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**PREDICTING ADOLESCENT ACADEMIC ACHIEVEMENT:
THE ROLE OF INTRAPERSONAL AND RISK BEHAVIOR FACTORS**

by

STEFANIE GILL SCALCUCCI

DISSERTATION

Submitted to the Graduate School

of Wayne State University

Detroit, Michigan

in partial fulfillment of the requirements

for the degree of

DOCTOR OF PHILOSOPHY

2018

MAJOR: EDUCATIONAL PSYCHOLOGY

Approved By:

Advisor

Date

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2018

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DEDICATION

To my grandmother- your accomplishments and tenacity will always be an inspiration.

אתה ממלא את ליבי ותפילותיי.

To my mother- without you this would not have been possible. I am grateful and honored to have you as a mother, mentor, advocate, and friend.

And to my husband- your relentless encouragement and unremitting patience mean so much more than words could ever say.

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CHAPTER 1 INTRODUCTION

A successful career trajectory depends predominantly on successful academic achievement in high school. Academic achievement is a complex multifaceted entity, particularly when associated with physiological, psychological, and psychosocial changes that occur throughout adolescence. Parents' values toward education (e.g., Paulson, 1994; Paulson, Marchant, & Rothlisberg, 1998; Perera, 2014), socioeconomic status (e.g., Baker & Johnston, 2010; Marchant, Paulson, & Schunk, 2006; Sameroff & Peck, 1998; Sirin, 2005), and chronic absenteeism in early elementary years (e.g., Balfanz & Byrnes, 2012; Chang & Romero, 2008) have been well established as important predictors of academic achievement. Research has also shown academic achievement to be associated with executive functioning (e.g., Best, Miller, & Naglieri, 2011; Bull, Espy & Wiebe, 2008; Lutzman, Elkovitch, Young, & Clark, 2010), achievement goal orientation (e.g., Elliot & Church, 1997; Huang, 2012; Middleton & Midgley, 1997), self-efficacy (e.g., Bandura, 1993; Bandura, Barbaranelli, Caprara, & Pastorelli, 1996; Coutinho & Neuman, 2008; Pintrich & DeGroot, 1990), future orientation (e.g., Nurmi, 1991; Raynor, 1970; Scholtens, Rydell, & Yang-Wallentin, 2013), hope (Snyder et al., 1997; Snyder et al., 1991; Robinson & Rose, 2010), risk taking behaviors (e.g., Bryant, Schulenberg, Bachman, O'Malley, & Johnston, 2000; Bryant, Schulenberg, O'Malley, Bachman, & Johnston, 2003; Centers for Disease Control and Prevention, 2009; Chang & Romero, 2008), and interpersonal relationships (e.g., Asher & Paquette, 2003; Galanaki & Vassilopoulou, 2007; Tucker, Dixon, & Griddine, 2010; Schieferecke & Card, 2013). Some of these constructs have been less well studied, especially in combination, and were of specific interest in this study.

Research conducted by Eccles, Midgley, and Adler (1984) documented a decrease in motivation and academic performance for many students in high school. Researchers have attempted to understand this decline (e.g., Eccles et al., 1984; Linnenbrink & Pintrich, 2002). Importantly, transformations occur in the brain throughout adolescence, which lead to cognitive and social-emotional vulnerability due to maturational changes involving decision-making, sensation seeking, and risk taking (Steinberg, 2005). In an ecological model of human development (Bronfenbrenner, 1979), there are multiple layers of influence on personal development, from immediate (microsystem) to relatively distant (macrosystem) life contexts, with levels in between (mesosystem, exosystem). At the very core of Bronfenbrenner's (1979) model are the dynamics of each individual's internal development. At this level, one's individual, intrapersonal development can be conceptualized as occurring within three critical domains—cognitive, social, and affective (Dusek, Flaherty, & Hill, 1981; Hill, 1983; Dodge & Pettit, 2003; Steinberg, 2005, 2008; Steinberg & Sheffield Morris, 2001). This study focused on variables associated with the cognitive and social domains.

In regard to academic underachievement, Weiner (1992) stated that, “the complex and multiple etiology of this problem calls for careful differentiation of its origins” (p.260). There is much support for focusing on the cognitive and social domains, which were emphasized in this study. Factors from these domains were strategically sampled in an effort to build a model to best explain variance in academic achievement. A deeper exploration into these domains allows for a more comprehensive perspective on predictors of academic achievement.

The Cognitive Domain

Executive functioning. Within the cognitive domain, an individual's ability to process academic demands is critical. Skills that are associated with academic achievement are highly dependent upon abilities related to executive functions (Blair & Razza, 2007). Executive functions are a set of neurocognitive goal oriented processes that facilitate the control and coordination of cognitive behavior (Luria, 1966; Welsh & Pennington, 1998). Efficient executive functioning in adolescence allows for the ability to process and integrate several sources of information, understand the varying components involved in complex situations, plan behavior, sequence events, and synthesize newly acquired information (Baron, 2003; Lutzman et al., 2010). All of these processes are necessary for learning and academic achievement.

Longitudinal research supports the assertion that executive functions contribute to academic achievement (Bull et al., 2008; George & Greenfield, 2005; Hitch, Towse, & Hutton, 2001; Miller & Hinshaw, 2010). Executive functions have been associated with academic achievement for students with and without disabilities (Best, Miller, & Jones, 2009). In particular, performance on working memory tasks and inhibition consistently relates to performance in reading and math (e.g., Blair & Razza, 2007; Bull & Scerif, 2001; Protopapas, Archonti, & Skaloumbakas, 2007; St. Clair-Thompson & Gathercole, 2006). Executive functions involve specific abilities that correspond to higher order cognitive processes (Lutzman et al., 2010). They play a critical role in an individual's ability to set goals, discern discrepancy between goals, and detect their rate of mastery (Blakemore & Choudhury, 2006). Higher-level learning required for advanced grade placement involves the initiation of regulatory processes to ensure academic success.

Achievement goal orientation. According to achievement goal theory, which extends from motivational theory, there are motivational processes that underlie academic performance and achievement (e.g., Dweck, 1986; Ames & Archer, 1988; Maehr, 1984; Midgley et al., 1998; Moeller, Theiler, & Wu, 2012; Nicholls, 1984; Pintrich, 2000; Pintrich & Schunk, 2002). Put simply, goal orientation is how a student approaches a learning task (Ames, 1992; Zweig & Webster, 2004). There are two distinct types of achievement goals, which are comprised of mastery goals and performance goals. As implied, mastery goals, also referred to as task goals, are driven by the desire to master academic content (e.g., Ames & Archer, 1988; Dweck, 1986; Midgley et al., 1998). Conversely, there are students who strive to appear competent (performance-approach), or strive to avoid looking incompetent (performance-avoidance), which are efforts consistent with ability or performance goal orientations (e.g., Ames & Archer, 1988; Dweck, 1986; Midgley et al., 1998). Midgley and colleagues (1998), among other researchers, found that motivation played a significant role in academic achievement, based on achievement goal orientation. Students' perceived ability influences whether they adopt an approach or avoidance goal orientation (Midgley et al., 1998). Research has supported the idea that students who are approach-oriented achieve more than those who are avoidance-oriented, as a result of motivation (e.g., Elliot & Church, 1997; Midgley et al., 1998; Pintrich & Schunk, 2002).

Academic self-efficacy. An important component in the acquisition and retention of academic information is self-efficacy. Bandura (1977, 1994) defined the term self-efficacy as a personal belief that one is able to achieve specific goals. Extensive research has shown that self-efficacy influences the behavior and actions that students exhibit

throughout their school career (e.g., Bandura, 1997; Eccles et al., 1984; Linnenbrink & Pintrich, 2000; Pintrich, 2000; Pintrich & De Groot, 1990; Schunk, 1989). Across age groups and demonstrated in correlational and experimental studies, positive self-efficacy is linked to the exertion of effort and the demonstration of greater persistence when completing tasks, which leads to greater achievement (e.g., Bandura, 1993; Bandura et al., 1996; Linnenbrink & Pintrich, 2002). Ultimately, research has shown a positive relationship between self-efficacy and academic achievement (e.g., Bandura, 1993; Bandura et al., 1996; Linnenbrink & Pintrich, 2002; Pintrich & De Groot, 1990; Schunk, 2003). Zimmerman (2000) stated, “self-efficacy beliefs increased prediction of academic outcomes as much as 25% of the variance above instructional influences” (p.89). This suggests the enormity of self-efficacy as it relates to academic achievement.

Future orientation. Adolescence is a time of biological, psychological, and social maturation. Certain characteristics of maturation include anticipating consequences for one’s actions and effectively planning ahead (Steinberg et al., 2009). Many researchers have emphasized the multidimensional nature of future orientation. The motivational aspect, which includes goal setting, is of interest in this study. Consistent with previous behavioral research, future orientation is conceptualized as the amount of time and energy put into planning for the future (“Future time perspective”; Cauffman & Steinberg, 2000; Husman & Shell, 2008), emotional outlook (Trommsdorff & Lamm, 1980; Van Calster, Lens, & Nuttin, 1987), and desire to reach long-term goals (Nurmi, 1991a). From an academic standpoint, future orientation involves understanding that a relationship exists between academic performance and future outcomes and goals.

Future orientation is especially important during the period of adolescence. At this stage of life, future educational or career goals are influenced by current academic expectations and performance (Kiuru, Aunola, Vuori, & Nurmi, 2007). Steinberg and colleagues (2009) found that adolescents over the age of 16 show more concern about, or greater orientation to, the future than do younger adolescents; this is consistent with findings that planning and thinking about the future increased with age (Nurmi, 1989, 1991a). Researchers, including Scholtens et al., (2013) and Nurmi (1991a), have found that academic achievement positively influenced students' future orientation. In addition, it has been demonstrated that motivational and cognitive aspects of future orientation positively impact academic achievement (Seginer & Mahajna, 2004).

Hope. Dixson, Worrell, and Mello (2017) described hope as one's perception of his or her ability to accomplish tasks in the future via envisioned paths. Students anticipate the future and consider goals in two ways (Snyder et al., 1997). Thoughts related to goals include agency and pathways thoughts. According to Snyder and colleagues (1997), agency thoughts refer to obtainment and maintenance of motivation in efforts to reach a goal. Pathways thoughts refer to the consideration of how one can attain his or her goal, or, in other words, determination of what path or paths one will take to reach their goal. Both are necessary components for a comprehensive conceptualization of hope.

Hope is a cognitive and motivational variable that has been found to be associated with academic achievement. Hope has shown to predict academic success in particular subject areas, such as math (Robinson and Rose, 2010), specific college courses, and college cumulative grade point average (GPA; e.g., Snyder et al., 1991; Snyder et al.,

1997; Snyder et al., 2002). Researchers, including Snyder and colleagues, and Day, Hanson, Maltby, Proctor, and Wood (2010), have found that hope predicted achievement, even when intelligence and prior performance were accounted for. Rand, Martin, and Shea (2011) found that, although hope did not demonstrate a zero-order correlation with GPA in law school ($r = .20$; $p = .08$), it did show to be a significant predictor of law school GPA when observed in a path analysis. In their hypothesized model, undergraduate GPA ($\beta = .38$; $p < .0001$) and hope ($\beta = .25$; $p = .034$) were found to explain 22% of achievement variance in law school GPA.

The Social Domain

School and social risk behaviors. There are a variety of social factors that can impact academic achievement, particularly the engagement of risk behavior. Risk behaviors are acts that can lead to negative consequences and interfere with school success. Substance or tobacco use, underage sexual activity, carrying a weapon, reckless driving, and encounters with the police are examples of risk behaviors. More specifically, school risk behaviors include truancy, excessive tardiness, lack of work completion, and off-task (inattentive or hyperactive) or disrespectful behavior.

The Centers for Disease Control and Prevention *National Youth Risk Behavior Survey* (YRBS) is conducted biennially to monitor risk behaviors and academic achievement. Survey results over time have supported a direct, negative relationship between risk behaviors and academic achievement, regardless of grade level, gender, or race/ethnicity (CDC, 2009). Anderson Moore, Lippman, and Ryberg (2014) found that risk behaviors were directly related to school dropout; pregnancy or teenage motherhood in high school was the greatest predictor of school dropout. In regard to school risk

behaviors, task-avoidance and behavior problems in younger grades were associated with low academic performance in higher grades (Metsäpelto et al., 2015) and eventual school dropout (Magdol, 2001). Risk behaviors that occur outside of school (e.g., alcohol and substance use) and inside of school (e.g., excessive tardiness) are both associated with academic achievement.

Loneliness. Relationships have been shown to be associated with academic achievement. For example, social support has been shown to have importance, including social support from parents (e.g. Bahar, 2010; Song, Bong, Lee, & Kim, 2015; Witkow & Fuligni, 2011; Cutrona, Cole, Colangelo, Assouline, & Russell, 1994), peers (e.g., Song et al., 2015; Witkow & Fuligni, 2011), and teachers (e.g., Song et al., 2015; Elias & Haynes, 2008). According to Dixon, Rayle, and Chung (2007), peer social support was a significant predictor of sense of mattering for both male and female college students.

In the proposed study, social isolation and peer supports, including loneliness and number of peer relationships, were studied. Social isolation has negative consequences on students' self-esteem (e.g., Hall-Lande, Eisenberg, Christenson, & Neumark-Sztainer, 2007; Heinrich & Gullone, 2006; Maes, Van den Noortgate, Vanhalst, Beyers, & Goossens, 2017), social skills (e.g., Asher, Hymel, & Renshaw, 1984; Heinrich & Gullone, 2006; Schinka, van Dulmen, Mata, Bossarte, & Swahn, 2013), and overall adjustment (Heinrich & Gullone, 2006). Importantly, loneliness as a result of peer rejection and maltreatment has been shown to impact later academic achievement (Buhs, Ladd, & Herald, 2006).

Mattering. Additionally, one area of focus was on a construct that taps one's sense of value and worth in their relationships with others, called "mattering". Studies

have shown that mattering is related to self-esteem (Rosenberg & McCullough, 1981), social adequacy concern (France & Finney, 2009), depression (Rosenberg & McCullough, 1981), and suicidal ideation (Elliott, Kao, & Grant, 2004). Mattering has also been found to be associated with academic achievement. However, there is very limited research that has directly measured the association between mattering and academic achievement to support this, especially at the high school level (i.e., Tucker et al., 2010; n = 9). There is a lack of published studies that have investigated the predictive power of mattering on adolescent academic achievement. This is necessary to better understand achievement variance in high school. This research expands upon what is currently known about the association between mattering and academic achievement.

Limitations of Past Research

Because adolescence is a time of physical, behavioral, and social-emotional maturation, it is necessary to have an understanding of what constitutes successful development. Academic success allows for opportunities after high school, such as attending college and obtaining a career. As research shows, however, there are many barriers that can inhibit academic achievement and limit future accomplishments. Anderson Moore et al., (2014) suggested that research on self-regulation, motivation, and executive functioning would continue to contribute to what is currently known about successful academic and life trajectory. Published studies have demonstrated associations between academic achievement and numerous variables, although at the time of this literature review, no literature was found with the exact focus of the current study. Prior models designed to predict academic achievement have not included the specific variables aforementioned in combination.

Limited research was found on academic achievement of students who reside in rural communities. This population has been overlooked and understudied, thus requiring a closer examination of factors related to achievement. A unique feature of this study was the rural sample population, which consisted of students who attended a high school in a small agricultural school district in Southeast Michigan. It is uncertain whether existing research, most of which has been conducted with students who reside in urban or suburban locations, can be generalized to describe student needs across all settings.

Purpose of Current Study

One unique feature of this study is the explicit focus at the intrapersonal level of one's ecology. Specifically, this research included a comprehensive examination of multiple and interrelated factors from the cognitive and social domains, and provided insight into how these variables, both isolated and jointly, are associated with academic achievement. With a better understanding of how this selection of key variables interact to predict achievement, more precise preventative measures and interventions can be developed based on individual student characteristics.

The purpose of this study was to sample key predictors from several important cognitive and social domains to build a model to better understand variance in adolescent academic achievement. It was expected that the variables would interact in ways to produce varying levels of academic achievement. For example, knowing that risk behavior is associated with lower achievement, if someone often engages in risky behaviors, yet he has strong orientation to the future and positive self-efficacy, would achievement still be compromised? Does higher executive functioning act as a moderator in the association between risk behaviors and achievement? Questions such as these

indicate the need for further research on the interaction among these intra- and inter-personal variables, and their relationship with academic achievement. The specific research questions were:

1. Which cognitive variables are most predictive of achievement?
2. Which social variables are most predictive of achievement?
3. In a full model of the most predictive variables from each level, is more variance in achievement explained than in prior models?
4. Does level of risk-taking behaviors moderate the expected relationship between executive functioning and academic achievement?

It was expected that executive functioning was the most predictive of academic achievement of the cognitive variables that were measured. Of the social variables, school and social risk behaviors were expected to be most predictive of academic achievement. In a full model of the most predictive variables from each level (cognitive and social), it was expected that more variance in achievement would be explained than in prior models. Finally, it was expected that levels of risk-taking behaviors moderate the expected relationship between executive functioning and academic achievement.

Significance

This research is important because academic achievement in high school significantly influences future goals and opportunities. Compared to high achieving students, students who experience low academic achievement are more likely to drop out of high school. In 2014, approximately 6.5% of students nationwide, between the ages of 16 and 24, dropped out of school (National Center for Education Statistics; NCES, 2016). Although this is a decrease of approximately 200% from the year 1990 (NCES, 2016), in

2014, around one in every 15 people ages 16 to 24 did not have a high school diploma or GED. In 2009, 31% of 18 to 24 year olds who did not have a high school diploma were living in poverty (Aud, KewalRamani, & Frohlich, 2011). However, high school graduates have the opportunity for higher education and, on average, earn more money throughout his or her lifetime. "...higher median earnings were associated with higher educational attainment" (Aud et al., 2011, p.92). A comprehensive model of academic achievement predictors can provide educators with additional insight on shared variables that impact adolescent school success.

