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High School Adolescents' Academic Engagement, Behaviors, And Achievement: Associations With Intrapersonal Factors And Academic Support Systems

Elizabeth Suzanne Robtoy
Wayne State University,

HIGH SCHOOL ADOLESCENTS' ACADEMIC ENGAGEMENT, BEHAVIORS, AND ACHIEVEMENT: ASSOCIATIONS WITH INTRAPERSONAL FACTORS AND ACADEMIC SUPPORT SYSTEMS

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ELIZABETH SUZANNE ROBTOY

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DEDICATION

This project is dedicated to my family – my parents, Terry and Karen Robtoy, and my brother, Philip. I truly would not be where I am today without your continuous support and encouragement. Our close-knit family has taught me the true meaning of unconditional love, and I am so thankful to have been blessed with the most wonderful parents. You have never let me forget how proud you are of me while I've pursed one of the most monumental goals in my life. Thank you for always being there for me. I love you all more than I could ever describe.

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CHAPTER 1 INTRODUCTION

As K-12 students progress through school, academic achievement becomes increasingly important, with high school being the culmination of this importance as students begin thinking about graduating and post-graduation plans. However, for many students, making the transition from middle school to high school can be difficult given the many challenges that accompany this transition. The transition involves adapting to higher academic expectations and coping with a new environment and social setting (Chase, Hilliard, Geldhof, Warren, & Lerner, 2014). Additionally, students are typically attending high school along with many more students than in middle school, which can be overwhelming for some students (Chase et al., 2014). Although the transition to high school can be challenging for even the most prepared and well-adjusted students, many of these students can overcome these challenges and navigate their new environments appropriately. For others, however, this transition is much more difficult, and these students are likely to experience poor academic outcomes, leading to fewer opportunities for success, which ultimately leads to less investment in society (Chase et al., 2014) and negative outcomes or behaviors such as unemployment, substance use, and delinquency (Chavez, Oetting, & Swaim, 1994; Henry, Knight, & Thornberry, 2012).

It is important to understand, then, what best predicts higher academic achievement. Research has fortuitously pointed to the idea that behaviors and cognitions are flexible and impressionable in regards to individual variables and interactions with the contextual environment (Kelso, 2000). Thus, a further exploration into these variables and interactions are needed in order to discover ways to influence behaviors and cognitions to ultimately lead to more positive outcomes for students.

Through the lens of Bronfenbrenner's ecological systems theory (1977; 1979; 2005), several key variables are identified in the current study. In this model, there are five environmental systems within which an individual develops. The purpose of the present study was to examine factors within the inner two layers, or systems, for their roles in predicting academic achievement. At the core of Bronfenbrenner's theory is the individual, and one level out from the individual is known as the microsystem, containing the institutions and groups that most immediately and directly impact an individual's development, including family, school, religious institutions, neighborhoods, and peers (Bronfenbrenner, 1977; 1979; 2005). Beyond the microsystem is the mesosystem, which involves the relationships between each of the aforementioned institutions and groups and how these groups interact with one another to influence the individual. The innermost ring of Bronfenbrenner's model was of focus in the current study due to the likelihood that factors at those levels will be most impactful in the development of academic outcomes.

Not only is academic achievement a critical developmental outcome, but students' behaviors that facilitate academic success (labeled "academic behaviors" in this study) and academic engagement are also key outcomes that are part of academic success. First, success in high school requires students to be organized, plan ahead, set goals for themselves, and sustain attention in and out of the classroom, among other things. These academic behaviors are critical as students move through elementary to high school. Therefore, another purpose of the current study was to investigate to what degree are academic behaviors such as attending school regularly, arriving to class on time, attending to instruction, using a planner, referring to online grade book, completing and turning in classwork and homework, and studying for quizzes and

tests predictive of better academic achievement, and which are more strongly associated with achievement than others.

Of the aforementioned academic behaviors, attendance has been widely researched in regard to its relationship to academic achievement (Gottfried, 2009; 2011; Parke & Kanyongo, 2012; Smith & Cook, 2012; Morrissey, Hutchison, & Winsler, 2014; Mahoney, 2015). Particularly in today's society, and especially in high school, making up missed assignments and assessments is extremely difficult given the increasingly fast-paced and time-sensitive classrooms (Mahoney, 2015). According to Altman and Meis (2012), about 15% of students in grades Kindergarten through 12th grade are absent from school for a total of about one month per school year, which has serious cumulative effects. Students who miss class fail to benefit from teacher-led lessons, peer interactions, and other activities that lead to learning (Morrissey et al., 2014), and absences during the elementary school years are an important predictor of future academic success (Gottfried, 2009; 2011). Schools are also becoming increasingly concerned about being late to class, and research has started to show a negative link between being late, or tardy, to class, and academic grades (Morrissey et al., 2014).

Another academic behavior is studying and study habits. Study habits such as spending time on homework and studying for tests have been positively correlated with both school grades and academic performance on standardized tests (On & Watkins, 1994; Freeman & Morss, 1993; Rogaten, Moneta, & Spada, 2013). Lastly, although research has indicated that doing homework can improve academic achievement (Cooper, Robinson, & Patall, 2006), literature examining the frequency of completed homework and turned in homework was not found. Additionally, no studies on other academic behaviors of interest in this study (using a planner/organization tool to keep track of assignments and referencing online grade book) were found in the current

literature. They are suspected to be important, yet the strength of their association with other variables of interest is unknown. Thus, they were included in this study.

Academic engagement is the third outcome variable of interest in this study. School engagement and academic motivation have been increasingly researched in regards to their association with academics, particularly because approximately half of high school dropouts reported that their main reason for dropping out of school was not feeling emotionally connected to school (Bridgeland, DiIulio, & Morison, 2006). Academic engagement has been conceptualized as a multi-dimensional construct that includes the emotional, behavioral, and cognitive processes in which students engage with their schooling (Christenson, Reschly, & Wylie, 2012). Larson and Rusk (2011) discovered that emotional engagement is associated with intrinsic motivation and the desire to succeed in school. Additionally, sense of school belonging, often associated with the emotional dimension of engagement, has been shown to predict students' academic achievement in addition to their academic motivation (Goodenow & Grady, 1993). Behavioral engagement involves students' observable participation in the classroom and other learning environments (Lowe & Dotterer, 2013). Researchers have found that characteristics of behavioral engagement, such as attendance, problem behavior, and indicators of effort, all predict academic achievement (Balfanz & Byrnes, 2006; Finn & Rock, 1997).

The cognitive dimension of academic engagement incudes students' perceptions and beliefs related to themselves, school, teachers, and other students (Lowe & Dotterer, 2013). In this respect, cognitive engagement involves students' sense of self-efficacy and school self-esteem. As such, students who are more confident in their ability to do well in school demonstrate higher academic achievement (Lowe & Dotterer, 2013), likely because they are more invested in the learning process. Additionally, these cognitive components of school

engagement, operationalized in a study as school participation and school expectations, significantly predicted school grades among African American adolescents (Sirin & Rogers-Sirin, 2005). In another study, global academic engagement levels combining all three constructs were assessed by items examining behavior and feeling toward school, classroom conduct, seriousness about school, time expenditure, self-expectations, self-evaluations (Chen, 2005), and were found to be associated with parent, teacher, and peer support, as well as academic achievement.

Some studies have found that the link between academic engagement and academic achievement depended on how achievement was measured, as well as the racial/ethnic and socioeconomic makeup of the study participants (Shernoff & Schmidt, 2008). Additionally, although numerous studies have shown a positive association between academic engagement and academic achievement, others have shown declines in academic engagement as students become older (Seidman, Allen, Aber, Mitchell, & Feinman, 1994; Wang & Eccles, 2012). Given this knowledge, it is important to further investigate the link between academic engagement and academic achievement to determine specifically how engaged students are in the high school setting in regards to how this relates to their level of academic achievement.

Academic engagement, academic behaviors, and academic achievement are all important school outcomes. Although the latter two are correlated with academic achievement, they are also likely important outcomes to study in and of themselves. Specifically, not all students who display successful academic behaviors always achieve high academically. And the opposite holds true as well. Students who do achieve high grades are not necessarily always displaying a high frequency of successful academic behaviors, and they may not be readily engaged with school. Thus, in the current study these three factors were conceptualized as independent

outcomes of interest in analyses, in order to better understand to what degree a carefully selected group of other intrapersonal and environmental factors, delineated next, predict each of them.

Additionally, because it is equally important to understand the complete nature of predictors of academic achievement as an ultimate outcome of interest, in some analyses, academic behavior and academic engagement were also considered to be potential predictors of achievement. What follows is a discussion of strategically selected intrapersonal factors suspected to be highly predictive of academic engagement, behaviors, and achievement — executive functioning and future orientation. Other important factors within the microsystem level of Bronfenbrenner's ecological systems theory (1977; 1979; 2005) include environmental support variables in key immediate life contexts that may help explain variance in academic engagement, behaviors, and achievement, including parent, teacher, and peer academic support.

Intrapersonal Factors

Executive functioning. At the core of ecological systems theory is the individual, and it makes sense to begin here in investigating intrapersonal factors that may be most closely related to an individuals' ability to succeed academically. Extensive research has shown that neuropsychological deficits, particularly those linked with executive functioning skills (Hinshaw, Carte, Fan, Jassy, & Owens, 2007), are related to academic outcomes. Executive functioning is generally conceptualized as abilities related to higher order cognitive processes such as judgment, decision making, and coordinating cognitive operations and social conduct (Latzman, Elkovitch, Young, and Clark, 2010). It is commonly used in reference to planning and sequencing complex behaviors while simultaneously paying attention to multiple stimuli, understanding basic situations, resisting distractions, inhibiting inappropriate responses, and sustaining behavior or attention for longer periods of time (Latzman et al., 2010).

Executive functioning skills have been shown to be associated with mathematics (Bull, Espy, & Wiebe, 2008; Bull & Scerif, 2001; Espy, McDiarmid, Cwik, Stalets, Hamby, & Senn, 2004; Geary, 1993), reading (Helland & Asbjornsen, 2000; Swanson, 1999), and nonverbal reasoning performance (Van der Sluis, de Jong, & Van der Leij, 2004). Specifically, conceptual flexibility is related to reading, arithmetic, and nonverbal reasoning in preschool children (Espy et al., 2004). Additionally, reading and mathematics achievement has been linked to the executive functioning construct of inhibitory control (Blair & Razza, 2007). The shifting construct of executive functioning was found to be associated with nonverbal reasoning and reading in elementary school-aged children (Van der Sluis, et al., 2004). Working memory capacity, associated with the executive functioning construct of monitoring, is also predictive of reading and mathematics achievement (Sesma, Mahone, Levine, Eason, & Cutting, 2009). Specifically, these researchers found that while working memory was not associated with word recognition skills, it was linked with reading comprehension, the ultimatel goal in reading achievement. Bull et al. (2008) found that visual short-term and working memory were also predictive of mathematics achievement in 7-year-old students. Still others have shown that when compared to a control group, students with poorer reading and mathematics achievement also showed lower working memory abilities (De Jong, 1998; Swanson, 1999; Swanson & Ashbaker, 2000). As shown, the construct of executive functioning as a whole has been shown to be associated with measures of academic achievement such as reading and math performance. However, executive functioning skills have not been well studied for their potential links to academic behaviors and academic engagement, nor have they been readily investigated in the high school environment when the importance of utilizing these skills increases.

Future orientation. Another important intrapersonal variable that is related to academic achievement is a student's future goals and plans, and the importance and value he or she places on learning and education. The construct of future orientation involves evaluating how important different aspects of the future are, as well as evaluating the degree to which one thinks about and has a clear vision for the future (Nurmi, Seginer, & Poole, 1990; Kirby, 1990). Thus, thoughts about the future likely influence one's immediate decisions and behaviors (Trempata, & Malmberg, 2002). Adolescents become more future-oriented as they age, and as mentioned, the pressure to begin thinking about the future intensifies in high school (Steinberg, Cauffman, Woolard, Graham, & Banich, 2009). In fact, by the end of high school, the two most important ideas that students are thinking about is future employment and future education (Nurmi, 1991). Although not vast in nature, research has shown that being future oriented is associated with high motivation and positive perceptions of future education and employment (Nurmi, 1991; Seginer, 2009). Additionally, educational and job-related aspirations have been shown to be associated with adult educational attainments (Beal & Crockett, 2010; McLeod & Fettes, 2007). Thinking about the future and possessing goals related to the future does not come automatically for all students, however. And as shown above, there is some literature investigating the link between future orientation and academic achievement, but links to academic behavior and engagement need to be explored.

Environmental Factors

Parent support. The critical role of parental support has been identified in some research emphasizing the importance of academic achievement (Fan & Chen, 2001; Hill & Chao, 2009; Seginer, 2006). Academic support provided by both parents and teachers is associated with higher academic performance in adolescents (Gottfried, Fleming, & Gottfried, 1994; Wentzel,

1998; Chen, 2008; Muller, 1998). Parents can support their children's education in a variety of ways, ranging from providing stimulating materials such as books and computers, to monitoring and assisting with homework completion (Chen, 2005). According to Hill and Taylor (2004), parents can also demonstrate support by communicating with their children's teachers, helping their children with educational activities at home, attending their children's school events, and attending parent-teacher conferences. Hill and Tyson (2010) performed a meta-analysis that revealed that communicating the importance of education to children, setting expectations for school, discussing learning strategies with children, and participating in school-related activities such as parent teacher conferences showed a positive association with achievement.

Chen (2005) also found that higher levels of parent support lead to better behaved children who were more motivated to learn and dedicated more time to school and education, and many other studies have also found a positive association between parent support and academic achievement (Keith, Keith, Quirk, Sperduto, Santillo, & Killings, 1998; Sui-Chu & Willms, 1996; Lam & Ducreux, 2013). In their study examining parent support from a parent perspective, Lam and Ducreux (2013) found a significant positive link between communication between parents and their children and academic achievement, e.g., increased communication lead to increased achievement. As shown above, a great deal of research has demonstrated positive correlations between parent support and academic achievement. However, competing findings have also been made. For example, both Balli, Wedman, and Demo (1997) and Hill, Castellino, and Lansford (2004) found that parent involvement did not predict academic achievement. Therefore, although the amount of literature investigating the role of parent support has increased, more research is needed to not only reiterate its association with academic achievement, but also to further unpack the construct to determine which specific parent support

behaviors foster academic engagement, academic behaviors, and academic achievement. Additionally, because most of the existing literature examines parent involvement in the elementary and middle school grades, less is known about the role of parent support in the high school environment. Thus, it is important to increase the amount of research investigating the correlation between parent support and high school students' academic engagement, academic behaviors, and academic achievement.

Teacher support. Many researchers have recognized that while the home is a central source of socialization, school is the primary context for formal learning (Birch & Ladd, 1996; Ma, Shek, Cheung, & Lam, 2000; Wentzel, 1997). Clearly, a large portion of students' days involves interactions with both teachers and peers. Not surprisingly, then, research has shown that how supported students feel by their teachers is positively associated with students' academic engagement, as demonstrated by behaviors such as displaying an interest in learning and possessing motivation to strive for academic success (Wentzel, 1997; Wentzel & Asher, 1995). Goodenow (1993) found teacher support to be positively correlated with middle-school students' motivation to learn. However, this association significantly dropped from 6th to 8th grade, making it clear that an investigation extending the sample into high-school aged students would help to better understand how, and to what degree, teacher support predicts motivation to learn in older adolescents. Ma et al. (2000) found a positive correlation between teacher support and students' prosocial engagement in school. Additionally, Tucker, Zayco, Herman, Reinke, Trujillo, Carraway, Wallack & Ivery (2002) found that teacher involvement was predictive of student engagement. Skinner and Belmont (1993) found that teacher involvement was central to students' classroom experiences in that it predicted students' behavioral and emotional engagement.

In addition to the relation between teacher support and academic engagement, teacher support has also been shown to predict academic achievement. For example, in a study simultaneously examining the role of academic support from parents, teachers, and peers, Chen (2005) found that teacher support showed the strongest correlation to academic achievement. In examining the research, the way in which teacher support is operationalized varies, with some studies conceptualizing it as solely emotional support, while others define teacher support as assisting with homework and providing needed learning materials. Therefore, it is critical to further investigate the role of teacher support in order to understand the critical types of teacher behaviors that are most predictive of academic engagement, academic behaviors, and academic achievement.

Peer support. As Erik Erikson described (1968), the adolescent years are characterized by the quest to develop self-identity and autonomy from parents, leading to higher importance and value placed on the development of peer relationships. As mentioned above, students are with their peers for a large majority of the school day, leading to the likelihood that peers will exert a high degree of influence. As such, many researchers have found that peers affect all areas of a student's life, particularly social and emotional adjustment, educational goals, and day-to-day behavior in school (Fuligni, Eccles, Barber, & Clements, 2001; Berndt, 1999). Additionally, other researchers have found that peers can be a source of support in the way of providing important intellectual information and resources such as notes and strategies, as well as modeling positive learning and academic behaviors (Schunk, 1987; Wentzel, 1993). Similarly, it was found that low-achieving peers who associate and socialize with high-achieving peers showed improved school performance over time (Steinberg et al., 1995).

In looking more specifically at the specific types of behaviors that peers display that influence others' academic achievement, Chen (2005) also found that perceived peer support in the form of behaviors such as assisting friends with homework and encouraging friends to study predicted academic achievement. In this study, however, peer support was the weakest link to academic achievement, falling behind perceived teacher and parent support. Therefore, this area should be further investigated, as the implications could be used to implement interventions within the school environment to promote peer relationships that will lead to higher school performance. Additionally, although some studies have shown a positive link with peer support to academic achievement, a deeper exploration of the particular academic behaviors and degree of academic engagement associated with peer support is needed.

