PERSONALITY PREDICTORS OF ACADEMIC ACHIEVEMENT IN GIFTED STUDENTS: MEDIATION BY SOCIO-COGNITIVE AND MOTIVATIONAL VARIABLES

A Dissertation

Presented to

The Faculty of the School of Education

The College of William and Mary in Virginia

In Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

by

Sakhavat Mammadov

May 2016

PERSONALITY PREDICTORS OF ACADEMIC ACHIEVEMENT IN GIFTED STUDENTS: MEDIATION BY SOCIO-COGNITIVE AND MOTIVATIONAL VARIABLES

by

Sakhavat Mammadov

Approved May 2016 by

Tracy L. Cross, Ph.D.

Chairperson of Doctoral Committee

Thomas J. Ward, Ph.D.

Jason A. Chen, Ph.D.

Jennifer Riedl Cross, Ph.D.

DEDICATION

To

My parents,

Ebulfez and Mehriban Mammadov,

My wife, Aysun,

And my son Hakan Said,

Without whom none of my success would be possible

Table of Contents

ACKNOWLEDGEMENTS

List of Tables

List of Figures

List of Appendices

PERSONALITY PREDICTORS OF ACADEMIC ACHIEVEMENT IN GIFTED STUDENTS: MEDIATION BY SOCIO-COGNITIVE AND MOTIVATIONAL VARIABLES

ABSTRACT

This quantitative study investigated the predictive role of the Big Five personality traits on academic achievement and its mediation by self-efficacy in self-regulated learning and academic motivation within the sample of gifted students ($N = 161$). The ACT or ACT Explore scores were used as a measure of academic achievement.

The first question asked about the relationships between the Big Five personality traits and all other measured variables. Agreeableness, conscientiousness, and openness were found to have significant associations with the ACT/ACT Explore composite and subtest scores. The second research question asked if personality, motivation, and self-regulatory efficacy differed by grade and gender. The results revealed that middle school students scored significantly higher than high school students on extraversion. Female students scored higher on neuroticism and lower on extraversion compared to their male counterparts. In addition, female students had more controlled type of motivation than male students. The third question was about the interplay between personality traits, self-regulatory efficacy, academic motivation, and academic achievement. Self-regulatory efficacy, controlled motivation, and autonomous motivation were hypothesized to serve as mediators in the relationships between personality traits and academic achievement. Of the Big Five traits, conscientiousness, agreeableness, and openness were presented in the path analysis model. All three personality traits had direct effects on academic

achievement. The indirect effects of these traits through specific pathways were estimated.

The present study contributes to the research field by revealing important relationships between specific constructs that have been suggested by personality, social cognitive, and self-determination theories. Academic motivation and self-regulatory efficacy established as important mediators of the association between Big Five personality traits and academic achievement. These findings suggest that educators should be aware of their students' different personality traits. Educators play an important role in promoting self-regulated learning (Peeters et al., 2014) and fostering intrinsic motivation and task engagement (Reeve, 2002). They should be trained to enhance students' efficacy by developing their self-regulatory skills through internalization of effective strategies for learning. In addition, teachers should learn how to be more autonomy supportive with students. Educational leaders have a key responsibility to make these happen effectively. They should give proactive attention to these requirements and ensure that their teachers are well-equipped to integrate self-regulatory and motivational resources into the school curriculum.

