The BRIEF was standardized on a total of 720 children for the Teacher Forms. The normative sample consisted of suburban (59%), urban (26.5%), and rural (14.5%) (Baron, 2000). White, African American, Hispanic, Asian/Pacific Islander, and Native American/Eskimo ethnicities are represented in the normative sample (Baron, 2000). The psychometric properties of reliability of the BRIEF Teacher Form include test-retest reliability ranging from .83-.92, inter-rater agreement of .32, and internal consistency ranging from .80-.98 (Baron, 2000).
Academic Competence Evaluation Scales. The ACES assesses academic competence, which includes both academic skills and academic enablers, in students ranging from kindergarten to twelfth grade (DiPerna & Elliot, 2000). DiPerna and Elliot (2000) define academic competence as “a multidimensional construct composed of the skills, attitudes, and behaviors of a learner that contribute to academic success in the classroom” (p. 1). Academic skills are “the basic and complex skills that are a central part of academic curricula in schools” and academic enablers are “attitudes and behaviors that allow a student to benefit from classroom instruction” (DiPerna & Elliot, 2000, p. 4).

The ACES assesses academic skills and academic enablers from the teacher and student perspective (DiPerna & Elliot, 2000). The academic skills included on the ACES include reading/language arts, mathematics, and critical thinking. The ACES manual (DiPerna & Elliot, 2000) provide the following descriptions for the academic enablers that are rated.

1. Interpersonal Skills: Interpersonal skills include cooperative learning behaviors necessary interact with other people.

2. Motivation: Motivation reflects a student’s approach, persistence, and level of interest regarding academic subjects and has been shown to correlate with achievement test scores, ratings of academic performance, and grades.

3. Engagement: Engagement refers to behaviors that reflect attentive, active participation in classroom instruction, and is a central component in virtually all theories of learning.
4. Study Skills: Study skills are behaviors or strategies that facilitate the processing of new material and generally have been viewed as a prerequisite for learning.

A total of seventy-three questions on the teacher form are rated on a five point rating scale (DiPerna & Elliot, 2000). The five ratings for the academic scales include proficiency ratings, which include: far below grade level, below grade level, grade level, above grade level, and far above grade level (DiPerna & Elliot, 2000). The five ratings for the academic enablers involve frequency ratings, which include: never, seldom, sometimes, often, and almost always (DiPerna & Elliot, 2000). Raw scores are converted into decile scores (DiPerna & Elliot, 2000). For the purpose of this study, only the motivation scale was used. The motivation scale consists of a total of eleven questions.

The ACES was standardized on a total of 1000 students, ranging in grade from kindergarten to twelfth grade (DiPerna & Elliot, 2000). All major races and ethnicities, socioeconomic status, and regions of the United States were represented in the sample (DiPerna & Elliot, 2000). The psychometric properties of reliability of the ACES include test-retest reliability ranging from .88-.97, inter-rater agreement of .31-.65, and internal consistency ranging from .94-.99 (DiPerna & Elliot, 2000).

Procedures

This study was conducted using archival data consisting of BRIEF scale ratings and ACES. Forms were completed during three separate faculty meetings at a charter school within a large, urban city and were completed for educational purposes. Each teacher completed a BRIEF form and the Motivation section of the
ACES form, based on their perceptions of the least motivated student whom they taught during the previous school year. The following instructions were given as part of this project:

I would like you to think about the least motivated student whom you taught this past year. With this student in mind, I would like you to complete two forms. First, please make sure that the numbers on the top right section of the first page on both forms match. For the first form, the BRIEF, please complete the label that is located on the top portion of the second page, specifying only the gender, grade, and age of the student at the time that you taught him or her. Do not write the student’s name or the birth date of the student on the form. Also, do not write your name on the form. For the second form, the ACES, please complete the information that is located on the front page, again specifying only the gender, grade, and age of the students from the time when you taught them. Again, please do not write the student’s name, birth date, or your name. You will be completing only the section entitled “Motivation” on this form, which is in the middle page and is highlighted. Please make sure you complete all items. Again, you are completing these two forms for the least motivated student whom you taught this past year.