Limitations of Past Research and Purpose of the Current Study

This combination of factors has not been considered for their combined ability to explain greater proportions of variance in academic engagement, behaviors, and achievement, despite the fact that ecologically, there are multiple life contexts that interact to explain academic achievement development, and this selection may provide important information. Specifically, past research has not examined the specific academic behaviors purported to be associated with academic achievement, such as attending school regularly, arriving to class on time, attending to instruction, using a planner, completing and turning in classwork and homework, and studying for quizzes and tests, and how parents, teachers, and peers play a role in influencing the frequency of these types of behaviors.

Additionally, despite the fact that executive functioning skills have been extensively researched as a whole, research examining how the constructs of executive functioning and measures of academic achievement are associated is not nearly as robust (Latzman et al., 2010),

nor has the correlation between executive functioning skills and successful academic behaviors and academic engagement been sufficiently researched. This combination of contextual supports, along with these other variables, has not been explored. Additionally, much of this research has seemed to focus on preschool and elementary-school aged students as opposed to students in high school, which was of focus here because of the critical transition dynamics that occur for that age group. Therefore, the current study investigated the roles of select intrapersonal and microsystem factors in high school adolescents' academic engagement, behavior, and achievement.

Research Questions

Based on the aforementioned information, the research questions of this study are as follows:

(1) To what degree do intrapersonal factors (executive functioning, future orientation) predict high school students' academic engagement, academic behaviors, and academic achievement?

(2) To what degree do environmental factors (parent support, teacher support, peer support) predict high school students' academic engagement, academic behavior, and academic achievement?

(3) Do environmental factors (parent support, teacher support, peer support) help to explain academic achievement above and beyond executive functioning and future orientation? Which of these factors most strongly predicts academic engagement, behaviors, and achievement?

(4) What role do achievement behavior and academic engagement additionally play in predicting achievement?

Significance of Study

It was hypothesized that the intrapersonal factors of executive functioning and future orientation would predict academic engagement, academic behaviors, and academic achievement. Specifically, those students displaying higher executive functioning skills and are more future-oriented would show higher academic engagement, academic behaviors, and academic achievement. Similarly, it was also hypothesized that the environmental factors (parent support, teacher support, peer support) would predict academic engagement, academic behaviors, and academic achievement. Specifically, students with more support from parents, teachers, and peers would demonstrate higher academic engagement, academic behaviors, and academic achievement. Additionally, it was also hypothesized that parent support, teacher support, and peer support would explain high school student academic engagement, academic behaviors, and academic achievement, above and beyond executive functioning and future orientation. In this sense, it was predicted that interpersonal variables would be more predictive of academic engagement, academic behaviors, and academic achievement than intrapersonal variables. Lastly, it was hypothesized that academic behavior and academic engagement would predict academic achievement. The results of this study will provide an increased understanding of the predictors of academic engagement, academic behaviors, and academic achievement in order to ultimately use these results and the knowledge that accompanies them in order to devise and subsequently implement specific and targeted interventions to increase high school students' academic achievement.

CHAPTER 2 REVIEW OF LITERATURE

Achievement and the subsequent feeling of success are important predictors of life outcomes, with the term achievement manifesting in a variety of ways. For one individual, achievement may mean winning a game against a rival team. For another individual, achievement may mean obtaining a job promotion. And for many, achievement means earning high grades within the school environment. As students progress through school, demonstrating academic achievement becomes increasingly important, with high school being one of the most important times to do so as students begin thinking about graduating and post-graduation plans. However, for many American students, making the transition from middle school to high school can be difficult given the many challenges that accompany this transition. The developmental needs of children change dramatically during adolescence, with high school being a critical period during which adolescents are faced with the developmental task of acquiring and increasing independence (Catsambis, 2001). Thus, making the transition from middle school to high school often involves adapting to higher academic expectations and coping with a new environment and social setting (Chase et al., 2014). Additionally, students are typically attending high school with many more students than they attended with in middle school, which can be overwhelming for some students (Chase et al., 2014). Although the transition to high school can be challenging for even the most prepared and well-adjusted students, many of these students can overcome these challenges and navigate their new environments appropriately. For others, however, this transition is much more difficult, and these students are likely to experience poor academic outcomes, leading to fewer opportunities for success, which ultimately leads to less investment in society (Chase et al., 2014) and negative behaviors as unemployment, substance use, and delinquency (Chavez, Oetting, & Swaim, 1994; Henry, Knight, &

Thornberry, 2012). It is important to understand, then, what best predicts higher academic achievement.

Theoretical Model

In his 1977 article, Urie Bronfenbrenner describes his observation of the fact that most previous research to date examining human behavior and development was conducted in a laboratory setting that involved situations that were unfamiliar and artificial, making it difficult to generalize findings to other settings (Bronfenbrenner, 1977). As a result of this observation, Bronfenbrenner (1977) claimed that the understanding of human development requires going beyond the direct observation of behavior in one setting, to examining multiple systems of interaction not limited to a single setting and taking into consideration all aspects of the environment. Thus, development is considered to occur within multiple, distinct levels of organization, or contexts, as opposed to occurring in isolation (Bronfenbrenner, 1977; 1979; 2005; Bronfenbrenner & Ceci, 1994; Ford & Lerner, 1992). In his 1977 article, Bronfenbrenner also discusses the topic of reciprocity and the fact that ecological experiments must allow to the effect of B on A instead of just the effect of A on B. Thus, each ecological level of organization interacts with the others, and reciprocal interactions occur within each contextual level as well (Bronfenbrenner, 1977; 1979; 2005).

According to Bronfenbrenner (1977; 1979; 2005), children find themselves simultaneously enmeshed in different ecosystems, from the most intimate home ecological system moving outward to the larger school system and the most expansive systems – society and culture. As mentioned, each of these systems inevitably interact with and influence each other and every aspect of the child's life. Specifically, Bronfenbrenner (1977; 1979; 2005) purports that there are multiple layers surrounding the individual: the microsystem (the small,

immediate setting in which an individual lives), the mesosystem (how the different parts of the individual's microsystem interact during a specific developmental period), the exosystem (the other people and places that the individual may not interact with often but that still have a large effect on them), and lastly, the macrosystem (largest and most remote set of people and things to an individual, but may still have great influence of them) (Bronfenbrenner, 1977; 1979; 2005).

The microsystem can be characterized in terms of what the individual "experiences" (Bronfenbrenner, 1977; 1979). An individual's microsystem can include any immediate relationships or organizations with which he or she interacts, such as the immediate family, or the school setting. In drawing on the notion of reciprocity, how these groups or organizations interact with the individual will affect how the individual grows and develops, such that more encouraging and nurturing relationships and places will likely contribute to more adaptive development. Additionally, how the individual reacts to those within the microsystem will affect how this individual is treated in return (Bronfenbrenner, 1977; 1979; 2005). Each child's particular personality traits, such as temperament, which is influenced by unique genetic and biological factors, ultimately have a hand in how the child is treated by others. One of the most significant findings that Bronfenbrenner (1979; 1986) uncovered in his study of ecological systems is that it is possible for siblings who find themselves within the same ecological system to still experience very different environments and thus, lives.

Mesosystems involve the interrelations among settings that the individual actively resides within (Bronfenbrenner, 1977; 1979; 2005). For example, if a child's caregivers take an active role in the child's school, such as going to parent-teacher conferences or watching their child's basketball games, this will likely contribute to the child's overall growth. The exosystem involves contexts in which the individual is not necessarily an active participant

(Bronfenbrenner, 1977; 1979; 2005). The exosystem can include parents' workplaces, extended family members, and the neighborhood in which the individual lives (Bronfenbrenner, 1977; 1979; 2005). For example, if a child's parent is laid off from work, this may have a negative effect on the child if the parent is then unable to pay rent or buy groceries. The converse is also true: if a parent receives a promotion and raise at work, this may have a positive affect on the child because the parent will likely be able to provide for more needs of the child. Lastly, macrosystems involve much broader, contextual variables, such as cultural values, socioeconomic status, governmental issues, the economy, and wars (Bronfenbrenner, 1977; 1979; 2005). Although these variables may not have a direct effect on a child, each may indirectly affect the child by influencing the society in which the child lives and grows.

Academic Achievement

Ecological models have not been extensively used in examining academic achievement and academic behavior, particularly among high school students. Chun and Dickson (2011) sought to understand whether Hispanic students' academic performance was related to the ecological proximal process factors of parent involvement and culturally-responsive teaching. Using both Bronfenbrenner's (1979) and Bourdieu's (1977) concept of cultural capital (non-financial social assets that promote social mobility beyond economic means), Strayhorn (2010) examined the link between school variables (metropolitan statistics and free/reduced lunch) and family variables (parent involvement) on math achievement of black high school students and found that both variables, or systems, predicted higher math achievement. When these models are used, researchers often use them in emphasizing the importance of school and classrooms as contexts (Eccles & Wigfield, 2002; Dotterer & Lowe, 2011). Further, other researchers have focused on schools nested within communities and neighborhoods (Dupere, Leventhal, Crosnoe,

& Dion, 2010). Although the amount of research using ecological models in examining achievement is not vast in nature as stated above, research has fortuitously pointed to the idea that individuals' behaviors and cognitions are flexible and impressionable in regards to individual variables and interactions with the contextual environment (Kelso, 2000). Thus, a further exploration into these variables is needed in order to discover ways to influence these behaviors and cognitions in order to lead to more positive outcomes for students.

Through the lens of Bronfenbrenner's ecological systems theory (1977; 1979; 2005), several key variables are identified in the current study. In this model, there are five environmental systems within which an individual develops. The purpose of the present study is to examine factors within the inner two layers, or systems, for their roles in predicting academic achievement. As discussed, the individual is at the core of Bronfenbrenner's theory, and one level out from the individual is known as the microsystem, containing the institutions and groups that most immediately and directly impact an individual's development, including family, school, religious institutions, neighborhoods, and peers (Bronfenbrenner, 1977; 1979; 2005). The innermost ring of Bronfenbrenner's model is of focus in the current study due to the likelihood that factors at those levels will be most impactful in the development of academic outcomes.

Academic Behavior

Not only is academic achievement a critical developmental outcome, but students' behaviors that facilitate academic success (labeled "academic behaviors" in this study) and academic engagement are also key outcomes that are part of academic success. First, success in high school requires students to be organized, plan ahead, set goals for themselves, and sustain attention in and out of the classroom, among other things. These academic behaviors are critical

as students move through elementary to high school. Therefore, another purpose of the current study is to investigate to what degree are academic behaviors such as attending school regularly, arriving to class on time, attending to instruction, using a planner, referencing online grade book, completing and turning in classwork and homework, and studying for quizzes and tests predictive of better academic achievement.

Of the aforementioned academic behaviors, attendance has likely been widely researched in regards to its relationship to academic achievement (Gottfried, 2009; 2011; Parke & Kanyongo, 2012; Smith & Cook, 2012; Morrissey et al., 2014; Mahoney, 2015). Although it may seem like an obvious concept, many are often surprised to learn that low school attendance can impact a student's educational performance. After all, attending school is critical in order to provide engaging and effective instruction to assist students in ultimately becoming productive individuals (Mahoney, 2015). Particularly in today's society, and especially in high school, making up missed assignments and assessments is extremely difficult given the increasingly fast-paced and time-sensitive classrooms (Mahoney, 2015). According to Altman and Meis (2012), about 15% of students in grades Kindergarten through 12th grade are absent from school for a total of about one month per school year, which has serious cumulative effects. Students who miss class fail to benefit from teacher-led lessons, peer interactions, and other activities that lead to learning (Morrissey et al., 2014), and absences during the elementary school years are an important predictor of future academic success (Gottfried, 2009; 2011).

Schools are also becoming increasingly concerned with the effect of being tardy, particularly in the middle and high school years when students are changing classrooms throughout the day (Morrissey et al., 2014). Therefore, in their study, Morrissey and colleagues (2014) investigated the link between family income, school attendance (including both absences

and tardies), and student's academic achievement over time. It was discovered that poor attendance predicted poorer grades, with absences more associated with grades than tardies (Morrissey et al., 2014).

Another important academic behavior is studying and study habits. Study habits such as spending time on homework and studying for tests have been positively correlated with both school grades and academic performance on standardized tests (On & Watkins, 1994; Freeman & Morss, 1993; Rogaten et al., 2013). Lastly, although research has indicated that doing homework can improve academic achievement (Cooper et al., 2006), literature examining the frequency of completed homework and turned in homework was not found. Additionally, no studies on other academic behaviors of interest in this study (using a planner/organization tool to keep track of assignments and referencing online grade book) were found in the current literature.

Academic Engagement

Academic engagement is the third outcome variable of interest in this study. School engagement and academic motivation have been increasingly researched in regards to their relation to academics, particularly because approximately half of high school dropouts reported that their main reason for dropping out of school as not feeling emotionally connected to school (Bridgeland et al., 2006). Academic engagement involves students' feelings, behaviors, and thoughts related to their educational experience (Lowe & Dotterer, 2013). Thus, academic engagement has been conceptualized as a multi-dimensional construct that includes the emotional, behavioral, and cognitive processes in which students engage with their schooling (Christenson et al., 2012). Larson and Rusk (2011) discovered that emotional engagement is associated with intrinsic motivation and the desire to succeed in school. Additionally, sense of

school belonging, often associated with the emotional dimension of engagement, has been shown to predict students' academic achievement in addition to their academic motivation (Goodenow & Grady, 1993). Behavioral engagement involves students' observable participation in the classroom and other learning environments (Lowe & Dotterer, 2013). Researchers have found that characteristics of behavioral engagement, such as attendance, problem behavior, and indicators of effort, all predict academic achievement (Finn & Rock, 1997; Balfanz & Byrnes, 2006).

The cognitive dimension of academic engagement incudes students' perceptions and beliefs related to themselves, school, teachers, and other students (Lowe & Dotterer, 2013). In this respect, cognitive engagement involves students' self of self-efficacy and school self-esteem. As such, students who are more confident in their ability to do well in school demonstrate higher academic achievement (Lowe & Dotterer, 2013), likely because they are more invested in the learning process. Additionally, these cognitive components of school engagement, operationalized in a study as school participation and school expectations, significantly predicted school grades among African American adolescents (Sirin & Rogers-Sirin, 2005). In another study, global academic engagement levels combining all three constructs were assessed by items examining behavior and feeling toward school, classroom conduct, seriousness about school, time expenditure, self-expectations, self-evaluations (Chen, 2005), and were found to be associated with parent, teacher, and peer support, as well as academic achievement.

Other studies have found that the link between academic engagement and academic achievement depended on how achievement was measured, as well as the racial/ethnic and socioeconomic makeup of the study participants (Shernoff & Schmidt, 2008). Although numerous studies have shown a positive association between academic engagement and

academic achievement, others have shown declines in academic engagement as students become older. Specifically, Seidman et al. (1994) discovered a decline in academic self-efficacy across middle school. Additionally, school compliance, participation in extracurricular activities, school identification, and subjective value of learning decreased among students from 7th to 11th grade (Wang & Eccles, 2012). Given this knowledge, it is important to further investigate the relation between academic engagement and academic achievement to determine specifically how engaged students are in the high school setting in regards to how this relates to their level of academic achievement. Given that behavioral engagement, as a construct, overlaps with the second outcome variable in the current study (academic behavior), "academic engagement" will be conceptualized as students' levels of emotional and cognitive types of engagement.

Academic engagement, academic behaviors, and academic achievement are all important school outcomes. Although the latter two are correlated with academic achievement, they are also likely important outcomes to study in and of themselves. Specifically, not all students who display successful academic behaviors always achieve high academically. And the opposite holds true as well. Students who do achieve high grades are not necessarily always displaying a high frequency of successful academic behaviors, and they may not be readily engaged with school. Thus, in the current study these three factors will be conceptualized as independent outcomes of interest in analyses, in order to better understand to what degree a carefully selected group of other intrapersonal and environmental factors, delineated next, predict each of them. Additionally, because it is equally important to understand the complete nature of predictors of academic achievement, as an ultimate outcome of interest, in some analyses, academic behavior and academic engagement will also be considered potential predictors of achievement.

What follows is a discussion of strategically selected intrapersonal factors suspected to be highly predictive of academic engagement, behaviors, and achievement —executive functioning and future orientation. Other important factors within the microsystem level of Bronfenbrenner's ecological systems theory (1977; 1979; 2005) include environmental support variables in key immediate life contexts that may help explain variance in academic engagement, academic behaviors, and academic achievement, including parent, teacher, and peer academic support.

Intrapersonal Factors

Executive functioning. At the core of ecological systems theory is the individual, and it makes sense to begin here in investigating intrapersonal factors that may be most closely related to individuals' ability to succeed academically. Extensive research has shown that neuropsychological deficits, particularly those linked with executive functioning skills (Hinshaw et al., 2007), are related to academic outcomes. Executive functioning is generally conceptualized as abilities related to higher order cognitive processes such as judgment, decision making, and coordinating cognitive operations and social conduct (Latzman et al., 2010). It is commonly used in reference to planning and sequencing complex behaviors while simultaneously paying attention to multiple stimuli, understanding basic situations, resisting distractions, inhibiting inappropriate responses, and sustaining behavior or attention for longer periods of time (Latzman et al., 2010).

The definition of executive functioning dates back to the work of Behkterev (Barkley, 2011), who in his 1905-1907 book *Fundamentals of Brain Function*, stated that damaged frontal lobes of the brain leads to a decrease in goal-directed behavior, also known as the main function of the prefrontal cortex. However, in wasn't until the 1970s that the term "executive" was first

used by Karl Pribram (Barkley, 2011) in referencing the prefrontal cortex as he described the executive role of the frontal cortex in the following way: "…the frontal cortex is critically involved in implementing executive programmes where these are necessary to maintain brain organization in the face of insufficient redundancy in input processing and in the outcomes of behavior" (p. 301). Soon after this time, the term executive functioning was used to refer to a set of neurological functions. Today, executive functioning has become one of the most common terms in neuropsychological journals and not surprisingly, is being increasingly linked to more and more variables.