SAKHAVAT MAMMADOV

DEPARTMENT OF EDUCATIONAL POLICY, PLANNING, AND LEADERSHIP

THE COLLEGE OF WILLIAM AND MARY IN VIRGINIA

PERSONALITY PREDICTORS OF ACADEMIC ACHIEVEMENT IN GIFTED

STUDENTS: MEDIATION BY SOCIO-COGNITIVE AND MOTIVATIONAL

VARIABLES

Chapter 1

Introduction

A widely accepted assumption in the field of gifted education is that giftedness is a developmental process (Cross, 2011; Finch, Speirs Neumeister, Burney, & Cook, 2014; Subotnik, Olszewski-Kubilius, & Worrell, 2011). In young children, the key variable of one's giftedness is the potential for outstanding levels of achievement in a given domain. However, as individuals mature from childhood through adolescence, the emphasis shifts to "achievement and high levels of motivation" (National Association for Gifted Children [NAGC], 2010a, p.1). Often associated with the seeming lack of motivation, gifted students who ultimately fail to reach their full potential have long captured the interest of educators and researchers (Colangelo, 2003; Rubenstein, Siegle, Reis, McCoach, & Burton, 2012; Whitmore, 1980). Gifted students are not typically considered at risk for academic failure. However, giftedness or high ability does not exempt these students from the academic as well as social and emotional challenges. Because of its societal and personal consequences, the phenomenon of gifted underachievement has been regarded as a top priority within the field of gifted education (Renzulli, Reid, & Gubbins, 1990). The NAGC recognizes gifted underachievers in the Gifted Education Programming Standards and emphasizes the importance of developing specialized intervention services for this population (NAGC, 2010b). Understanding the interplay between the factors that are the obstacles to success or the impetuses for high achievement is critical to providing needed insight into solutions for major and perplexing issues currently facing the

educators of gifted students. In an effort to explain the factors contributing to academic achievement in gifted students, this study combines research on the Big Five personality traits, academic motivation, and self-efficacy for self-regulated learning (i.e., self-efficacy beliefs about one's capability of using self-regulatory processes in learning) to test a psychological mechanism of achievement in a sample of gifted middle and high school students.

There are many factors that contribute to students' performance in academic domains. Achievement or underachievement results from various cognitive, social, demographic, motivational, and psychological factors such as academic self-efficacy (Putwain, Sander, & Larkin, 2013), social involvement (Robbins et al., 2004), gender (Olani, 2009), motivation (Kaufman, Agars, & Lopez-Wagner, 2008), and personality traits (Poropat, 2009). Knowing the factors that affect achievement and the mechanisms underlying their relationships is important to the planning of interventions for meeting students' needs and to improve their performance.

Although the primary focus of research investigating factors of academic success has been on individual differences in cognitive variables (Deary, Strand, Smith, & Fernandes, 2007; Sternberg, Grigorenko, & Bundy, 2001), the role of personality variables on academic achievement has gained attention recently (Laidra, Pullman, & Allik, 2007; O'Connor & Paunonen, 2007). At present, research on personality and its relationship to other psychological, social, and academic constructs is active, more so than it was several decades ago (Funder, 2001). Research has indicated that students' personality affects their academic performance (De Feyter, Caers, Vigna, & Berings, 2012; Kilic-Bebek, 2009; Poropat, 2009). Although this effect can operate like stable

habits in learning situations (De Raad & Showenburg, 1996), it is changeable and is mediated by socio-cognitive and motivational variables (Bidjerano & Dai, 2007; Puklek Levpušček, Zupančič, & Sočan, 2013, Trautwein, Ludtke, Roberts, Schnyder, & Niggli, 2009). In other words, a number of different explanatory variables such as self-efficacy and motivation are included in the psychological mechanism that underlies an observed relationship between personality traits and academic achievement (e.g., McIlroy, Poole, Ursavas, & Moriarty, 2015; Zhou, 2015).

This study investigated the predictive role of the Big Five personality traits on academic achievement and its mediation by perceived self-efficacy beliefs in self-regulated learning and academic motivation within the sample of gifted students. For linguistic brevity, perceived self-efficacy in self-regulated learning is represented in a shorter form as *self-regulatory efficacy* (Caprara, 2008).

Purpose

The purpose of this study was to examine the predictive role of the Big Five personality traits on the academic achievement of gifted students, and investigate whether self-regulatory efficacy and academic motivation serve as mediators. This knowledge could lead to the development of effective educational and psychosocial interventions that improve academic performance through a change in self-regulatory efficacy and academic motivation.