After the forms were completed, the school psychologist scored the protocols for use in educational planning. Protocols were then stored in the school psychologist’s office. The data were then procured from storage and entered into SPSS/Mac computer software. Statistical analyses were performed using this computer software.
Analyses

Descriptive statistics were used to analyze the data collected. The design of this study was correlational in nature; this was used to measure and describe a relationship between executive functioning and motivation. To examine these relationships, multiple bivariate correlations were computed using Pearson correlation. The ordinal variable grade was transformed into a categorical variable with three levels of grade. The lower school consisted of kindergarten through fourth grades, middle school consisted of fifth through eighth grades, and upper school consisted of ninth through twelfth grades. The categorical variable grade was then used as the factor with twelve separate one-way analyses of variance (ANOVA) with motivation and executive functions serving as separate dependent variables. Alpha was set at \( p < .05 \) and Bonferroni was utilized for multiple comparisons. Because the ACES has higher scores indicating better performance, and the BRIEF has higher scores indicating worsening performance, the ACES scores were reversed scored so that higher scores were indicative of worsening motivation. These reversed scores were utilized in the Pearson correlations. The original scores were utilized in the analyses of variance.
Chapter 4

Results

Descriptive Statistics

Reported in Table 2 are descriptive statistics for the sample for the BRIEF and ACES variables. All mean index scores and composite scores for the BRIEF and the ACES fell within the clinically significant ranges. The highest mean on the BRIEF was found for the Global Executive Composite index and the lowest mean was found for the Inhibit scale; however, all areas of the BRIEF were elevated. The standard deviations were relatively comparable across most of the variables.

Table 2

Means and Standard Deviations Across Sample for Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhibit</td>
<td>75.31</td>
<td>16.67</td>
<td>46-124</td>
</tr>
<tr>
<td>Shift</td>
<td>78.15</td>
<td>21.00</td>
<td>45-137</td>
</tr>
<tr>
<td>Emotional Control</td>
<td>76.62</td>
<td>19.40</td>
<td>43-127</td>
</tr>
<tr>
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<td>79.00</td>
<td>18.69</td>
<td>48-132</td>
</tr>
<tr>
<td>Initiate</td>
<td>77.68</td>
<td>11.29</td>
<td>57-101</td>
</tr>
<tr>
<td>Working Memory</td>
<td>78.22</td>
<td>12.60</td>
<td>50-111</td>
</tr>
<tr>
<td>Plan/Organize</td>
<td>77.60</td>
<td>10.11</td>
<td>49-100</td>
</tr>
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<td>Organization of Materials</td>
<td>78.83</td>
<td>20.66</td>
<td>44-123</td>
</tr>
<tr>
<td>Monitor</td>
<td>77.69</td>
<td>12.17</td>
<td>54-116</td>
</tr>
<tr>
<td>Metacognition Index</td>
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<td>14.72</td>
<td>56-133</td>
</tr>
<tr>
<td>Global Executive Composite</td>
<td>83.35</td>
<td>14.38</td>
<td>57-122</td>
</tr>
<tr>
<td>ACES</td>
<td>1.43</td>
<td>1.03</td>
<td>1-7</td>
</tr>
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</table>
Relationship between Executive Function and Motivation Rating Scales

Pearson correlations were performed to determine whether or not there were significant relationships between the various indices of the BRIEF and the ACES Motivation scale. Additionally, as expected, many of the indices of the BRIEF correlated highly with one another as depicted in Table 3.

Results indicate that motivation, as measured by the ACES, was significantly related with the Shift scale of the BRIEF \( (r = -0.217, p < 0.05, \text{one-tailed}) \). The shared variance was 4.71% constituting a small effect. Motivation was also significantly correlated with the Emotional Control scale of the BRIEF \( (r = -0.232, p < 0.05, \text{one-tailed}) \). This relationship also created a small effect with 5.38% of shared variance. Additionally, motivation was significantly correlated with the Behavioral Regulation Index (BRI) scale of the BRIEF \( (r = -0.228, p < 0.05, \text{one-tailed}) \). The shared variance was 5.12%, also resulting in a small effect. There was also a significant relationship found between the Metacognition (MI) and the ACES \( (r = -0.225, p < 0.05, \text{one-tailed}) \). This constituted a small effect with 5.06% of shared variance. Last, there was a significant correlation between motivation and the Global Executive Composite scale of the BRIEF \( (r = -0.228, p < 0.05, \text{one-tailed}) \). There was 5.12% of shared variance, creating a small effect.
**Motivation and Executive Functioning**