The results are expected to help drive interventions that address common intrapersonal and interpersonal variables from the cognitive and social domains that influence achievement. Rather than sampling from a single domain, a model that includes cognitive and social predictors of academic achievement provides a more comprehensive explanation of achievement variance. Pérez, Costa, and Corbí (2012) found that 66% of achievement variance was attributed to a combination of cognitive and motivational variables (i.e., general intelligence, academic self-concept, effort, learning strategies, and goal orientations). Specifically, they identified that 48% of the variance was explained by factors related to intelligence, and 18% was explained by the remaining variables. Identification of additional achievement barriers allows for the development of further individualized interventions that are more meaningful to students; this, in turn, can improve performance and increase the likelihood of high school graduation.

CHAPTER 2 LITERATURE REVIEW

According to the Michigan Department of Education (2016), there was a critical shortage of qualified individuals to fill positions in numerous fields that required, at the least, a college graduate-level degree. Some of these positions for the 2015-2016 academic year included school psychologists, speech pathologists, physical therapists, special education teachers, and world language teachers. The systemic problem of low educational attainment in the United States will have long-lasting negative consequences on society if not addressed. Today's youth must obtain advanced educational degrees in order to ensure the continuation of these critical professional positions.

In 2012, the average mathematics literacy score for 15-year-old students in the United States was lower than that of 29 other international education systems, lower than 22 in the area of science literacy, and lower than 19 in the area of reading literacy (Kena et al., 2016). The national high school dropout rate in 2014 was 6.5%, which is approximately one in every 15 students. Maynard, Salas-Wright, and Vaughn (2015) found that, compared to graduates, high school dropouts in the United States had a greater likelihood of arrests, possession of or selling drugs, attempting suicide, and nicotine dependence. There are significant societal costs for high school dropouts associated with public assistance and criminal activity (Aud et al., 2011; Maynard et al., 2015).

In order to address such a daunting issue, the underlying etiology of low achievement must first be understood. This review includes an in depth investigation into specific variables from the cognitive and social domains that impact educational achievement throughout adolescence. Adolescents experience changes in emotional

regulation and responses, attitudes and personal views, and social relationships. Because adolescence is a time of global transition, developmental considerations are made.

Bronfenbrenner's (1979) ecological systems theory is comprised of four environmental levels that are thought to influence human development. It is theorized that interrelations exist between people and their environments, and that human behavior is a result of the interactions between a person and their environment. Biological and psychological factors are affected and modified by the microsystem, mesosystem, exosystem, and macrosystem. The microsystem includes the individual's immediate environment, direct relationships, experiences, and perceptions. An adolescent's microsystem is comprised of numerous interrelated elements, including intrapersonal variables. School performance is influenced by intra- and interpersonal variables and other elements within an adolescent's microsystem. Bronfenbrenner (1979) defines the mesosystem as "a system of microsystems" (p.25). In other words, it is the active involvement of a person in multiple, interrelated settings. For an adolescent, this includes the relationship between school and home. Beyond the mesosystem is the exosystem, which is identified as larger settings that impact a person, without their direct participation. Bronfenbrenner used a local school board as an example of an adolescent's exosystem. Finally, the outermost system, called the macrosystem, includes broad ideologies, such as culture and religion.

Even though research has shown strong correlations between intelligence and academic achievement (e.g., Busato, Prins, Elshout, & Hamaker, 2000; Gagné & St Père, 2001; Rohde & Thompson, 2007; Spinath, Spinath, Harlaar, & Plomin, 2006), there is unaccounted for variance. A great deal of research has been conducted in order to

identify additional variables that predict academic achievement (e.g., Busato et al., 2000; Pérez et al., 2012; Spinath et al., 2006; Trigwell, Ashwin, & Millan, 2013). As previously stated, variables include executive functioning (e.g., Best et al., 2011; Bull et al., 2008; Latzman, et al., 2010), achievement goal orientation (e.g., Elliot & Church, 1997; Huang, 2012; Middleton & Midgley, 1997), self-efficacy (e.g., Bandura, 1993; Bandura et al., 1996; Coutinho & Neuman, 2008; Pintrich & DeGroot, 1990), future orientation (e.g., Nurmi, 1991; Raynor, 1970; Scholtens et al., 2013), hope (e.g., Snyder et al., 1997; Snyder et al., 2002; Robinson & Rose, 2010), risk taking behaviors (e.g., Centers for Disease Control and Prevention, 2009; Chang & Romero, 2008; Breslau, Lane, Sampson, & Kessler, 2008; McLeod, Uemura, & Rohrman, 2012), loneliness (e.g., Asher & Paquette, 2003; Galanaki & Vassilopoulou, 2007; Rosenstreich & Margalit, 2015) and mattering (e.g., Tucker et al., 2010; Schieferecke & Card, 2013).

The Cognitive Domain

Executive functioning. Adolescence is typically characterized by a need to control behavior and affect in order to comply with societal and academic demands (Steinberg, 2005). The core components of adolescent cognitive development include the acquisition of a self-directed and self-automated mind (Keating, 2004). This is achieved by an integration of executive functioning skills. Significant advances in neuroscience have verified this integrated account of adolescent cognition and behavior (Giedd et al., 1999; Paus et al., 1999; Sowell, Thompson, Tessner, & Toga, 2001).

Executive functions are goal-orientated processes that assist with the control and implementation of purposeful behavior (Welsh & Pennington, 1998). The subdomains that compose executive function allow people to self-monitor their behavior, sustain

attention, set goals, and sequence and plan behavior (Baron, 2003; Lezk, Howieson, & Loring, 2004). Additionally, executive functions facilitate decision-making, inhibitory control, cognitive flexibility, motivation, working memory, and empathy (Burkley, 2001; Edgall, 1995).

Growth occurs in adolescence in the prefrontal cortex due to the expansion of linkages throughout the brain (Barkley, 2001). This process, comprised of interconnected neocortical areas, is vital to cognitive control (Biederman et al., 2004). The prefrontal cortex also contains areas that send and receive input from cortical and motor systems (Miller & Cohen, 2001). Feedback from several subcortical structures supply input to the series of actions involved in executive functioning (Posner & Peterson, 1990).

Early studies of executive functions theorized that the prefrontal cortex changed significantly in structure during adolescence (e.g., Huttenlocher, De Courten, Garey, & Van der Loos, 1983). Magnetic Resonance Imaging (MRI) studies provide evidence that the adolescent brain undergoes significant maturational changes (Blakemore & Choudhury, 2006). Primary modifications include continued myelination of axons in the prefrontal cortex (Blakemore & Choudhury, 2006). This leads to an increase in the transport speed of neural information. The second transformation that occurs pertains to changes in the neural growth and density of synapses (Burgeois, Goldman, Rakic, & Rakic, 1994; Huttenlocher, 1979).

Synapses formed in the prefrontal cortex during adolescence exceed adult levels (Blakemore & Choudhury, 2006). Synaptic pruning allows the remaining circuits to function more efficiently. This improvement in frontal lobe functioning was observed to positively impact prospective memory, selective attention, the ability to problem solve,

and working memory (Burgess, Vetch, Costello, & Shallice, 2000). Improvement in reasoning expertise and information processing are also evident in early adolescence (Steinberg, 2005).

Executive functions are considered vital to the implementation of complex adolescent behavior (Goldberg & Serdman, 1991). Longitudinal research has shown that executive functions contribute to academic achievement (Bull et al., 2008; George & Greenfield, 2005; Hitch et al., 2001; Miller & Hinshaw, 2010). Executive functions have been associated with academic achievement among children of varying ages and ability levels (Best et al., 2009). Throughout childhood and adolescence, children develop the ability to ignore distractions (Klenberg, Korkman, & Lahti-Nuutila, 2001), inhibit inappropriate responses (e.g., Carlson & Moses, 2001), shift between different sets of tasks (Zelazo, Müller, Frye, & Marcovitch, 2003a, 2003b), and integrate these abilities to solve complex problems (Asato, Sweeney, & Luna, 2004; Bull, Espy, & Senn, 2004; Miyake et al., 2000).

The constructs listed above are essential to the acquisition and retention of academic information. Lutzman and colleagues (2010) concluded that the ability to perform well academically is largely contingent upon areas in the brain that govern executive functioning, specifically the prefrontal cortex. Supporting literature noted that key components of executive functions, including cognitive flexibility, self-monitoring, and planning, are important for secondary school success (Blair & Diamond, 2008; Naglieri & Das, 1990). Developing brain functions, in conjunction with hormonal and pubertal maturations, make adolescence a period of increased vulnerability (Steinberg,

2005). Fellow researchers proposed that cognitive ability is important, but additional variables help to contribute to student success.

Achievement goal orientation. Motivation pertains to a multitheoretical framework that characterizes a group of actions and behaviors (Eccles et al., 1984). Motivational constructs that are applicable to self-regulated learning encompass internal and external properties (Garner, 2009). Included in this framework is goal orientation (Elliot & Church, 1997), assigning relevance to the assignment (Pintrich, Smith, Garcia, & McKeachie, 1991) and self-efficacy (Schunk & Ertmer, 2000; Zimmerman, 1998, 2000). Theoretical constructs regarding student motivation in academic environments have been studied from multiple perspectives (Pintrich & DeGroot, 1990). Varying research ideologies include studies from diverse fields; psychological, neurological, and physiological perspectives exist (Pintrich, 2003). Information from varying studies regarding motivation is multifaceted and divergent, which illustrates the importance of studying motivation from a variety of perspectives (Pintrich, 2000). Information obtained from all facets of study should be considered when examining motivational theories (Pintrich, 2000).

The study of motivation, in part, addresses the causes of goal oriented cognitive activities (e.g., Ames, 1992; Atkinson, 1964; Dweck & Leggett, 1988; Pintrich, 2000; Pintrich & Schunk, 1996). The role of goal orientation has been a substantial focus in research, with particular focus placed on self-regulated learning and academic achievement motivation (Ames, 1992; Dweck & Leggett, 1988; Pintrich, 2000; Pintrich & Schunk, 1996). Goals provide a structure that allows people to interpret and react to events or activities that result in divergent patterns of affect and cognition (Dweck &

Leggett, 1988). Of particular importance regarding goal orientation is the development of higher level executive functioning and metacognitive abilities (Pintrich & DeGroot, 1990). Different brain systems become better integrated throughout adolescence. Distinct characteristics of executive functions operate more effectively (Eccles et al., 1984). Planning and goal directed behavior improve with age (Midgley et al., 1998).

Dweck (1986) conducted research in order to characterize adaptive and maladaptive teaching styles and students' learning patterns. The model that was established demonstrated that the students' cognitive approach to problem solving was impacted by their views regarding success and failure. This strongly influenced the quality of their perceived performance (Dweck, 1986; Dweck & Elliot, 1983). An important component of Dweck's study was to formulate and establish a working hypothesis regarding the reasons why students with similar cognitive ability levels performed differently when presented with the same set of problems. The cognitive mediators examined included information processing and the students' perceptions and interpretation of the tasks that were administered. The conclusions reached, from student interviews and rating scales, indicated that the instructor's teaching style and goal orientation had the most impact on student performance.

Students reported experiencing a sense of inadequacy in response to poor performance when instructors emphasized performance orientation (Diener and Dweck, 1978, 1980). Furthermore, students associated their lack of success to low ability and displayed concern with external judgments. When students viewed their classroom setting as mastery oriented they attempted to use alternative problem solving strategies

and were more likely to put effort into challenging tasks (Ames & Archer, 1988). Improvement in self-concept was also observed (Diener and Dweck, 1978, 1980).

There are two types of achievement goal orientations: mastery and performance (e.g., Ames & Archer, 1988; Dweck, 1986; Midgley et al., 1998). Goal orientations describe how a student approaches learning (Ames, 1992; Zweig & Webster, 2004). According to researchers (e.g., Ames & Archer, 1988; Dweck, 1986; Midgley et al., 1998), a student is oriented toward mastery if he or she is driven to gain a solid understanding of the material. Students who desire to present as competent to their peers and teachers are performance-approach oriented. Students who strive to avoid appearing incompetent have a performance-avoidance orientation. Robbins and colleagues (2004) conducted a meta-analysis of more than 100 studies that measured associations between psychosocial variables and college retention and college GPA. Academic goals showed greater correlation with retention in college compared to academic performance.

Academic self-efficacy. Initially operationalized by Albert Bandura (1977a), self-efficacy is a person's beliefs about their ability to accomplish a specific task. There is an important distinction between self-efficacy and related concepts, such as self-esteem and self-concept. Self-efficacy refers to accomplishing a particular task, such as mathematical problem solving. Self-esteem and self-concept have broader definitions. It has been reported that correlations between self-efficacy and academic achievement have been significantly influenced by the operationalization and assessment method of self-efficacy (Pajares, 1996a, 1996b; Marsh, Roche, Pajares, & Miller, 1997).

Self-efficacy theory (Bandura, 1977a, 1986) originated from social cognitive theory, which was initially called social learning theory. Social cognitive theory proposes

that people learn through social interaction with others and with the environment. Human behavior impacts the environment, and the environment influences human behavior. Bandura (1994) suggested that self-efficacy impacts a person's cognition, motivation, and affect. Bandura (1977a) identified four sources of information that influence self-efficacy: performance accomplishment, vicarious experience, verbal persuasion, and physiology (p.191). He found that experiences gained from performance accomplishment, compared to vicarious experiences, produced greater and more generalized efficacy expectations. Vicarious experiences produced greater efficacy expectations than a lack of experience. Despite the source of information utilized for behavioral changes (i.e., enactive or vicarious experiences), subsequent performance was equally predicated by efficacy expectations (Bandura, 1977a). Academic self-efficacy is advanced by performance accomplishment. Pajares (1996a) acknowledged multiple variables (i.e., acquisition of cognitive skills, modeling effects, attributional feedback, and goal setting) that impact self-efficacy. These factors were associated with academic performance.

In addition, Bandura (1977a) suggested that expectations lead to a modification of behaviors. He proposed that there are two types of expectations: outcome and efficacy. Efficacy expectations are a person's belief that he or she has the ability to produce a desired outcome by engaging in certain behaviors. Self-efficacy influences one's perceived difficulty of a task, as well as the amount of effort put forth to complete that task (Bandura, 1977a; Pajares, 1996a). Perceived self-efficacy and performance outcomes have been shown to be cyclical in nature. The mastery of new skills directly advances self-efficacy (Weiten & Lloyd, 2006), and higher levels of self-efficacy are positively

correlated with greater behavioral change (Bandura, 1977a). To increase self-efficacy, a person must attempt a task and experience failure. The way a person interprets failure influences his or her level of self-efficacy (Weiten & Lloyd, 2006).

Stronger self-efficacy beliefs that promote expectations for success lead to increased effort and perseverance on a task, which increases the likelihood of performance accomplishment (Bandura, 1977a; Pajares, 1996a). Pintrich and DeGroot (1990) maintained that students who perceived themselves to be academically capable were more likely to utilize additional metacognitive strategies (self-efficacy $r = .33$, $p < .001$; intrinsic value $r = .63$, $p < .001$). Strategies included self-regulation and the ability to persist at academic tasks, despite one's level of interest. When tasks become more difficult and there is a greater reliance on working memory, self-efficacy is beneficial (Hoffman & Schraw, 2009). Hoffman and Spataru (2008) found that self-efficacy and metacognitive prompting improved academic performance and efficiency through the utilization of reflection and previously learned strategies. This is important in the academic setting, particularly as students reach secondary levels.

When developing a model to explain achievement variability, Coutinho and Neuman (2008) found that, of the predicting variables studied, performance approach and mastery approach were significantly correlated with self-efficacy ($r = .43$, $p < .001$; $r = .36$, $p < .001$ respectively). In their study, Pajares and Kranzler (1995) found that 60% of the variance in math problem solving performance for high school students was accounted for by self-efficacy, in addition to general mental ability, math anxiety, gender, and mathematical achievement levels. Bandura, and colleagues (1996) found that 58% of achievement variance was explained by academic self-efficacy, in combination with

other sociocognitive factors. Based on work by Pajares and Kranzler (1995), Pajares (1996a) found that the predictive strength of other measured variables that impact academic achievement is decreased by the inclusion of self-efficacy. He also found that self-efficacy better predicted performance than did prior attainments. “The direct effect of self-efficacy on performance ($\beta = .349$) was as strong as the effect of ability ($\beta = .324$)” (Pajares, 1996a, p.554). A greater increase in self-efficacy was observed in students who received feedback regarding their ability, which directly improved performance, as opposed to those who received effort attributional feedback on prior performance (Schunk, 1982, 1983; Schunk & Gunn, 1986).

Pajares (1996b) conducted a study in order to measure self-efficacy beliefs of gifted students' mathematical ability levels. There were no significant gender differences found in levels of self-efficacy, although gifted girls outperformed gifted boys on the mathematical tasks. Gifted students, compared to students in general education, reported more realistic assessments of their strengths and weaknesses (Pajares, 1996b; Pajares & Kranzler, 1995). Many students, however, overestimated their academic ability, with the exception of females in the gifted program. Gifted students displayed self-efficacy with regard to their ability to solve mathematical reasoning problems (Pajares, 1996b). Hoffman (2010) found gender differences in undergraduate students' belief in their ability to solve problems related to math reasoning skills; males reported higher levels of self-efficacy. Males outperformed females in accuracy and efficiency on complex multiplication tasks. Self-efficacy was found to significantly predict performance on math problem solving task accuracy and efficiency for males and females.

Research shows there is a significant, positive relationship between student self-efficacy and academic performance (e.g., Bandura, 1993; Bandura et al., 1996; Hoffman & Spataru, 2008; Pajares, 1996a; Pintrich & DeGroot, 1990). Through their meta-analysis of 109 studies, Robbins et al., (2004) found that, of all other measured variables, academic self-efficacy was the best predictor for college GPA. Self-efficacy influences academic performance, which results in students' development of personal preferences for certain subject areas. As a result of perceived academic self-efficacy, students are motivated to pursue advanced academic placements, develop preferences for college majors, or choose desired career paths. Children's career and life preferences are determined by their perceived efficacy, as opposed to actual academic achievement (Bandura, Barbaranelli, Caparara, & Pastorelli, 2001).