The Big Five personality traits are extraversion (positive emotions, activity, sociability, and the tendency to seek stimulation in the company of others), agreeableness (the tendency to be prosocial and cooperative toward others rather than antagonistic), conscientiousness (the tendency to show self-discipline, planning, and organization),

neuroticism (vulnerability to unpleasant emotions such as anxiety, anger, and depression), and openness to experience (a degree of intellectual curiosity, creativity, and preference for novelty and variety). This classification of personality traits is supported by a large body of sound empirical evidence (McCrae & Costa, 1999). The relationship between the Big Five personality traits and academic achievement has been documented in a number of studies (e.g., Caprara, Vecchione, Alessandri, Gerbino, & Barbaranelli, 2011; Chamorro-Premuzic & Furnham, 2003a, b; De Feyter et al., 2012; Furnham & Monsen, 2009). Conscientiousness and openness have been found to be strong predictors of academic achievement (e.g., Caprara et al., 2011; Diseth, 2003; Noftle & Robins, 2007; Poropat, 2009), whereas agreeableness, neuroticism, and extraversion have not shown consistent and conclusive results (e.g., Duff, Boyle, Dunleavy, & Ferguson, 2004; Furnham, Chamorro-Premuzic, & McDougall, 2003; Laidra et al., 2007; Poropat, 2009).

The personality traits may relate to academic achievement directly or indirectly, through mediation of other variables. The candidate mediators in this study are academic motivation and self-regulatory efficacy. Because academic motivation and self-regulatory efficacy may have more practical value in academic settings (Zuffianò et al., 2013), understanding their role in the relationship between personality traits and academic achievement is important for creating supportive academic environments for student learning. The mechanisms linking academic motivation to achievement have been widely documented in extant research (Deci, Vallerand, Pelletier, & Ryan, 1991; Vallerand, Blais, Briere, & Pelletier, 1989; Vecchione, Alessandri, & Marsicano, 2014). The role of self-regulatory efficacy as a predictor of academic achievement, too, has been stressed by social cognitive theorists (e.g., Caprara et al., 2011; Zimmerman & Schunk, 2004).

Research has also reported the pervasive role that self-regulatory efficacy exerts on students' academic motivation (e.g., Bandura, Barbaranelli, Caprara, & Pastorelli, 1996, 2001; Caprara et al., 2008, 2011; Zimmerman & Schunk, 2004).