Aside from the number of studies on executive functioning increasing, definitions of executive functioning have increased as well, with Eslinger (1996) discovering that leading researchers in neuropsychology would associate as many as 33 different functions with it by the mid-1990s. Although there is no conclusive definition of executive functioning, one of the most popular definitions was provided by Welsh and Pennington (1988), defining executive functioning as:

> The ability to maintain an appropriate problem-solving set for attainment of a future goal. [It includes these components:] a) an intention to inhibit a response or to defer it to a later more appropriate time; b) a strategic plan of action sequence; and c) a mental representation of the task, including the relevant stimulus information encoded in memory and the desired future goal-state (p. 201-202).

In this respect, executive functioning involves the components of intentionality (goal-directedness), inhibition, planning, and working memory (Welsh and Pennington, 1988). In 1996, Roberts and Pennington removed intentionality and planning from the definition. Additional and future researchers have continued to develop their own working definitions of

executive functioning (Lezak, 1995; Butterfield & Albertson, 1995; Borkowski & Burke, 1996; Denckla, 1996; Gioia, Isquith, Guy, & Kenworthy, 2000).

In 1994, Barkley applied the theories of executive functioning specifically to ADHD, and specified in his 1997 book that executive functioning is self-regulation directed toward the future and a set of self-directed actions used by an individual to change his or her behavior in order to attain a goal (Barkley, 2011). Additionally, Barkley claimed that there appear to be at least five of these self-directed, or executive, functions (Barkley, 2011). These functions, of which he claimed are conscious, voluntary, and effortful, included: 1.) Self-inhibition – the capacity to suppress a dominant response, interrupt a current sequence of behavior if it is not effective in reaching a goal, and not allowing anything to interrupt the current actions towards a goal. 2.) Self-directed sensory-motor action – the use of self-directed visual imagery to practice actions privately to oneself. 3.) Self-directed private speech – self-directed instructions and self-questioning to guide problem solving. 4.) Self-directed emotion/motivation – using the three aforementioned functions to replace the initial strong emotion with alternative emotional responses more consistent with the individual's goal. 5.) Self-directed play (reconstitution) – analysis of the environment and one's previous behavior, and synthesis of the aspects of the environment and behavior into new combinations to determine whether these new combinations serve effective in reaching one's goal. Based on these five executive functions, Barkley defined executive functioning as a self-directed set of actions intended to change a future outcome, often in the context of others because the goals of which individuals are trying to reach are typically social in nature (Barkley, 2011).

Many of the previously mentioned researchers, as well as others, have stated that goal-directed actions require various neurocognitive processes including working memory, planning,

problem solving, self-monitoring, interference control, and self-motivation (Barkley, 2011). It is also important to note that the previously mentioned executive functions are not to be thought of as independent from one another; rather, they are likely hierarchically organized in development and interact with one another in order to reach particular goals (Barkley, 2011).

Despite the fact that executive functioning has been extensively researched, researching examining how the constructs of executive functioning and measures of academic achievement are associated is not nearly as robust (Latzman et al., 2010). Additionally, much of this research has seemed to focus on preschool and elementary-school aged students as opposed to students in high school. Executive functioning skills have been shown to relate to mathematics (Bull, Espy, & Wiebe, 2008; Bull & Scerif, 2001; Espy, McDiarmid, Cwik, Stalets, Hamby, & Senn, 2004; Geary, 1993), reading (Helland & Asbjornsen, 2000; Swanson, 1999), and nonverbal reasoning performance (Van der Sluis, et al., 2004). However, in addition to the research examining the relation between executive functioning and academic achievement being thin, findings have also been somewhat ambiguous. For example, some research has demonstrated that conceptual flexibility is related to reading, arithmetic, and nonverbal reasoning in preschool children (Espy et al., 2004). Additionally, the shifting construct of executive functioning was found to be associated with nonverbal reasoning and reading in elementary school-aged children (Van der Sluis, De Jong, & Van der Leij, 2007). However, when general intellectual functioning was included as a covariate, these differences did not remain (Van der Sluis, Van der Leij, & De Jong, 2005).

Working memory capacity has been associated with the executive functioning construct of monitoring, is related to reading and mathematics achievement (Sesma, Mahone, Levine, Eason, & Cutting, 2009). Specifically, these researchers found working memory to be linked

with reading comprehension, but not word recognition skills. Bull et al. (2008) found that visual short-term and working memory were predictive of mathematics achievement in 7-year-old students. Still others have shown that when compared to a control group students with poorer reading and mathematics achievement also showed lower working memory abilities (De Jong, 1998; Swanson, 1999; Swanson & Ashbaker, 2000). Reading and mathematics achievement has also been shown to be related to the executive functioning construct of inhibitory control (Blair & Razza, 2007). When compared to a control group, those students with reading and mathematics disabilities showed a significantly decreased ability to inhibit a dominant or automatic response (Helland & Asbjornsen, 2000). However, in other studies, a sample of 4th- and 5th- grade students did not show a link between mathematics disabilities and inhibitory control, instead showing problems associated with more general executive functioning tasks (Van der Sluis et al., 2004). As shown, the construct of executive functioning as a whole has been shown to be related to measures of academic achievement such as reading and math performance. However, executive functioning skills have not been well studied for their potential links to academic behaviors and academic engagement, nor have they been readily investigated in the high school environment when the importance of utilizing these skills increases.

Future orientation. As mentioned, as students enter high school, the pressure to begin thinking about the future begins to increase. Specifically, students are asked to think about such things as which types of careers they are interested in holding in the future, colleges they may be interested in attending, and further educational experiences they may be interested in pursuing. This is an important area to examine, as educational and job-related aspirations have been shown to be associated with adult educational attainments (Beal & Crockett, 2010; McLeod & Fettes,

2007). Thus, another important intrapersonal variable that is related to academic achievement is a student's future goals and plans, specifically the importance and value he or she places on learning and education. The construct of future orientation refers to a collection of loosely related affective, attitudinal, cognitive, and motivational variables (Greene, 1986), such as the length of time one is able to project imagined life into the future (Lessing, 1972), the extent to which one thinks about the future (Cauffman & Steinberg, 2000), how optimistic or pessimistic one is about the future (Trommsdorff & Lamm, 1980), the extent to which one has a clear vision of the future (Kirby, 1990), the extent one believes there is a link between current decisions and future well-being (Somers & Gizzi, 2001), extent to which one believes he or she has control over the future (McCabe & Barnett, 2000), and the extent to which one engages in goal setting (Nurmi, 1989). Thus, thoughts about the future likely influence one's immediate decisions and behaviors (Trempata, & Malmberg, 2002).

Adolescents become more future-oriented as they age, and as mentioned, the pressure to begin thinking about the future intensifies in high school (Steinberg et al., 2009). Specifically, older adolescents report thinking about and planning the future more than younger adolescents and are also better able to discuss future-oriented emotions such as hope and fear (Nurmi, 1991). In fact, by the end of high school, the two most important ideas that students are thinking about are future employment and future education (Nurmi, 1991).

Although not vast in nature, research has shown that being future oriented is associated with high motivation and positive perceptions of future education and employment (Nurmi, 1991; Seginer, 2009). Additionally, educational and job-related aspirations have been shown to be associated with adult educational attainments (Beal & Crockett, 2010; McLeod & Fettes, 2007). Thinking about the future and possessing goals related to the future does not come

automatically for all students, however. And as shown above, there is some literature investigating the link between future orientation and academic achievement, but links to academic behavior and engagement need to be explored.

Environmental Factors

Parent support. The importance of parent involvement in children's education has become a critical topic in educational policy and research (Catsambis, 2001). As such, many schools have called for increases in efforts to improve parental involvement and family-school relationships in order to ultimately improve academic achievement (Catsambis, 2001). Research has indicated that academic support provided by both parents and teachers is associated with higher academic performance in adolescents (Gottfried et al., 1994; Wentzel, 1998; Chen, 2008; Muller, 1998). Parents can support their children's education in a variety of ways, ranging from providing stimulating materials such as books and computers to monitoring and assisting with their homework completion (Chen, 2005). According to Hill and Taylor (2004), parents can also demonstrate support by communicating with their children's teachers, helping their children with educational activities at home, attending their children's school events, and attending parent-teacher conferences. Hill and Tyson (2010) performed a meta-analysis that revealed that communicating the importance of education to children, setting expectations for school, discussing learning strategies with children, and participating in school-related activities such as parent teacher conferences showed a positive association with achievement.

Chen (2005) also found that higher levels of parent support lead to better behaved children who were more motivated to learn and dedicated more time to school and education, and many other studies have also found a positive association between parent support and academic achievement (Keith et al., 1998; Sui-Chu & Willms, 1996; Lam & Ducreux, 2013). In

their study examining parent support from a parent perspective, Lam and Ducreux (2013) found a significant relationship between communication between parents and their children and academic achievement, e.g., increased communication lead to increased achievement. As shown above, a great deal of research has demonstrated positive correlations between parent support and academic achievement. However, competing findings have also been made. For example, both Balli et al. (1997) and Hill et al. (2004) found that parent involvement did not predict academic achievement. Therefore, although the amount of literature investigating the role of parent support has increased, more research is needed to not only reiterate its association with academic achievement, but also to further unpack the construct to determine which specific parent support behaviors foster academic engagement, academic behaviors, and academic achievement.

Teacher support. In addition to academic support provided by parents, it is also crucial to understand the association between teacher academic support and academic engagement, behaviors, and achievement. Many researchers have recognized that while the home is a central source of socialization, school is the primary context for formal learning (Birch & Ladd, 1996; Ma et al., 2000; Wentzel, 1997). Clearly, a large portion of students' days involves interactions with both teachers and peers. Not surprisingly, then, research has shown that how supported students feel by their teachers is positively associated with students' academic engagement, as demonstrated by behaviors such as displaying an interest in learning and possessing motivation to strive for academic success (Wentzel, 1997; Wentzel & Asher, 1995). When students perceive their teachers as supportive, they are more likely to engage in their work, including asking the teacher for help when needed (Marchand & Skinner, 2007). Additionally, feeling supported by teachers fosters investment in school and makes students more likely to comply

with teachers' requests and instructions (Wentzel, 2005). Perceptions of teachers support have also been linked with less cheating behavior among students (Murdock et al., 2008), leading to the idea that teacher support likely encourages students to take more ownership over their learning and engage in attempts to understand the content of what they learn to avoid cheating on assignments and assessments. Goodenow (1993) found teacher support to be positively correlated with middle-school students' motivation to learn. However, this association significantly dropped from 6th to 8th grade, making it clear that an investigation extending the sample into high-school aged students would help to better understand how, and to what degree, teacher support influences motivation to learn in older adolescents. Ma et al. (2000) found a positive correlation between teacher support and students' prosocial engagement in school. Additionally, Tucker et al., (2002) found that teacher involvement was predictive of student engagement. Skinner and Belmont (1993) found that teacher involvement was central to students' classroom experiences in that it predicted students' behavioral and emotional engagement.

In addition to the relation between teacher support and academic engagement, teacher support has also been shown to predict academic achievement. For example, in a study simultaneously examining the role of academic support from parents, teachers, and peers, Chen (2005) found that teacher support showed the strongest correlation to academic achievement. In examining the research, the way in which teacher support is operationalized varies, with some studies conceptualizing it as solely emotional support, while others define teacher support as assisting with homework and providing needed learning materials. Therefore, it is critical to further investigate the role of teacher support in order to understand the critical types of teacher

behaviors that are most predictive of academic engagement, academic behaviors, and academic achievement.

Peer support. As Erik Erikson described (1968), the adolescent years are characterized by the quest to develop self-identity and autonomy from parents, leading to higher importance and value placed on the development of peer relationships. As mentioned above, students are with their peers for a large majority of the school day, leading to the likelihood that peers will exert a high degree of influence. As such, many researchers have found that peers affect all areas of a student's life, particularly social and emotional adjustment, educational goals, and day-to-day behavior in school (Fuligni et al., 2001; Berndt, 1999). Students often turn to their peers for assistance in the classroom (Ryan & Shim, 2012), making it importance to examine the types of assistance peers often provide to one another. Researchers have found that peers can be a source of support in the way of providing important intellectual information and resources such as notes and strategies, as well as modeling positive learning and academic behaviors (Schunk, 1987; Wentzel, 1993). Similarly, it was found that low-achieving peers who associate and socialize with high-achieving peers showed improved school performance over time (Steinberg et al., 1995).

Help-seeking behavior has also been shown to increase students' achievement by way of students in need of help obtaining task-relevent information (Ryan & Shim, 2012). Modeling and reinforcement regarding motivation and engagement have also been found to likely occur during help-seeking interactions (Ryan & Shim, 2012). Lastly, it is also likely that the development of camaraderie over solving a problem or obtaining help will serve as emotional support (Ryan & Shim, 2012). Some studies investigating the predictive nature of help-seeking and academic achievement differentiates between two types adaptive help and expedient help

(Karabenick, 2003; 2004). Adaptive help is conceptualized as contributing to learning and achievement because the students are clarifying, explaining, or hinting about the correct problem-solving process or solution. On the contrary, expedient help may challenge learning and achievement by merely providing a peer with the answer without giving an explanation (Karabenick, 2003; 2004). An explanation on the difference between the two types of assistance peers provide to one another is important, because it points to the likelihood that adaptive help is likely to contribute to not only higher academic achievement, but also academic engagement and academic behaviors that promote achievement as students become more invested in their learning and education.

In looking even more specifically at the specific types of behaviors that peers display that influence others' academic achievement, Chen (2005) also found that perceived peer support in the form of behaviors such as assisting friends with homework and encouraging friends to study predicted academic achievement. In this study, however, peer support was the weakest link to academic achievement, falling behind perceived teacher and parent support. Therefore, this area should be further investigated, as the implications could be used to implement interventions within the school environment to promote peer relationships that will lead to higher school performance. Additionally, although some studies have shown a positive link with peer support to academic achievement, a deeper exploration of the particular academic behaviors and degree of academic engagement associated with peer support is needed.

Conclusions

This aforementioned combination of factors has not been considered for their combined ability to explain greater proportions of variance in academic engagement, behavior, and achievement, despite the fact that ecologically, there are multiple life contexts that interact to

explain academic achievement development and this selection may provide important information. Specifically, past research has not examined the specific academic behaviors purported to be associated with academic achievement, such as attending school regularly, arriving to class on time, attending to instruction, using a planner, referencing online grade book, completing and turning in classwork and homework, and studying for quizzes and tests, and how parents and teachers play a role in influencing the frequency of these types of behaviors. Additionally, despite the fact that executive functioning skills have been extensively researched as a whole, research examining how the constructs of executive functioning and measures of academic achievement are associated is not nearly as robust (Latzman et al., 2010), nor has the correlation between executive functioning skills and successful school behaviors and academic engagement been sufficiently researched.

This combination of contextual supports, along with these other variables, has not been done yet. Additionally, much of this research has seemed to focus on preschool and elementary-school aged students as opposed to students in high school, which is of focus here because of the critical transition dynamics that occur for that age group. Therefore, the proposed study will further investigate the roles of select intrapersonal and microsystem factors in high school adolescents' academic engagement, behavior, and achievement in order to obtain and increased understanding of the predictors of academic engagement, various academic behaviors, and academic achievement. This knowledge will, in turn, be invaluable in developing specific interventions to target each of the investigated variables. Specifically, the findings of the proposed study would allow for the development of student-targeted, as well as teacher- and parent-targeted interventions, in order to reach multiple contexts aside from the individual only, as aligned with ecological systems theory. Targeting multiple contextual systems in addition to

the student themselves would likely result in a more comprehensive intervention that could lead to increases in not only academic achievement, but successful behaviors that contribute to academic achievement and a higher investment in learning and education.

CHAPTER 3 METHOD

Participants

The participants of the current study were high school students from a mid-western, suburban high school that enrolls about 1,285 students. According to U.S. News and World Report (2013), the school is comprised of 49% males and 51% females. Seventy-six percent of the student body is Caucasian, 20% are African-American, 2% are Hispanic, and 2% are Asian. Students were randomly selected from English/Language Arts classes, which are required for all students, and thus was expected to result in a representative sample. The final sample consisted of 415 participants (n=171 males; 41.2%). There were 144 students in 9th grade (34.7%), 135 students in 10th grade (32.5%), and 135 students in 11th grade (32.5%). The majority of participants ranged between ages 14 to 17. Most students were Caucasian (n=302, 72.8%%), and the others were African-American (n=66, 15.9%), Hispanic/Latino (n=4, 1.0%, mixed race (n=24, 5.8%), and Asian (n=7, 1.7%). Demographics were comparable to the overall student population.

Measures

Demographics. Students completed a short demographic survey containing items pertaining to grade, age, sex, and ethnicity, followed by measures of the following constructs.

Academic achievement. Students were asked to report their most recent grades in their four core classes (English/Language Arts, math, science, social studies). Specifically, they were asked to circle A, B, C, D, or E in response to the question, "What are your most recent grades in each of the following classes?": English/Language Arts, Math, Science, and Social Studies. Grades will be coded between 1 (E) and 5 (A). They were also asked to note the grades that they typically achieve, specifically "What grades do you most often receive?" Students circled one of

the following options: As, As and Bs, Bs, Bs and Cs, Cs, Cs and Ds, Ds, Ds and Es, or Es. Responses were be coded between 1 (As) and 9 (Es).

Academic behavior. To assess students' behaviors that are believed to be at the root of academic success, the following achievement behaviors were measured: attendance, being on time to class, use of a planner/organizer, accessing online grade book, homework and classwork completion, turning in of homework and classwork, attention in class, and studying. However, no operational definitions or validated measures of achievement behavior had been widely established at the time of this study; thus, a measure was created and piloted for the purposes of this research. Students viewed a table that asked them to place a checkmark indicating how many days per week (1 day, 2 days, 3 days, 4 days, or 5 days) they displayed the following behaviors: "Use a planner/calendar to keep track of tests, quizzes, and assignments"; "complete homework/classwork"; "turn in homework/classwork"; "pay good attention in class"; "study for class, quiz, or test"; "look at online grade book"; "come to school"; "on-time to 1st hour, 2nd, hour, 3rd hour, 4th hour, 5th hour, and 6th hour." An aggregate score, based on psychometric analyses post data collection, was computed to represent the degree to which students display academic behaviors. Items were coded using a Likert scale, with a checkmark in the "1 day" column representing a score of one and a checkmark in the "5 days" column representing a score of five. All responses were summed, with higher scores representing a higher frequency of academic behaviors. For the current dissertation's sample, Cronbach's alpha internal reliability was .70.