Future orientation. Future orientation is a multidimensional term. As operationalized by Steinberg et al. (2009), future orientation “has components that are cognitive (e.g., the extent to which one thinks about the future), attitudinal (e.g., the extent to which one prefers long-term as opposed to short-term goals), and motivational (e.g., the extent to which one formulates plans to achieve long-term goals)” (p. 29). Research has demonstrated the existence of a positive relationship between academic achievement and future orientation ($r = .58, p < .001$, Scholtens et al., 2013; Nurmi, 1991a). However, due to various conceptualizations of this term, as well as different methodological approaches utilized in studies, research findings on future orientation are inconsistent (Trommsdorff, 1983). Properties of future orientation do not have to be viewed as singular constructs, but rather can be seen as concurrent and as multidimensional (e.g., Nurmi, 1991a; Trommsdorff, 1983).

According to Nurmi (1991a), three psychological processes underlie future orientation: motivation, planning, and evaluation. Expectations for the future are influenced by the degree of desire to reach specific goals. A person must plan on how goals can be attained and evaluate whether the plan can realistically be achieved. This includes identifying barriers that interfere with goal attainment, as well as resolving any interference. Additionally, she suggested that previous experience (schemata), or personal interests and motives influence future expectations. Expectations for the future influence motivation, which, in turn, influences the goals that are established. During the planning process of how to reach a goal, a person must rely on his or her current skills and background knowledge. The plan is then evaluated in terms of feasibility. A person's self-concept and attributional style influences their evaluation of the plan.

According to Weiner's (1985) attribution theory, people who attribute prior success to their personal effort and persistence, rather than external mechanisms, such as luck, are more likely to have a higher self-concept or sense of self-efficacy. Alternately, people who attribute prior failures to internal mechanisms are more likely to have a less favorable conceptualization of his or her abilities (Nurmi, 1991a; Weiner, 1985). Personal goals influence the choices people make, which in turn guide their development (Baltes, P.B., 1997; as cited in Samela-Aro, 2009). Goals are an important aspect of future orientation. Goals can be broken down into a hierarchical system, consisting of 'subgoals' and 'lower level goals' that develop in conjunction with each other in order to create larger or 'higher level goals' (Nurmi, 1991a, p.5). Nurmi (1991a) suggested that individuals who possess a greater sense of self-esteem tend to set higher goals for themselves.

Nurmi (1991a) described three factors that influence students' future orientation. The first factor involves cultural influences. For example, women in some cultures are discouraged from obtaining a formal education, whereas women in other cultures are encouraged to excel academically. Secondly, social interactions play a role in the development of future orientation. Social influences include parent, academic, and peer expectations. Lastly, future orientation is influenced by cognitive ability and social skills. Decisions regarding future expectation outcomes significantly influence students' identities and life after high school (Nurmi, 1991a).

Raynor (1969) expanded upon Atkinson's (1964) theory of achievement motivation to include perceptions about the future (Gjesme, 1974). Students who demonstrated positive and persistent study habits, and who had a high grade point average (GPA), were more likely to establish and reach future goals (De Volder & Lens, 1982). Students who possess intrinsic motivation to succeed academically tend to be invested in learning (Weiner, 1992). Receiving good grades reinforces intrinsic motivation. It also builds a connection between academic achievement and future success (Weiner, 1992). Motivation to accomplish a task is greater when the task has been perceived as necessary to reach a goal. Success on immediate tasks is dependent upon success on prior sequential tasks (Weiner, 1992). The amount of perceived success on the previous task impacts the anticipation of success on the following task.

Raynor (1969) proposed that expectations of success influence motivation to achieve, which increases effort and expectations regarding immediate success. This ultimately leads to immediate and future success. Motives behind achievement and perceived instrumentality of a task for the future are factors that influence immediate and

distant outcomes (Raynor, 1969). Conversely, Weiner (1992) suggested that underachievement leads to loss of confidence and motivation, followed by negative perceptions of school and continually larger gaps of content and knowledge. This can result in disconnect between school and future orientation. Underachieving students who lack motivation are less likely to make a connection between their schoolwork and eventual job performance (Weiner, 1992). As such, schoolwork is not viewed as a necessary component for the acquisition of individual long-term goals for some students (e.g., Gottfried, 1985; Pintrich & De Groot, 1990; Weiner, 1992). College students who took an introductory psychology course and felt that their coursework and academic performance were important for their future career performed better, overall, than students who found the course to be irrelevant to future success (Raynor, 1970).

Educational expectations, both short- and long-term, are associated with adolescents' school performance and overall adjustment (Kiuru, Aunola, Vuori, & Nurmi, 2007). High achieving students reported higher educational expectations than did students who experienced behavioral difficulties and tended to be lower achieving students (Kiuru et al., 2007). Kiuru and colleagues (2007) found that female adolescents who reported greater behavioral problems also reported lower short-term educational expectations. Problem behaviors at the group level for males predicted lower short-term educational expectations. At the individual level, however, male adolescents' short- and long-term goals were most strongly predicted by academic achievement. Gender differences in future orientation have not been well established, with the exception of select domain specific future roles, such as family roles versus career roles (Steinberg et al., 2009).

Research has shown that, with age, adolescents gain interest in their future (Nurmi, Poole, & Kalakoski, 1994; Steinberg et al., 2009). The life domains that are of the most concern near the end of high school include continuing education, successful employment (Nurmi, 1991), and family (Nurmi et al., 1994). Nurmi et al., (1994) studied future orientation of Australian and Finnish male and female adolescents, from both rural and urban residences. Findings showed age, gender, cultural, and geographic differences between subjects in regard to length of time to reach future goals and content of concerns. Age did not significantly impact future occupational expectations. However, the frequency of thoughts regarding future education and plans for family increased with age. Compared to males, females were more concerned with goals related to family. Cultural differences were found, in that Australian adolescents expected to reach their goals earlier than Finnish adolescents. Finally, a decline in occupational interests was found for adolescents living in rural areas as they aged, compared to those living in urban areas, due to limited career options.

Comings, Parrella, and Soricone (1999) found age to be a significant predictor of persistence to complete an adult learning program. Younger adult learners in their teens were less likely to persist and complete their learning program than older adult learners. Approximately 40% of teens and 52% of adults in their 20's completed the program, compared to over 75% of adults aged 30 years or older. No significant relationship was found between gender or ethnicity and persistence.

Older adolescents and college students reported a greater number of future events, but not necessarily events that were farther into the future (Green, 1986). Findings on age differences have not been consistent, however, when future orientation required

adolescents to picture themselves in the future. (e.g., Nurmi, 1991a; Steinberg et al., 2009; Trommsdorff, Lamm, & Schmidt, 1979). It has been suggested that as adolescents age, they become more conservative in their expectations. This may be due to the realization that the future is rapidly approaching, and with maturation they have a better understanding of their abilities and the feasibility of reaching immediate and distant goals (e.g., Nurmi, Poole, & Kalakoski, 1994; Steinberg et al., 2009).

Hope. Hope is a goal-directed concept, cognitive in nature. Hope is based on a person's belief in his or her capabilities. Common terms in hope research include *will* and *way* (Snyder et al., 1991). Will is one's motivation to put forth effort to reach a set goal, also known as agency thoughts. Motivational characteristics of hope resemble those of similar constructs, such as mastery goal orientation and self-efficacy (Snyder, 2000; Robinson & Rose, 2010; Dixon, Worrell, Olszewski-Kubilius, & Subotnik, 2016). Ways, or pathways thoughts, are cognitive methods for determining through which course of action a person will reach his or her goal. Snyder and colleagues (1991) emphasized that hope is comprised of the two aforementioned components: agency and pathways thoughts. Although these are similar concepts, there are distinct differences, and both are necessary to measure hope. In other words, neither agency thoughts nor pathways thoughts can stand alone when conceptualizing hope. However, Day and colleagues (2010) informed readers to interpret their results with caution due to the high correlation between the two orientations (i.e., pathways and agency; $r = .80$) when entered in the regression model.

Significant differences in sense of hope have not been found between genders (e.g., Marques, Pais-Ribeiro, & Lopez, 2011b; Levi, Einav, Ziv, Raskind, & Margalit,

2014) or grade level (Marques et al., 2011b). Hope has been associated with overall wellbeing (e.g., Snyder et al., 1997; Marques et al., 2011b; Marques, Lopez, & Pais-Ribeiro, 2011a). Children who reported a greater sense of hope also reported feeling less depressed and had a more positive view of him- or her-self (Snyder et al., 1997).

Hope has been conceptualized as a broad, general concept, as well as something that applies to specific domains. Robinson and Rose (2010) were interested in domain-specific hope theory. They argued that an individual's sense of hope varies between different life domains, and that domain-specific measures of hope better predict academic achievement compared to a general measure of hope. "The predictive validity of score inference on measures of hope in academic domains increases when the measures are matched to the specific academic context" (p.48). Through regression analysis, they found that the measure of academic hope was the best predictor of college students' final grade; the model accounted for 19.8% of variance in college math course GPA. In their article validating the Children's Hope Scale (CHS), Snyder and colleagues (1997) encouraged future researchers to highlight the specific goals a child hopes to attain, which can be helpful when pertaining to certain illnesses or situations. Feldman and Kubota (2015) found that the general hope predicted domain-specific hope (i.e., academic hope; $\beta = .57, p < .001$), which in turn predicted GPA ($\beta = .54, p < .001$). Their model found that 51% of the variance in GPA was explained by academic-specific hope and academic-specific self-efficacy.

There are conflicting findings on the association between hope and academic achievement. Snyder et al., (1997) found a positive and significant correlation between the CHS and the Iowa Test of Basic Skills (Hieronymous & Hoover, 1985, as cited in

Snyder et al., 1991). The CHS explained 25% of the shared variance. As cited in Snyder et al., (1991), Anderson (1988), found that hope, as measured by the Hope Scale, was positively correlated with expected college course grades. Although hope was not significantly associated with grades earned on college students' first exam, hope did significantly predict final course grades. Importantly, students' ability to earn their desired grade did not differ with level of hope, which indicated that level of hope did not influence goal attainment. However, students who reported higher levels of hope set higher goals for themselves, and thus, performed better academically. Griggs and Crawford (2017) found a relationship between hope, grade point average (GPA), and health risk behaviors (i.e., alcohol use and engagement in sexual risk-taking) in university freshman. However, core self evaluation (CSE) was found to mediate the relationship between hope and alcohol use, as well as hope and GPA.

Marques et al., (2011a) conducted a program called "Building Hope for the Future" with Caucasian and mostly female students in Portugal. Students were separated into a treatment group and a control group. The intervention included one-hour sessions per week, for five weeks. Pre- and post-test (end of treatment, as well as 6 month- and 18 month- follow up) results showed a significant increase in hope, as measured by the CHS, for the treatment group, but not for the control group. At time 1, hope and academic achievement were significantly correlated. However, academic achievement remained relatively stable over time for both groups. In other words, higher levels of hope over time did not show significant effect on academic achievement for group or time.

In a two-year cross-sectional, longitudinal study conducted by Marques et al., (2011b), hope moderately predicted academic achievement at time 1 (initial), time 2

(one-year follow-up), and time 3 (two-year follow-up). Over time, and as the authors expected, correlation magnitudes decreased. Test-retest correlations for hope at the one- and two-year follow-up were .51 and .49, respectively. Test-retest correlations for academic achievement were .92 and .90, respectively.

Findings do not all support a direct association between hope and academic achievement. For example, Dixson and colleagues (2016) found that hope did not significantly predict academic achievement in gifted students. They did find, however, that hope predicted students' *perceived* ability. Levi et al., (2014), found an indirect association between hope and academic achievement in their sample of Israeli high school students. Hope had a direct effect on expected grades, and expected grades had a direct effect on actual grades. Due to the direct and indirect effects of hope on academic performance and related variables, it is important to include in this study.

The Social Domain

School and social risk behaviors. Boyer (2006) examined four particular areas of research that explain the development of risk-taking behaviors: cognitive, emotional, psychobiological, and social. He argued that factors from all of these areas, while each independently important, interact to explain engagement in risk-taking behaviors. In adolescence, these factors are labile during the maturation process. Adolescents have a greater tendency to engage in risk behaviors when compared to adults (e.g., Arnett, 1992; Gardner & Steinberg, 2005). These behaviors often include substance use, engaging in unprotected sex, driving while under the influence of drugs or alcohol, and reckless driving (Arnett, 1992). Risk behaviors directly associated with school include off-task or noncompliant behaviors, frequent tardiness, truancy, and lack of work completion.

Weiner (1992) referred to risk behaviors in the school setting as the “legacy of persistent underachievement” (p.260). A reciprocal interaction has been observed between risk behaviors and academic achievement.

Truancy, a school risk behavior, is a strong predictor of adolescent substance abuse (Hallfors, Vevea, Iritani, Cho, Khatapoush, & Saxe, 2002). Based on their research results (n= 6,315), McLeod et al., (2012) determined that delinquency and substance use were associated with diminished educational attainment. Data analyzed from the *Monitoring the Future* study (University of Michigan, Institute for Social Research, 2003) indicated that approximately 11% of eighth grade students and approximately 16% of tenth grade students were truant over a four-week period (Henry, 2007). School disengagement variables, including poor grades and low educational aspirations, were some of the most salient predictors of truant behavior (Henry, 2007). Students who drop out of school are often students who skip or are late to class (Henry, 2007).

The Center for Disease Controls (CDC) established the National Youth Behavior Risk Survey (NYBRS) and the Youth Risk Behavior Surveillance System (YRBSS, 2013) to monitor health-risk behaviors. Risk factors include: behaviors that contribute to unintentional injuries and violence, sexual behaviors resulting in unintended pregnancy and sexually transmitted diseases, alcohol and other drug use, tobacco use, unhealthy dietary behaviors, and inadequate physical activity. Although these social risk behaviors do not often occur within the academic setting, they nevertheless impact student academic achievement. Published reports by the CDC (2009a, 2009b) demonstrated a relationship between each of these risk factors and school performance. Among all

studied variables, greater engagement in risk-behaviors was most highly correlated with poor academic performance.

According to Magdol (2001), the risk behaviors that most negatively impact academic achievement include drug and alcohol use/abuse, delinquency, and other behavior problems. Frequent substance use is linked with lower academic achievement (e.g., Breslau et al., 2008; McLeod et al., 2012), truancy (e.g., Henry, 2007), and school dropout (e.g., Anderson Moore et al., 2014; Breslau, 2010). In 2015, 39% of twelfth graders, 28% of tenth graders, and 15% of eighth graders reported the use of an illicit drug within the past year (Johnston, O'Malley, Miech, Bachman, & Schulenberg, 2015a). The illicit drugs cited include MDMA (aka "Molly"), heroin, marijuana, synthetic marijuana (i.e., "K-2" and "spice"), and amphetamines.

Data analyzed from the 2003 YBRS revealed that, compared to moderate and non-drinkers, high school students who engaged in binge drinking, in conjunction with other non-school related risk behaviors, reported poor school performance. Of the students who earned D's and F's, 17% reported to have consumed one or more drinks of alcohol while on school property, compared to 2% of students who earned A's (YBRS, 2009). Rates of binge drinking increased as students progressed through high school (YBRS, 2003). This suggests that students in 12th grade are more likely than students in 9th grade to binge drink. Adolescent binge drinking declined significantly in 2015, with rates of 17%, 11%, and 5% of twelfth, tenth, and eighth grade students (Johnston et al., 2015a).

Tobacco use (smoking in particular) has been found to have the greatest impact on academic achievement, independent of other substances ingested (Breslau, 2010;

McLeod et al., 2012). Encouraging statistics were recently reported: in 2015, adolescent cigarette smoking was the lowest it has ever been since first recorded 41 years ago (Miech, Johnston, O'Malley, Bachman, & Schulenberg, 2015). Of the eighth, tenth, and twelfth graders combined, 7% reported smoking a cigarette within the last 30 days (Miech et al., 2015). However, tobacco ingestion is higher when accounting for more than one method of use (i.e., cigarettes, vaporizers [e-cig], cigarillos). More than 11% of the eighth, tenth, and twelfth grade students combined reported any form of use of tobacco within the last 30 days (Johnston, Miech, O'Malley, Bachman, & Schulenberg, 2015b).

Variability in risk behavior has been noted when considering gender and age. Gullone, Moore, Moss, and Boyd, (2000a) observed that gender had a main effect on multiple subscales of the Adolescent Risk-Taking Questionnaire (ARQ; i.e., thrill-seeking behaviors, reckless behaviors, antisocial behaviors, and perceptions of reckless behaviors). Males were more likely than females to engage in these risk behaviors, which is consistent with previous research. Adolescent males, in both the United States and England, scored higher than adolescent females on the Sensation-Seeking Scale (SSS; Zuckerman, Eysenck, & Eysenck, 1978).

Adolescence is a period when risk behaviors are prevalent (Steinberg & Morris, 2001). Significant differences between age groups for all ARQ subscales were reported. Older adolescents were more likely than younger adolescents to engage in risk behaviors (Gullone et al., 2000a). Consumption of alcohol and substance use has been consistently higher for students in upper grades compared to students in lower grades (Johnston et al., 2015; YBRS, 2003). Additionally, a significant difference was found between younger

adolescents (ages 11-13) and older adolescents (16 years and older), in their likelihood of understanding, reasoning, and appreciation of the courtroom proceedings *after* engaging in criminal behavior, with older adolescents showing higher scores (Grisso et al., 2003). However, there are conflicting findings on age and risk behavior engagement. Crone et al. (2008) found that young adolescents were more likely than older adolescents to make riskier choices. A decrease in sensation seeking related to age has also been found (Zuckerman et al., 1978). It has been argued that the peak of risk-taking behaviors during adolescence does not take situational, environmental, or cultural variables into consideration (e.g. Males, 2009, 2010; Sercombe, 2010), and thus inflates the significance of age on risk behaviors.

Loneliness. Loneliness is a person's perception of his or her relationships. Close friendships and networks, or lack thereof, are paramount in regard to interpersonal relationships. Researchers (e.g., Galanaki, 2005, 2013; Galanaki & Vassilopoulou, 2007) have specified loneliness from other related concepts, such as aloneness and solitude. Loneliness is commonly defined as an internal feeling of social isolation, negativity, sadness, and emptiness, due to perceived deficiency in social relationships, or a sense of not belonging (e.g., Asher & Hopmeyer, 1997; Asher & Paquette, 2003; Baumeister & Leary, 1995; Galanaki, 2013; Heinrich & Gullone, 2006; Maes et al., 2017; Rosenstreich & Margalit, 2015). Researchers, including Heinrich and Gullone (2006) and Galanaki and Vassilopoulou, (2007), have noted the multidimensional nature of loneliness. For example, loneliness has been identified as having affective, cognitive, and behavioral roots. Weiss (1973; as cited in Galanaki & Vassilopoulou, 2007) brought about the idea that there are two types of loneliness: emotional and social. The former is due to a lack of

an intimate, emotional bond. The latter results from lack of friendships. Weiss proposed that the two types of loneliness provoke different feelings, such as anxiety and emptiness compared to boredom and a sense of not belonging.