The current study is the first investigating the association of personality traits with academic achievement in the presence of academic motivation and self-regulatory efficacy as mediator variables. Figure 1 illustrates the conceptual diagram that guides the design and analysis of the study. Figure 2 presents the hypothesized model to be tested. A rationale for this model is provided in the upcoming chapters.
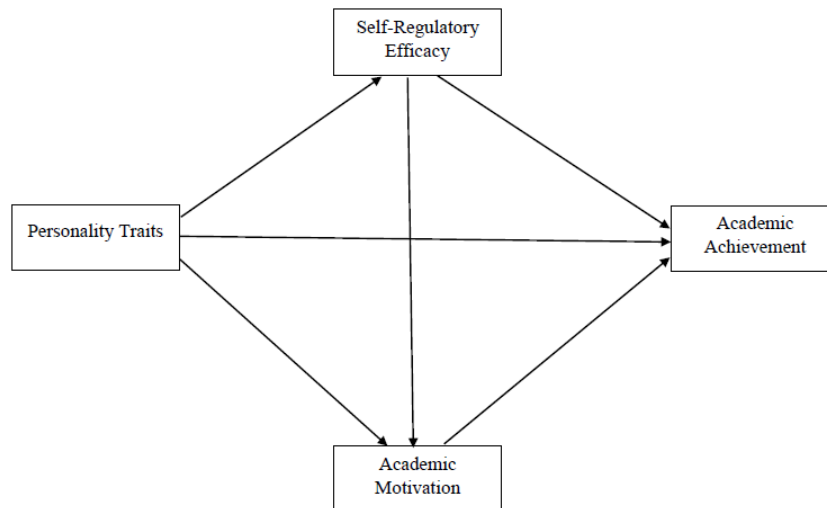
Figure 1. A conceptual diagram illustrating the association between personality traits and academic achievement and its mediation by self-regulatory efficacy and academic motivation.
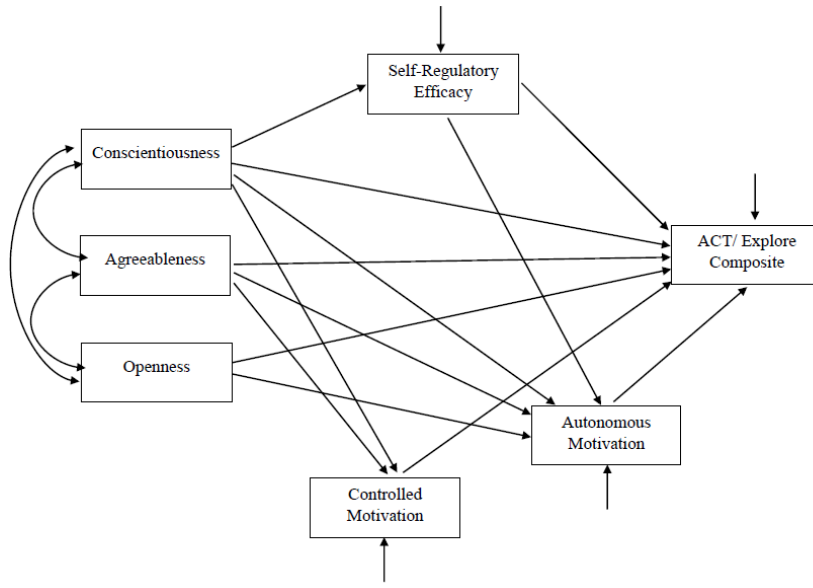
Figure 2. A statistical diagram of the hypothesized model.

Research Questions

Three research questions have been developed to address the purpose of the study. In addition, seven hypotheses were used to address the third research question.

1. How are gifted students' personality traits, self-regulatory efficacy, academic motivation, and academic achievement related to one another?

2. How do personality, academic motivation, and self-regulatory efficacy differ by grade and gender?

3. In what ways do gifted students' personality traits, self-regulatory efficacy, and academic motivation predict their academic achievement?

Rationale

Working with gifted students can be both a joy and a challenge for teachers. The most frustrating of all challenges is when a student's performance falls noticeably short of his/her potential. This discrepancy between students' actual and expected performance

7

is called underachievement (McCall, Evahn, & Kratzer, 1992). Academic underachievement among gifted students has been one of the fundamental problems in the field for over six decades. Conklin (1940) and Musselman (1942) were the researchers who first used the notion of gifted underachievement. In spite of long-standing research attention to this topic, underachievement among gifted students is still considered a major problem (Reis, 2003).

Education and academic achievement are key pathways to creating individual opportunities and building a secure future for all students, including the gifted. These factors have become gatekeepers to institutions of higher education, occupational attainments, and career paths (Ritchie & Bates, 2013). Most gifted underachievers appear to teachers as "unmotivated" or having behavioral problems, while also being labeled as "capable of doing much better" (Seeley, 2004, p.2). Gifted students' potential to achieve at high levels is important to recognize. A belief in this need provides a rationale for investigating potential factors that may help (or hinder) fulfillment of potential. Certainly, there are many biological, psychological, and environmental causes and contributors to achievement or underachievement. The aim of this study is to focus on the area of achievement in gifted students by taking a more psychological perspective, while reserving comprehensive discussion of the possible implications for practice.