Academic engagement. The Perceived Academic Engagement Scale (PAES) (Chen, 2005) was used to examine academic engagement, which the author developed. Drawing on a variety of definitions of "academic engagement" in the then-existing literature, Chen (2005)

defined academic engagement as a multidimensional construct encompassing behavioral (e.g., classroom conduct), attitudinal (e.g., attitudes toward schooling), and instrumental (e.g., participation in academic activities) processes, that may influence their academic success. Chen (2005) constructed the PAES, a 25-item questionnaire, based on this notion that there are various types of academic engagement, deciding to also develop items measuring behavioral, attitudinal, and instrumental conceptualizations of engagement. On the PAES, respondents answer questions regarding their perceptions of the frequency of which they engage in certain academically desirable or undesirable activities (Chen, 2005). Specifically, the dimensions measured include: behavior and feeling toward school, classroom conduct, seriousness about school, time expenditure, self-expectations, and self-evaluations. Participants rate the frequency with which they engage in each of the academic activities described on each item on a 5-point Likert-type scale, ranging from 1 (never) to 5 (always). Examples of items from the PAES (Chen, 2005) include, "I enjoy going to school because I want to learn" and "I work hard to complete my homework." Some items from the PAES overlap slightly with the "academic behavior" items discussed above, such as, "I go to school every day." In the same fashion, higher average scores were interpreted to indicate better academic engagement as perceived by the adolescents (Chen, 2005).

To ensure the reliability of the PAES, Chen (2005) performed an item analysis. Items with the lowest correlations with the sum scale were deleted. Only one original item was deleted. The PAES was comprised of a variety of items designed to tap different dimensions of academic engagement. A principal component analysis (PCA) was conducted to determine there were any meaningful dimensions that could characterize the data (Chen, 2005). The results of the PCA suggested that all of the items for the PAES worked together to form one summary

dimension of perceived academic engagement. Psychometric analyses demonstrated that the PAES showed high internal consistency (α=.93), after the weak items were removed. Its alpha co-efficient is thus well above the acceptable level of .70 (Nunnally, 1978). Cronbach's alpha internal reliability was similar to that of Chen's (2005), at .93 as well.

Chen (2005) also established both content validity and construct validity. To ensure content validity, Chen (2005) constructed items for each scale from both a theoretical and empirical standpoint (e.g., Johnson, Johnson, & Anderson, 1983; Johnson, Johnson, Buckman, & Richards, 1985; Wentzel, 1998). Chen (2005) also piloted items from each scale to a small sample of students twice, and based on feedback, modified some of the items to reach content validity. Revisions included eliminating items that were thought to be inapplicable or inappropriate to the target population, rephrasing ambiguous items for better clarity, and reformatting the questionnaire to make it more user-friendly (Chen, 2005). Some items were also phrased negatively in order to reduce response bias (Nunnally, 1978). These items were reverse-coded before conducting analyses. Construct validity was established by checking the adequacy of the measures for each construct on the basis of both the squared multiple correlations (R^2) and the coefficient of determination, an indicator of general reliability of measurement model as well as the extent to which observed variables measure academic engagement. The R^2 coefficient for the PAES was .85, suggesting that the variables are adequate for measuring academic engagement, thus providing support for construct validity (Chen, 2005).

Executive Functioning. The Barkley Deficits in Executive Functioning (BDEFS) was used to measure executive functioning skills (Barkley, 2011). The development of the original BDEFS began as an effort to develop a cost-effective means of conveniently capturing the neuropsychological, behavioral, emotional, and motivational symptoms often attributed to

deficits in executive functioning. Another reason for the development of the BDEFS was because of accumulating evidence suggesting that evidence of executive functioning tests were not the most ecologically valid means for clinically evaluating executive functioning (Barkley, 2011). Two federal grant-funded studies helped the development of the prototype of the BDEFS (Barkley, 2011). The first was the UMASS Study and examined clinic-referred adults with ADHD, comparing these adults to a clinical control group and a community control group. The clinical control group consisted of participants who were self-referred to the clinic to be evaluated for ADHD, but who were not given a diagnosis based on subclinical symptomatology. The second study was the Milwaukee Study, which was a follow-up study of hyperactive children as they entered young adulthood. The BDEFS development was largely based on an earlier theory of executive functioning, its five constructs, and their specific adaptive purposes (Barkley, 2011) and the literature on the nature of executive functioning (Denckla, 1996; Fuster, 1997).

The BDEFS-Short Form (BDEFS-SF) was developed in response to situations in which an examiner or respondent does not have time to complete the 89-item BDEFS-Long Form (BDEFS-LF). As such, the BDEFS-SF is a quick screening tool for assessing the possibility of deficits in executive functioning in daily life (Barkley, 2011). It is a 20-item screener comprised of the four highest-loading items from each of the five subscales (self-management to time, self-organization/problem solving, self-restraint or inhibition, self-motivation, and self-activation/concentration). Higher scores on both the BDEFS-SF and BDEFS-LF indicate greater deficits in executive functioning. For purposes of the current study, the BDEFS-SF was used and reverse coded so that higher scores indicated higher executive functioning skills. To

represent an overall total score for executive functioning, the items comprising this scale were averaged.

A Cronbach's alpha was conducted to analyze internal consistency of the BDEFS and it was found to be .918 for the Total EF Symptoms. The Cronbach's alpha for the five factors ranged from .914 to .958 (total score (α = .87), self-management to time (α = .78), self-organization and problem-solving (α = .73), self-restraint (α = .73), self-motivation (α = .78), and self-regulation of emotions (α = .90) (Barkley, 2011). For the current study, the BDEFS-SF was utilized, and Cronbach's alpha internal reliability was found to be .89. The BDEFS-LF also provides ADHD-EF index evaluating the likelihood that the individual may have adult ADHD. The Cronbach's alpha for the ADHD-EF Index was .842. A test/retest comparison was completed on 62 randomly selected participants and was adequate at .62 to .90 for the five factors and .70 for the Total EF Symptoms Score. Both of these analyses were conducted on the full BDEFS from the norming sample (Barkley, 2011).

The BDEFS has some evidence of the ecological validity of its scores, at least in terms of correlations with other self-report measures, including impairment in daily living and occupational functioning, and is comprehensive, including aspects of executive functioning that are relevant to daily life functioning (Coffman, 2014). In regards to discriminant validity, data from the UMASS study showed that 80-98% of adults with ADHD were in the clinical range across the various factors of the BDEFS, versus only 8-11% across the various factors in the community control group (Barkley, 2011), using the self-report data. The UMASS study also revealed that the ADHD-EF Index was a good predictor of adults with ADHD, with 98.5% of the group with ADHD showing a score above the 93rd percentile on the ADHD-EF index.

In terms of criterion validity, severity of ADHD symptoms is one of the most researched areas with the BDEFS (Barkley, 2011). As was mentioned, the correlation was significant for the Total Score on the BDEFS with ADHD symptom criteria. Total ADHD symptoms were measured by self-report on the Barkley Adult Rating Scales for ADHD, which is based on DSM criteria (Barkley, 2011). For the inattentive symptoms of ADHD, the correlations ranged from .80 to .92 across the five factors and the ADHD-EF Index of the BDEFS. For hyperactive/impulsive symptoms of ADHD, the correlations were slightly less at .68 to .71 (Barkley, 2011) across the five factors and the ADHD-EF Index. In looking at construct validity, a factor analysis was conducted using the UMASS sample to see if ADHD symptoms and BDEFS symptoms were measuring the same construct (Barkley, 2011). Barkley's analysis revealed that due to high factor loading, ADHD and EF did, in fact, appear to be measuring the same construct and thus, essentially different names for the same concept (Coffman, 2014).

Future Orientation. A five-item subscale called "Clarity of Long Term Goals" was used, which focused specifically on students' thoughts and goals about the future in general. This was used to assess adolescents' future orientation. Items were taken from the Mathtech Attitude and Value Scales (Kirby, 1990). Participants responded using a five-point scale (1=Strongly Disagree, 5=Strongly Agree) and answered questions such as, "I have a good idea of where I'm headed in the future" and "I know what my long-range goals are." Reliability for the Attitude and Value Inventory as a whole was determined by administering the questionnaire to 990 students and calculating the Cronbach's alpha (Kirby, 1990), and was determined to be .89. A subsequent study using these scales found reliability to be at .89 for their sample (Wernersbach, 2013). Cronbach's alpha internal reliability was .92 for the current study's sample.

Future orientation was also measured with two items from a 22-item scale developed by Somers and Gizzi (2001) for their study investigating how future orientation, school involvement, and school attachment predict adolescents' risky behaviors. The two items were "Earning a diploma is an important goal to me" and "School is important to my future." Thus, while the Clarity of Long Term Goals scale measures a general sense of future orientation in terms of knowing what one wants for oneself in the future, this other scale refers to specific school/education values that are more concrete and in the immediate future, hereafter referred to as "future educational goals." Participants responded using a five-point scale (1=Strongly Disagree, 5=Strongly Agree). In their study, Somers and Gizzi (2001) found that the Cronbach's alpha was 0.72 for the entire sample, 0.80 for girls, and 0.74 for boys (Somers & Gizzi, 2001). In the current study, Cronbach's alpha internal reliability was .82 for the sample. These two items were used in addition to the Kirby (1990) measure described above.

Parent, Teacher, and Peer Support. In addition to the PAES described above, Chen (2005) also developed three separate support scales to measure parent support, teacher support, and peer support. These measures were created through an examination of research investigating the notion of academic support (Birch & Ladd, 1996; Schneider & Lee, 1990; Wentzel, 1993, 1998). Academic support was defined by Chen (2005) as "an array of direct and indirect provisions of resources to students." (p. 91). Academic support is a multi-dimensional construct that includes emotional support (providing encouragement), instrumental support (assisting with homework), and cognitive support (communicating value of educational success). Each scale is comprised of multiple dimensions that form one summary dimension of the construct being measured (parent, teacher, or peer support). Respondents rate the level of agreement on items on

a 5-point Likert-type scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Higher average scores indicate stronger levels of support as perceived by the respondents (Chen, 2005).

A principal component analysis (PCA) was also conducted on each of the support scales to determine if there were any meaningful dimensions that could characterize the data (Chen, 2005). The results of the PCA suggested that all of the items, for each of the support scales, worked together to form one summary dimension on each scale. For example, it was determined that each of the items on the parent support scale worked together to form one "parent support" dimension. Chen (2005) performed an item analysis on each of these scales as well to ensure each scale's reliability, and items with the lowest correlations with the sum scale were deleted. Each scale's reliability is reported in its subsection below.

Chen (2005) also established both content validity and construct validity for each measure. As with the PAES, to ensure content validity, Chen (2005) constructed items for each scale from both a theoretical and empirical standpoint (e.g., Johnson, Johnson, & Anderson, 1983; Johnson, Johnson, Buckman, & Richards, 1985; Wentzel, 1998) and piloted items from each scale to a small sample of students twice, and based on feedback, modified some of the items to reach content validity. Revisions included eliminating items that were thought to be inapplicable or inappropriate to the target population, rephrasing ambiguous items for better clarity, and reformatting the questionnaire to make it more user-friendly (Chen, 2005). Some items were also phrased negatively in order to reduce response bias (Nunnally, 1978). These items were reverse-coded before conducting analyses. Chen (2005) established construct validity by checking the adequacy of the measures for each construct on the basis of both the squared multiple correlations (R^2) and the coefficient of determination, an indicator of general

reliability of measurement model as well as the extent to which observed variables measure parental academic support. Each scale's construct validity is reported in its subsection below.

Each of the support scales will be described in their own section below, including the amount of items on the questionnaire, which dimensions each scale measures, and the validity and reliability.

Parent Support. The Perceived Parental Academic Support Scale (PPASS) (Chen, 2005) was used to examine parent support. The PPASS is a 28-item questionnaire, in which respondents answer questions regarding their perception of the extent of academic support provided by their parents (Chen, 2005). Multiple dimensions are part of the overall parent support construct: interpersonal (relationship and communication), cognitive (interpretation of expectations), emotional (care and encouragement), behavioral (social control and monitoring), instrumental (direct assistance with schoolwork, discussion about school-related matters, and provision of educational resources), and overall support. These dimensions form one summary dimension of perceived parental academic support Examples of items from the PPASS (Chen, 2005) include, "My parents make sure that I spend the majority of my time doing homework and studying," and "My parents help me find ways to resolve school problems."

Three of the original items were deleted from the PPASS after Chen (2005) performed an item analysis. Psychometric analyses demonstrated that the PPASS showed high internal consistency (α=.88), after the weak items were removed. Its alpha co-efficient is thus well above the acceptable level of .70 (Nunnally, 1978). Cronbach's alpha internal reliability was .90 for the current sample. The R^2 coefficient for the PPASS was .88, suggesting that the variables are adequate for measuring parental academic support, thus providing support for construct validity (Chen, 2005).

Teacher Support. The Perceived Teacher Academic Support Scale (PTASS) (Chen, 2005) was used to examine teacher support. The PTASS is a 22-item questionnaire, in which an individual answers questions regarding their perception of the extent of academic support provided by their teachers (Chen, 2005). The construct is comprised of several dimensions: interpersonal (relationship and communication), cognitive (interpretation of expectations), emotional (care and encouragement), instrumental (direct assistance with schoolwork, discussion about school-related matters, and provision of educational resources), and overall support. Examples of items from the PTASS (Chen, 2005) include, "I feel comfortable sharing with my teachers about my school problems," and "My teachers spend time outside of class to explain to me the materials that I don't understand."

Three of the original items were deleted from the PTASS after Chen (2005) performed an item analysis. Psychometric analyses demonstrated that the PTASS showed high internal consistency (α=.89), after the weak items were removed. Its alpha co-efficient is thus well above the acceptable level of .70 (Nunnally, 1978). Cronbach's alpha internal reliability was .92 for the current sample. The R^2 coefficient for the PTASS was .91, suggesting that the variables are adequate for measuring teacher academic support, thus providing support for construct validity (Chen, 2005).

Peer Support. The Perceived Peer/Friend Academic Support Scale (PFASS) (Chen, 2005) was used to examine peer/friend support. The PFASS is a 22-item questionnaire, in which an individual answers questions regarding their perception of the extent of academic support provided by their peers/friends (Chen, 2005). Specifically, the dimensions measured include: interpersonal (relationship and communication), cognitive (interpretation of expectations), emotional (care and encouragement), instrumental (direct assistance with schoolwork, discussion

about school-related matters, and provision of educational resources), and overall support. Examples of items from the PFASS (Chen, 2005) include, "My friends want to help me to do my best in school," and "If I don't understand my schoolwork, I feel comfortable asking my friends for help."

Three of the original items were deleted from the PTASS after Chen (2005) performed an item analysis. Psychometric analyses demonstrated that the PFASS showed high internal consistency (α=.88), after the weak items were removed. Its alpha co-efficient is thus well above the acceptable level of .70 (Nunnally, 1978). Cronbach's alpha internal reliability was .92 for the current sample. The R^2 coefficient for the PFASS was .88, suggesting that the variables are validity (Chen, 2005).

Procedure

After approval from Wayne State University's Institutional Review Board (IRB), data was collected throughout students' classes at the selected high school. All English teachers and all students enrolled in an English class were contacted. The examiner explained that data collection would occur during the first 15-20 minutes of their class period on a day that worked best for the English teachers to ensure the least amount of disruption to teachers' instruction. Parents were sent supplemental information forms via first-class mail two weeks prior to data collection. These letters described the nature of the study and what type of information was to be collected. The letters also provided parents the opportunity to request an electronic copy of the survey for their own viewing purposes and/or to refuse their child's participation. Students whose parents could not be contacted or who declined their participation in the study were given an alternative task during data collection.

The principal investigator (PI) entered the high school with blank surveys contained in manila envelopes, and distributed an appropriate number to each classroom participating in the study. Oral assent forms were given to all students before they were asked to participate in the study. Parents, teachers, and students were informed that the study was voluntary, and that all data collected would be anonymous. The PI provided each classroom with instructions that directed participating students to take a blank survey from a manila envelope, and then place the survey in a second manila envelope when completed. Students had the option of receiving a piece of candy after completing or attempting to complete the survey. The PI then returned to each classroom to gather all testing materials, which were stored in a locked filing cabinet. Teachers were compensated with a five-dollar gift card for their assistance.

Data Analysis

Data collected was entered, coded, and analyzed using SPSS software. SPSS was utilized to examine the data, including conducting frequency distributions of demographic information. With respect to specific research hypotheses and questions, inferential statistical analyses were used. An alpha criterion of 0.05 was utilized to examine statistical significance. The following table presents the research questions, hypotheses, variables used, and statistical analyses.