Loneliness is subjective (Galanaki, 2005); people experience loneliness differently and for different reasons. It should be noted that the feeling of loneliness is not necessarily a result of having a limited number of friends, social isolation, or lack of interaction with others (Heinrich & Gullone, 2006; Galanaki, 2005). That is not to say, however, that these concepts are not related. Asher et al., (1984) found a negative correlation between loneliness and number of friends. Children with no friends reported a greater sense of loneliness than children with five or more friends. Adolescents are more likely to experience loneliness if they have social difficulties, internalizing problems, such as depression, anxiety, and low self-esteem, or elevated aggression (Galanaki & Vassilopoulou, 2007).

There are conflicting findings that support an association between loneliness and academic achievement. For example, Asher et al., (1984) did not find a relationship between loneliness and Stanford Diagnostic Reading Test (SDRT) achievement scores, and they found only minimal association between loneliness and Comprehensive Test of Basic Skills (CTBS) achievement scores. Buhs et al., (2006) found an indirect association between peer rejection and achievement. A link was found between peer rejections in childhood and decreased participation in the classroom; decreased classroom participation predicted changes in achievement. Lu and Zhou (2013) found that migrant Chinese students who attended migrant schools reported greater loneliness and lower performance on a language test than migrant or urban Chinese students who attended

public schools. The differences were not, however, statistically significant. No differences in math test scores were observed.

Conversely, Benner (2011) found a significant association between achievement and loneliness. Benner conducted a two-year longitudinal study with male and female Latino high school students. Students were placed in one of three categories based on loneliness measured in 9th grade and again in 10th grade: students who reported low loneliness in 9th and 10th grade (low-steady; 78%); students who reported high loneliness in 9th and 10th grade (high-steady; 11%); and students who reported low loneliness in 9th grade and high loneliness in 10th grade (low-increasing; 11%). Results showed that low-increasing students demonstrated lower achievement and were more likely to have failed the high school exit exam than low-steady students. In addition, high-steady students were more likely to have failed the high school exit exam than low-steady students. No statistically significant differences were found in achievement levels between low-increasing and high-steady students. Similarly, Rosenstreich & Margalit (2015) found that loneliness negatively correlated with academic achievement exam scores during students' first year of college.

Because loneliness is conceptualized as one's perceived relationships compared to their ideal relationships, it is best measured by self-report. The Child Loneliness Questionnaire (Asher & Wheeler, 1985) is a valid and reliable self-report measure of perceived loneliness in children and adolescents. Galanaki (2005) observed that younger children interpret loneliness more concretely, compared to older children or adolescents. Younger children tend to define loneliness as the experience of being alone, whereas adolescents have a better understanding of what loneliness feels like and represents.

Approximately 10% of children experience chronic loneliness (Asher et al., 1984; Benner, 2011), which demonstrates the importance of further research on this topic and the possible association with academic achievement.

Mattering. The interaction between a person and his or her environment plays a crucial role in their current and future functioning. Mattering is another aspect of interpersonal relationships; it is one's sense of feeling needed by and having purpose to others (Rosenberg & McCullough, 1981). Extensive research by Rosenberg and McCullough (1981) provides an in-depth view of mattering. Mattering has been shown to be associated with self-esteem (Rosenberg & McCullough, 1981; Marshall, 2001), social adequacy concern (France & Finney, 2009), depression (Rosenberg & McCullough, 1981), suicidal ideation (Elliott et al., 2004), and overall wellness (e.g., Dixon Rayle, 2005; Marshall, 2001). Females have reported a greater sense of mattering compared to males (e.g., Dixon Rayle, 2005; Dixon, Scheidegger, & McWhirter, 2009; Marshall, 2001). Longitudinal research, conducted by Marshall, Liu, Wu, Berzonsky, & Adams (2010), supported the notion that a young adult's sense of mattering remains relatively stable over time.

Two forms of mattering have been identified: interpersonal mattering and social/general mattering (Rosenberg & McCullough, 1981), although there are researchers that consider it to be a singular concept (Marshall, 2001). Mattering is multidimensional in nature and has been conceptualized as a three-factor model (e.g., Rosenberg & McCullough; Elliot et al., 2004; Dixon Rayle, 2005). Rosenberg and McCullough (1981) identified attention, importance, and dependence as the three critical

components. Elliot and colleagues (2004) altered the terms and described them as awareness, importance, and reliance.

Awareness is one's knowledge of others' acknowledgement of his or her existence, or knowing that others pay attention to them. Importance is a person's feeling that he or she is significant to others. People feel reliance when they feel that others need them. More recently a four-factor has been identified (e.g., France & Finney, 2009). The four-factor model consists of awareness, importance, and reliance, and also includes ego-extension. France and Finney (2009) define ego-extension as the experience of others sharing one's emotions. They found that the importance factor explained 32% of variance, while 40% was explained by ego-extension, 42% was explained by awareness, and 50% was explained by the reliance factor. They found that a four-factor model better fit the data than the three-factor model, although both models are statistically significant.

Mattering has been found to be positively associated with academic achievement (Bloch, 2009; Schieferecke & Card, 2013; Tucker et al., 2010), although research is limited. For example, Tucker and colleagues (2010) found a correlation between mattering and achievement, although the sample consisted of 9 male African American high school students with grades of C or above and without any discipline history. Schieferecke and Card (2013) also found an association between mattering and achievement; their study comprised of only 21 male college participants. Bloch (2009) analyzed data from the National Education Longitudinal Study (NELS), which was collected every two years from 1988 to 1994 ($n = 24,599$). Student GPA measured academic achievement, and "mattering to teachers" was measured by a scale that consisted of only two questions (i.e., "teachers are interested in students" and "most of

my teachers listen to what I have to say”). According to Bloch, only “importance mattering” was measured, omitting “awareness” and “reliance mattering”. Bloch concluded that student academic achievement was significantly and positively (although mildly) correlated with mattering to teachers. A mild relationship was also observed between mattering to peers and achievement.

Mann (2013) found Project Challenge to be a successful intervention for at-risk girls in middle school. In his experimental study, 35 girls who had a history of trauma engaged in an intervention that addressed self-confidence, self-esteem, mattering, identity, and perceived social support. Mattering was measured by the Mattering Index (short-form; Elliot, et al., 2004). School success was measured by changes in GPA, suspensions/expulsions, and truancy, 10-12 months after treatment. The experimental intervention significantly improved the girls’ school success. More specifically, paired samples t-tests showed significant differences between pre- and post-treatment measurements for Group 1 and Group 2. To be noted, results were obtained from a small sample and thus may not be generalizable to broader populations. Although limited, the research that exists, has demonstrated a positive correlation between the mattering and achievement.

Conclusion

The purpose of this study, as described at the end of chapter one, is to develop a model to explain achievement variance in adolescence, using an ecological systems perspective. A model that includes these particular intra- and interpersonal variables from the cognitive and social domains has yet to be established. Adolescent academic achievement is associated with executive functioning, achievement goal orientation, self-

efficacy, future orientation, hope, school and social risk behaviors, loneliness, and mattering. Further research on this topic is needed, however, to determine whether these specific variables, individually and jointly, can predict achievement variance, and to what degree. Given the number of students who drop out of high school annually, it is imperative to continue research efforts in order to gain a better understanding of predictors of achievement variance. This information can be utilized to develop preventative strategies and individualized interventions.

CHAPTER 3 METHOD

Participants

Participants included students who attended a high school in an agricultural school district in Southeast Michigan in spring, 2017. According to the 2016 census, the township in which the school is located had a population of approximately 4,513 and fewer than 2,000 households. Approximately 90% of the population was white, 6% black or African American, 3% Korean, 1.6% Hispanic, and .4% two or more races. An estimated 4.8% of residents were considered to fall below the poverty level, with a 3.7% unemployment rate. Of residents 25 years and older, 5.2% did not obtain a high school diploma or equivalent, 42.6% were high school graduates, 31.8% had some college or an associates degree, and 20.2% held a Bachelor's degree or higher. The median and mean household income was \$60,164 and \$67,750, respectively.

The 2016-2017 school year graduation rate was 91.8%, which was a decline from the previous school year (96.08%). With regard to statewide testing (M-STEP), 17.3% of students assessed were proficient in all areas. The district was comprised of 741 students, 241 of who were in grades 9 through 12. Parents of one student did not allow their child to participate in the study. A total of 216 students participated in the study, with a final sample of 210 students (117 male, 55.7%; 93 female, 44.3%) in 9th ($n= 52$, 24.8%), 10th ($n= 60$, 28.6%), 11th ($n= 46$, 21.9%), and 12th grade ($n= 51$, 24.3%). Unfortunately, many students did not correctly report socioeconomic status, which was used as a control variable. Pairwise deletion was used, which resulted in just 155 students being included in this study. Ages of participants ranged between 13 and 19 years old, although the majority of students were between 14 and 18 years old: 14 ($n= 26$, 12.4%), 15 ($n= 58$,

27.6 %), 16 ($n= 43$, 20.5%), 17 ($n= 49$, 23.3%), and 18 ($n= 29$, 13.8%). Participants were primarily identified as Caucasian ($n= 169$, 80.5%), with the remaining identified as multi-racial ($n= 19$, 9%), African American/Black ($n= 7$, 3.3%), Native American ($n= 5$, 2.4%), Hispanic or Latino ($n= 4$, 1.9%), Asian ($n= 2$, 1%), other ($n= 2$, 1%), or preferred not to answer ($n= 2$, 1%).

Table 1

Demographics

Demographic	Frequency	Percent
<u>Gender</u>		
Male	117	55.7
Female	93	44.3
Total	210	100
<u>Age</u>		
13	1	0.5
14	26	12.4
15	58	27.6
16	43	20.5
17	49	23.3
18	29	13.8
19	2	1.0
Total	210	100
<u>Grade Level</u>		
Ninth Grade	52	24.8
Tenth Grade	60	28.6
Eleventh Grade	46	21.9
Twelfth Grade	51	24.3
Total	209	99.5
<u>Race/Ethnicity</u>		
Hispanic or Latino	4	1.9
African American/Black	7	3.3
Caucasian	169	80.5
Native American Indian	5	2.4
Asian	2	1.0
Multi-Racial	19	9.0
Other	2	1.0
Prefer not to answer	2	1.0
Total	210	100

Measures

Demographic information, including age, grade-level (9, 10, 11, or 12), gender/sex (male or female), race/ethnicity (Hispanic or Latino, African American/Black, Caucasian/White, Middle-Eastern, Native American, Asian, Indian, Pakistani, Afghani, or other Indian Subcontinent, Multi-racial, Other, or Prefer not to answer), and a socioeconomic status proxy measured by free and reduced lunch status (Yes/No) were collected. Based on a meta-analysis by Robbins et al. (2004), socioeconomic status was found to explain approximately 35% of the variance of college GPA, and was thus an important measure to include. With the exception of age, the demographic information was reported in a forced choice format.

Academic achievement. Self-reported grades were used to represent students' academic achievement, both overall and in specific courses. First, students reported a holistic assessment of their typical grades on a 9-point scale ranging from "Mostly A's" (score=1), "Mostly A's and B's", "Mostly B's" to "Mostly E/F's" (score=9). Next, students reported their most recent grades in each of the four core classes (i.e., English/Language Arts, Math, Science, and Social Studies) on a 5-point scale; they were asked to circle one of the following: "A" (score=1), "B", "C", "D", or "E/F" (score=5). If students were unsure, they were prompted to choose the grade that they typically earned, or suspected they received. For clarity, core classes offered at this high school were specified for each subject area. For example, Math includes Algebra I & II and Geometry; Science includes Biology, Chemistry, Physics, Anatomy, and Agricultural Science; Social Studies includes Civics/Econ, US & World History, and Geography. There are no alternate classes for English/Language Arts. The responses from the four

class grades were averaged; the average of grades is called “GPA” for the purpose of this study.

Executive functioning. The Barkley Deficits of Executive Functioning Self Report-Short Form (Barkley, 2011) was used to measure executive functioning. The self-report short-form consists of 20 items displayed in a 4-point Likert scale format. Students were asked to report the frequency of particular behaviors within the past six months by circling 1=“Never or rarely”, 2=“Sometimes”, 3=“Often”, and 4=“Very often”. Empirically and theoretically based, this assessment tool screens for deficits in executive functioning through five subscales: Self-organization, self-restraint, self-motivation, self-regulation of emotion, and self-management of time (Barkley, 2011; Allee-Smith, Winters, Drake, & Joslin, 2013).

High internal consistency for the long form ($\alpha = .91$ to $.96$) and short form ($\alpha = .92$), and satisfactory test-retest reliability ($r = .62 - .80$, $p < .001$) have been demonstrated (Barkley, 2011). Construct validity was established by the use of the Prototype BDEFS (P-BDEFS), and was demonstrated by the use of Barkley’s personal definition of executive functioning as the basis (Barkley, Murphy, & Fischer, 2008; Barkley, 2011; Allee-Smith et al., 2013). Discriminant validity was found to be satisfactory across all scales and in multiple studies, based on significantly higher ratings from individuals with ADHD than individuals without ADHD (Barkley, 2011).

Achievement goal orientation. The Patterns of Adaptive Learning Scales (PALS; Midgley et al., 2000) was conducted and used as a measure to determine student achievement goal orientation. The PALS student survey includes 94 questions that comprise five scales. All items are responded to using this 5-point Likert scale: 5= “Very

true”, 4=”true”, 3= “Somewhat true”, 2=”not true”, and 1= “Not at all true”. The Personal Achievement Goal Orientation scale was used to measure achievement goal orientation, which comprises of the Mastery Goal Orientation (5 questions; $\alpha=.85$), Performance-Approach Goal Orientation (5 questions; $\alpha=.89$), and Performance-Avoidance Goal Orientation (4 questions; $\alpha=.74$) subscales. It should be noted that the Performance-Avoidance scale was not included in the regression analysis, due to the observed high correlation with the Performance-Approach scale ($r= .681$, $p< .001$), in an attempt to avoid multicollinearity. In this study, students were instructed to specifically answer the questions in relation to their English Language Arts class.

Internal consistency was evidenced by alpha coefficients of between .62 and .83 (Roeser, Midgley, & Urda, 1996) and .84 (Middleton & Midgley, 1997). Reliability coefficients were usually found to be higher for older children compared to younger children. Alpha coefficients for the ability-approach and ability-avoid goal orientation subscales were both .83 (Midgley et al., 2000). Significant correlations ($r= .63$ and $.67$) were reported between the ability- and task-oriented PALS scales and scales developed by Nicholls et al. (1984), which the authors interpreted as good convergent validity (Midgley et al, 1998). Construct validity was demonstrated by relating each goal orientation to academic self-efficacy (Midgley et al., 2000). Coefficients for task goal scales (.63) and ability goal scales (.61) indicated moderate stability (Anderman & Midgley, 1997).

Academic self-efficacy. The PALS (Midgley et al., 2000) is comprised of five scales, and each scale is comprised of multiple subscales. The Academic Efficacy subscale from the PALS Academic-Related Beliefs, Attitudes, and Strategies scale, was

used to measure academic self-efficacy. This subscale, which consists of five questions, has an alpha level of .78 (Midgley et al, 2000; Dever & Kim, 2016). Questions include: “I’m certain I can master the skills taught in class this year”; “I’m certain I can figure out how to do the most difficult class work”; “I can do almost all the work in class if I don’t give up”; “Even if the work is hard, I can learn it”; and “I can do even the hardest work in this class if I try”. These questions were dispersed between all other questions used from the PALS. Items were displayed as a 5-point Likert scale and were scored with value assignment ranging between: 5= “Very true”, 3= “Somewhat true”, and 1= “Not at all true”. Dever and Kim (2016) found equivalent factor loadings and factor structure for African American girls, African American boys, Caucasian girls, and Caucasian boys, which demonstrated weak measurement invariance. Again, students were instructed to specifically answer the questions in relation to their English Language Arts class.

Future orientation. Future orientation was measured by the Skepticism About the Relevance of School for Future subscale from the PALS (Midgley et al., 2000) Academic-Related Beliefs, Attitudes, and Strategies scale. Questions include: “Even if I want to do well in school, it will not help me have the kind of life I want when I grow up”; “My chances of succeeding later in life don’t depend on doing well in school”; “Doing well in school doesn’t improve my chances of having a good life when I grow up”; “Getting good grades in school won’t guarantee that I will get a good job when I grow up”; “Even if I am successful in school, it won’t help me fulfill my dreams”; and “Doing well in school won’t help me have a satisfying career when I grow up”. These questions were dispersed between all other questions used from the PALS, were displayed as a 5-point Likert scale and scored with value assignment ranging between: 5=

“Very true”, 3= “Somewhat true”, and 1= “Not at all true”. This six-question subscale has an alpha level of .83. Responses were reversed coded and the mean score was used to represent future orientation.

Hope. The Children’s Hope Scale (CHS; Snyder et al., 1997) was used to measure students’ sense of hope. This scale consists of six statements that are answered on a 5-point Likert scale format, ranging from 1= “None of the time” to 5= “All of the time”. Three statements pertain to agency thoughts, and three to pathways thoughts; however, these subscales cannot be measured individually. The authors conducted a pilot study to ensure understanding of the questions, and some questions were re-written. This scale initially consisted of 12 items and the sample consisted of 372 children (53% male), ages 9 -14. Five additional studies were conducted with different samples of children with varying illnesses and diagnoses, as well as children without any identified illnesses. Across the five studies, children varied in age from 7-17 years old. Factor structure was demonstrated by pre- and post-test results from the studies conducted in Oklahoma. They found a similar pattern of factor loadings for the agency and the pathway items. Although the factors were distinct, they were positively correlated with one another on the pre- and post-test ($r = .52$, $r = .61$).