The primary goal of this study is to investigate to what extent and in what ways personality traits predict academic achievement. The researcher additionally seeks to document mediating processes that involve self-regulatory efficacy and academic motivation. The primary theoretical frameworks used in this study are the Big Five model of personality (Goldberg, 1981; John & Srivastava, 1999; McCrae & Costa, 1996),

Social-Cognitive Theory (Bandura, 1986), and the Self-Determination Theory of motivation (Deci & Ryan, 2000).

Though a plethora of personality models and taxonomies exist (for an overview, see Maltby, Day, & Macaskill, 2007), only a few taxonomies have solid theoretical and statistical justifications. The five-factor model or the Big Five is one of them. The Big Five is the prevailing conceptualization of basic personality dimensions that has received the most attention and support from personality researchers. The Big Five personality model has been acknowledged as a comprehensive taxonomy that captures the majority of individual differences in behavioral patterns (McCrae & Costa, 1999). Hence, using the Big Five factors to study daily behavior and performance has been credited with prompting many important advances in different fields. In the field of education, the Big Five personality factors contribute to the explanation of individual differences in academic achievement (Caprara et al., 2011; Chamorro-Premuzic & Furnham, 2008; Poropat, 2009; Zuffianò et al., 2013). Conscientiousness and openness to experience were revealed to be strong predictors of academic achievement in the general population (Caprara et al., 2011; Diseth, 2003; Noftle & Robins, 2007; Poropat, 2009). Research on the other three factors, however, has not shown consistent and conclusive results (Duff et al., 2004; Furnham et al., 2003; Laidra et al., 2007; Poropat, 2009).

The impact of the Big Five personality traits on academic achievement extends beyond the direct effect of these factors: There are other important predictors of academic achievement that mediate the association between personality and academic achievement. Two candidate mediators are self-regulatory efficacy and academic motivation. Self-regulatory efficacy is defined as one's belief about their capability of using self-

regulatory processes such as goal setting, self-monitoring, self-evaluation, and strategy use (Zimmerman, 2000). Academic motivation is defined as enthusiasm for academic achievement, which involves the degree to which students possess certain specific behavioral characteristics related to motivation (Hwang, Echols, & Vrongistinos, 2002).

Self-regulation is defined as "the selective process by which learners transform their mental abilities into academic skills" (Zimmerman, 2002, p.65). In other words, self-regulation is self-generated thoughts, feelings, and actions that are systematically oriented towards the goal attainment (Zimmerman, 1994, p. ix). Self-regulatory efficacy, therefore, is one's beliefs about how they explore their own thought processes by evaluating the outcomes of actions and planning alternative pathways to success (Usher & Pajares, 2008). Self-regulatory efficacy has a pervasive role in academic motivation and achievement in diverse academic areas and for students at all grade levels (Bandura, 1997; Bandura et al., 1996, 2001; Caprara et al., 2008, 2011; Pajares, 2007; Zimmerman & Schunk, 2004). Students' beliefs that they can regulate their own learning raise their efficacy for academic activities (Caprara et al., 2008). Their efficacy increases academic achievement both directly and through raising academic aspirations and motivation (Zimmerman & Bandura, 1994; Zimmerman, Bandura, & Martinez-Pons, 1992).

Role of academic motivation and self-regulatory efficacy as potential mediators of the relationship between personality traits and academic achievement is certainly critical to study, especially in an educational context. In comparison to personality traits, both self-regulatory efficacy and academic motivation may have more practical value in academic settings (Zuffianò et al., 2013). Although research has suggested that personality traits may be altered with cognitive (Jackson, Hill, Payne, Roberts, & Stine-

Morrow, 2012), behavioral (Magidson, Roberts, Collado-Rodriguez, & Lejuez, 2014),

and clinical (De Fruyt, Van Leeuwen, Bagby, Rolland, & Rouillon, 2006) interventions,

the knowledge regarding the use of these approaches is in its infancy and an integration

of these interventions into education and classrooms has not been explored

systematically. In contrast, more is known about the possibility of modifying one's self-

regulatory efficacy and academic motivation through various educational and

psychological mechanisms (Bandura, 1997; Zimmerman & Schunk, 2004; Zuffianò et al.,

2013). School practice could well be modified to improve students' academic

performance when students' personality traits are identified and the mediating roles of

self-regulatory efficacy and academic motivation are understood.