Table 1

Statistical Analyses

Research Question 1: To what degree do intrapersonal factors (executive functioning, future orientation) predict high school students' academic engagement, academic behaviors, and academic achievement?		
Research Hypotheses	Variables	Statistical Analyses
H1: The intrapersonal factors (executive functioning, future orientation) will explain a statistically significant	<u>Predictor variables</u> *Step 1:* sex, grade	Seven Hierarchical Linear Regression Analyses

proportion of variance in high school student achievement.	*Step 2:* - Executive functioning - Clarity of long terms goals - Future educational goals <u>Criterion variables</u> - Academic engagement - Academic behaviors - Academic achievement - English/Language Arts (ELA) grade - Mathematics grade - Science grade - Social Studies grade	
Research Question 2: To what degree do environmental factors (parent support, teacher support, peer support) predict high school students' academic engagement, academic behaviors, and academic achievement?		
Research Hypotheses	Variables	Statistical Analyses
H2: The environmental factors (parent support, teacher support, peer support) will explain a statistically significant proportion of variance in high school student achievement.	<u>Predictor variables</u> *Step 1:* sex, grade *Step 2:* - Parent support - Teacher support - Peer support <u>Criterion variables</u> - Academic engagement - Academic behaviors - Academic achievement - ELA grade - Mathematics grade - Science grade - Social Studies grade	Seven Hierarchical Linear Regression Analyses
Research Question 3: Do environmental factors (parent support, teacher support, peer support) explain variance in academic variables (engagement, behavior, achievement) above and beyond executive functioning and future orientation? Which of these factors matter the most in predicting these academic outcomes?		
Research Hypotheses	Variables	Statistical Analyses
H3: Perceived parent support, perceived teacher support, and perceived peer support will	<u>Predictor variables</u> *Step 1*: sex, grade	Seven Hierarchical Linear Regression Analyses

explain high school student academic achievement above and beyond executive functioning and future orientation.	*Step 2:* - Executive functioning - Clarity of long term goals - Future educational goals *Step 3:* - Parent support - Teacher support - Peer support <u>Criterion variables</u> - Academic engagement - Academic behaviors - Academic achievement - ELA grade - Mathematics grade - Science grade - Social Studies grade	
Research Question 4: What role do academic behavior and academic engagement play in this predictive model of academic achievement? Specifically, to what degree do academic behavior and academic engagement predict academic achievement?		
Research Hypotheses	Variables	Statistical Analyses
H4: Academic behavior and academic engagement will explain a statistically significant proportion of variance in high school student achievement.	<u>Predictor variables</u> *Step 1*: sex, grade *Step 2:* - Parent support - Teacher support - Peer support *Step 3:* - Executive functioning - Clarity of long term goals - Future educational goals *Step 4:* - Academic behavior - Academic engagement <u>Criterion variable</u> - Academic achievement - ELA Grade - Mathematics Grade - Science Grade - Social Studies Grade	Five Hierarchical Linear Regression Analysis

CHAPTER 4 RESULTS

The purpose of this study was to investigate the role of select intrapersonal and microsystem factors in high school adolescents' academic achievement, behavior, and engagement, as well as the predictive nature of academic achievement, behavior, and engagement in regards to their association with parent, teacher, and peer support. The distribution of the sample was normal. While there was little missing data, what was missing was handled by the use of mean substitution. In all analyses, a criterion alpha level of .05 was used to determine statistical significance. Preliminary analyses involved a series of Analysis of Variance (ANOVA) tests for sex and grade-level differences in the study variables. Results revealed many differences at the main effect level, but not a sex by grade interaction. The authors were not interested in these demographic variations in themselves and thus controlled for them in the main study analyses, which all involved hierarchical linear regression analysis with sex and grade entered at step 1 of each. Descriptive data and internal consistency measures for all variables are presented in Table 2. A correlation matrix examining associations between all measured variables is provided in Table 3.

Table 2

Descriptive Statistics and Cronbach's Alphas: Survey Aggregate Scores

					Range	
Variables	Missing	α	Mean	*SD*	Min	Max
Acad. Achievement	4	n/a	7.44	1.43	2.00	9.00
Eng. Lang Arts Grade	0	n/a	4.23	0.99	1.00	5.00
Mathematics Grade	0	n/a	4.06	1.04	1.00	5.00
Science Grade	0	n/a	4.14	1.00	1.00	5.00
Social Studies Grade	0	n/a	4.35	.91	1.00	5.00
Academic Behavior	2	.70	4.27	0.44	1.69	5.00
Academic Engagement	0	.93	3.72	0.63	1.36	4.96
Executive Functioning	1	.89	3.25	0.47	1.55	4.00
Long Term Goals	0	.92	3.61	1.04	1.00	5.00
Future Educ. Goals	0	.82	4.51	0.76	1.00	5.00
Parent Support	1	.90	3.95	0.54	1.89	4.93
Teacher Support	2	.92	3.58	0.66	1.32	5.00
Friend Support	2	.92	3.58	0.68	1.09	5.00

Table 3

Pearson Product-Moment Correlation Matrix: All Study Variables

	1	2	3	4	5	6	7	8	9	10	11	12
1. Academic Achievement	-											
2. Academic Engagement	.59**	-										
3. Academic Behavior	.54**	.74**	-									
4. ELA Grade	.68**	.55**	.51**	-								
5. Math Grade	.67**	.38**	.37**	.37**	-							
6. Science Grade	.72**	.40**	.41**	.53**	.54**	-						
7. Social Studies Grade	.64**	.39**	.33**	.54**	.37**	.57**	-					
8. Exec. Functioning	.41**	.58**	.42**	.32**	.25**	.31**	.31**	-				
9. Long-Term Goals	.10*	.33**	.20**	.18**	.03	.10*	.08	.38**	-			
10. Educational Goals	.45**	.61**	.46**	.38**	.28**	.28**	.25**	.34**	.24**	-		
11. Parent Support	.29**	.49**	.39**	.29**	.14**	.18**	.12*	.36**	.29**	.42**	-	
12. Teacher Support	.30**	.48**	.31**	.31**	.26**	.20**	.16**	.31**	.35**	.34**	.48*	-
13. Peer Support	.32**	.52**	.37**	.36**	.12*	.24**	.24**	.32**	.34**	.39**	.37**	.50**

*$p < .05$; **$p < .01$

Research Question 1: To what degree do intrapersonal factors (executive functioning, future orientation) predict high school students' academic engagement, academic behaviors, and academic achievement?

In examining the degree to which internal factors predicted academic engagement, academic behaviors, and academic achievement, seven hierarchical linear regression analyses were run. The intrapersonal predictor variables were entered together at step two, after sex and grade at step one. For academic engagement, the model was significant at step two (R^2= .56, F= 101.47, df= 5, 402, $p < .001$), indicating that intrapersonal factors accounted for 56% of the variance when examining academic engagement, significantly above and beyond that accounted for at step one (R^2 change= .51, $p < .001$). An analysis of the standardized beta weights indicated that the variables found to be significant within the model were executive functioning ($\beta = .41$, $t = 10.96$, $p < .001$) and future educational goals ($\beta = .43$, $t = 11.83$, $p < .001$). Long-term goals was not significant. See Table 4.

Regarding academic behavior, the model was significant at step two (R^2= .34, F= 41.76, df= 5, 402, $p < .001$), significantly above and beyond that accounted for at step one (R^2 change= .27, $p < .001$). An analysis of the standardized beta weights indicated that, the variables found to be significant within the model were once again executive functioning ($\beta = .31$, $t = 6.72$, $p < .001$) and future educational goals ($\beta = .33$, $t = 7.34$, $p < .001$). Long-term goals was not significant. See Table 5.

With academic achievement as the criterion variable, the model was significant at step two (R^2= .29, F= 33.30, df= 5, 398, $p < .001$), significantly above and beyond that accounted for at step one (R^2 change= .28, $p < .001$). For this model, all three individual variables were found

to be significant, including executive functioning (β = .34, t = 7.03, p < .001), long-term goals (β = -.11, t = -2.38, p < .05), and future educational goals (β = .35, t = 7.55, p < .001). See Table 6.

In examining specific subject areas, for English/Language Arts, the model was significant at step two (R^2= .25, F= 26.34, df= 5, 402, p < .001), significantly above and beyond that accounted for at step one (R^2 change= .16, p < .001). An analysis of the standardized beta weights indicated that executive functioning (β = .25, t = 5.08, p < .001) and future educational goals (β = .24, t = 5.02, p < .001) were significant, while long-term goals was not significant. See Table 7.

In looking at grades in mathematics courses, the model was significant at step two (R^2= .12, F= 10.89, df= 5, 402, p < .001), significantly above and beyond that accounted for at step one (R^2 change= .11, p < .001). Also in this area, the individual variables of executive functioning (β = .21, t = 3.96, p < .001) and future educational goals (β = .23, t = 4.48, p < .001) were significant, while long-term goals was not significant. See Table 8.

For science, the model was significant at step two (R^2= .14, F= 13.48, df= 5, 402, p < .001), significantly above and beyond that accounted for at step one (R^2 change= .13, p < .001). An analysis of the standardized beta weights indicated that the individual variables of executive functioning (β = .27, t = 5.21, p < .001) and future educational goals (β = .19, t = 3.68, p < .001) were significant, while long-term goals was not significant. See Table 9.

In the area of social studies, the model was significant at step two (R^2= .16, F= 14.94, df= 5, 402, p < .001), significantly above and beyond that accounted for a step one (R^2 change= .13, p < .001). As previously observed, the individual variables of executive functioning (β = .30, t = 5.70, p < .001) and future educational goals (β = .16, t = 3.12, p < .01) were significant, while long-term goals was not significant. See Table 10.

Table 4

Hierarchical Linear Regression Analysis – Intrapersonal Factors on Academic Engagement

Predictor	B	SE B	β	t
Constant	.13	.31		.44
Executive Functioning	.55	.05	.41***	10.96
Long-Term Goals	.04	.02	.06	1.71
Future Educational Goals	.36	.03	.43***	11.83

Note. $R^2 = .56$ ($F = 101.47$, $df = 5, 402$ $p < .001$)
* $p < .05$, ** $p < .01$, *** $p < .001$

Table 5

Hierarchical Linear Regression Analysis – Intrapersonal Factors on Academic Behavior

Predictor	B	SE B	β	t
Constant	2.85	.27		10.74
Executive Functioning	.29	.04	.31***	6.72
Long-Term Goals	-.00	.02	-.01	-.17
Future Educational Goals	.19	.03	.33***	7.34

Note. $R^2 = .34$ ($F = 41.76$, $df = 5, 402$ $p < .001$)
* $p < .05$, ** $p < .01$, *** $p < .001$

Table 6

Hierarchical Linear Regression Analysis – Intrapersonal Factors on Academic Achievement

Predictor	B	SE B	β	t
Constant	1.23	.89		1.39
Executive Functioning	1.01	.14	.34***	7.03
Long-Term Goals	-.15	.06	-.11	-2.38
Future Educational Goals	.66	.09	.35***	7.55

Note. $R^2 = .30$ ($F = 33.30$, $df = 5, 398$, $p < .001$)
* $p < .05$, ** $p < .01$, *** $p < .001$

Table 7

Hierarchical Linear Regression Analysis – Intrapersonal Factors on English/Language Arts Grade

Predictor	B	SE B	β	t
Constant	-.49	.63		-.78
Executive Functioning	.52	.10	.25***	5.08
Long-Term Goals	.01	.05	.01	.12
Future Educational Goals	.31	.06	.24***	5.02

Note. $R^2 = .25$ ($F = 26.34$, $df = 5, 402$, $p < .001$)
* $p < .05$, ** $p < .01$, *** $p < .001$

Table 8

Hierarchical Linear Regression Analysis – Intrapersonal Factors on Mathematics Grade

Predictor	B	SE B	β	t
Constant	2.16	.72		3.00
Executive Functioning	.46	.12	.21***	3.96
Long-Term Goals	-.10	.05	-.10	-1.86
Future Educational Goals	.32	.07	.23***	4.48

Note. $R^2 = .12$ ($F = 10.89$, $df = 5, 402$, $p < .001$)
* $p < .05$, ** $p < .01$, *** $p < .001$

Table 9

Hierarchical Linear Regression Analysis – Intrapersonal Factors on Science Grade

Predictor	B	SE B	β	t
Constant	.75	.68		1.10
Executive Functioning	.58	.11	.27***	5.21
Long-Term Goals	-.06	.05	-.06	-1.27
Future Educational Goals	.25	.07	.19***	3.68

Note. $R^2 = .14$ ($F = 13.48$, $df = 5, 402$, $p < .001$)
* $p < .05$, ** $p < .01$, *** $p < .001$

Table 10

Hierarchical Linear Regression Analysis – Intrapersonal Factors on Social Studies Grade

Predictor	B	SE B	β	t
Constant	-.02	.62		-.03
Executive Functioning	.57	.10	.30***	5.70
Long-Term Goals	-.07	.04	-.08	-1.51
Future Educational Goals	.19	.06	.16**	3.12

Note. $R^2 = .16$ ($F = 14.94$, $df = 5, 402$, $p < .001$)
* $p < .05$, ** $p < .01$, *** $p < .001$

Research Question 2: To what degree do environmental factors (parent support, teacher support, peer support) predict high school students' academic engagement, academic behaviors, and academic achievement?

To determine the degree to which environmental factors predicted academic engagement, academic behaviors, and academic achievement, three hierarchical linear regression analyses were run. These environmental predictor variables were entered together at step two, after sex and grade at step one. For academic engagement, the model was significant at step two ($R^2 = .42$, $F = 58.78$, $df = 5, 401$, $p < .001$), significantly above and beyond that accounted for at step one (R^2 change= .38, $p < .001$). All three predictor variables found to be significant within the model, including parent support (β = .29, $t = 6.61$, $p < .001$), teacher support (β = .21, $t = 4.28$, $p < .001$), and peer support (β = .30, $t = 6.26$, $p < .001$). See Table 11.

In examining academic behavior, the model was significant at step two ($R^2 = .27$, $F = 29.28$, $df = 5, 401$, $p < .001$), significantly above and beyond that accounted for at step one (R^2 change= .19, $p < .001$). An analysis of the standardized beta weights indicated that the variables found to be significant within the model were parent support (β = .27, $t = 5.48$, $p < .001$) and

peer support (β = .19, t = 3.59, p < .001), while teacher support was not significant. See Table 12.

For academic achievement, the model was significant at step two (R^2= .16, F= 14.73, df= 5, 397, p < .001), significantly above and beyond that accounted for at step one (R^2 change= .16, p < .001). For this model, all three predictor variables were found to be significant, including parent support (β = .17, t = 3.10, p < .01), teacher support (β = .14, t = 2.44, p < .05), and peer support (β = .18, t = 3.09, p < .01). See Table 13.

In examining specific subject areas, for English/Language Arts, the model was significant at step two (R^2= .21, F= 21.43, df= 5, 401, p < .001), significantly above and beyond that accounted for at step one (R^2 change= .13, p < .001). An analysis of the standardized beta weights indicated that all three predictor variables were found to be significant, including parent support (β = .17, t = 3.29, p < .01), teacher support (β = .13, t = 2.37, p < .05), and peer support (β = .16, t = 2.88, p < .01. See Table 14.

The model was significant at step two for mathematics (R^2= .09, F= 7.47, df= 5, 401, p < .001), significantly above and beyond that accounted for at step one (R^2 change= .08, p < .001). Within the subject of mathematics, the only significant variable was teacher support (β = .28, t = 4.68, p < .001). Perceived parent support and peer support were not significant. See Table 15.

For science, the model was significant at step two (R^2= .08, F= 6.46, df= 5, 401, p < .001), significantly above and beyond that accounted for at step one (R^2 change= .06, p < .001). Within the subject of science, the only significant variable was peer support (β = .15, t = 2.47, p < .05). Perceived parent support and teacher support were not significant. See Table 16.

The model was significant at step two for social studies (R^2= .09, F= 7.94, df= 5, 401, p < .001), significantly above and beyond that accounted for a step one (R^2 change= .07, p < .001).

An analysis of the standardized beta weights indicated that the only significant variable was peer support (β = .25, t = 4.11, p < .001). Perceived parent support and teacher support were not significant. See Table 17.

Table 11

Hierarchical Linear Regression Analysis – Environmental Factors on Academic Engagement

Predictor	B	SE B	β	t
Constant	1.18	.35		3.40
Parent Support	.34	.05	.29***	6.61
Teacher Support	.19	.05	.21***	4.28
Peer Support	.27	.04	.30***	6.26

Note. R^2 = .42 (F= 58.78, df= 5, 401, p < .001)
* p < .05, ** p < .01, *** p < .001

Table 12

Hierarchical Linear Regression Analysis – Environmental Factors on Academic Behavior

Predictor	B	SE B	β	t
Constant	3.33	.28		12.06
Parent Support	.22	.04	.27***	5.48
Teacher Support	.06	.04	.09	1.70
Peer Support	.13	.04	.19***	3.59

Note. R^2 = .27 (F= 29.28, df= 5, 401, p < .001)
* p < .05, ** p < .01, *** p < .001

Table 13

Hierarchical Linear Regression Analysis – Environmental Factors on Academic Achievement

Predictor	B	SE B	β	t
Constant	3.81	.96		3.99
Parent Support	.44	.14	.17**	3.10
Teacher Support	.30	.13	.14*	2.44
Peer Support	.37	.12	.18**	3.09

Note. $R^2 = .16$ ($F = 14.73$, $df = 5, 397$, $p < .001$)
* $p < .05$, ** $p < .01$, *** $p < .001$

Table 14

Hierarchical Linear Regression Analysis – Interpersonal Factors on English/Language Arts Grade

Predictor	B	SE B	β	t
Constant	.42	.64		.66
Parent Support	.31	.09	.17**	3.29
Teacher Support	.20	.08	.13*	2.37
Peer Support	.23	.08	.16**	2.88

Note. $R^2 = .21$ ($F = 21.43$, $df = 5, 401$, $p < .001$)
* $p < .05$, ** $p < .01$, *** $p < .001$

Table 15

Hierarchical Linear Regression Analysis – Environmental Factors on Mathematics Grade

Predictor	B	SE B	β	t
Constant	3.74	.73		5.15
Parent Support	.03	.11	.01	.26
Teacher Support	.44	.10	.28***	4.68
Peer Support	-.02	.09	-.01	-.18

Note. $R^2 = .09$ ($F = 7.47$, $df = 5, 401$, $p < .001$)
* $p < .05$, ** $p < .01$, *** $p < .001$

Table 16

Hierarchical Linear Regression Analysis – Environmental Factors on Science Grade

Predictor	B	SE B	β	t
Constant	2.21	.70		3.15
Parent Support	.16	.10	.09	1.56
Teacher Support	.13	.09	.08	1.38
Peer Support	.22	.09	.15*	2.47

Note. $R^2 = .08$ ($F = 6.46$, $df = 5, 401$, $p < .001$)
* $p < .05$, ** $p < .01$, *** $p < .001$

Table 17

Hierarchical Linear Regression Analysis – Environmental Factors on Social Studies Grade

Predictor	B	SE B	β	t
Constant	1.77	.63		2.82
Parent Support	.07	.09	.04	.79
Teacher Support	.02	.08	.01	.18
Peer Support	.33	.08	.25***	4.11

Note. $R^2 = .09$ ($F = 7.94$, $df = 5, 401$, $p < .001$)
* $p < .05$, ** $p < .01$, *** $p < .001$

Research Question 3: Do environmental factors (parent support, teacher support, peer support) explain variance in academic variables (engagement, behavior, achievement) above and beyond executive functioning and future orientation? Which of these factors matter the most in predicting academic achievement?