From the six studies, Cronbach’s alphas ranged from .72 to .86 (median = .77). Temporal stability was demonstrated through two of the six studies in which the authors conducted test-retest correlations. Both correlations were significant ($r(369) = .71$, $p < .001$; $r(89) = .73$, $p < .001$). Convergent validity was demonstrated in each of the pre-post-test studies through parent report; positive correlations were obtained for both studies. Additionally, positive and significant correlations were found between the CHS

and all four scales of the Self-Perception Profile for Children (SPP-C; Harter, 1985, as cited in Snyder et al., 1997). Discriminant validity was shown by a slightly negative correlation between CHS and hopelessness, and the scale did significantly correlate with intelligence as measured by the WISC-R and WISC-III (Wechsler, 1974, 1991, respectively). The CHS was positively and significantly correlated with scores from the Iowa Test of Basic Skills, (Hieronymus & Hoover, 1985, as cited in Snyder et al., 1997), $r(100) = .50, p < .001$, demonstrating predictive validity. Snyder and colleagues (1997) found no significant gender or age differences in responses.

School and social risk behaviors. The following questions developed for this study regarding school-related risk behaviors were asked: 1) “Approximately how often are you tardy to class?”; 2) “Approximately how often do you skip one class?”; 3) “Approximately how often do you skip two or more classes?”; and 4) “Approximately how often do you complete and turn in homework?”. Participants circled one of four options: “Never/Very Rarely”; “1-2 times per week”; “3-4 times per week”; or “5+ times per week” for questions one, two, and three. To answer the fourth question, participants circled one of the following: “Never/Very Rarely”; “Occasionally”; “Often”; or “Always/Almost Always”. Questions one and two were reversed scored, and an average of questions one, two, and four was used to represent school risk behavior. To avoid confounding results, question three was not included in the data analysis due to its similarity with question two.

In addition, the PALS (Midgley et al., 2000), Cheating Behavior (3 questions; $\alpha=.87$) and Disruptive Behavior (5 questions; $\alpha=.87$) subscales were used. Although cheating and disruptive behaviors are types of school risk behaviors, they were distinctly

measured. However, a high correlation was found between the Cheating Behavior and Disruptive Behavior subscales ($r = .617, p < .001$). As such, only the Cheating Behavior subscale was used in the analyses to avoid multicollinearity.

Social risk behaviors were measured with the Adolescent Risk Questionnaire (ARQ; Gullone et al., 2000a). The ARQ measures the frequency of engagement in risk behaviors (Gullone et al., 2000a; Gullone, Paul, & Moore, 2000b). This scale consists of 22 questions that are presented in a 5-point Likert format, ranging from 0 (*Never do*) to 4 (*Do very often*). For its development, Moore and Gullone (1996) gathered reports from 570 (279 female) 12 to 17-year-old adolescents. A second phase of psychometric evaluation was conducted with 925 (461 female) 11 to 18-year-old adolescents. Internal consistency for 38 of the 40 coefficients was demonstrated by Cronbach's alphas of 0.7 or higher --most of which exceeded 0.8 (Gullone et al., 2000a; Gullone et al., 2000b). Reasonable stability was reported, with the majority of coefficients ranging between 0.6 and 0.8, supporting test-retest reliability (Gullone et al., 2000a). The ARQ has demonstrated good convergent validity (Cronbach's alpha coefficients between .72 and .91) and discriminant validity (Gullone et al., 2000b).

Loneliness. Multiple measures were included to measure students' relationships with others, including number of social relationships and sense of loneliness. To measure number of social relationships, students were asked to write the number of close friends they have. The Children's Loneliness Questionnaire (CLQ; Asher & Wheeler, 1985) was used to measure loneliness. The CLQ is a revision of the Children's Loneliness and Social Dissatisfaction Scale (Asher et al., 1984). Asher and Wheeler (1985) specified the questions to reflect feelings in the school environment. The CLQ consists of 24 items,

including 8 dispersed ‘filler’ questions. The 16 loneliness items on the scale were found to be “internally consistent (Cronbach’s alpha= .90) and internally reliable (split-half correlation between forms = .83; Spearman-Brown reliability coefficient = .91; Guttman split-half reliability coefficient = .91)” (Asher et al., 1984, p.1458).

Mattering. Mattering is a concept rooted in a person’s feeling important to others. A 24-item measure, the Mattering Index (Elliott et al., 2004), was used in the study. Elliot et al., (2004) utilized Rosenberg’s three-factor conceptualization of mattering and developed a scale to appropriately measure the concept. The factors include awareness, importance, and reliance. Initially, Elliot and colleagues administered a 47-item questionnaire to 508 college students. Questions were excluded if less than 10% of the item variance was accounted for by one of the factors, which demonstrated construct validity. In addition to the original study, results from two additional studies (n=388, n=544) supported the three-factor model. Through confirmatory factor analysis, the awareness factor demonstrated Cronbach’s alphas of .835 for sample one, .872 for sample two, and .816 for sample three. The importance factor demonstrated .839, .859, and .792, and the reliance factor demonstrated .833, .872, and .829, respectively. The full mattering index revealed Cronbach’s alphas of .904 for sample one, .922 for sample two, and .886 for sample three. These results suggest that the Mattering Index is internally consistent and a valid measure of mattering.

Procedures

The Institutional Review Board (IRB) approved all study procedures. School office personnel provided all high school student addresses to the principal investigator (PI). Information letters were mailed via U.S. mail to parents of all enrolled students in

grades 9, 10, 11, and 12. If parents allowed their child to participate in the study, no further action was required. If parents disagreed, they wrote their child's name on an included tear-off sheet and returned it to the high school office within two weeks; one student was opted out of the study.

Prior to dissemination of the questionnaires, the PI read aloud an administration script. Before students began the questionnaire, they were provided with and asked to read through an information sheet, which explained the study, described possible risks and benefits of participation, and clearly indicated voluntary participation. Most students completed the questionnaire in approximately 20 minutes or less; additional time was provided to students as needed. The two students who did not participate quietly read or worked on an assignment given by the teacher. When finished, students placed their questionnaires in an envelope at the front of the classroom. No students chose to discontinue participation partway through, and therefore no questionnaires were collected separately and shredded prior to data analysis. When all questionnaires in the class were collected, all students, despite participation, were allowed to take a piece of candy provided by the PI.

Data Analysis

The Statistical Package for Social Science (SPSS), version 24, computer program was utilized to compute all statistical analyses. The nominal alpha criterion level was set at 0.05, which is common practice. Table 2 reflects the analytic plan.

Table 2

Statistical Analyses

	Hypotheses	Variables	Statistical Analyses
1.	Preliminary analyses were first run using ANOVA to test for gender, grade level, and socioeconomic differences in all study variables. Results were used to determine whether to enter any or all of them as covariates in subsequent analyses, in which case they were added at step 1 of hierarchical linear regression analyses.		
RQ1	Which cognitive variables are most predictive of achievement?		
H ₁ :	Executive functioning is the cognitive variable that is most predictive of academic achievement.	<p><i>Predictor variables:</i> Executive functioning Mastery goal orientation Performance-approach goal orientation Performance-avoidance goal orientation Academic self-efficacy Future orientation Hope</p> <p><i>Criterion variable:</i> Academic achievement</p>	Multiple linear regression analysis
RQ2	Which social variables are most predictive of achievement?		
H ₂ :	School and social risk behaviors are the social variable that are most predictive of academic achievement.	<p><i>Predictor variables:</i> School risk behaviors Social risk behaviors Cheating Behaviors Disruptive Behaviors Loneliness Mattering</p> <p><i>Criterion variable:</i> Academic achievement</p>	Multiple linear regression analysis
RQ3	In a full model of the most predictive variables from each level, is more variance in achievement explained than in prior models?		
H ₃ :	In a full model of the most predictive variables from each level, more variance in achievement is explained than in prior models.	<p><i>Predictor variables:</i> Step one: Cognitive variable(s) Step two: Social variable(s)</p> <p><i>Criterion variable:</i></p>	Hierarchical linear regression analysis

		Academic achievement	
RQ4	Does level of risk-taking behaviors moderate the expected relationship between executive functioning and academic achievement?		
H ₄ :	Levels of risk-taking behaviors moderate the expected relationship between executive functioning and academic achievement.	<i>Predictor Variables:</i> Executive functioning <i>Moderating Variable:</i> School risk behaviors Social risk behaviors <i>Criterion Variable:</i> Academic achievement	Multiple linear regression analysis

CHAPTER 4 RESULTS

The purpose of this study was to construct a model that best predicts academic achievement in adolescence, incorporating an ecological perspective in how variables were selected for inclusion. SPSS (version 24) was selected to analyze the data. Analysis of Variance (ANOVA) tests were run to determine gender, grade level, and socioeconomic status differences in the variables examined; multiple differences were found for each. Thus, those variables were controlled for in the primary study analyses. A normal distribution was observed. Any missing data, which was minimal, was adjusted for by use of pairwise deletion. Results from all analyses were considered statistically significant with a criterion alpha of .05. Table 3 shows the means and standard deviations for the study variables. Table 4 represents a correlation matrix of the study variables.

Table 3

Descriptive Statistics

	Minimum	Maximum	Mean	Standard Deviation
GPA	1.50	5.00	4.1009	.83363
Grades Total	1.00	9.00	6.8947	1.92614
BDEFS Total	1.35	4.00	3.0018	.60761
PALS Mastery	1.00	5.00	3.5226	.94476
PALS Avoidance	1.00	5.00	2.8009	.80961
PALS Approach	1.00	5.00	2.6928	.98231
PALS Self-Efficacy	1.20	5.00	3.6466	.82176
PALS Skepticism (Future Orientation)	1.00	5.00	3.6502	.93070
CHS Total	1.00	5.00	3.4500	.78429
School Risk Behavior	1.00	3.33	1.4393	.53971
PALS Cheating	1.00	5.00	2.1906	1.18728
PALS Disruptive	1.00	5.00	2.2407	1.02018
ARQ Total	1.00	3.59	1.7097	.51785
CLQ Total	1.06	4.69	2.3161	.71649
Mattering Total	1.33	4.88	3.5390	.66960

Note. N= 216; GPA= Grade Point Average; BDEFS= Barkley Deficits of Executive Functioning Scale; PALS= Patterns of Adaptive Learning Scales; CHS= Children's Hope Scale; ARQ= Adolescent Risk Questionnaire; CLQ= Children's Loneliness Questionnaire

Table 4

Correlations Matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. GPA	--														
2. Grades Total	.860**	--													
3. BDEFS Total	.380**	.338**	--												
4. PALS Mastery	.414**	.450**	.391**	--											
5. PALS Avoidance	-.001	.002	-.130	.190**	--										
6. PALS Approach	.109	.065	.036	.283**	.681**	--									
7. PALS Self-Efficacy	.511**	.501**	.399**	.520**	.097	.192**	--								
8. PALS Skepticism	.164*	.235**	.386**	.404**	-.120	-.041	.274**	--							
9. CHS Total	.575**	.491**	.567**	.409**	.043	.154*	.549**	.178*	--						
10. School Risk Behavior	-.524**	-.552**	-.427**	-.445**	-.046	-.163*	-.425**	-.325**	-.364**	--					
11. PALS Cheating	.239**	.280**	.382**	.381**	.049	-.016	.301**	.464**	.180**	.428**	--				
12. PALS Disruptive	.227**	.289**	.341**	.364**	.106	.164*	.225**	.513**	-.091	.386**	.617**	--			
13. ARQ Total Risk behavior	.203**	.228**	.369**	.342**	.010	-.018	.219**	.338**	-.139*	.428**	.476**	.520**	--		
14. CLQ Total Loneliness	-.263**	-.217**	-.551**	-.222**	.130	-.038	-.285**	-.252**	-.464**	.325**	.110	.062	.160*	--	
15. Matting Total	.350**	.367**	.546**	.398**	-.074	.048	.368**	.384**	.603**	-.345**	-.234**	-.302**	-.240**	-.599**	--

Note. N= 216; GPA= Grade Point Average; BDEFS= Barkley Deficits of Executive Functioning Scale; PALS= Patterns of Adaptive Learning Scales; CHS= Children's Hope Scale; ARQ= Adolescent Risk Questionnaire; CLQ= Children's Loneliness Questionnaire

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

Research Question 1: Which cognitive variables are most predictive of achievement?

A hierarchical linear regression analysis was run to answer this question. In the first step, gender, grade level, and socioeconomic status (SES) were entered as control variables. Step two included the cognitive variables measured: Executive Functioning, Mastery Orientation, Performance-Approach Orientation, Self-Efficacy, Future Orientation, and Hope. As previously stated, Performance Orientation is often distinguished as either performance-approach or performance-avoidance and they are measured independently. Both performance variables were initially measured independently, although, due to a high correlation between them ($r = .681, p < .001$), only Performance-Approach Orientation was used in the analysis.

At step one, the model was significant ($R = .445, \text{Adjusted } R^2 = .182, F = 12.295, df = 3, 149, p < .001$), although SES was the only significant predictor ($\beta = .447, p < .001$). This suggests a positive relationship between SES and academic achievement. In step two the model was again significant ($R = .674, \text{Adjusted } R^2 = .420, F = 13.231, df = 9, 143, p < .001$). SES remained as a significant predictor, but less so than in step one ($\beta = .215, p < .05$), and Hope was the only cognitive factor that significantly predicted academic achievement ($\beta = .355, p < .001$).

Table 5

Hierarchical Multiple Linear Regression Analysis- Cognitive Variables

Model		<i>B</i>	<i>SE B</i>	β	Adjusted R^2	<i>t</i>	<i>p</i>
1	(Constant)	3.101	.271			11.455	.000
	Gender	-.021	.124	-.013		-.172	.863
	Grade level	-.003	.057	-.004		-.048	.961
	SES	.425	.072	.447	.182	5.910	.000
2	(Constant)	.944	.436			2.163	.001
	Gender	.090	.117	.054		.771	.442
	Grade level	.054	.049	.072		1.084	.280
	SES	.205	.069	.215		2.960	.004
	Executive Functioning	.041	.118	.030		.344	.731
	Mastery Orientation	.118	.074	.133		1.586	.115
	Approach Orientation	.009	.057	.010		.150	.881
	Self-Efficacy	.165	.086	.163		1.930	.056
	Future Orientation	-.022	.066	-.025		-.337	.737
	Hope	.378	.091	.355	.420	4.178	.000

Note: Model 1 ($R = .445$, $R^2 = .198$, $\Delta R^2 = .198$, $F = 12.295$, $df = 3, 149$, $p < .001$); Model 2 ($R = .674$, $R^2 = .454$, $\Delta R^2 = .256$, $F = 13.231$, $df = 9, 143$, $p < .001$)

Research Question 2: Which social variables are most predictive of achievement?

This question was answered through hierarchical linear regression analysis. In the first step, gender, grade level, and socioeconomic status were again entered as control variables. Step two included the social variables measured: Cheating, School Risk Behaviors, Social Risk Behaviors, Loneliness, and Mattering. It should be noted that there was a high correlation between the PALS Cheating Behavior and PALS Disruptive Behavior subscales ($r = .617$, $p < .001$). In order to avoid multicollinearity, the latter subscale was excluded from this analysis. At step one, the model was significant ($R =$

.445, Adjusted $R^2 = .182$, $F = 12.212$, $df = 3, 148$, $p < .001$); again, SES was the only significant predictor ($\beta = .447$, $p < .001$). The model was also significant at step two ($R = .674$, Adjusted $R^2 = .343$, $F = 13.231$, $df = 9, 143$, $p < .001$). SES was again a significant predictor ($\beta = .245$, $p < .05$), as well as School Risk Behaviors ($\beta = -.385$, $p < .001$) and Mattering ($\beta = .175$, $p < .05$). Results can be found in Table 6.

Table 6

Hierarchical Multiple Linear Regression Analysis- Social Variables

Model		<i>B</i>	<i>SE B</i>	β	Adjusted R^2	<i>t</i>	<i>p</i>
1	(Constant)	3.101	.272			11.416	.000
	Gender	-.021	.124	-.013		-.172	.864
	Grade level	-.003	.057	-.004		-.048	.962
	SES	.425	.072	.447	.182	5.890	.000
2	(Constant)	3.503	.631			5.554	.000
	Gender	-.063	.117	-.038		-.539	.591
	Grade level	.069	.053	.093		1.306	.194
	SES	.233	.074	.245		3.150	.002
	Cheating	-.019	.055	-.027		-.339	.735
	School Risk Behaviors	-.609	.135	-.385		-4.523	.000
	Social Risk Behaviors	.002	.130	.001		.012	.991
	Loneliness	.038	.106	.032		.359	.720
	Mattering	.218	.108	.175	.343	2.027	.045

Note: Model 1 ($R = .445$, $R^2 = .198$, $\Delta R^2 = .198$, $F = 12.212$, $df = 3, 148$, $p < .001$); Model 2 ($R = .615$, $R^2 = .378$, $\Delta R^2 = .180$, $F = 10.872$, $df = 8, 143$, $p < .001$)

Research Question 3: In a full model of the most predictive variables from each level, is more variance in achievement explained than in prior models?

A hierarchical linear regression was used again to test a full model, using results from research questions one and two. At step one, covariates were controlled for. At step two, the cognitive variable that best explained variance in achievement (Hope) was entered. At step three, the significant social variables, School Risk Behaviors and Mattering, were added. As observed in the previous two regressions, SES was significant at each step: Step one ($\beta = .447, p < .001$), step two ($\beta = .264, p < .001$), and step three ($\beta = .169, p < .05$). At step two, Hope was significant ($\beta = .499, p < .001$). Finally, at step three, Hope remained significant ($\beta = .451, p < .001$), and School Risk Behaviors was significant ($\beta = -.327, p < .001$). Mattering was not found to be a significant predictor of achievement variance in the third step ($\beta = -.072, p = .346$). The model explained approximately 18% of the variance in academic achievement at the first step ($R = .445, R^2 = .198, \Delta R^2 = .198, \text{Adjusted } R^2 = .182, F = 12.295, df = 3, 149, p < .001$). At the second step, the model explained approximately 40% of the variance ($R = .641, R^2 = .411, \Delta R^2 = .212, \text{Adjusted } R^2 = .395, F = 25.775, df = 4, 148, p < .001$), and approximately 47% at step three ($R = .701, R^2 = .491, \Delta R^2 = .081, \text{Adjusted } R^2 = .471, F = 23.513, df = 6, 146, p < .001$). Results are presented in Table 7.