Table 3  
*Correlations between BRIEF scales and ACES*

<table>
<thead>
<tr>
<th></th>
<th>Inhibit</th>
<th>Shift</th>
<th>Emotional Control</th>
<th>BRI</th>
<th>Initiate</th>
<th>Working Memory</th>
<th>Plan/Organize</th>
<th>Organization of Materials</th>
<th>Monitor</th>
<th>MI</th>
<th>GEC</th>
<th>ACES</th>
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<td>Initiate</td>
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<td>-</td>
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<td>.540**</td>
<td>.301**</td>
<td>.455**</td>
<td>.690**</td>
<td>.710**</td>
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<td>-</td>
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</tr>
<tr>
<td>Organization of Materials</td>
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<td>.291**</td>
<td>.141</td>
<td>.228*</td>
<td>.579**</td>
<td>.582**</td>
<td>.659**</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
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<tr>
<td>Monitor</td>
<td>.712**</td>
<td>.663**</td>
<td>.646**</td>
<td>.737**</td>
<td>.539**</td>
<td>.647**</td>
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<td>MI</td>
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<td>.574**</td>
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<td>.464**</td>
<td>.723**</td>
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<tr>
<td>GEC</td>
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<td>.842**</td>
<td>.727**</td>
<td>.846**</td>
<td>.619**</td>
<td>.720**</td>
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<td>.560**</td>
<td>.832**</td>
<td>.673**</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ACES</td>
<td>-.172</td>
<td>-.217*</td>
<td>-.232*</td>
<td>-.228*</td>
<td>-.036</td>
<td>-.098</td>
<td>-.006</td>
<td>-.145</td>
<td>-.077</td>
<td>-.225*</td>
<td>-.228*</td>
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</tbody>
</table>

* * significant at the 0.05 level
** ** significant at the 0.01 level
Motivation and Executive Functioning

Table 4 reports the means and standard deviations of the BRIEF and ACES variables in the sample across the three levels of grade. Heightened means were found for all areas of the BRIEF as well as for the Motivation scale of the ACES. In many areas, the means increased as the grade level increased. For example, the mean for the lower school was 67.59 for the Shift scale, i.e. the mean for the middle school was 76.38 for the Shift scale, and the mean for the upper school was 78.15 for the Shift scale. Similarly, the mean for Organization of Material was 68.05 for lower school, 73.19 for middle school, and 90.96 for upper school.

Table 4

*Means and Standard Deviations for Entire Sample across Grade Level*

<table>
<thead>
<tr>
<th>Variable</th>
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<th>SD</th>
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<td></td>
<td></td>
</tr>
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<td>22</td>
<td>71.09</td>
<td>16.07</td>
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<td>Middle</td>
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<td>77.31</td>
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</tr>
<tr>
<td>Upper</td>
<td>27</td>
<td>77.56</td>
<td>18.75</td>
</tr>
<tr>
<td><strong>Shift</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower</td>
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<td>67.59</td>
<td>12.08</td>
</tr>
<tr>
<td>Middle</td>
<td>16</td>
<td>76.38</td>
<td>16.78</td>
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<tr>
<td>Upper</td>
<td>27</td>
<td>87.81</td>
<td>24.74</td>
</tr>
<tr>
<td><strong>Emotional Control</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower</td>
<td>22</td>
<td>69.23</td>
<td>15.07</td>
</tr>
<tr>
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<td>82.69</td>
<td>14.54</td>
</tr>
<tr>
<td>Upper</td>
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<td>79.04</td>
<td>23.36</td>
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*Note.* Table continues on following page.
## Table of Executive Functioning Variables

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<th>SD</th>
</tr>
</thead>
<tbody>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower</td>
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*Note.* Table continues on following page.
### Variable | $N$ | $M$ | $SD$
---|---|---|---
Metacognition Index
Lower | 22 | 73.95 | 8.41
Middle | 16 | 80.63 | 14.05
Upper | 27 | 92.52 | 14.00
Global Executive Composite
Lower | 22 | 74.45 | 10.08
Middle | 16 | 82.44 | 10.80
Upper | 27 | 91.15 | 15.12
ACES
Lower | 22 | 1.23 | .528
Middle | 16 | 1.63 | 1.54
Upper | 27 | 1.48 | .975

**The Effect of Grade Level on Motivation**

A one-way analysis of variance was utilized to assess significant differences between the three levels of grade on the ACES Motivation scale. Levene’s test of equality of error variances was not significant for the variables; therefore, a one-way analysis of variance approach to the data was appropriate. The ANOVA revealed that the interaction of motivation and grade level was not significant, $F(2, 62) = .74$, $p = .481$, $\eta^2 = .023$. Thus, teacher-rated motivation did not significantly differ whether the student was in lower school, middle school, or upper school. However, all means for motivation were significantly low, i.e., between the tenth and twentieth percentiles.
The mean for the lower school was 1.23, the mean for the middle school was 1.63, and the mean for the upper school was 1.48.

**The Effect of Grade Level on Executive Function Skills**

**Grade group across inhibit.** Results revealed no significant differences between grade and the Inhibit scale of the BRIEF, $F(2, 62) = 1.066, p = .350, \eta^2 = .033$. Thus, the Inhibit scale did not significantly differ, dependent on grade level. All means were considered clinically significant for this index; the mean for the lower school was 71.09; the mean for the middle school was 77.31, and the mean for the upper school was 77.56.