To examine whether environmental factors explain variance in the academic variables above and beyond intrapersonal variables, seven hierarchical linear regression analyses were run. The intrapersonal predictor variables were entered together at step two, after sex and grade at step one. The environmental variables were entered at step three. For academic engagement, the model was significant at step two ($R^2 = .55$, $F = 96.16$, $df = 5, 400$, $p < .001$), significantly above and beyond that accounted for at step one (R^2 change= .50, $p < .001$). The model was also significant at step three ($R^2 = .62$, $F = 79.28$, $df = 8, 397$, $p < .001$), significantly above that accounted for at step two (R^2 change= .07, $p < .001$). An analysis of the standardized beta weights revealed that all predictor variables aside from long-term goals were found to be significant within the model, including executive functioning ($\beta = .34$, $t = 9.33$, $p < .001$), future

educational goals (β = .32, t = 8.62, p < .001), parent support (β = .11, t = 2.95, p < .01), teacher support (β = .15, t = 3.82, p < .001), and peer support (β = .15, t = 3.70, p < .001). Further analysis of the beta weights suggests that executive functioning and future educational goals held more than twice the weight of parent support, teacher support, and peer support. See Table 18.

In examining academic behavior, the model was significant at step two (R^2= .33, F= 38.47, df= 5, 400, p < .001), significantly above and beyond that accounted for at step one (R^2 change= .25, p < .001). The model was also significant at step three (R^2= .36, F= 28.33, df= 8, 397, p < .001), significantly above that accounted for at step two (R^2 change= .04, p < .001). An analysis of the standardized beta weights revealed that the predictor variables of executive functioning (β = .25, t = 5.31, p < .001), future educational goals (β = .22, t = 4.71, p < .001), and parent support (β = .15, t = 3.04, p < .01) were found to be significant within the model. Long-term goals, teacher support, and peer support were not significant, although peer support was only non-significant by a small amount In looking more closely at the beta weights, it appears that executive functioning and future educational goals held the most weight, as previously observed with academic engagement. See Table 19.

For academic achievement, the model was significant at step two (R^2= .27, F= 29.73, df= 5, 396, p < .001), significantly above and beyond that accounted for at step one (R^2 change= .26, p < .001). The model was also significant at step three (R^2= .30, F= 20.90, df= 8, 393, p < .001), significantly above that accounted for at step two (R^2 change= .03, p < .01). An analysis of the standardized beta weights revealed that executive functioning (β = .29, t = 5.94, p < .001), long-term goals (β = -.16, t = -3.26, p < .01), future educational goals (β = .27, t = 5.47, p < .001), and teacher support (β = .13, t = 2.33, p < .05) were found to be significant within the model. Parent support and peer support were not significant. A closer examination of the beta weights reveals

that while executive functioning, long-term goals, future educational goals, and teacher support were significant, executive functioning and future educational goals held more than twice the amount of weight as long-term goals and teacher support. See Table 20.

In examining specific subjects areas, for English/Language Arts, the model was significant at step two (R^2= .23, F= 23.99, df= 5, 400, $p < .001$), which is significantly above and beyond that accounted for at step one (R^2 change= .15, $p < .001$). The model was also significant at step three (R^2= .26, F= 17.76, df= 8, 397, $p < .001$), significantly above that accounted for at step two (R^2 change= .03, $p < .01$). An analysis of the standardized beta weights revealed that executive functioning (β = .20, t = 3.94, $p < .001$), future educational goals (β = .15, t = 2.92, $p <$ .01), and teacher support (β = .11, t = 2.05, $p < .05$) were found to be significant within the model. Long-term goals, parent support, and peer support were not significant. See Table 21.

In looking at grades in mathematics courses, the model was significant at step two (R^2= .11, F= 9.42, df= 5, 400, $p < .001$), significantly above and beyond that accounted for at step one (R^2 change= .10, $p < .001$). The model was also significant at step three (R^2= .15, F= 8.88, df= 8, 397, $p < .001$), significantly above that accounted for at step two (R^2 change= .05, $p < .001$). An analysis of the standardized beta weights revealed that executive functioning (β = .19, t = 3.53, p < .001), long-term goals (β = -.13, t = -2.52, $p < .05$), future educational goals (β = .19, t = 3.48, $p < .01$), and teacher support (β = .28, t = 4.64, $p < .001$) were found to be significant within the model. Parent support and peer support were not significant. See Table 22.

For science, the model was significant at step two (R^2= .13, F= 11.86, df= 5, 400, $p <$ .001), significantly above and beyond that accounted for at step one (R^2 change= .12, $p < .001$). The model was also significant at step three (R^2= .14, F= 8.03, df= 8, 397, $p < .001$), but not significantly above that accounted for at step two. An analysis of the standardized beta weights

revealed that only executive functioning (β = .25, t = 4.51, p < .001) and future educational goals (β = .13, t = 2.42, p < .05) were significant within the model. Long-term goals, as well as each of the support variables, were not significant. See Table 23.

In the area of social studies, the model was significant at step two (R^2= .14, F= 12.78, df= 5, 400, p < .001), significantly above and beyond that accounted for at step one (R^2 change= .11, p < .001). The model was also significant at step three (R^2= .16, F= 9.40, df= 8, 397, p < .001), significantly above that accounted for at step two (R^2 change= .02, p < .05). An analysis of the standardized beta weights revealed that executive functioning (β = .27, t = 4.92, p < .001) and peer support (β = .18, t = 3.00, p < .01) were significant within the model. Long-term goals (β = -.10, t = -1.88, p = .061) and future educational goals (β = .10, t = 1.92, p = .056) were not significant at the .05 level, but only very slightly. Parent support and teacher support were not significant. See Table 24.

In looking across each of the four core classes, executive functioning and future educational goals carried the highest beta weights.

Table 18

Hierarchical Linear Regression Analysis – Intrapersonal and Environmental Variables on Academic Engagement

Predictor	B	SE B	β	t
Constant	-.17	.30		-.55
Executive Functioning	.45	.05	.34***	9.33
Long-Term Goals	-.01	.02	-.01	-.36
Educational Goals	.26	.03	.32***	8.62
Parent Support	.13	.05	.11**	2.95
Teacher Support	.14	.04	.15***	3.82
Peer Support	.14	.04	.15***	3.70

Note. $R^2 = .36$ ($F = 28.33$, $df = 8, 397$, $p < .001$)
* $p < .05$, ** $p < .01$, *** $p < .001$

Table 19

Hierarchical Linear Regression Analysis – Intrapersonal and Environmental Variables on Academic Behavior

Predictor	B	SE B	β	t
Constant	2.65	.28		9.57
Executive Functioning	.23	.04	.25***	5.31
Long-Term Goals	-.02	.02	-.06	-1.25
Educational Goals	.13	.03	.22***	4.71
Parent Support	.12	.04	.15**	3.04
Teacher Support	.04	.03	.06	1.23
Peer Support	.06	.03	.10	1.84

Note. $R^2 = .62$ ($F = 79.27$, $df = 8, 397$, $p < .001$)
* $p < .05$, ** $p < .01$, *** $p < .001$

Table 20

Hierarchical Linear Regression Analysis – Intrapersonal and Environmental Variables on Academic Achievement

Predictor	B	SE B	β	t
Constant	1.26	.94		1.35
Executive Functioning	.88	.15	.29***	5.94
Long-Term Goals	-.21	.07	-.16**	-3.26
Educational Goals	.52	.10	.27***	5.47
Parent Support	.08	.14	.03	.57
Teacher Support	.27	.12	.13*	2.33
Peer Support	.17	.12	.08	1.46

Note. $R^2 = .30$ ($F = 20.97$, $df = 8, 393$, $p < .001$)
* $p < .05$, ** $p < .01$, *** $p < .001$

Table 21

Hierarchical Linear Regression Analysis – Intrapersonal and Environmental Variables on English/Language Arts Grade

Predictor	B	SE B	β	t
Constant	-.747	.67		-1.12
Executive Functioning	.41	.11	.20***	3.94
Long-Term Goals	-.05	.05	-.05	-.99
Educational Goals	.20	.07	.15**	2.92
Parent Support	.15	.10	.08	1.53
Teacher Support	.17	.08	.11*	2.05
Peer Support	.13	.08	.09	1.61

Note. $R^2 = .26$ ($F = 17.76$, $df = 8, 397$, $p < .001$)
* $p < .05$, ** $p < .01$, *** $p < .001$

Table 22

Hierarchical Linear Regression Analysis – Intrapersonal and Environmental Variables on Mathematics Grade

Predictor	B	SE B	β	t
Constant	2.52	.75		3.35
Executive Functioning	.42	.12	.19***	3.53
Long-Term Goals	-.13	.05	-.13*	-2.52
Educational Goals	.26	.08	.19**	3.48
Parent Support	-.14	.11	-.07	-1.28
Teacher Support	.43	.09	.28***	4.64
Peer Support	-.11	.09	-.07	-1.17

Note. $R^2 = .15$ ($F = 8.88$, $df = 8, 397$, $p < .001$)
* $p < .05$, ** $p < .01$, *** $p < .001$

Table 23

Hierarchical Linear Regression Analysis – Intrapersonal and Environmental Variables on Science Grade

Predictor	B	SE B	β	t
Constant	.88	.73		1.21
Executive Functioning	.52	.11	.25***	4.51
Long-Term Goals	-.09	.05	-.10	-1.79
Educational Goals	.18	.07	.13*	2.42
Parent Support	.01	.11	.01	.10
Teacher Support	.10	.09	.06	1.08
Peer Support	.11	.09	.08	1.27

Note. $R^2 = .14$ ($F = 8.03$, $df = 8, 397$, $p < .001$)
* $p < .05$, ** $p < .01$, *** $p < .001$

Table 24

Hierarchical Linear Regression Analysis – Intrapersonal and Environmental Variables on Social Studies Grade

Predictor	B	SE B	β	t
Constant	.48	.65		.74
Executive Functioning	.50	.10	.27***	4.92
Long-Term Goals	-.09	.05	-.10	-1.88
Educational Goals	.13	.07	.10	1.92
Parent Support	-.07	.10	-.04	-.76
Teacher Support	.00	.08	.00	.03
Peer Support	.24	.08	.18**	3.00

Note. $R^2 = .16$ ($F = 9.40$, $df = 8, 397$, $p < .001$)
* $p < .05$, ** $p < .01$, *** $p < .001$

Research Question 4: What role do academic behavior and academic engagement play in this predictive model of academic achievement? Specifically, to what degree do academic behavior and academic engagement predict academic achievement?

To examine the predictive nature of academic behavior and academic engagement in regards to academic achievement, a hierarchical linear regression analysis was run. The intrapersonal predictor variables were entered together at step two, after sex and grade at step one. The environmental variables were entered at step three, and academic engagement and academic behavior were entered at step four. The model was significant at step two ($R^2 = .27$, $F = 29.73$, $df = 5, 396$, $p < .001$), significantly above and beyond that accounted for at step one (R^2 change= .25, $p < .001$). The model was also significant at step three ($R^2 = .30$, $F = 20.90$, $df = 8, 393$, $p < .001$), significantly above that accounted for at step two (R^2 change= .03, $p < .01$).

Lastly, the model was also significant at step four (R^2= .39, F= 24.87, df= 10, 391, p < .001), significantly above that accounted for at step three (R^2 change= .09, p < .001). An analysis of the beta weights suggests that the predictor variables found to be significant within the model included executive functioning (β = .15, t = 2.93, p < .01), long-term goals (β = -.14, t = -3.13, p < .01), future educational goals, (β = .14, t = 2.76, p < .01), academic engagement (β = .26, t = 3.35, p < .01), and academic behavior (β = .23, t = 3.84, p < .001). Parent support, teacher support, and friend support were not significant. See Table 25.

In examining English/Language Arts achievement specifically, the model was significant at step two (R^2= .23, F= 23.99, df= 5, 400, p < .001), significantly above and beyond that accounted for at step one (R^2 change= .15, p < .001). The model was also significant at step three (R^2= .26, F= 17.76, df= 8, 397, p < .001), significantly above that accounted for at step two (R^2 change= .03, p < .01). Lastly, the model was also significant at step four (R^2= .35, F= 21.44, df= 10, 395, p < .001), significantly above that accounted for at step three (R^2 change= .09, p < .001). An analysis of the beta weights suggests that the predictor variables found to be significant within the model included academic engagement (β = .28, t = 3.51, p < .01) and academic behavior (β = .21, t = 3.43, p < .01). None of the other predictor variables were significant. See Table 26.

For mathematics grades, the model was significant at step two (R^2= .11, F= 9.42, df= 5, 400, p < .001), significantly above and beyond that accounted for at step one (R^2 change= .10, p < .001). The model was also significant at step three (R^2= .15, F= 8.88, df= 8, 397, p < .001), significantly above that accounted for at step two (R^2 change= .05, p < .01). Lastly, the model was also significant at step four (R^2= .20, F= 10.04, df= 10, 395, p < .001), significantly above that accounted for at step three (R^2 change= .05, p < .001). An analysis of the beta weights

suggests that the predictor variables found to be significant within the model included long-term goals (β = -.12, t = -2.32, p < .05), parent support (β = -.12, t = -2.14, p < .05), teacher support (β = .24, t = 4.09, p < .001), and academic behavior (β = .20, t = 3.02, p < .01). Executive functioning, future educational goals, peer support, and academic engagement were not significant. See Table 27.

In examining the core class of science, the model was significant at step two (R^2= .13, F= 11.86, df= 5, 400, p < .001), significantly above and beyond that accounted for at step one (R^2 change= .12, p < .001). The model was also significant at step three (R^2= .14, F= 8.03, df= 8, 397, p < .001), but not significantly above that accounted for at step two. Lastly, the model was also significant at step four (R^2= .20, F= 9.69 df= 10, 395, p < .001), significantly above that accounted for at step three (R^2 change= .06, p < .001). An analysis of the beta weights suggests that the predictor variables found to be significant within the model included executive functioning (β = .15, t = 2.55, p < .05) and academic behavior (β = .25, t = 3.69, p < .001). All other predictive variables were not significant. See Table 28.

Regarding social studies grades, the model was significant at step two (R^2= .14, F= 12.78, df= 5, 400, p < .001), significantly above and beyond that accounted for at step one (R^2 change= .11, p < .001). The model was also significant at step three (R^2= .16, F= 9.40, df= 8, 397, p < .001), significantly above that accounted for at step two (R^2 change= .02, p < .05). Lastly, the model was also significant at step four (R^2= .21, F= 10.63, df= 10, 395, p < .001), significantly above that accounted for at step three (R^2 change= .05, p < .001). An analysis of the beta weights suggests that the predictor variables found to be significant within the model included executive functioning (β = .15, t = 2.57, p < .05), peer support (β = .13, t = -2.21, p < .05), academic engagement (β = .24, t = 2.81, p < .01), and academic behavior (β = .14, t = 2.05, p <

.05). Long-term goals, future educational goals, parent support, and teacher support were not significant. See Table 29.