Table 7

Hierarchical Multiple Linear Regression Analysis- Cognitive and Social Variables

Model		<i>B</i>	<i>SE B</i>	β	Adjusted R^2	<i>t</i>	<i>p</i>
1	(Constant)	3.101	.271			11.455	.000
	Gender	-.021	.124	-.013		-.172	.863
	Grade level	-.003	.057	-.004		-.048	.961
	SES	.425	.072	.447	.182	5.910	.000
3	(Constant)	1.377	.332			4.151	.000
	Gender	.121	.108	.072		1.116	.266
	Grade level	.039	.049	.052		.800	.425
	SES	.251	.066	.264		3.777	.000
	Hope	.532	.073	.499	.395	7.299	.000
3	(Constant)	2.804	.448			6.259	.000
	Gender	.080	.102	.048		.783	.435
	Grade level	.072	.047	.097		1.550	.123
	SES	.161	.065	.169		2.461	.015
	Hope	.482	.084	.451		5.733	.000
	School Risk Behaviors	-.517	.108	-.327		-4.804	.000
	Mattering	-.089	.094	-.072	.471	-.945	.346

Note: Model 1 ($R = .445$, $R^2 = .198$, $\Delta R^2 = .198$, $F = 12.295$, $df = 3, 149$, $p < .001$); Model 2 ($R = .641$, $R^2 = .411$, $\Delta R^2 = .212$, $F = 25.775$, $df = 4, 148$, $p < .001$) Model 3 ($R = .701$, $R^2 = .491$, $\Delta R^2 = .081$, $F = 23.513$, $df = 6, 146$, $p < .001$)

A follow up exploratory regression analysis was run with Mattering removed because it was not found to be a significant predictor in the model above. Nothing changed at steps one and two. At step three, with only School Risk Behaviors added, the model still explained approximately 47% of the variance ($R = .699$, $R^2 = .488$, $\Delta R^2 = .078$, Adjusted $R^2 = .471$, $F = 28.058$, $df = 5, 147$, $p < .001$). Results are presented in Table 8.

Table 8

Hierarchical Multiple Linear Regression Analysis- Mattering Removed

Model		<i>B</i>	<i>SE B</i>	β	Adjusted R^2	<i>t</i>	<i>p</i>
1	(Constant)	3.101	.271			11.455	.000
	Gender	-.021	.124	-.013		-.048	.863
	Grade level	-.003	.057	-.004		-.048	.961
	SES	.425	.072	.447	.182	5.910	.000
3	(Constant)	1.377	.332			4.151	.000
	Gender	.121	.108	.072		1.116	.266
	Grade level	.039	.049	.052		.800	.425
	SES	.251	.066	.264		3.777	.000
	Hope	.532	.073	.499	.395	7.299	.000
3	(Constant)	2.629	.408			6.446	.000
	Gender	.071	.102	.042		.695	.488
	Grade level	.076	.047	.102		1.642	.103
	SES	.157	.065	.165		2.414	.017
	Hope	.439	.071	.411		6.191	.000
	School Risk Behaviors	-.504	.107	-.319	.471	-4.726	.000

Note: Model 1 ($R = .445$, $R^2 = .198$, $\Delta R^2 = .198$, $F = 12.295$, $df = 3, 149$, $p < .001$); Model 2 ($R = .641$, $R^2 = .411$, $\Delta R^2 = .212$, $F = 25.775$, $df = 4, 148$, $p < .001$) Model 3 ($R = .699$, $R^2 = .488$, $\Delta R^2 = .078$, $F = 28.058$, $df = 5, 147$, $p < .001$)

Research Question 4: Does level of risk-taking behaviors moderate the expected relationship between executive functioning and academic achievement?

The final research question examined the possible moderating effect of risk-taking behaviors on the relationship between executive functioning and academic achievement. Risk-behaviors were distinguished as either school or social risk behaviors, and were run in separate regressions. The initial analysis examined school risk behaviors. Covariates were controlled for in step one of the hierarchical linear regression. Executive functioning and school risk-behaviors were added in step two ($R = .612$, $R^2 = .374$, $\Delta R^2 = .176$, Adjusted $R^2 = .353$, $F = 17.719$, $df = 5, 148$, $p < .001$). In order to determine moderation, the executive functioning and school risk behavior variables were centered and multiplied together, which produced an interaction variable; this was added in step three ($R = .642$, $R^2 = .412$, $\Delta R^2 = .037$, Adjusted $R^2 = .388$, $F = 17.151$, $df = 6, 147$, $p < .001$). If significantly more variance can be explained with the addition of the interaction variable, moderation would be indicated. Results indicate an approximate 3% change at statistically significant levels with the addition of the interaction variable. This model shows that school risk behaviors do not moderate the relationship between executive functioning and academic achievement. Results are presented in Table 9.

Table 9

Hierarchical Multiple Linear Regression Analysis- Executive Functioning and Academic Achievement with School Risk Behaviors as Moderating Variable

Model		B	SE B	β	Adjusted R ²	t	p
1	(Constant)	3.101	.270			11.493	.000
	Gender	-.021	.123	-.013		-.173	.863
	Grade level	-.003	.056	-.004		-.049	.961
	SES	.425	.072	.447	.182	5.930	.000
2	(Constant)	3.503	.525			6.667	.000
	Gender	.023	.116	.014		.196	.845
	Grade level	.071	.052	.095		1.385	.168
	SES	.227	.071	.238		3.199	.002
	Executive Functioning	.227	.105	.165		2.150	.033
	School Risk Behaviors	-.590	.122	-.373	.353	-4.848	.000
3	(Constant)	3.353	.514			6.528	.000
	Gender	.049	.113	.029		.432	.666
	Grade level	.084	.050	.112		1.668	.097
	SES	.218	.069	.229		3.151	.002
	Executive Functioning	.305	.106	.222		2.884	.005
	School Risk Behaviors	-.724	.126	-.458		-5.734	.000
	EF*School RB	-.445	.146	-.226	.388	-3.054	.003

Note: EF= Executive Functioning; RB= Risk Behaviors

Model 1 (R= .445, R²= .198, ΔR^2 = .198, F= 12.377, df=3, 150, p< .001); Model 2 (R= .612, R²= .374, ΔR^2 = .176, F= 17.719, df= 5, 148, p< .001); Model 3 (R= .642, R²= .412, ΔR^2 = .037, F= 17.151, df=6, 147, p< .001)

Next, a possible moderating effect of social risk-taking behaviors on the relationship between executive functioning and academic achievement was examined. Again, covariates were controlled for in step one of the hierarchical linear regression. In step two, social risk-behaviors and executive functioning were added ($R = .533$, $R^2 = .284$, $\Delta R^2 = .086$, Adjusted $R^2 = .260$, $F = 11.769$, $df = 5, 148$, $p < .001$). Similarly, the executive functioning and social risk behavior variables were centered and multiplied together, which produced an interaction variable, which was added in step three ($R = .543$, $R^2 = .295$, $\Delta R^2 = .011$, Adjusted $R^2 = .267$, $F = 10.270$, $df = 6, 147$, $p < .001$). There was no change at statistically significant levels with the addition of the interaction variable. This model shows that social risk behaviors do not moderate the relationship between executive functioning and academic achievement. Results are shown in Table 10.

Table 10

Hierarchical Multiple Linear Regression Analysis- Executive Functioning and Academic Achievement with Social Risk Behaviors as Moderating Variable

Model		<i>B</i>	<i>SE B</i>	β	Adjusted R^2	<i>t</i>	<i>p</i>
1	(Constant)	3.101	.270			11.493	.000
	Gender	-.021	.123	-.013		-.173	.863
	Grade level	-.003	.056	-.004		-.049	.961
	SES	.425	.072	.447	.182	5.930	.000
2	(Constant)	2.285	.546			4.186	.000
	Gender	.085	.124	.051		.683	.495
	Grade level	.043	.055	.057		.777	.438
	SES	.338	.073	.355		4.631	.000
	Executive Functioning	.354	.114	.258		3.104	.002
	Social Risk Behaviors	-.174	.125	-.107	.260	-1.394	.166
3	(Constant)	2.294	.544			4.220	.000
	Gender	.084	.123	.050		.684	.495
	Grade level	.053	.055	.070		.958	.340
	SES	.329	.073	.345		4.507	.000
	Executive Functioning	.372	.114	.271		3.255	.001
	Social Risk Behaviors	-.231	.130	-.141		-1.772	.078
	EF*Social RB	-.287	.190	-.112	.267	-1.506	.134

Note: EF= Executive Functioning; RB= Risk Behaviors

Model 1 ($R = .445$, $R^2 = .198$, $\Delta R^2 = .198$, $F = 12.377$, $df = 3, 150$, $p < .001$); Model 2 ($R = .533$, $R^2 = .284$, $\Delta R^2 = .086$, $F = 11.769$, $df = 5, 148$, $p < .001$); Model 3 ($R = .543$, $R^2 = .295$, $\Delta R^2 = .011$, $F = 10.270$, $df = 6, 147$, $p < .001$)

CHAPTER 5 DISCUSSION

Traditional psychological processes as they relate to academic achievement include cognition, motivation, and social-emotional variables. Within the context of the ecological systems theory (Bronfenbrenner, 1979), cognitive and social-emotional development is contingent upon the evolving interactions that occur between a person and their environment. Family, peer, and cultural norms are thought to significantly impact academic achievement and performance (Bronfenbrenner, 1979). Bronfenbrenner (1977) devised a conceptual and operational model that was used to examine proximal processes as they relate to variables that impact academic performance. Systemic environmental variables and intrapersonal predictors of achievement were also examined. Each subsystem contained in Bronfenbrenner's ecological systems theory was evaluated in order to determine which roles, rules, and norms contribute to academic and social-emotional development. Direct and indirect engagement with one's academic environment has shown to be a significant factor for academic and developmental success (Chun & Dickson, 2011).

The purpose of this study was to develop a model that best explains variance in adolescent academic achievement. Cognitive and social characteristics influence how an individual interacts with and responds to his or her environment. A holistic approach consistent with ecological theory was taken in order to examine multiple inter- and intra-personal variables that influence development and academic achievement. Many factors contribute to successful academic functioning. It is important to determine which model of aggregate variables has the most influence on achievement. This study examined a unique combination of social and cognitive variables.

A correlation matrix was constructed and findings were generally supportive of the reviewed research. Significant positive correlations were found between achievement and executive functioning, mastery goal orientation, academic self-efficacy, future orientation, and hope. Conversely, but also as expected, significant negative correlations were found between achievement and cheating behaviors, disruptive behaviors, school risk behaviors, social risk behaviors, loneliness, and mattering. Interestingly, no significant correlation was found between achievement and performance-approach orientation, or between achievement and performance-avoidance orientation. This was unexpected due to prior research that demonstrated a correlation between performance-goal orientation and students' use of maladaptive learning strategies (e.g., Pintrich, 2000b; Middleton & Midgley, 1997; Ryan, Pintrich, & Midgley, 2001).

The first research question addressed the relationship between cognitive variables (i.e., executive functioning, achievement goal orientation, academic self-efficacy, future orientation, and hope) and achievement. It was expected that executive functioning would be the most significant predictor of achievement from the cognitive variables, which would be consistent with previous research (e.g., Best, Miller, & Jones, 2009; Bull et al., 2008). Executive functioning includes higher-level thinking and reasoning skills that are required to carry out daily tasks (such as motivation, planning, organizing, etc.), and this is critical for academic success. Contrary to expectations, executive functioning was not a significant predictor of achievement. It is possible that executive functioning was not significant in the model because of the assessment method. For this study, executive functioning was measured through self-report. However, executive functioning could be diagnostically assessed by a subjective professional, which could yield different results. It

is also possible that executive functioning plays a larger role in academic achievement when students reach college level as brain maturation continues post-adolescence. Research shows that the prefrontal cortex, which is responsible for executive functioning, continues to develop throughout adolescence and into early adulthood (e.g., Best, Miller, & Jones, 2009).

Hope was found to be the only significant predictor of variance in achievement from the cognitive domain. Hope, as it relates to adolescent academic achievement, originates from one's ability to generate and initiate academic goals and plans. This is primarily based on a positive perception of one's ability within different environmental settings. Therefore, although unexpected, it is not surprising that hope was a strong predictor variable. This finding is consistent with research conducted by Marques and colleagues (2011b). Also, Dixson and colleagues (2016) found a positive correlation between hope and perceived academic competence and ability. Additional researchers (e.g., Snyder et al., 1991; Rand, Martin, & Shea, 2011; Day et al., 2010) have also supported the direct and indirect associations between hope and achievement. Previous research has indicated a consistent linkage between student hope, school attendance, and academic success (Gallup, 2009b, cited in Lopez, 2010). Students, who attend school regularly and possess achievement goals and pathways to reach those goals, are more likely to succeed academically.

As stated earlier, mastery goal orientation was positively correlated with achievement, while performance-approach and performance-avoidance orientation were not. Results from the regression analysis did not show mastery goal orientation as a significant predictor of achievement variance. This is somewhat surprising, as students

who are mastery-oriented strive to understand and integrate academic content (e.g., Ames & Archer, 1988; Dweck, 1986). It could be beneficial to examine how students perceive their classroom environment, as well as their teachers' instructional techniques. Dweck (1986) found that teaching style and goal orientation played a large role in student achievement. It could be that many students perceived their teachers as performance-orientated, and that thwarted their efforts to achieve. Additionally, students were asked to specifically consider their English/Language Arts class. There is a possibility that mastery goal orientation would hold more significance in predicting achievement if questions were specified to math or science. Furthermore, curriculum is much more demanding than it was over the past couple of decades. It is possible that, despite the approach students take to utilize when acquiring academic information, the work is too difficult to master. Alternately, students who host a mastery orientation may be more humble about their academic standing, and underestimated their grade point averages.

Another interesting finding was that, although positively correlated, future orientation was not a significant variable in the model. Future orientation as it relates to academic achievement is viewed as ones' ability to think about and anticipate the future as well as predict outcomes based on current academic status (Kiuru et al., 2007). Environmental factors that influence this decision making process includes choice of peer group, intrapersonal decisions regarding risk engagement, and cultural variables and expectations. Students are also required to recognize the impact that these choices could have on future goals and objectives. Perhaps future orientation was not significant in the model because of the participants' locale. It could be that results are consistent with Nurmi and colleagues' (1994) finding that students from a rural area reported lower

future orientation due to fewer career opportunities. Additionally, it was expected that reported future orientation would be greater for students in upper grades. Interestingly, no significant differences were found between grade level and future orientation. These results are inconsistent with previous research findings that demonstrated that interest in future orientation increases with age (Nurmi, Poole, & Kalakoski, 1994; Steinberg et al., 2009). This difference could be due to the type of questions used to measure future orientation in this study (Patterns of Adaptive Learning Scales, Skepticism About the Relevance of School for Future subscale), which emphasized school as being necessary for future success, as opposed to general thoughts regarding future success.

Focus was then placed on the variables of interest within the social domain: school risk behaviors, cheating, disruptive behaviors, social risk behaviors, loneliness, and mattering. Many studies have demonstrated that risk behaviors negatively impact school performance; more engagement in risk behaviors is generally associated with lower academic performance (e.g., Hallfors et al., 2002; Henry, 2007) and higher rates of school dropout (Henry, 2007). As such, it was expected that, out of the social variables measured, school and social risk behaviors would be the most predictive of achievement.

For this study, risk behaviors were categorized into school and social risk behaviors. School risk behavior was measured by the frequency of truancy, tardiness, and homework completion. Social risk behaviors were measured by the Adolescent Risk Questionnaire, and included behaviors that generally occur outside of the school setting, such as reckless driving and tobacco, drug, and alcohol use. As expected, school risk behaviors were found to be a significant predictor of achievement variance. Despite the obvious, this is critical information that supports existing research. Truancy and frequent

tardiness prevent students from exposure to the curriculum, which leads to disengagement and decreases the chance of graduation.

Surprisingly, cheating behaviors and social risk behaviors were not found to be significant predictors in this model. It is possible that students who would typically cheat on assignments and tests do not bother to do the work at all, or they do so undetected. In regard to social risk behaviors, these findings were not consistent with established research, including the longitudinal National Youth Behavior Risk Survey developed by the Center for Disease Control. There is a chance that students provided inaccurate responses to the sensitive questions. Students may have felt embarrassed to truthfully answer the questions, or may have thought they could be identified, despite assurance of confidentiality and anonymity. However, it should not be discredited that a statistically significant negative correlation was found between cheating and achievement, as well as between social risk behaviors and achievement. As such, these are still important variables to consider when examining achievement variance.

Although not expected, it is not surprising that mattering, a person's sense of having purpose to and feeling needed by others (Rosenberg & McCullough, 1981), was significant in the model. Mattering as it relates to Bronfenbrenner's ecological systems theory (1979) is viewed as an interaction between a person and their environment. It is a microsystem variable that impacts a person's perception of their academic environment and plays a crucial role with regard to academic achievement (Bloch, 2009; Schieferecke & Card, 2013; Tucker et al., 2010). This study contributes to the limited literature on mattering and academic achievement. It supports the idea that students' sense of mattering does significantly predict school performance. Additionally, this is an

important finding, in that teachers and school staff can readily provide direct interventions. For example, it is practicable to designate different “jobs” or duties to students that are important to the schools’ functioning. If students are involved in meaningful activities, such as recycling, hall monitoring, or making announcements, recognition of their support could increase their sense of mattering, which, in turn, would improve achievement.

To address the third research question, the significant predictors from the cognitive and social domains were analyzed to create a cohesive model of achievement variance in adolescence. Originally, it was anticipated that executive functioning and school and social risk behaviors would be significant in the cognitive and social models, and would thus be included in the model to best predict achievement. However, this was not the case, as previously discussed. Based on results from the initial regression analyses, the independent variables used in the full model were hope, from the cognitive domain, and school risk behaviors and mattering from the social domain. The aggregate model predicted 47% of the variance in academic achievement, although mattering did not significantly contribute in the combined model. As such, an exploratory analysis was conducted without mattering included. The results remained the same. In other words, controlling for gender, grade, and SES, hope and school risk behaviors predicted 47% of the variance in achievement. It is interesting to consider why mattering was no longer significant in the cohesive model. Perhaps the inclusion of hope explains the loss of predictive power. Of the three variables in the model, mattering had the weakest correlation with GPA, which could have contributed to its’ insignificance. However, one is left to wonder why this would be. It would be beneficial for future researchers to

examine hope and mattering in combination, as they relate to academic achievement. Regardless, the overall model predicts nearly half of academic achievement variance, which provides meaningful information to existing literature.