**Grade group across shift.** There was a significant effect of grade group on the Shift scale of the BRIEF, $F(2, 62) = 6.715, p = .002, \eta^2 = .178$. Power was acceptable (power = .903). This relationship constituted a mild effect with approximately 18% of the variance accounted for by grade group. Bonferroni post hoc analyses revealed that upper school students ($M = 87.81, SD = 24.74$) scored significantly higher than lower school students ($M = 67.59, SD = 12.08$). Figure 1 depicts the mean for the Shift scale across the three grade levels.
Figure 1. Mean for the Shift scale of the BRIEF across grade level.

**Grade group across emotional control.** There were no significant differences between grade and the Emotional Control scale of the BRIEF, $F(2, 62) = 2.731, p = .073, \eta^2 = .081$. Therefore, the Inhibit scale did not significantly differ for students in lower school, middle school, or upper school, although a trend was noted in the appropriate direction. All means were considered clinically significant for this index; the mean for students within the lower school was 69.23; the mean for students within the middle school was 82.69, and the mean for students within the upper school was 79.04.

**Grade group across the behavioral regulation index.** The effect of grade on the Behavior Regulation Index of the BRIEF was also not significant, $F(2, 62) = 2.78, p = .070, \eta^2 = .082$. The Behavioral Regulation Index did not significantly differ dependent on grade level although a trend was noted in the correct direction. Again,
means for all grade levels were elevated for this index, indicating that teachers reported that all students had difficulty with behavioral regulation. The mean for the lower school was 71.59; the mean for the middle school was 82.06, and the mean for the upper school was 83.22.

**Grade group across initiate.** There was a significant effect of grade group on the Initiate scale of the BRIEF, $F(2, 62) = 12.569, p < .001, \eta^2 = .288$. Power was acceptable (power = .995). This relationship constituted a small effect with approximately 29% of the variance accounted for by grade group. Bonferroni post hoc analyses indicated that teachers reported upper school students ($M = 83.89, SD = 11.82$) as having significantly more difficulty initiating tasks than lower school students ($M = 69.55, SD = 7.08$). Thus, grade level had a significant effect on Initiate. Figure 2 depicts the means for the Initiate scale across grade levels.

![Figure 2. Mean for the Initiate scale of the BRIEF across grade level.](image-url)
Grade group across working memory. There was also a significant effect of grade level on the Working Memory scale of the BRIEF, $F(2, 62) = 6.18$, $p = .004$, $\eta^2 = .166$. Power was acceptable (power = .887). This relationship constituted a mild effect, with approximately 17% of the variance accounted for by grade level.

Bonferroni post hoc analyses revealed that upper school students ($M = 84.22$, $SD = 14.01$) scored significantly higher than lower school students ($M = 73.27$, $SD = 7.61$) on the Working Memory scale of the BRIEF. Figure 3 depicts the means for the Working Memory scale across the three grade levels.

Figure 3. Mean for the Working Memory scale of the BRIEF across grade level.

Grade group across plan/organize. There was a significant effect of grade group on the Plan/Organize scale of the BRIEF, $F(2, 62) = 13.048$, $p < .001$, $\eta^2 = .296$. Power was acceptable (power = .996). This relationship constituted a mild effect, with approximately 30% of the variance accounted for by grade group.
Bonferroni post hoc analyses indicated that teachers rated upper school students \((M = 84.04, SD = 8.73)\) as being significantly higher than both lower school students \((M = 72.36, SD = 8.00)\) and middle school students \((M = 73.94, SD = 9.21)\) on the Plan/Organize scale of the BRIEF. Thus grade level had a significant effect on Plan/Organize across all three grade levels. Figure 4 depicts the means for the Plan/Organize scale across grade levels.

\[
\begin{align*}
\text{Lower} & \quad \text{Middle} \\
& \quad \text{Upper} \\
\end{align*}
\]

\[
\begin{align*}
60 & \quad 65 & \quad 70 & \quad 75 & \quad 80 & \quad 85 & \quad 90 & \quad 95 \\
\end{align*}
\]

Figure 4. Mean for the Plan/Organize scale of the BRIEF across grade level.

**Grade group across organization of materials.** There was also a significant effect of grade on the Organization of Materials scale of the BRIEF, \(F(2, 62) = 10.768, p < .001, \eta^2 = .258\). Power was acceptable (power = .987). This relationship constituted a mild effect, with approximately 26% of the variance accounted for by grade group. Bonferroni post hoc analyses indicate that upper school students \((M = 90.96, SD = 21.67)\) scored significantly higher than both lower school students \((M = 68.05, SD = 11.59)\) and middle school students \((M = 73.19, SD = 18.70)\). Thus, the
grade level had a significant effect on the Organization of Materials scale across all three levels of grade. Figure 5 depicts the means for the Organization of Materials scale across grade levels.