 Academic motivation is an important psychological concept in education and is

related to many different educational outcomes (Deci & Ryan, 1985). For this reason, the

long-lasting interest in studying motivation in various educational contexts is

understandable. Self-determination theory is one of the most widely used conceptual

perspectives to understand academic motivation. Self-determination theory suggests that

humans have innate needs for autonomy—desire to self-regulate behavior, competence—

desire to interact effectively with the environment and attempt mastery of skills, and

relatedness—desire to feel a secure and reciprocal connection to others (Deci & Ryan,

1985; 2008; Ryan & Deci, 2000a). Self-determination theory provides a comprehensive

taxonomy of motivation. This taxonomy suggests that behavior can be seen as

intrinsically motivated, extrinsically motivated, or amotivated (Deci & Ryan, 1985;

1991). Intrinsically motivated behaviors are engaged in when students find an activity

interesting and do it for pleasure and satisfaction (Deci, 1975; Deci & Ryan, 1985).

Intrinsic motivation is enhanced when students feel competent and related to others and when they are supported by autonomy (Deci & Ryan, 1992; Grolnick, Gurland, Jacob, & DeCourcey, 2002; Ryan & Deci, 2000b). Extrinsically motivated behaviors are instrumental in nature (Fortier, Vallerand, & Guay, 1995), because they are regulated through external means in a form of constraint or reward. There can be some levels of internalization in extrinsically motivated behaviors. The types of extrinsic motivation, from lower to higher levels of self-determination, are: external regulation, introjection, and identification (Vallerand et al., 1992). Amotivation is a relative absence of motivation and occurs when an individual does not perceive contingency between their own actions and outcomes (Vallerand et al., 1992). Amotivated individuals believe that their behaviors are caused by outside forces that are out of their control. This type of motivational behavior is similar to learned helplessness in many ways (Abramson, Seligman, & Teasdale, 1978). Learned helplessness happens when individuals believe that outcomes are uncontrollable, and as a result remain passive despite possessing ability to change these outcomes.

The literature on academic motivation suggests that gifted students, on average, have higher levels of intrinsic motivation than comparison groups (Gottfried, Gottfried, Cook, & Morris, 2005; Vallerand, Gagné, Senecal, & Pelletier, 1994). However, the assumption that gifted students are inherently motivated to learn has not been supported empirically (Gottfried et al., 2005; McCoach & Siegle, 2003). The difference in academic motivation between high- and low-achieving gifted students is clear evidence of this (Gentry & Owen, 2004; McCoach & Siegle, 2003). For example, in McCoach and Siegle's (2003) study, among several psychological factors, the motivation factor yielded

the largest mean difference between gifted achievers and gifted underachievers, suggesting that there are other factors beyond high intellectual ability influencing motivation. Other research has shown that internal personality characteristics shape academic motivation for all students including gifted students (Baker, Bridger, & Evans, 1998; Deci & Ryan, 2008; Wentzel, 2002).

Developing self-determined forms of motivation in students is essential for enduring academic success. However, it is somewhat unclear how personality and self-regulatory efficacy impact academic motivation and its relationship with academic achievement. Cognitive Evaluation Theory (Deci & Ryan, 1985; 1991), a mini-theory within self-determination theory, emphasizes the determinants of motivation. Cognitive evaluation theory proposes that autonomous motivation changes as a function of one's feelings of competence. For example, when a student feels incompetent (i.e., lower self-efficacy) in the academic domain, he should have a decreased autonomous motivation (i.e., less intrinsic motivation). De Feyter et al. (2012) reported that at higher levels of exam success beliefs, self-efficacy was negatively associated with the academic motivation of emotionally stable students; however, no impact was found for neurotic students. This research suggests that specific personality traits influence the association between motivation and self-efficacy.