As previously stated, executive functioning allows for higher level thinking, which is necessary for academic engagement. Research supports the association between executive functioning and academic achievement (e.g., Best, Miller, & Jones, 2009; Bull et al., 2008; Miller & Hinshaw, 2010; George & Greenfield, 2005). The same cognitive functions that govern executive functioning are also implicated when making risky choices. It was of particular interest whether school or social risk behaviors had an effect on the relationship between executive functioning and academic achievement. Due to the large role that executive functioning plays in decision-making, it was expected that both school and social risk taking behaviors would have a moderating effect on the relationship between achievement and executive functioning.

To address the final research question, a hierarchical linear regression was run in order to determine whether school risk behaviors was a moderating variable. Contrary to expectations, school risk behaviors did not have a moderating effect on the relationship between executive functioning and academic achievement. It could be possible that the students with higher executive functioning never or rarely engage in school risk behaviors, minimizing the effect. Next, a regression was run to determine whether social risk behaviors had a moderating effect. Again, contrary to expectations, social risk behaviors did not have a moderating effect on the relationship between executive functioning and achievement. Noted earlier, it is possible that reported engagement in social risk behaviors might not have been an accurate assessment of actual behaviors.

However, self-report is generally the most utilized assessment tool when measuring engagement in risky behaviors.

Results indicate that the strength of the relationship between executive functioning and academic achievement was not influenced by engagement in school or social risk taking behaviors. However, it is unknown whether standardized, examiner-administered evaluations of executive functioning would be consistent with the self-reported deficits in executive functioning obtained. Alternately, it is possible that school and social risk behaviors simply have no moderating effect on the relationship between executive functioning and academic achievement. In future research, it would be interesting to inverse the independent variables and examine whether executive functioning moderates the relationship between school and social risk behaviors and achievement.

This discussion would not be complete if the rural nature of the sample was not considered. It is possible that the unexpected finding of no relationship between executive functioning and achievement is a unique dynamic within this sample. Perhaps the conceptualization of executive functioning utilized should be reconsidered to account for the unique characteristics of this particular population. Development of executive functioning is, in part, related to available opportunities and exposure to different experiences (Barkley, 2001). That being said, geographical location may have additional implications that have yet to be fully explored.

Study Limitations and Directions for Future Research

This study was designed to predict adolescent academic achievement variance based on a variety of social and cognitive variables. No existing research studies were

found that have specifically examined hope, school risk behaviors, and mattering, as predictors of achievement variance. Additional studies should be conducted in order to determine if this model could be replicated, although limitations of this study must be addressed. To be noted, this study consisted of a narrow sample population. The participants attended school in a small rural area, and the majority of participants were Caucasian. Although this may compromise generalizability of results across culturally diverse populations, this study was intended to closely examine the understudied rural population.

It is important that rural populations continue to be highlighted in order to expand upon the limited research currently available. However, unique considerations must be made as well. For example, it is uncertain whether the psychometric properties of the scales used in this study are consistent between rural and other populations. Validity and reliability studies are often conducted with large samples that are representative of the overall population. As such, rural populations may be overlooked during the process, which raises slight concern about the reliability of the scales. The psychometric properties of the rating scales were not thoroughly examined, thus making it possible that more appropriate measures could have been utilized in this study. This possible limitation must be addressed in future research in order to determine which rating scales yield the most accurate information for this particular population.

Consistent with established research (e.g., Robbins et al., 2004), socioeconomic status was a significant predictor of achievement variance. However, many students left the SES proxy question blank or checked more than one answer, which suggests there was confusion about the question's meaning. It has been found that the effect of SES is

more likely to be overestimated when a single aspect of SES is utilized (Sirin, 2005), which, in this case, was related to family income. Additionally, despite its frequent use in research, Sirin (2005) specifically warned against the use of school lunch programs as a measure of SES due to inaccuracy of information. A more straightforward and comprehensive examination of economic status would be beneficial in future studies. Collaboration with parents should be considered for follow-up studies, which could provide a more accurate account of family SES, such as household income and parental education.

Contained within one's microsystem is a complex network of interrelations between parental engagement and academic performance. Parental level of educational attainment and parent involvement in their student's education are important variables to include in future research. Although there is existing research on parent education, school involvement, and overall academic achievement, it would be of value to determine if there is a specific relationship between level of parent involvement and student reported feelings of hope, as well as frequencies with which students engage in school risk behaviors.

Finally, due to the large number of variables that were measured, students were asked to answer many questions. The length of the survey may have caused fatigue, and could have resulted in participants eventually circling answers for the sole purpose of finishing. Future studies may wish to examine fewer variables at one time, or consider utilizing a computer-response system for engagement purposes. Future research may also wish to delve deeper into the concepts of hope, school risk behaviors, and mattering. For example, inquiry about domain-specific hope could provide additional information into

the specific role of hope as it relates to academic performance. Additionally, it would be interesting to examine possible predictors of hope. If predictors of hope could be identified, results could be used for prevention and intervention purposes.

Conclusions and Applications

Although there is a great deal of existing research that explores the impact of different variables on academic achievement, there has not been a study conducted that has examined this unique combination of variables from the cognitive and social domains. This research is useful because it supports existing literature and provides a thorough investigation of numerous inter- and intra-personal variables that impact academic functioning during adolescence. More specifically, it was found that hope, school risk behaviors, and mattering significantly predicted achievement. In a unified model, hope and school risk behaviors best-predicted achievement variance. This information can be utilized for prevention and early intervention purposes. For example, this data supports the development and implementation of programs that are designed to educate parents about the importance of school and encourage participation in their children's education. The ultimate objective would be the prevention of school risk behaviors, such as truancy, tardiness, and lack of work completion. Additionally, it supports the development and implementation of programs for children that focus on increasing students' sense of hope and mattering.

APPENDIX A

Wayne State University IRB Approval

**WAYNE STATE
UNIVERSITY**

IRB Administration Office
87 East Canfield, Second Floor
Detroit, Michigan 48201
Phone: (313) 577-1628
FAX: (313) 993-7122
<http://irb.wayne.edu>

NOTICE OF EXPEDITED APPROVAL

To: Stefania Scalucci
College of Education

From: Dr. Deborah Ellis or designee C. Trentacosta, PhD / 2-2
Chairperson, Behavioral Institutional Review Board (B3)

Date: July 28, 2016

RE: IRB #: 052016B3E

Protocol Title: Predicting Adolescent Academic Achievement: The Role of Intrapersonal and Risk Behavior Factors

Funding Source:

Protocol #: 1605014911

Expiration Date: July 27, 2019

Risk Level / Category: 45 CFR 46.404 - Research not involving greater than minimal risk Research not involving greater than minimal risk

The above-referenced protocol and items listed below (if applicable) were **APPROVED** following *Expedited Review Category (#7)* by the Chairperson/designee for the Wayne State University Institutional Review Board (B3) for the period of 07/28/2016 through 07/27/2019. This approval does not replace any departmental or other approvals that may be required.

- Revised Protocol Summary Form (revision received in the IRB office 07/14/16)
- Research Protocol (received in the IRB office 05/04/16)
- A waiver of consent and waiver of written documentation of consent for Parental Supplemental Information Letter has been granted according to 45CFR 46 116(d) and 45CFR 46 117(c) and justification provided by the Principal Investigator in the Protocol Summary Form. This waiver satisfies: 1) risk is no more than minimal, 2) the waiver does not adversely affect the rights and welfare of research participants, 3) the research could not be practicably carried out without the waiver and 4) providing participants additional pertinent information after participation is not appropriate.
- A waiver of written documentation of consent has been granted according to 45CFR 46 117(c) and justification provided by the Principal Investigator in the Protocol Summary Form. This waiver satisfies: 1) risk is no more than minimal, data are survey responses with minimal risk content, 2) That the research involved no procedures for which written consent is normally required outside the research context, consent would not be required for these procedures outside the research context. 3) The consent process is appropriate, 4) An Information sheet disclosing the required and appropriate additional elements of consent disclosure will be provided to participants.
- Adolescent Information Sheet Ages 13 - 17 (revision dated 06/22/16)
- Parent Supplemental Information Letter with Decline to Participate Option (revision dated 06/22/2016)
- Adult Student Information Sheet (revision dated 06/22/2016)
- Administration Script
- Letter to Teachers
- Data Collection Tools (4): i) Demographic Form / Grades Measurement / Academic Risk Behavior ii) Patterns of Adaptive Learning Scales (PALS), iii) Adolescent Risk Questionnaire (ARQ) and iv) Barkley Deficits in Executive Functioning Scale (B-DEFS)
- Please note: This submission was reviewed under the IRB Administration Office Flexible Review and Oversight Policy, therefore the expiration date is July 27, 2019.

-
- Federal regulations require that all research be reviewed at least annually. You *may* receive a "Continuation Renewal Reminder" approximately two months prior to the expiration date; however, it is the Principal Investigator's responsibility to obtain review and continued approval *before* the expiration date. Data collected during a period of lapsed approval is unapproved research and can never be reported or published as research data.
 - All changes or amendments to the above-referenced protocol require review and approval by the IRB **BEFORE** implementation.
 - Adverse Reactions/Unexpected Events (AR/UE) must be submitted on the appropriate form within the timeframe specified in the IRB Administration Office Policy (<http://www.irb.wayne.edu/policies-human-research.php>).

NOTE:

1. Upon notification of an impending regulatory site visit, hold notification, and/or external audit the IRB Administration Office must be contacted immediately.
2. Forms should be downloaded from the IRB website at each use.

*Based on the Expedited Review List, revised November 1998

Notify the IRB of any changes to the funding status of the above-referenced protocol.

APPENDIX B

Letter of Support from School District



Whiteford Agricultural School District

of the Counties of Lenawee and Monroe, Michigan

6655 Consear Road
Ottawa Lake, MI 49267
734-856-1443

Superintendent/Business Office Fax: 734-854-6463
Middle School/High School Fax: 734-856-2564
Elementary School Fax: 734-856-4724

To Whom It May Concern,

I have authorized Stefanie Gill Scalcucci, Principal Investigator and a doctoral student in the Educational Psychology Ph.D. program at Wayne State University, to conduct research in Whiteford Agricultural Schools, specifically within the high school. Her research will examine the role of intrapersonal and risk behavior factors on academic achievement (Titled *Predicting Academic Achievement: The Role of Intrapersonal and Risk Behavior Factors*). I am aware that Mrs. Scalcucci will be present at Whiteford High School for the duration of the data collection, which will take place over the course of several days during predetermined class hours for each grade level.

I understand that the procedures implemented by the investigator will guarantee that students and/or parents may opt out of the study, and that for those who do participate, the students' identities will remain confidential and will only be identifiable through a coded number. I have had the opportunity to review the questionnaire to be utilized and the parent and student informational sheets. I have no concern for the welfare of the students who will participate in the study. As such, I authorize Mrs. Scalcucci to conduct her research at Whiteford High School.


Signature

Valerie Orr

Superintendent

APPENDIX C

Parent Supplemental Information Letter with “Decline to Participate” Option

Title of Study: *Predicting adolescent academic achievement:*

The role of intrapersonal and risk behavior factors

Researcher's Name: *Stefanie Gill Scalcucci, M.A., NCSP*

Purpose

You are being asked to allow your child to be in a research study at their school that is being conducted by Stefanie Gill Scalcucci, Doctoral Candidate of the College of Education from Wayne State University to gather information regarding student academic achievement influenced by personal factors. Your child has been selected because he or she is a high school student (grades 9-12) who attends Whiteford High School. Every student who attends Whiteford High School is invited to be involved in this study. Approximately 250 students are expected to enroll in this study.

Study Procedures

If you decide to allow your child to take part in the study, your child and other participants in the class will be asked to complete the questionnaire during the first portion of one class period on a specified date. Your child will be informed that he/she can opt out of taking the questionnaire, and is able to discontinue the questionnaire at any point in time without any consequences. Completion of the questionnaire will take approximately 15 to 25 minutes, although more time will be available if necessary. The questionnaire format requires students to circle a number that best describes their response, ranging from “Never” to “Always”, “Not true at all” to “Very true”, etc. The questionnaire asks about feelings towards academics and performance, motivation to do well or try hard, level of effort put into schoolwork, focusing on work and quality of work, confidence in academic ability, risky behaviors inside and outside of school, peer influence, the importance of school for the future, feelings about themselves, and social relationships. Copies of the questionnaire will be available for parents to review by contacting Stefanie Gill Scalcucci.

Benefits

There may be no direct benefits for your child; however, information from this study may benefit other people now or in the future.

Risks

It is unlikely, but in the interest of being conservative in anticipating risk, some of the risk behavior, feelings about themselves, or social relationships questions could make kids uncomfortable. In order to minimize these psychological risks, a school counselor will be available to answer questions that may arise.

Costs

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

Compensation

You or your child will not be paid for taking part in this study. Your child will be offered a piece of candy, regardless of participation.

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.

Voluntary Participation /Withdrawal:

Your child's participation in this study is voluntary. 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 Stefanie Gill Scalcucci or one of her research team members at the following phone number (313) 577-1614. 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 the Wayne State Research Subject Advocate at (313) 577-1628 to discuss problems, obtain information, or offer input.

Participation

If you do not return the tear-off sheet on the following page or contact the principal investigator (PI) within a 2-week period, to state that you do not give permission for your child to be in research, your child will be enrolled into the research. You may contact the PI at:

Phone: (313) 577-1614

Fax: (313) 577-5235

Email: Stefanie.gill@wayne.edu

If you do not wish to have your child participate in the study, you may fill out the form and return it to the High School Office.

I do not allow my child _____ to participate in this research study.	
Name	

Printed Name of Parent	

Signature of Parent	_____
	Date

APPENDIX D

Administration Script

Good morning/afternoon class,

My name is Stefanie Gill Scalcucci and I am a doctoral student at Wayne State University. Today you will have the opportunity to participate in a survey about how different personal factors are related to academic achievement. Questions will ask things such as how your current grades are, your goals and motivation for academic achievement, school and social behaviors, how you feel about your ability to perform academically, and thoughts about the future.

A form was mailed to your home that explained this to your parents or guardians. They had the option to not have you participate. If you participate, you do not have to complete the survey if you do not want to. You can stop taking the survey at any time. Whether you complete the survey or not, this will not affect how you are treated by any staff member or myself. If your parent or guardian has opted you out, or you chose not to participate, please sit quietly at your desk and work on an assignment as instructed by your teacher, or read a book silently.

Please be sure to read both pages of the information sheet that I give to you, and put your initials on the bottom of each page to show that you read them. You will be keeping the information sheet. It should take around 20 minutes or less to fill out the survey, but more time can be provided if you need. If you decide to be in the study, you will take a survey from this envelope that will go around the classroom. If you are completing a survey, please make sure to keep your eyes on your own survey and try to cover your answers with a piece of paper as you go so no one else can see your answers. It is important that you answer these questions honestly. All surveys are anonymous, so no one will know what answers you give. So, do NOT write your name or birthday on your survey.

When you have finished, check each page to make sure you didn't miss any questions. You can bring your completed survey to your teacher. Please remember, this is not a test. You will not be graded and this has no impact on your schoolwork or grades. Please raise your hand if you need help at any time or if you need something read to you. It is important that you do not discuss this survey or your answers with other students or staff. If you have any questions afterwards, please ask your teacher or ask to talk to me.

Once all of the surveys are collected, everyone will be allowed to chose a piece of candy.

Thank you very much!

APPENDIX E

Letter to Teachers

Dear high school teachers,

My name is Stefanie Gill Scalcucci and I am an educational psychology doctoral student at Wayne State University. I am planning to survey the students in grades 9 through 12 regarding personal factors that impact academic achievement in adolescence. Superintendent Orr has given me permission to distribute a brief survey during the first 20 minutes of first and/or second hour class. I will make sure that you are aware of the specific day, time, and class hour I will be coming so as not to disrupt your class instruction. I will come to each classroom on the specified date to read the instructions of the survey and explain it to the students.

We want the students to know that this survey is optional and not required by the school. Some student's have been opted out of the study by their parents, and they will not be asked to participate, but will be asked to sit quietly at their desk and work on an assignment or read a book silently. Students who participate will be instructed to NOT write their name in order to guarantee anonymity. A written copy of the instructions will be provided to you also, but the goal is to reduce the burden on you.

I very much appreciate your assistance in this process, as I am doing this study to complete my degree. Overall results will be shared with Whiteford High School when all data have been analyzed and the study has been completed. As a token of my appreciation, I will be bringing in coffee and donuts (before school starts in the teachers' lounge) for all to enjoy during the last week of school.

Thank you for your cooperation and assistance.

Sincerely,

Stefanie

Stefanie Gill Scalcucci, M.A., NCSP, TLLP

Phone (cell): (734) 642-8803

APPENDIX F**Adolescent Information Sheet**

(Ages 13-17)

Title: Predicting adolescent academic achievement: Intrapersonal and risk behavior factors**Study Investigator: Stefanie Gill Scalcucci****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 high school student who attends Whiteford High School. Approximately 250 students are expected to enroll in this study. 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 personal factors predict your academic performance.

What will happen to me?

You will be asked to complete a questionnaire that requires you to circle a number that best describes your response, ranging from "Never" to "Always", "Not true at all" to "Very true", etc. The questionnaire asks about feelings towards academics and performance, motivation to do well or try hard, level of effort put into schoolwork, focusing on work and quality of work, confidence in academic ability, risky behaviors inside and outside of school, the importance of school for the future, feelings about yourself, and social relationships.

How long will I be in the study?

This study is one-time only will take approximately 20 minutes to complete. Additional time will be provided if necessary.

Will the study help me?

You may not benefit from being in this study, however information from this study may help other people in the future by helping us understand what individual factors impact academic performance.

Will anything bad happen to me?

It is unlikely, but some of the risk behavior, feelings about yourself, and social relationship questions could make you uncomfortable. In case, a school counselor will be available to answer questions that you might have afterwards.