![Graph](image)

*Figure 5. Mean for the Organization of Materials scale of the BRIEF across grade level.*

**Grade group across monitor.** There was also a significant effect of grade level on the Monitor scale of the BRIEF, $F(2, 62) = 5.311, p = .007, \eta^2 = .146$. Power was acceptable (power = .82). This relationship constituted a mild effect, with approximately 15% of the variance accounted for by grade group. Bonferroni post hoc analyses indicate that teachers rated upper school students ($M = 82.81, SD = 12.83$) as having significantly greater difficulty than lower school students ($M = 72.23, SD = 11.20$) in monitoring. Thus, the grade level had a significant effect on the Monitor scale of the BRIEF. Figure 6 depicts the mean for the Monitor scale across grade level.
Grade group across the metacognition index. There was a significant effect of grade level on the Metacognition Index of the BRIEF, $F(2, 62) = 14.075, p < .001$, $\eta^2 = .312$. Power was acceptable (power = .998). This relationship constituted a mild effect, with approximately 31% of the variance accounted for by grade group. Bonferroni post hoc analyses indicate that upper school students ($M = 92.52, SD = 13.99$) scored significantly higher than both lower school students ($M = 73.95, SD = 8.42$) and middle school students ($M = 80.63, SD = 14.05$). Thus, the grade level had a significant effect on the Metacognition scale of the BRIEF. Please see Figure 7.
Figure 7. Mean for the Metacognition index of the BRIEF across grade level.

**Grade group across the global executive composite.** Last, there was a significant effect of grade level on the Global Executive Composite (GEC) scale of the BRIEF, $F(2, 62) = 10.711, p < .001, \eta^2 = .257$. Power was acceptable (power $= .987$). This relationship constituted a mild effect, with approximately 26% of the variance accounted for by grade group. Bonferroni post hoc analyses indicate that lower school students ($M = 74.45, SD = 10.08$) scored significantly lower than upper school students ($M = 91.15, SD = 15.12$) on this scale. Thus, the grade level had a significant effect on the Global Executive Composite scale of the BRIEF. Figure 8 depicts the means for the Global Executive Composite scale across grade levels.
Motivation and Executive Functioning

Summary of Results

Overall, results of the analyses indicated that teachers’ ratings of the executive function capacities of unmotivated students were consistent with the hypothesis that academic motivation and executive function skills are significantly correlated. Specifically, significant correlations were found in the areas of Shift, Emotional Control, the Behavioral Regulation Index, the Metacognition Index, and the Global Executive Composite scales of the BRIEF. Results of the analyses also revealed that upper school teachers perceive higher levels of executive dysfunction than elementary and middle school teachers in the areas of Plan/Organize, Organization of Materials, and on the Metacognition Index. Upper school teachers also reported more significant executive function difficulties than lower school teachers on the Shift, Initiate, Working Memory, Monitor, and Global Executive Composite scales of the BRIEF.

Figure 8. Mean for the Global Executive Composite scale of the BRIEF across grade level.
Chapter 5

Discussion

Discussion of Findings

The purpose of the study was to examine the relationship between motivation and executive function skills in a population of urban youth, from the perspective of teachers. The study also sought to determine the relationship between differing grade levels and the changes in teacher perspective both of motivation and of executive functions of students.

Results indicated that two areas of the BRIEF, the Shift and Emotional Control scales, both of which are related to the regulation of behavior, were significantly correlated with motivation. In addition, the broader areas of executive function as assessed by the BRIEF’s Behavior Regulation Index, the Metacognition Index, and the Global Executive Composite, were significantly related to motivation.

Gioia, Isquith, Guy, and Kenworthy (2000) define the Shift scale as measuring “the ability to move freely from one situation, activity, or aspect of a problem to another as the circumstances demand” (p. 18). McCloskey, Perkins, & Van Divner (2009) view shifting as being flexible in thoughts, perceptions, emotions, and actions. This may relate to academic motivation because students who are able to shift easily and maintain flexibility may be better able to regulate their behavior and adapt to the classroom demands and instruction. These students may move from one topic or assignment to the next with ease, thereby increasing their work completion and their teachers’ perceptions of their levels of understanding of academic material. Teachers may view students who shift quickly and easily as being more highly motivated.
Motivation and Executive Functioning

because they are more adaptable and can persevere through academic material quickly. Conversely, students who have difficulty with shifting may tend to be more rigid and as a result, take longer to complete and comprehend academic tasks. These students may be viewed as lacking academic motivation and determination.