Table 25

Hierarchical Linear Regression Analysis – Academic Engagement and Academic Behaviors on Academic Achievement

Predictor	B	SE B	β	t
Constant	-.57	1.02		-.56
Executive Functioning	.44	.15	.15**	2.93
Long-Term Goals	-.19	.06	-.14**	-3.13
Educational Goals	.27	.10	.14**	2.76
Parent Support	-.09	.13	-.03	-.68
Teacher Support	.15	.11	.07	1.40
Peer Support	.05	.11	.02	.41
Academic Engagement	.58	.17	.26**	3.35
Academic Behavior	.73	.19	.23***	3.84

Note. $R^2 = .39$ ($F = 24.87$, $df = 10, 391$, $p < .001$)
* $p < .05$, ** $p < .01$, *** $p < .001$

Table 26

Hierarchical Linear Regression Analysis – Academic Engagement and Academic Behaviors on English/Language Arts Grade

Predictor	B	SE B	β	t
Constant	-1.91	.73		-2.62
Executive Functioning	.11	.11	.05	1.01
Long-Term Goals	-.03	.04	-.03	-.72
Educational Goals	.02	.07	.02	.29
Parent Support	.04	.09	.02	.37
Teacher Support	.09	.08	.06	1.10
Peer Support	.04	.08	.03	.54
Academic Engagement	.44	.12	.28**	3.51
Academic Behavior	.47	.14	.21**	3.43

Note. $R^2 = .35$ ($F = 21.44$, $df = 10, 395$, $p < .001$)
* $p < .05$, ** $p < .01$, *** $p < .001$

Table 27

Hierarchical Linear Regression Analysis – Academic Engagement and Academic Behaviors on Mathematics Grade

Predictor	B	SE B	β	t
Constant	1.29	.85		1.51
Executive Functioning	.20	.13	.09	1.56
Long-Term Goals	-.12	.05	-.12*	-2.32
Educational Goals	.14	.08	.10	1.70
Parent Support	-.23	.11	-.12*	-2.14
Teacher Support	.38	.09	.24***	4.09
Peer Support	-.17	.09	-.11	-1.88
Academic Engagement	.24	.15	.15	1.68
Academic Behavior	.48	.16	.20**	3.02

Note. $R^2 = .20$ ($F = 10.04$, $df = 10, 395$, $p < .001$)
* $p < .05$, ** $p < .01$, *** $p < .001$

Table 28

Hierarchical Linear Regression Analysis – Academic Engagement and Academic Behaviors on Science Grade

Predictor	B	SE B	β	t
Constant	-.59	.82		-.72
Executive Functioning	.31	.12	.15*	2.55
Long-Term Goals	-.08	.05	-.08	-1.54
Educational Goals	.06	.08	.05	.78
Parent Support	-.08	.11	-.04	-.77
Teacher Support	.05	.09	.03	.56
Peer Support	.06	.09	.04	.63
Academic Engagement	.16	.14	.10	1.17
Academic Behavior	.56	.15	.25***	3.69

Note. $R^2 = .20$ ($F = 9.69$, $df = 10, 395$, $p < .001$)
* $p < .05$, ** $p < .01$, *** $p < .001$

Table 29

Hierarchical Linear Regression Analysis – Academic Engagement and Academic Behaviors on Social Studies Grade

Predictor	B	SE B	β	t
Constant	-.20	.73		-.28
Executive Functioning	.28	.11	.15*	2.57
Long-Term Goals	-.08	.04	-.09	-1.72
Educational Goals	-.00	.07	-.00	-.06
Parent Support	-.15	.09	-.09	-1.63
Teacher Support	-.06	.08	-.04	-.75
Peer Support	.18	.08	.13*	2.21
Academic Engagement	.35	.13	.24**	2.81
Academic Behavior	.28	.14	.14*	2.05

Note. $R^2 = .21$ ($F = 10.63$, $df = 10, 395$, $p < .001$)
* $p < .05$, ** $p < .01$, *** $p < .001$

CHAPTER 5 DISCUSSION

Making the transition to and through high school is an inevitably challenging time for most students as they are presented with a new way of thinking about school and achievement. GPA, SAT scores, and other achievement-related variables take on new meaning, as these variables become the primary vessel in reaching one's goals in life. Specifically, in today's society, the emphasis placed on attending college and choosing a career that will lend itself to financial success often clouds the importance of fostering many other important variables that can contribute to academic success, such as successful academic behaviors, an investment and engagement with school, and support from parents, teachers and peers, among others. As students seemingly must attain a higher level of requirements than ever before, it is difficult to find opportunities to focus on teaching and honing in on key intrapersonal and environmental variables that have been shown to be associated with higher academic engagement, behaviors, and achievement. However, research has shown that behaviors and cognitions are flexible and impressionable in regards to individual variables and interactions with the contextual environment (Kelso, 2000); thus, it is imperative to grow the body of literature that details these key variables in order to ultimately lead to their incorporation within the school environment.

Referring back to Bronfenbrenner's ecological model (1977; 1979; 2005) that details the systems in which an individual develops, the current study investigated this system through the eyes of the individual (at the center of Bronfenbrenner's theory), as well as the innermost ring, the microsystem, which contains the individuals and groups that most directly impact an individual's development (Bronfenbrenner, 1977; 1979; 2005). Specifically, the purpose of the current study was to explore the degree to which select intrapersonal variables (executive functioning, long-term goals, and future educational goals) and environmental variables (parent,

teacher, and peer support) were associated with academic engagement, academic behaviors, and academic achievement. In this respect, academic engagement and academic behaviors are considered outcome variables, but as mentioned, they hold predictive value as well. Specifically, understanding how invested in school students are, as well as the successful academic behaviors they display, is important because both areas have been shown to be positively associated with academic achievement (Finn & Rock, 1997; Chen, 2005; Sirin & Rogers-Sirin, 2005; Balfanz & Byrnes, 2006; Gottfried, 2009; 2011; Larson & Rusk, 2011; Parke & Kanyongo, 2012; Smith & Cook, 2012; Morrissey et al., 2014; Mahoney, 2015).

Various themes emerged in the current study. A consistent trend throughout almost all analyses was the significance of executive functioning skills and future educational goals. Consistent with research that has shown that neuropsychological deficits, particularly those linked with executive functioning skills, are related to academic outcomes (Hinshaw, Carte, Fan, Jassy, & Owens, 2007), these aforementioned variables significantly explained variance in academic engagement, academic behaviors, and academic achievement, sometimes holding almost twice the weight of the support variables. Even when unpacking academic achievement and examining each of the four academic classes – English/Language Arts, mathematics, science, and social studies – executive functioning and future educational goals significantly explained the variance in academic grades in these classes. These findings are in line with the literature pointing to the link between executive functioning skills and various academic areas including math (Bull, Espy, & Wiebe, 2008; Bull & Scerif, 2001; Espy, McDiarmid, Cwik, Stalets, Hamby, & Senn, 2004; Geary, 1993) and reading (Helland & Asbjornsen, 2000; Swanson, 1999).

Nurmi (1991) purported that by the end of high school, the two most important ideas that students are thinking about are future employment and future education. This statement is supported by findings here. For example, while future educational goals consistently and significantly explained the variance in engagement, behaviors, and achievement, long-term goals did not. This may suggest that having goals and future plans in general may not matter as much as knowing that school and graduating are important. Regarding why this may be the case, as previously discussed, doing well in school and obtaining a high school diploma in order to ultimately further one's career appears to be one of the most important ideas communicated by school systems in today's society. Thus, conversations have become less focused on having goals for one's life in general, and more focused on the fact that doing well in school is the first, and sometimes only, step to begin even thinking about what one may want to accomplish in life.

Additionally, in regards to executive functioning, current findings suggest that the ability to plan, organize, sustain attention, inhibit impulses, and control emotions not only significantly explained the variance in the grades that students' earned, but also how engaged students were in school and the successful behaviors that they displayed. If a student possesses a higher degree of executive functioning skills, he or she may also be likely to take the time to think about how school really works; specifically, he or she may be more likely to engage in planning and being organized. Additionally, these types of students may also be more likely to believe that studying for tests and working hard are important. Further, they may also be more likely to have higher engagement because they will be less likely to violate school rules (and thus, be less impulsive) and more likely to pay attention in class and to their homework. These findings are newer contributions to the literature, as the link between executive functioning skills and academic engagement and behaviors has not been thoroughly studied in this area thus far.

Interestingly, however, with respect to overall grades a student typically obtains, long-term goals significantly explained the variance in academic achievement. This was the only time in which long-term goals significantly explained the variance in any of the dependent variables. Perhaps having goals for one's life in general somehow leads to better achievement because those students are more innately capable of achieving higher grades. Specifically, because these students may be more innately inclined to have higher grades, they may not necessarily need to be engaged and invested with school or demonstrate successful behaviors. Although not voluminous, there is some research that has shown that being future oriented is associated with high motivation and positive perceptions of future education and employment (Nurmi, 1991; Seginer, 2009). Given the present study's findings, it is clear that additional research investigating the difference between future educational goals and broader, long-term goals is needed to fully understand how each predicts academic engagement, behaviors, and achievement.

While parent, teacher, and peer support all significantly explained variance in academic engagement, behaviors, and achievement in some way, their significance varied depending on the outcome variable. For example, all three support variables significantly explained variance in academic engagement and academic achievement, consistent with research that has also shown a positive link between student achievement and engagement, respectively (Chen, 2005; Tucker, Zayco, Herman, Reinke, Trujillo, Carraway, Wallack & Ivery, 2002). However, perceived support of teachers was not significantly linked to academic behaviors. Although the link between teacher support and academic behaviors was not very far from being significant, this is an interesting finding, given that teachers are often thought of as the primary means through which the importance of behaviors such as studying for a test, coming to class on time,

turning in homework, and paying attention in class are communicated. However, given the increased rigor of the curriculum and the requirement to include more content-driven instruction within a class period, teachers may not have the time to explicitly "teach" these successful academic behaviors. Instead, it may be the case that students observe their friends demonstrating successful behaviors and achieving, and thus, they emulate those behaviors as well. Similarly, perhaps having the support of one's parents as it relates to school makes students more likely to adopt successful behaviors. Overall, current findings are consistent with previous literature indicating that academic support provided by both parents and teachers is associated with higher academic performance in adolescents (Gottfried, Fleming, & Gottfried, 1994; Wentzel, 1998; Chen, 2008; Muller, 1998).

The current study also investigated the equally important predictive nature of academic engagement and behaviors to determine each one's association with academic achievement. Results indicated that displaying successful academic behaviors and being engaged in school did, in fact, significantly explain variance in academic achievement, indicating that both of these key variables made a difference in whether students were academically successful. Across each of the four core classes, academic behavior consistently and significantly explained the variance in achievement, but academic engagement only significantly explained the variance in English/Language Arts and social studies. Perhaps the latter two classes involve more engagement due to being a more discussion-based environment and requiring more inferential, higher-order thinking and writing. This could be explored more in future research.

Limitations and Directions for Future Research

Regarding limitations for the current study, the students who completed questionnaires were enrolled in 9th through 11th grade. Thus, no 12th grade students participated in the study due

to already being dismissed from school. Consequently, it could be important to explore whether any differences in results would be found by including 12th grade students and thus considering the developmental trajectory into that final year of high school. At that point, the 12th grade students that have been accepted to colleges or otherwise have chosen their post-high school career paths, and thus the patterns of relations among these variables may be different. Further, although the current study controlled for grade-level differences due to not being of interest for the study, future research may seek to examine grade-level differences. Specifically, although numerous studies have shown a positive association between academic engagement and academic achievement, others have shown declines in academic engagement as students become older (Seidman, Allen, Aber, Mitchell, & Feinman, 1994; Wang & Eccles, 2012). Thus, investigating whether students are more future-oriented as they age, and if they display a higher frequency of successful academic behaviors or perceive differing levels of support from important groups of individuals in their lives, would be important in order to more closely understand what explains variance in academic achievement across the full high school age range.

Another limitation of the study is the fact that data regarding academic achievement and grades in each of the four core classes was gathered though self-report. This lends itself to the possibility that data reported was not necessarily accurate and thus, possibly not an accurate representation of some students' levels academic achievement, one of the main dependent measures of the study. It is likely that students who do not consistently display successful academic behaviors such as checking their online grade book may have over- or under-estimated their overall grades or grades in various classes, a correlation that could be an area of future research as well. It would also be beneficial for future research to determine a means of

collecting more accurate data regarding students' actual grades and grade-point averages (GPAs), while still protecting the anonymity of students' identities. Similarly, because the overall averages of each of the measures were high, there is also the possibility that students not only overestimated their grades, but their executive functioning abilities or academic engagement as well.

Implications and Conclusions

Despite the aforementioned limitations, the current study's findings hold important practical implications for how society views the importance of academic engagement, academic behaviors, intrapersonal factors, and environmental factors in regards to their link with academic achievement. Throughout each of the analyses performed, one major finding that emerged in understanding what explained variance in student success was the consistent significant role of executive functioning skills and future educational goals. Often underestimated in the school environment is the role of executive functioning in learning. Specifically, there is a need to explicitly teach students the importance of being organized, paying attention, and avoiding distractions as much as possible, and as the current study demonstrates, these are key variables in not only understanding a student's achievement, but their engagement and behaviors as well. Even more important, though, is the need to provide teachers with a 'tool box' of strategies for how to teach students with executive functioning skills deficits, including such techniques as allowing for student movement to facilitate work production, taking 'brain breaks' before, during or after the teaching of a lesson, and teaching study skills or organizational techniques such as using a planner.

The implications of the above findings are also important in that how students perceive support from those around them plays a role in the degree to which they view school as

important. Specifically, understanding the conversations and support that parents, teachers, and peers have and show to students is part of understanding how students think about school and how invested students are in school. This becomes imperative then, that teachers, parents, and peers communicate their supportiveness to their children, students, and friends, respectively, and not just assume that this support is implicitly understood. Teachers may need explicit information about how best to do this; specifically, they may need to know that in addition to providing a thorough and well-planned academic lesson, it is equally important to encourage the importance of studying and the importance of attending class every day, for example. This is especially important to do at the high school level, as it is often assumed that students come to high school already knowing how to study or knowing the value of good attendance and arriving to class on time. Perhaps school principals need to inform all teachers to communicate their support to students at specific times throughout the school year as well.

In examining which variables matter the most in terms of their link with academic engagement, academic behaviors, and academic achievement, analyses showed that as a whole, both intrapersonal and environmental factors significantly explain the variance in the dependent measures of achievement. However, an even closer examination reveals that while the support variables were significant, the variance explained was small, meaning that it is only one part of the equation in the quest to explain what explains the variance in engagement, behaviors, and achievement. Specifically, as mentioned above, executive functioning skills and future educational goals consistently held more than twice the weight of the other significant variables. How then, does one capitalize on these findings to intervene in a student's schooling career to ultimately increase academic achievement?

Although considered to be intrapersonal factors because of the fact that each construct involves the processes that occur within the individual, it is imperative that interventions to increase these constructs begin on an interpersonal level – with the support of parents, teachers, and peers. Specifically, schools need to allow for more explicit teaching of executive functioning skills early one in one's education. Because executive functioning skills are often associated with a medical diagnosis of ADHD, it is possible that a belief that executive functioning skills are not malleable often prevents intervention. And as mentioned, teachers and parents are not necessarily teaching and practicing the development of executive functioning skills because of our increasingly technological environment. Parents put more events directly into their phones, such as play dates or doctors appointments, and not as frequently onto a visible calendar so that their children can observe when an event will occur and the time that will lapse before that event occurs. Further, because society has become so accustomed to getting immediate results such as typing in directions the moment one enters the car or researching information on a search engine that will provide results in approximately a second, the need to plan ahead has essentially been eliminated.

In this respect, thoughts about the future may not occur as readily due to being more 'in-the-moment', so the focus becomes more on the mere importance of school and less on the importance in setting both short- and long-term goals. It is inevitable that this technological world will not slow down anytime soon, so it is critical to find time and ways to not only teach students the importance of doing well in school, but how to get there. Having more meaningful conversations with children and students about what it means to be successful, the various behaviors that successful students display, and what each support system can provide for a student is a major step in allowing students to advocate for what they need to be successful and

to start practicing the important life-long behaviors that will not only lead to academic achievement, but achievement in one's aspirations, endeavors, and values.

APPENDIX A

Letter of Support from Berkley High School

BERKLEY SCHOOLS

BERKLEY HIGH SCHOOL
WWW.BERKLEYSCHOOLS.ORG

March 30, 2016

Elizabeth Robtoy
Doctoral Candidate, Wayne State University
112 Jeffrey Avenue
Royal Oak, Michigan 48073

Dear Elizabeth Robtoy,

This letter is to confirm that I have agreed to allow you to collect data from students at Berkley High School for your dissertation research examining the various factors that influence academic achievement. I understand that participating students will be completing several questionnaires measures factors including teacher and parent scaffolding, future orientation, peer supports, executive functioning skills, and academic engagement. I have been informed that students will have the opportunity to decline or discontinue participation at any time. I understand the methods for ensuring confidentiality.

Yours in Education,

Randall P. Gawel
Principal, Berkley High School

APPENDIX B

Parent Supplemental Information Letter with "Decline to Participate" Option

Title of Study: The role of academic behavior, engagement, and supports on academic achievement

Researcher's Name: Elizabeth Robtoy

Purpose:
You are being asked to allow your child to be in a research study at their school that is being conducted by Ph.D. candidate Elizabeth Robtoy in the department of Educational Psychology at Wayne State University to find out how parent, teacher, and peer supports, as well as executive functioning skills and thoughts about the future, are related to achievement behaviors, academic engagement, and academic achievement. Your child has been selected, because he or she attends Berkley High School, and is between 14 to 18 years of age.

Study Procedures:
If you decide to allow your child to take part in the study, your child will be asked to participate in a brief study lasting no longer than twenty minutes. He or she will complete questionnaires addressing a number of topics, including achievement behaviors, academic engagement, academic achievement, executive functioning, future orientation, parent academic support, teacher academic support, and peer academic support.

- Your child has the option of not answering some of the questions in the study, may decline participate, or withdraw from the study entirely, even after deciding to participate.
- Your child will be in the study for one 15-20 minute survey, which will take place in his or her English class for one day.
- Copies of the survey are held by the primary investigator (Elizabeth Robtoy) and the supervising professor and may be reviewed by the parents upon request.

Benefits:
As a participant in this research study, there may be no direct benefit for your child; however, information from this study may benefit other people now or in the future.

Risks:
There are no known risks at this time to participation in this study.

Costs:
There are no costs to you or your child to participate in this study.

Compensation:
For taking part in this research study, your child will receive a piece of candy of his or her choosing.

Confidentiality:
All information collected about your child during the course of this study will be kept confidential to the extent permitted by law. All information collected about your child during the

course of this study will be kept without any identifiers. Thus, the data are anonymous. There is no way to trace any survey back to a particular student.

Voluntary Participation/Withdrawal:
Your child's participation in this study is voluntary. He/she may withdraw at any time. You are free to withdraw your child at any time. Your decision about enrolling your child in the study will not change any present or future relationships with Wayne State University or its affiliates, your child's school, your child's teacher, your child's grades or other services you or your child are entitled to receive.

Questions:
If you have any questions about this study now or in the future, you may contact Elizabeth Robtoy at the following phone number: . If you have questions or concerns about your rights as a research participant, the Chair of the Institutional Review Board can be contacted at (313) 577-1628. If you are unable to contact the research staff, or if you want to talk to someone other than the research staff, you may also call (313) 577-1628 to ask questions or voice concerns or complaints.

If you do not wish to have your child participant in the study, you may fill out the form and return it to your child's teacher.

I do not allow my child _____to participate in this research study.