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. You will also receive a piece of candy of your choosing if you decide not to participate in this research study.

Do my parents or guardians know about this?

This study information has been given to your parents/guardian at least 2 weeks ago. They were given an opportunity to decline your participation. No one will ever be allowed to see your answers.

What about confidentiality?

This study is completely anonymous. You will NOT write your name or birthday on the survey, so none of the information can be linked back to you.

What if I have any questions?

For questions about the study please call Stefanie Gill Scalcucci at (313) 577-1614. 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 the Wayne State Research Subject Advocate at (313) 577-1628 to discuss problems, obtain information, or offer input.

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. You do not have to answer every question if you do not want to. No one will be angry if you decide to stop being in the study.

APPENDIX G**Adult Student Information Sheet**
(Ages 18-19)**Title: Predicting adolescent academic achievement: Intrapersonal and risk behavior factors**

Principal Investigator (PI): Stefanie Gill Scalcucci

Wayne State University, Educational Psychology Department

(313) 577-1614

Purpose:

You are being asked to be in a research study of personal influences on adolescent academic achievement because you are a high school student (grades 9-12) who attends Whiteford High School. Approximately 250 students are expected to enroll in this study. This study is being conducted at Wayne State University College of Education.

Study Procedures

If you take part in the study, you will be asked to complete the questionnaire during the first part of a class period, one time only. Completion of the questionnaire will take approximately 15 to 25 minutes, although more time will be available if necessary. You will be asked to fill out a questionnaire that requires you to circle a number that best describes your response, ranging from “Never” to “Always”, “Not true at all” to “Very true”, etc. The questionnaire asks about feelings towards academics and performance, motivation to do well or try hard, level of effort put into schoolwork, focusing on work and quality of work, confidence in academic ability, risky behaviors inside and outside of school, peer influence, the importance of school for the future, feelings about yourself, and social relationships. You are free to not answer any questions or withdraw at any time.

Benefits

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

Risks

By taking part in this study, you may experience the following risks:

Emotional risks of feeling uncomfortable.

In order to minimize this, a school counselor will be available to answer questions that you might have afterwards.

Costs

There will be no costs to you for participation in this research study.

Compensation

You will not be paid for taking part in this study. You will be offered a piece of candy, regardless of participation.

Confidentiality:

All information collected about you during the course of this study will be kept without any identifiers.

Voluntary Participation /Withdrawal:

Taking part in this study is voluntary. You are free to not answer any questions or withdraw at any time.

Your decision will not change any present or future relationships with Wayne State University or its affiliates, your school, your teacher, your grades or other services you are entitled to receive.

Questions

If you have any questions about this study now or in the future, you may contact Stefanie Gill Scalcucci or one of her research team members at the following phone number (313) 577-1614. 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 the Wayne State Research Subject Advocate at (313) 577-1628 to discuss problems, obtain information, or offer input.

Participation

By completing the questionnaire you are agreeing to participate in this study.

APPENDIX H

Demographic Form/ Grades Measurement/Academic Risk Behavior

1. Gender/Sex: _____ Male _____ Female _____ Transgender Male

_____ Transgender Female _____ Prefer Not to Answer

2. Grade: _____ 9th _____ 10th _____ 11th _____ 12th

3. Age: _____

4. What is your primary racial or ethnic background?

_____ Hispanic or Latino

_____ African-American/Black

_____ Caucasian/White

_____ Middle-Eastern

_____ Native American (Indian)

_____ Asian

_____ Indian, Pakistani, Afghani, or other Indian subcontinent origin

_____ Multi-racial (list both): _____

_____ Other: _____

_____ Prefer not to answer

5. Mark yes or no for ONE of the following:

Do you pay for your own lunch? Yes _____ No _____

Do you pay for part of your lunch and the school pays for part? Yes _____ No _____

Does the school pay for your lunch? Yes _____ No _____

6. Do you attend any classes in a resource room? Yes _____ No _____

7. How many close friends do you have? _____

8. What grades do you most often receive?*(Circle the response that most accurately describes your grades overall)*

Mostly As

Mostly As and Bs

Mostly Bs

Mostly Bs and Cs

Mostly Cs

Mostly Cs and Ds

Mostly Ds

Mostly Ds and Es./Fs

Mostly Es/Fs

9. What were your most recent grades in each of the following classes (circle)**If unsure, indicate the grade that you suspect you earned, or typically earn***English/Language Arts:** A B C D E/F**Mathematics:** A B C D E/F*(Includes Algebra I & II and Geometry)***Science:** A B C D E/F*(Includes Biology, Chemistry, Physics, Anatomy, or Agricultural Science)***Social Studies:** A B C D E/F*(Includes Civics/Econ, US & World History and Geography)***10. Approximately how often are you tardy to class? (circle one)**

Never/Very Rarely 1-2 times per week 3-4 times per week 5 + time per week

11. Approximately how often do you skip one class? (circle one)

Never/Very Rarely 1-2 times per week 3-4 times per week 5 + time per week

12. Approximately how often do you skip two or more classes? (circle one)

Never/Very Rarely 1-2 times per week 3-4 times per week 5 + time per week

13. Approximately how often do you complete and turn in homework? (circle one)

Never/Very Rarely Occasionally Often Always/Almost Always

APPENDIX I

Patterns of Adaptive Learning Scales (PALS)
(Midgley et al., 2000)

Personal Achievement Goal Orientations subscales

Academic-Related Perceptions, Beliefs, and Strategies select subscales

1. I'm certain I can master the skills taught in this class this year.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

2. It's important to me that I don't look stupid in class.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

3. Even if I do well in school, it will not help me have the kind of life I want when I grow up.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

4. It's important to me that other students in my class think I am good at my class work.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

5. It's important to me that I learn a lot of new concepts this year.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

6. I'm certain I can figure out how to do the most difficult class work.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

7. My chances of succeeding later in life don't depend on doing well in school.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

8. I sometimes annoy my teacher during class.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

9. I sometimes copy answers from other students during tests.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

10. One of my goals in class is to learn as much as I can.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

11. One of my goals is to show others that I'm good at my class work.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

12. Doing well in school doesn't improve my chances of having a good life when I grow up.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

13. One of my goals is to master a lot of new skills this year.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

14. I sometimes get into trouble with my teacher during class.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

15. I sometimes cheat on my class work.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

16. Getting good grades in school won't guarantee that I will get a good job when I grow up.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

17. One of my goals is to keep others from thinking I'm not smart in class.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

18. I sometimes behave in a way during class that annoys my teacher.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

19. Even if I am successful in school, it won't help me fulfill my dreams.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

20. It's important to me that I thoroughly understand my class work.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

21. I sometimes copy answers from other students when I do my class work.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

22. One of my goals is to show others that class work is easy for me.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

23. Doing well in school won't help me have a satisfying career when I grow up.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

24. One of my goals is to look smart in comparison to the other students in my class.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

25. It's important to me that I look smart compared to others in my class.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

26. It's important to me that I improve my skills this year.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

27. I sometimes don't follow my teacher's directions during class.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

28. It's important to me that my teacher doesn't think that I know less than others in class.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

29. I can do almost all the work in class if I don't give up.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

30. I sometimes disturb the lesson that is going on in class.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

31. One of my goals in class is to avoid looking like I have trouble doing the work.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

32. Even if the work is hard, I can learn it.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

33. I can do even the hardest work in this class if I try.

NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE
1	2	3	4	5

APPENDIX J

Adolescent Risk Questionnaire (ARQ)
(Gullone et al., 2000)

Please estimate the frequency with which you engage in the following behaviors:

1. Underage drinking

NEVER		SOMETIMES		FREQUENTLY
1	2	3	4	5

2. Smoking

NEVER		SOMETIMES		FREQUENTLY
1	2	3	4	5

3. Getting drunk

NEVER		SOMETIMES		FREQUENTLY
1	2	3	4	5

4. Taking drugs

NEVER		SOMETIMES		FREQUENTLY
1	2	3	4	5

5. Staying out late

NEVER		SOMETIMES		FREQUENTLY
1	2	3	4	5

6. Drinking and driving

NEVER		SOMETIMES		FREQUENTLY
1	2	3	4	5

7. Stealing cars/ going for joy rides

NEVER		SOMETIMES		FREQUENTLY
1	2	3	4	5

8. Having unprotected sex

NEVER		SOMETIMES		FREQUENTLY
1	2	3	4	5

9. Speeding

NEVER		SOMETIMES		FREQUENTLY
1	2	3	4	5

10. Driving without a license

NEVER		SOMETIMES		FREQUENTLY
1	2	3	4	5

11. Snow skiing

NEVER		SOMETIMES		FREQUENTLY
1	2	3	4	5

12. Tao Kwon Do fighting

NEVER		SOMETIMES		FREQUENTLY
1	2	3	4	5

13. Inline skating

NEVER		SOMETIMES		FREQUENTLY
1	2	3	4	5

14. Parachuting

NEVER		SOMETIMES		FREQUENTLY
1	2	3	4	5

15. Entering a Competition

NEVER		SOMETIMES		FREQUENTLY
1	2	3	4	5

16. Flying a plane

NEVER		SOMETIMES		FREQUENTLY
1	2	3	4	5

17. Leaving school

NEVER		SOMETIMES		FREQUENTLY
1	2	3	4	5

18. Overeating

NEVER		SOMETIMES		FREQUENTLY
1	2	3	4	5

19. Teasing/Picking on people

NEVER		SOMETIMES		FREQUENTLY
1	2	3	4	5

20. Cheating

NEVER

SOMETIMES

FREQUENTLY

1

2

3

4

5

21. Talking to strangers

NEVER

SOMETIMES

FREQUENTLY

1

2

3

4

5

22. Sniffing gas or glue

NEVER

SOMETIMES

FREQUENTLY

1

2

3

4

5

APPENDIX K

Barkley Deficits in Executive Functioning Scale (B-DEFS)
(Barkley, 2011)

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	Some- times	Often	Very Often
1. Procrastinate or put off doing things until the last minute				
2. Can't seem to hold in mind things I need to remember				
3. Not motivated to prepare in advance for things I know I am supposed to do				
4. Have trouble doing what I tell myself to do				
5. Have trouble learning new or complex activities as well as others				
6. Have difficulty explaining things in their proper order or sequence				
7. Unable to "think on my feet" or respond as effectively as others to unexpected events				
8. I don't seem to process information as quickly or as accurately as others				
9. Unable to inhibit my reactions or responses to events or others				
10. Make impulsive comments to others				
11. Likely to do things without considering the consequences for doing them				
12. Fail to consider past relevant events or past personal experiences before responding to situations (I act without thinking)				
13. Do not put as much effort into my work as I should or than others are able to do				

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	Some- times	Often	Very Often
14. Others tell me I am lazy or unmotivated				
15. Inconsistent in the quality or quantity of my work performance				
16. Unable to work as well as others without supervision or frequent instruction				
17. Have trouble calming myself down once I am emotionally upset				
18. Cannot seem to regain emotional control and become more reasonable once I am emotional				
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.				
20. I remain emotional or upset longer than others				

APPENDIX L

Children's Loneliness Questionnaire (Asher & Wheeler, 1985)

Please read each statement and indicate how true it is for you using the following rating scale:

1 = That's always true about me

2 = That's true about me most of the time

3 = That's sometimes true about me

4 = That's hardly ever true about me

5 = That's not true at all about me

- _____ 1. It's easy for me to make new friends at school.
- _____ 2. I like to read.
- _____ 3. I have nobody to talk to in my class.
- _____ 4. I'm good at working with other kids in my class.
- _____ 5. I watch TV a lot.
- _____ 6. It's hard for me to make friends at school.
- _____ 7. I like school.
- _____ 8. I have lots of friends in my class.
- _____ 9. I feel alone at school.
- _____ 10. I can find a friend in my class when I need one.
- _____ 11. I play sports a lot.
- _____ 12. It's hard to get kids in school to like me.
- _____ 13. I like science.
- _____ 14. I don't have anyone to hang out with at school.
- _____ 15. I like music.
- _____ 16. I get along with my classmates.

- _____ 17. I feel left out of things at school.
- _____ 18. There are no other kids I can go to when I need help in school.
- _____ 19. I like to paint and draw.
- _____ 20. I don't get along with many other kids in school.
- _____ 21. I'm lonely at school.
- _____ 22. I am well liked by the kids in my class.
- _____ 23. I like playing board games a lot.
- _____ 24. I don't have any friends in class.

APPENDIX M

Children's Hope Scale
(Snyder et al., 1997)

Think about how you are in **most situations**. Circle the number that describes YOU best.

1. I think I am doing pretty well.

None of the time	A little of the time	Some of the time	Most of the time	All of the time
1	2	3	4	5

2. I can think of many ways to get the things in life that are most important to me.

None of the time	A little of the time	Some of the time	Most of the time	All of the time
1	2	3	4	5

3. I am doing just as well as other kids my age.

None of the time	A little of the time	Some of the time	Most of the time	All of the time
1	2	3	4	5

4. When I have a problem, I can come up with lots of ways to solve it.

None of the time	A little of the time	Some of the time	Most of the time	All of the time
1	2	3	4	5

5. I think the things I have done in the past will help me in the future.

None of the time	A little of the time	Some of the time	Most of the time	All of the time
1	2	3	4	5

6. Even when others want to quit, I know that I can find ways to solve the problem.

None of the time	A little of the time	Some of the time	Most of the time	All of the time
1	2	3	4	5

APPENDIX N

Matting Index (Elliot, Kao, & Grant, 2004)

Think about your relationships with other people in general and indicate the degree to which each statement is in line with these relationships. When you respond to these statements, do not think of specific people in your life, rather, try to focus on **everyone in general** (your parents, family, friends from home, friends here, professors, team members). Think of all these people as a whole when responding to these items. There are no right or wrong answers. Just answer as honestly as possible. Not all students feel the same way or are expected to feel the same way.

1. People do not ignore me.

Strongly disagree		Neutral		Strongly Agree
1	2	3	4	5

2. When people need help, they come to me.

Strongly disagree		Neutral		Strongly Agree
1	2	3	4	5

3. No one really needs me.

Strongly disagree		Neutral		Strongly Agree
1	2	3	4	5

4. Sometimes I feel almost as if I were invisible.

Strongly disagree		Neutral		Strongly Agree
1	2	3	4	5

5. People tend to rely on me for support.

Strongly disagree		Neutral		Strongly Agree
1	2	3	4	5

6. My successes are a source of pride to the people in my life.

Strongly disagree		Neutral		Strongly Agree
1	2	3	4	5

7. At social gatherings, no one recognizes me.

Strongly disagree		Neutral		Strongly Agree
1	2	3	4	5

18. Most people do not care what happens to me.

Strongly disagree		Neutral		Strongly Agree
1	2	3	4	5

19. I have noticed that people will sometimes inconvenience themselves to help me.

Strongly disagree		Neutral		Strongly Agree
1	2	3	4	5

20. There are people who react to what happens to me in the same way they would if it happened to them.

Strongly disagree		Neutral		Strongly Agree
1	2	3	4	5

21. People generally know when I am around.

Strongly disagree		Neutral		Strongly Agree
1	2	3	4	5

22. When I have a problem, people usually don't want to hear about it.

Strongly disagree		Neutral		Strongly Agree
1	2	3	4	5

23. There are people who care enough about me to criticize me when I need it.

Strongly disagree		Neutral		Strongly Agree
1	2	3	4	5

24. People count on me to be there in times of need.

Strongly disagree		Neutral		Strongly Agree
1	2	3	4	5

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ABSTRACT**PREDICTING ADOLESCENT ACADEMIC ACHIEVEMENT:
THE ROLE OF INTRAPERSONAL AND RISK BEHAVIOR FACTORS**

by

STEFANIE GILL SCALCUCCI**May 2018****Advisor:** Dr. Cheryl Somers**Major:** Educational Psychology**Degree:** Doctor of Philosophy

There is a large body of research that shows moderate to strong correlations between academic achievement and various inter- and intra-personal variables. The aim of this study was to develop a model that explains the most variance and best predicts academic achievement in adolescence. Specifically, executive functioning, achievement goal orientation, academic self-efficacy, future orientation, and hope, from the cognitive domain, as well as school risk behaviors, social risk behaviors, loneliness, and mattering from the social domain were examined. Participants included 210 high school students (93 females, 117 males) from an agricultural school district in southeastern Michigan. In an aggregate model, it was found that hope and school risk behaviors explained nearly half (47%) of achievement variance, when gender, grade level, and socioeconomic status were controlled for. Although mattering was significant when examining the social variables alone, it did not significantly contribute to the model when hope was included. Also of interest was whether school or social risk behaviors moderated the relationship between executive functioning and achievement. Results did not support this hypothesis. Implications of the findings and suggestions for future research are discussed.

AUTOBIOGRAPHICAL STATEMENT

Stefanie Gill Scalcucci

EDUCATION

- 2018 Doctor of Philosophy (PhD), Wayne State University – Detroit, MI
Major: Educational Psychology
- 2013 Master of Arts, Wayne State University – Detroit, MI
Major: School & Community Psychology
- 2010 Bachelor of Arts, Michigan State University – East Lansing, MI
Major: Psychology; Specialization: Women, Gender, & Social Justice

SCHOLARLY HONORS

- 2010- Present Golden Key International Honor Society, Wayne State University
- 2009- Present Psi Chi, The National Honor Society in Psychology, Michigan State University
- 2008 Departmental Honors, Women’s Studies, Michigan State University
- 2008-2010 Dean’s List, Michigan State University
- 2007- Present Phi Sigma Theta National Honor Society, Michigan State University
- 2006-2010 Michigan Merit Award, Michigan State University

PROFESSIONAL EXPERIENCE

- Aug 2013- Present School Psychologist, Monroe County Intermediate School District – Monroe, MI
- Aug 2016 – Aug 2017 Home-based therapist, Monroe Community Mental Health Authority – Monroe, MI
- Aug. 2012- Aug 2013 School Psychologist Intern, Futures Health Core – Detroit, MI

LICENSURE/CERTIFICATION

- Feb 2016 – Present Michigan: Temporary Limited Licensed Psychologist (TLLP)
- Jan 2016- Present National School Psychology Certificate
- Aug 2013- Present Michigan: School Psychologist Certificate