Emotional control refers to the ability of students to maintain control over their feelings and emotions. Students who are able to control their emotions effectively may exhibit fewer behavioral concerns in the classroom and therefore exhibit greater focus and motivation in regard to their schoolwork. Teachers may view students who exhibit competent emotional control as highly motivated because these students appear to be focused on academic material and less prone to behavioral problems such as altercations and outbursts. Students who lack emotional control may be viewed as having difficulty with academic motivation because their interfering behaviors prohibit their full access to the curriculum and to assignment completion.

Teachers did not associate the executive function areas of Initiate, Working Memory, Plan/Organize, Organization of Materials, or Monitor as assessed by the BRIEF with academic motivation. All of these areas are related to metacognition, a concept which Gioia et al. (2000) define as the “ability to cognitively self-manage tasks” (p. 20). Metacognition involves the self-regulatory concepts required for tasks. Teachers may not have related these concepts to academic motivation, because they are not as easily observed in the classroom. Classroom teachers are more easily attuned to students’ overall externalizing behaviors, such as the shifting and controlling of emotions, areas which are associated with behavior regulation. Teachers may tend to overlook difficulties with metacognition because these are not
Motivation and Executive Functioning

as prominent in the classroom to the same degree as are overt behaviors. Therefore teachers do not view students as unmotivated when they lack the use of specific metacognitive strategies required in completing academic tasks.

Interestingly, teachers did not associate these individual areas of metacognition with academic motivation; however, academic motivation was significantly correlated with all index scores of the BRIEF, including the Behavioral Regulation Index, the Metacognition Index, and the Global Executive Composite. This indicates that although teachers do not associate academic motivation with individual areas of metacognition, as a whole, they do see a significant relationship. Therefore, when a student exhibits a relative amount of difficulty in many areas of metacognition, teachers view this combination of concerns also as a lack of motivation. This may also be the reason why the Initiate scale, which falls under the Behavioral Regulation Index, was not significantly correlated with academic motivation from the teachers’ perspectives. Teachers do not view problems with initiation, in and of itself as a factor in motivation; however, in combination with problems related to shifting and emotional control, it is associated with a lack of motivation.

Overall, the results of the Pearson correlations indicate that teachers view executive functions as a whole as being related to academic motivation. However, teachers consider the areas related to behavioral regulation more closely related to and as a part of academic motivation than metacognitive concepts. Again, this may be due to the easily observable characteristics related to behavioral regulation than to metacognition. This finding supports the first hypothesis in that executive functions
are significantly related to academic motivation. Therefore, teachers perceive students as lacking motivation when they lack self-regulation, particularly in the area of behavioral regulation.

Results of the current study also indicated that teachers of ninth through twelfth graders report a much higher degree of executive dysfunction than do teachers of kindergarten through eighth grade students. Notably, upper school teachers reported more concerns for unmotivated students in the areas of Shift, Initiate, Working Memory, and on the Global Executive Composite as measured by the BRIEF than do lower school teachers (grades kindergarten through four). These findings provide partial support for the second hypothesis that teachers of upper school students reported more executive function concerns than did teachers of lower school students; however, middle school teachers did not report more executive dysfunction in these areas than lower school teachers.

The large difference in teacher perception of shifting between lower and upper school students may be due to the increase in academic rigor and the demand for independence at the high school level. Lower school students may not exhibit as much difficulty in the area of shifting, because they are not required to be as flexible and adaptive as are upper school students. Lower school teachers typically provide much greater guidance and direction as students shift from one task to another. Additionally, routines are much more readily adopted in the lower grades than in the upper grades, giving younger students more support when changing tasks and assignments. Conversely, upper school students are required to shift easily and quickly from one task to another independently, typically with little guidance from
adults. Additionally, the academic demands are greater, causing a greater need for independent shifting and cognitive and behavioral flexibility. Therefore, students who lack overall academic motivation may exhibit greater difficulty in shifting during high school years than during the lower school years.

Similarly, upper school teachers reported much more executive dysfunction in the area of initiating than did lower school teachers for students who lack academic motivation. Again, this finding may be a result of the changing demands from elementary school to high school as well as the high school requirement for autonomy. Students at the upper school level are expected to demonstrate ambition and leadership skills in regard to academic tasks. They are required to exhibit these skills independently and initiate class work and homework assignments quickly and with ease. Lower school students may encounter fewer challenges in the area of initiation, because their teachers heavily support them as they begin new academic tasks and instruction. Lower school teachers often model tasks and provide step-by-step directions for students; this form of support decreases by the high school age as teachers strive to instill independence in students. For this reason, upper school teachers report more difficulty in initiation for their unmotivated students than do lower school teachers.