Name

_____
Printed Name of Parent

_____ _____
Signature of Parent Date

APPENDIX C

Administration Script

Good morning/afternoon class,

My name is Elizabeth Robtoy and I am a doctoral student at Wayne State University. Today you will have the opportunity to participate in a survey about how different factors such as parent, teacher, and peer support are related to academic achievement and achievement-related behaviors. The survey will ask a number of questions, and should only take about 20 minutes.

A form was mailed to your home that explained this to your parents also. Your parents have had the option to not have you participate. You do not have to complete the surveys if you do not want to. You can stop the survey at any time. Your completion of the survey will not affect the way are treated by any staff member or myself.

Please be sure to read both pages of the information sheet we give you, and put your initials at the bottom of each page to show that you read them. If you choose to be in the study, please pick up a survey from this envelope (marked "blank surveys"). Bring the survey back to your desk and fill it out. Please keep your answers covered with a piece of paper as you go, so no one can see your answers. Keep your eyes on your own survey. Please check to make sure you've answered all questions on the survey. Please remember this is not a test and it will not be graded. It does not have an impact on your grades or school work whatsoever. It is just important that you are very honest. Please do not put your name on any of the surveys. Each packet is uniquely coded with a number that identifies the data only, not you as a person. The surveys are completely anonymous, so **no one** will ever know what answers you give.

Please raise your hand if you need help at any time. When you are done with the survey, bring it back up to me, and place it in this envelope (marked "finished surveys"). You can then take a piece of candy, even if you did not complete the entire survey. If you are not participating, you can complete course work as regularly scheduled.

It is very important that you do not discuss the survey or your answers with other students or staff. If you have any questions, please tell an adult at school.

Thank you very much.

APPENDIX D

Documentation of Adolescent Assent Form

(Ages 13-17)

Title: The role of academic behavior, engagement, and supports on academic achievement
Study Investigator: Elizabeth Robtoy

Why am I here?
This is a research study. Only people who choose to take part are included in research studies. You are being asked to take part in this study because you are a student attending Berkley High School, and are between the ages of 14 years to 18 years. Please take time to make your decision. Be sure to ask questions about anything you don't understand.

Why are they doing this study?
This study is being done to find out what factors predict students' academic achievement, achievement-related behaviors, and academic engagement in order to help understand how to help students demonstrate achievement. This study is also trying to understand how these achievement-related behaviors and engagement are related to their academic achievement.

What will happen to me?
You will be provided the opportunity to complete a short survey that will ask questions about the how you perceive parent, teacher, and peer supports, as well as questions about your current academic achievement, the types of behavior you use to be successful, your engagement with school, your planning skills, and how you think about the future.

How long will I be in the study?
You will be in the study for just this one-time survey, which is expected to last no longer than 20 minutes.

Will the study help me?
In taking the study, you may gain insight about your parents, teachers, and peers, as well as your own behavior and personal feelings. This study may also help other people in the future by providing critical information about which factors within a student, and in a students' lives, lead to academic achievement.

Will anything bad happen to me?
There are no known risks at this time to participation in this study.

Will I get paid to be in the study?
For taking part in this research study, you will receive a piece of candy of your choosing.

Do my parents or guardians know about this? (If applicable)
This study information has been given to your parents or guardian, and they were given the opportunity to decline your participation. You can talk this over with them before you decide whether you wish to participate. However, nobody will ever be allowed to see your answers.

What about confidentiality?
This study is completely anonymous. You will ***not*** write your name on the survey, so none of the information you provide can be linked back to you. We will keep your records private unless we are required by law to share any information. The law only says that we have to tell someone if you might hurt yourself or someone else.

What if I have any questions?
For questions about the study please call Elizabeth Robtoy at (586) 596-8677. If you have questions or concerns about your rights as a research participant, the Chair of the Institutional Review Board can be contacted at (313) 577-1628.

Do I have to be in the study?
You don't have to be in this study if you don't want to or you can stop being in the study at any time. Please discuss your decision with your parents and researcher. No one will be angry if you decide to stop being in the study.

APPENDIX E

SURVEY INSTRUMENT

SECTION 1: Please answer the following questions about yourself.

1. What grade are you in? (circle one)

   9th 10th 11th 12th

2. What is your sex? (circle one)

   Male Female

3. What is your ethnicity?

_____ African American _____ Hispanic-American/Latino-Latina

_____ Caucasian _____ Asian/Pacific Islander

_____ American Indian ____ Other: _____

4. What grades do you most often receive? Circle the response below that more accurately describes your overall grades:

As	As and Bs	Bs	Bs and Cs	Cs	Cs and Ds	Ds	Ds and Es	Es
1	2	3	4	5	6	7	8	9

What were your most recent grades in each of the following classes (circle):

English/Language Arts:	A	B	C	D	E
Math:	A	B	C	D	E
Science:	A	B	C	D	E
Social Studies:	A	B	C	D	E

5. Are you in a Resource Room for Math or English, or an LRC classroom (circle)?

   Yes No

SECTION 2: Please indicate HOW MANY DAYS PER WEEK you display the following behaviors by placing a checkmark in the correct column.

	1 Day	2 Days	3 Days	4 Days	5 Days
Use a planner/calendar to keep track of tests, quizzes, and assignments.					
Complete homework/classwork					
Turn in homework/classwork					
Pay good attention in class					
Study for class, quiz, or test					
Look at online gradebook					
Come to school					
On-time to 1st Hour					
On-time to 2nd Hour					
On-time to 3rd Hour					
On-time to 4th Hour					
On-time to 5th Hour					
On-time to 6th Hour					

SECTION 3: Using the scale below, please circle the number to indicate how much you **engage in** the following academic activities.

	Never	Almost Never	Somewhat	Almost Always	Always
1. I enjoy going to school because I want to learn.	1	2	3	4	5
2. I go to school every day.	1	2	3	4	5
3. I go to school on time every day.	1	2	3	4	5
4. I violate school rules.	1	2	3	4	5
5. I distract other students from paying attention in class.	1	2	3	4	5

6. I don't pay attention in class.	1	2	3	4	5
7. I take careful notes in class.	1	2	3	4	5
8. When my teachers assign students work to do in class. I work hard to complete it well.	1	2	3	4	5
9. I always submit homework on time.	1	2	3	4	5
10. I work hard to complete homework.	1	2	3	4	5
11. I often find extra schoolwork to do.	1	2	3	4	5
12. I study hard for all my examinations.	1	2	3	4	5
13. I don't pay serious attention to my schoolwork.	1	2	3	4	5
14. I don't care about whether I do well in school or not.	1	2	3	4	5
15. If I do well on a test, I am encouraged to continue to study hard.	1	2	3	4	5
16. If I don't do well on a test, I am determined to study harder to do better next time.	1	2	3	4	5
17. If I don't understand schoolwork, I find ways to understand it.	1	2	3	4	5
18. I put full effort into schoolwork.	1	2	3	4	5
19. I find ways to motivate myself to study.	1	2	3	4	5
20. I help other students with their schoolwork.	1	2	3	4	5
21. I finish schoolwork before I play.	1	2	3	4	5
22. I spend most of my time doing homework and studying.	1	2	3	4	5
23. I set high expectations for myself to do well in school.	1	2	3	4	5
24. I have high expectations that I will get into college.	1	2	3	4	5
25. Overall, I consider myself a good student.	1	2	3	4	5

SECTION 4: How often do you experience each of these problems? Please circle the number next to each item that best describes your behavior **DURING THE PAST 6 MONTHS.**

	Never or Rarely	Sometimes	Often	Very Often
1. Procrastinate or put off doing things until the last minute	1	2	3	4
2. Can't seem to hold in mind things I need to remember to do	1	2	3	4
3. Not motivated to prepare in advance for things I know I am supposed to do	1	2	3	4
4. Have trouble doing what I tell myself to do	1	2	3	4
5. Have trouble learning new or complex activities as well as others	1	2	3	4
6. Have difficulty explaining things in their proper order or sequence	1	2	3	4
7. Unable to "think on my feet" or respond as effectively as others to unexpected events	1	2	3	4
8. I don't seem to process information as quickly or as accurately as others	1	2	3	4
9. Unable to inhibit my reactions or responses to events or others	1	2	3	4
10. Make impulsive comments to others	1	2	3	4
11. Likely to do things without considering the consequences for doing them	1	2	3	4
12. Fail to consider past relevant events or past personal experiences before responding to situations (I act without thinking)	1	2	3	4
13. Do not put as much effort into my work as I should or than others are able to do	1	2	3	4
14. Others tell me I am lazy or unmotivated	1	2	3	4
15. Inconsistent in the quality or quantity of my work performance	1	2	3	4
16. Unable to work as well as others without supervision or frequent instruction	1	2	3	4

17. Have trouble calming myself down once I am emotionally upset	1	2	3	4
18. Cannot seem to regain emotional control and become more reasonable once I am emotional	1	2	3	4
19. Cannot seem to distract myself away from whatever is upsetting me emotionally to help calm me down. I can't refocus my mind to a more positive framework.	1	2	3	4
20. I remain emotional or upset longer than others	1	2	3	4

SECTION 5: Please use the following scale to circle the number next to each item to indicate the degree you agree with the next group of questions.

	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
1. I don't know what I want out of life.	1	2	3	4	5
2. I have a good idea of where I'm headed in the future.	1	2	3	4	5
3. I know what I want out of life.	1	2	3	4	5
4. I have a clear picture of what I'd like to be doing in the future.	1	2	3	4	5
5. I know what my long-range goals are.	1	2	3	4	5
6. Earning a diploma is an important goal to me.	1	2	3	4	5
7. School is important to my future.	1	2	3	4	5

SECTION 6: Using the scale below, please circle the number to indicate how much you agree with the following statements about your **parent(s)/guardian(s).**

	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
1. I feel comfortable sharing with my parents about my school problems.	1	2	3	4	5
2. My parents help me find ways to resolve school problems.	1	2	3	4	5

3. My parents discuss with me about my future plans with study.	1	2	3	4	5
4. My parents discuss with me about my future plans with work.	1	2	3	4	5
5. My parents don't care about whether I do well in school or not.	1	2	3	4	5
6. My parents don't care about my learning progress.	1	2	3	4	5
7. My parents want me to do my best in school.	1	2	3	4	5
8. My parents have high expectations for me to do well in school.	1	2	3	4	5
9. My parents have high expectations that I will go to college.	1	2	3	4	5
10. I feel pressure by my parents to do well in school.	1	2	3	4	5
11. When I do well on a test, my parents praise me.	1	2	3	4	5
12. When I don't do well on a test, my parents encourage me to study harder to do better next time.	1	2	3	4	5
13. My parents have a positive influence on how I behave toward schooling.	1	2	3	4	5
14. My parents provide me with money to buy learning materials.	1	2	3	4	5
15. My parents buy me learning materials.	1	2	3	4	5
16. My parents don't have the money to afford learning materials for me.	1	2	3	4	5
17. My parents encourage me to participate in tutoring to enrich my learning.	1	2	3	4	5
18. My parents don't have the money to afford tutoring for me.	1	2	3	4	5
19. My parents don't have the time to help me with schoolwork.	1	2	3	4	5

20. My parents don't have sufficient knowledge to help me with schoolwork.	1	2	3	4	5
21. My parents have never discussed with my teachers about my school performance.	1	2	3	4	5
22. My parents often ask me about my schoolwork.	1	2	3	4	5
23. My parents don't care about whether I go to school everyday or not.	1	2	3	4	5
24. My parents advise and encourage me to socialize with academically oriented classmates.	1	2	3	4	5
25. My parents advise and encourage me to socialize with well-behaved classmates.	1	2	3	4	5
26. My parents study my report cards and discuss the grades with me.	1	2	3	4	5
27. My parents make sure that I spend the majority of my time doing schoolwork and studying.	1	2	3	4	5
28. Overall, my parents provide support to help me do well in school.	1	2	3	4	5

SECTION 7: Using the scale below, please circle the number to indicate how much you agree with the following statements about your **teachers**.

	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
1. I feel comfortable sharing with my teacher about my school problems.	1	2	3	4	5
2. My teachers help me find ways to resolve school problems.	1	2	3	4	5
3. When I don't understand my schoolwork, I feel comfortable asking my teachers for help.	1	2	3	4	5
4. My teachers have discussed with me about my future plans with study.	1	2	3	4	5
5. My teachers have discussed with me about my future plans with work.	1	2	3	4	5
6. My teachers don't care about whether I do well in school or not.	1	2	3	4	5

7. My teachers don't care about my learning progress.	1	2	3	4	5
8. My teachers are willing to help me learn.	1	2	3	4	5
9. My teachers want to help me to my best in school.	1	2	3	4	5
10. My teachers don't care about whether I come to school everyday or not.	1	2	3	4	5
11. My teachers have high expectations for me to do well in school.	1	2	3	4	5
12. My teachers have high expectations that I will go to college.	1	2	3	4	5
13. When I do well on a test, my teachers praise me.	1	2	3	4	5
14. When I don't do well on a test, my teachers encourage me to study harder to do better next time.	1	2	3	4	5
15. My teachers have a positive influence on how I behave toward schooling.	1	2	3	4	5
16. My teachers provide me with learning materials.	1	2	3	4	5
17. My teachers encourage me to participate in classroom activities.	1	2	3	4	5
18. My teachers carefully check my homework.	1	2	3	4	5
19. My teachers spend time outside of class to explain to me the materials that I don't understand.	1	2	3	4	5
20. If I don't do well in school, my teachers would find out why in order to better help me.	1	2	3	4	5
21. My teachers are willing to meet with my parent(s) to talk about my school performance.	1	2	3	4	5
22. Overall, my teachers provide support to help me to do well in school.	1	2	3	4	5

SECTION 8: Using the scale below, please circle the number to indicate how much you agree with the following statements about your **friends**.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I feel comfortable sharing with my friends about my school problems.	1	2	3	4	5
2. My friends help me find ways to resolve school problems.	1	2	3	4	5
3. If I don't understand my schoolwork, I feel comfortable asking my friends for help.	1	2	3	4	5
4. My friends discussed with me about my future plans with study.	1	2	3	4	5
5. My friends discussed with me about my future plans with work.	1	2	3	4	5
6. My friends don't care about whether I do well in school or not.	1	2	3	4	5
7. My friends don't care about my learning progress.	1	2	3	4	5
8. My friends want to help me to do my best in school.	1	2	3	4	5
9. My friends are willing to help me learn.	1	2	3	4	5
10. My friends want me to advance to the next grade.	1	2	3	4	5
11. My friends have high expectations for me to do well in school.	1	2	3	4	5
12. My friends have high expectations that I will go to college.	1	2	3	4	5
13. My friends and I want to do well in school.	1	2	3	4	5
14. I feel pressured by my friends to do well in school.	1	2	3	4	5
15. When I do well in school, my friends praise me.	1	2	3	4	5
16. When I don't do well on a test, my friends encourage me to study harder to do better next time.	1	2	3	4	5

17. My friends have a positive influence on how I behave toward schooling.	1	2	3	4	5
18. My friends lend me learning materials.	1	2	3	4	5
19. My friends and I spend most of our time together doing homework and studying.	1	2	3	4	5
20. My friends and I have discussed how to prepare for tests, including the ACT or SAT.	1	2	3	4	5
21. If I were absent from school, my friends would help me learn the materials that I missed.	1	2	3	4	5
22. Overall, my friends provide support to help me do well in school.	1	2	3	4	5

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ABSTRACT

HIGH SCHOOL ADOLESCENTS' ACADEMIC ENGAGEMENT, BEHAVIORS, AND ACHIEVEMENT: ASSOCIATIONS WITH INTRAPERSONAL FACTORS AND ACADEMIC SUPPORT SYSTEMS

by

ELIZABETH SUZANNE ROBTOY

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Advisor: Dr. Cheryl Somers

Major: Educational Psychology

Degree: Doctor of Philosophy

The current study investigated the roles of select intrapersonal and environmental factors in high school adolescents' academic engagement, behavior, and achievement. This aforementioned combination of factors has not been considered for their combined ability to explain greater proportions of variance in academic engagement, behavior, and achievement, despite the fact that ecologically, there are multiple life contexts that interact to explain academic achievement development and this selection may provide important information. Participants were 415 high school students (171 males, 244 females) from a mid-western, suburban high school that enrolls about 1,285 students. Future educational goals, as well as executive functioning, emerged as key significant predictors of academic engagement, behaviors, and achievement. Parent, teacher, and peer support also significantly explained a portion of the variance in academic engagement, behaviors, and achievement. These findings are discussed with regard to their usefulness in developing specific interventions to target each of the investigated variables to ultimately increase student engagement, behaviors, and achievement.

AUTOBIOGRAPHICAL STATEMENT

Elizabeth Robtoy

EDUCATION

2016 Doctor of Philosophy (Ph.D.), Wayne State University – Detroit, MI
Major: Educational Psychology

2012 Master of Arts, Wayne State University – Detroit, MI
Major: School and Community Psychology

2010 Bachelors of Arts, Albion College – Albion, MI
Majors: Psychology, Communication Studies
Human Services Concentration

SCHOLARLY HONORS

2010 Bachelor of Arts in Psychology and Communication Studies, *summa cum laude*
Albion College

2010 Departmental Honors in Human Services
Albion College

CURRENT PROFESSIONAL MEMBERSHIPS

2010-Present Michigan Association of School Psychologists
2010-Present National Association of School Psychologists
2010-Present American Psychological Association
2010-Present Phi Beta Kappa, Academic Honor Society 2010

PROFESSIONAL EXPERIENCE

2015-present Clinical Intern.
Common Ground Sanctuary, Royal Oak, MI

2014-present School Psychologist
Berkley School District, Oak Park, MI

2012-2014 School Psychologist
Dearborn Public Schools, Dearborn, MI

LICENSURE AND CERTIFICATION

August 2015 – Michigan: Temporary Limited Licensed Psychologist
June 2013 – Michigan: School Psychology Full Certificate
August 2012 – Michigan: School Psychologist Preliminary Certificate