Additionally, lower school teachers reported fewer challenges in the area of working memory for unmotivated students than upper school teachers. As with shifting and initiation, this may also be due to the focus on autonomy in the upper grades. In elementary school, directions and instructions are typically broken down into chunks for students. Students are also provided with frequent redirection and
repetition. Because of the stress on independence during the teenage years, these accommodations are not readily provided, leading to difficulty with holding large amounts of instruction and directions in mind in order to complete academic tasks. As a result, upper school teachers report more significant concerns in the area of working memory for students who lack motivation than lower school teachers.

Because of the significant differences in executive dysfunction in the areas of shifting, initiating, and working memory between lower school students and upper school students, it is also reported that concerns in overall executive dysfunction also vary by grade level. Upper school teachers reported a more significant concern in regard to overall executive dysfunction than do lower school teachers, as measured by the General Executive Composite on the BRIEF.

Findings from the current study also indicate that upper school teachers reported that unmotivated students had more difficulty in the areas of Plan/Organize, Organization of Materials, Monitor, and on the Metacognition Index (MI) of the BRIEF, than both lower school teachers (grades kindergarten through four) and middle school teachers (grades five through eight). These findings also provide partial support for the second hypothesis because teachers of upper school students reported more executive function concerns than teachers of lower school students. All of the reported areas are related specifically to metacognition, which is essentially thinking about the self-regulatory concepts required for tasks. Upper school teachers reported that unmotivated students may not finish long-term projects, may have disorganized backpacks, and may not check their work for mistakes. Although middle school and lower school teachers may view these areas as concerns, upper school teachers report
a much more significant level of dysfunction among high school students who exhibit low academic motivation. Essentially, upper school teachers report that high school students lack the self-regulation skills needed to fulfill academic obligations. Again, this finding may be attributed to the increased number of independent assignments and projects required at the high school level. Adolescents are expected to be self-sufficient in regard to the organization, planning, and monitoring that is needed for academic requirements. Lower school and middle school students are often given support and guidance with these metacognitive areas and are not required to manage assignments and projects on their own. When these students reach the high school level and independence is mandatory, they may encounter challenges with the self-management of their academic requirements, leading to a decrease in academic motivation and achievement.

In the current study, significant differences were not found in the domains of Motivation, as assessed on the ACES among the three grade levels. Additionally, significant discrepancies were not found on the Inhibit scale, the Emotional Control scale, or on the Behavioral Regulation Index of the BRIEF between the varying grade levels. All of the lower school, middle school, and upper school teachers reported a high level of dysfunction in these areas for their unmotivated students. Certainly motivation was a large area of concern for teachers of all grades because they completed the rating scales on students who were considered “the least motivated” in their class.

Students who have difficulty with inhibition may exhibit impulsive behavior, act without thinking, and be hyperactive. Teachers of all grade levels report
significant concern with inhibition for unmotivated students. Students who lack motivation may display difficulty in inhibiting their behavior at all ages because they lack focus in school and their unpredictable behaviors significantly interfere with their progress. Similarly, lower, middle, and upper school teachers also report that unmotivated students have significant difficulty with emotional control across age and grade level. Students who have difficulty with emotional control are often characterized by frequent mood changes and outbursts, temper tantrums, and may become easily angered or upset. Students who lack emotional modulation also have difficulty with motivation because their behaviors interfere with their ability to attend to and persevere through academic tasks. Results indicate that difficulties with behavioral regulation for unmotivated students neither increase nor decrease with age. Behavioral regulation challenges are present at all grade levels for students who lack motivation.

Overall results indicate a relationship between academic motivation and executive function skills. Results also reveal that as students age and progress through the grades, greater difficulty with executive function is reported by their teachers, particularly in relation to metacognition and self-regulatory skills. These findings are consistent with previous research that associates motivation with self-regulation (Bartels & Magun-Jackson, 2009; Clearly & Zimmerman, 2008; Garner, 2009; Ning & Downing, 2010; Zimmerman & Schunk, 2008). Students who effectively and consistently utilize self-regulation strategies such as planning, organizing, monitoring, and behavioral regulation tend to also exhibit a higher level of academic motivation. Students who lack these self-regulatory skills, which are related to
executive function skills, tend to exhibit less task engagement and motivation for academic achievement.

Results are also consistent with previous research that associates motivation, specifically intrinsic motivation, with goal theory (Ames, 1992; Dweck & Leggett, 1988) Heyman & Dweck, 1992; McGregor & Elliot, 2002). When students develop academic goals for themselves, particularly goals that are made to improve their skills and expand their knowledge, they often exhibit a higher level of natural interest or intrinsic motivation. Goal setting can be related to the self-regulatory skills of planning, organizing, and monitoring, all of which fall under the umbrella of executive functions. Therefore, when students exhibit self-regulation and create attainable academic goals for the purpose of enhancing their knowledge, they also typically display a high level of academic motivation. The results of the current study support this preceding literature.

Implications of Findings

Results of the current study stress the critical need for self-regulation interventions for students prior to the high school level. Interventions in self-regulation are needed to improve students’ readiness for independent and rigorous academic requirements, which are often introduced to students during their high school years. Students are frequently required to initiate academic tasks independently, plan through the tasks, organize their materials and time, and monitor through these complex assignments and projects. Simultaneously, students must regulate their behavior and mood, to ensure that they are focused and to assist with the prevention of distractions. In order to help them better prepare for autonomy in
regard to class requirements, interventions that specifically teach metacognitive and self-regulation strategies will be beneficial. The implementation of such programs will increase the use of self-regulation strategies, improving students’ beliefs in themselves, and thus, their academic motivation and achievement.

The relationship between academic motivation and executive function skills may also foster change in teachers’ perceptions of motivation. Teachers may better understand underachievement in students and be better prepared to address how it may relate to academic motivation and executive function skills. Additionally, teachers’ knowledge about the onset of executive function and motivational deficits, particularly during the high school level, will aid with the implementation of interventions in these areas at appropriate age levels. Teachers may not view students as solely “unmotivated” or “lazy” and instead examine more deeply the complex combination of self-regulatory and executive function deficits of students, which may initially appear as only motivational. As a result, teachers may have more positive perceptions of their students, simultaneously increasing students’ perceptions of their own strengths and ability. Additionally, school psychologists may wish to incorporate executive function assessments into their comprehensive psycho-educational evaluations, particularly when they receive referrals for motivation or poor work completion.

The implications of this study are particularly salient for students of color, who continuously lag behind their Caucasian and Asian-American classmates in academic achievement. Teachers often report that students of color are academically unmotivated; however, motivation is a complex concept involving multiple factors
and may be mistaken for self-regulation deficits. As a result, it is even more crucial that self-regulation and metacognitive strategies be taught in the urban school districts, which house the greatest number of students of color, to assist in improving overall academic achievement.

**Limitations**

Limitations are present in the current study. The study used a sample of teachers from one charter school within a large, urban city, with a predominately Hispanic student population; therefore, teachers’ prototypical ratings of students may not generalize to rural or suburban districts with students representing other socio-economic and racial populations. Additionally, in using this sample of convenience and through the use of archival data, demographic information was not collected for the teachers who completed the rating scales; this may have implications in regard to age, race, ethnicity, years of experience, and gender of the raters because this information is unknown.

Additionally, rating scales were used in this study and are considered subjective. Rating scales often reflect the raters’ perceived notions and personal biases about students. Also, interobserver reliability is typically low for rating scales and factors such as the halo affect may also attenuate the outcomes. In the current study, personal biases and the halo effect may have particular significance, because teachers rated the “least motivated student” in their classes; the teachers may have held negative perceptions about the particular students and rated the students as lacking both motivation and executive function skills as a result of these overall negative perceptions. Last, the Brief Inventory Rating of Executive Function (BRIEF)
was administered as a measure of executive function; however, it does not measure executive function specifically but measures what teachers perceive to be strengths and weaknesses of behavior related to executive function.

There are also statistical limitations to the current study. Although results indicate a relationship between academic motivation and executive function skills, causal implications cannot be made. Additionally, differences in executive dysfunction were reported between the grade levels; however, causal relationships are unknown. Therefore, unknown mediating or moderating factors may pose as alternative explanations for the relationships presented in the study. Last, effect sizes were mild for statistical analyses, suggesting small magnitudes of effect.

**Future Directions**

The current study established a relationship between academic motivation and executive function skills in urban youth. Results also revealed that executive function deficits increased with grade level within this specific population, from the perspective of teachers. Future research should extend to other populations, such as rural and suburban school districts with students of varying racial, ethnic, and socioeconomic communities. It will be beneficial for future research to measure also motivation and executive function from the perspective of the students and parents. Additionally, it may be beneficial to use other measurements of executive function, such as norm-referenced assessments, rather than through subjective rating scales to gain a more valid estimate of executive function ability. Last, future research could focus on executive function and self-regulation interventions to determine whether or not academic motivation increased after successful implementation.
References


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## Appendix

### Data Collection Worksheet

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**Gender:**

### BRIEF Scores

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### Negativity Scale

Acceptable  Elevated  High Elevated

### Inconsistency Scale

Acceptable  Questionable  Inconsistent

### ACES Motivation Score

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