Intelligence or intellectual ability is probably the most documented predictor of academic success (e.g., Neisser et al., 1996; Pintrich, Cross, Kozma, & McKeachie, 1986; Sternberg & Kaufman, 1998). An intelligence score has been the most widely used criterion for identifying the gifted. However, it gives little information of practical value concerning gifted students' performance on educationally relevant tasks (Moore, Hahn, &

Brenthall, 1978). Although gifted students are expected to excel academically (Ford, 1995), being gifted does not assure educational success. There exist some risks and pressures that accompany giftedness that may lead gifted students to fail to perform at a level commensurate with their abilities. The students who experience underachievement may lack self-efficacy, goal-directedness, or self-regulation skills (Siegle & McCoach, 2001). Research within the gifted population is critical to understanding the ways that individual differences are expressions of the dynamic relationship between predictors and academic success.

To conclude, this study reports investigations of some of the most promising mediator candidates that might account for the predictive relationship between personality traits and academic achievement among gifted students. Socio-cognitive and motivational variables are expected to add significant explanatory value to a model of the Big Five personality traits in explaining differences in academic achievement. Self-regulatory efficacy and academic motivation will help to better determine the indirect effects of personality traits on academic achievement. Interaction of these variables will also help to explain and clarify the mixed results in previous research regarding the impact of particular personality traits.

Definition of Terms

1. *Academic achievement*: The specified level of attainment of proficiency in academic work measured by test scores (Shamshuddin, Reddy, & Rao, 2007). In this study, ACT or ACT Explore scores were used as a measure of academic achievement. Indicators include students' subject mean scores (math, science, reading, English) and the composite scores in ACT or ACT Explore.

2. *Academic motivation*: The degree to which a student is enthusiastic toward excelling in academic tasks.

3. *Agreeableness*: One of the Big Five factors that contrasts traits such as kindness, trust, and warmth with traits such as hostility, selfishness, and distrust (Goldberg, 1993).

4. *Amotivation*: The doing of an activity without perceiving contingencies between outcomes and own actions (Vallerand et al., 1992).

5. *Autonomous motivation*: The doing of an activity with a full sense of volition and choice because the activity is interesting or personally important (Williams, 2002).

6. *Conscientiousness*: One of the Big Five factors that contrasts such traits as organization, thoroughness, and reliability with traits such as carelessness, negligence, and unreliability (Goldberg, 1993).

7. *Controlled motivation*: The doing of an activity with the feeling of pressure because of a coercive demand or a seductive offer (Williams, 2002).

8. *External regulation*: The doing of an activity through external means such as rewards and constraints (Vallerand et al., 1992).

9. *Extraversion*: One of the Big Five factors that contrasts such traits as talkativeness, assertiveness, and high activity level with traits such as silence, passivity, and reserve (Goldberg, 1993).

10. *Extrinsic motivation*: The doing of an activity for external factors and not for its own sake (Deci, 1975). There are three types of extrinsic motivation that can be

ordered along a self-determination continuum: external regulation, introjection, and identification.

11. *Identification*: The doing of an activity through consciously valuing it and judging important, especially that it is perceived as chosen by oneself (Vallerand et al., 1992). This is a more autonomy driven type of extrinsic motivation.

12. *Intrinsic motivation*: The doing of an activity for its inherent satisfaction and pleasure derived from participation (Deci & Ryan, 1985).

13. *Introjection*: The doing of an activity through internalizing the reasons for one's own actions (Vallerand et al., 1992).

14. *Neuroticism*: One of the Big Five factors that includes such traits as nervousness, moodiness, and temperamentality (Goldberg, 1993).

15. *Openness to experience*: One of the Big Five factors that includes traits such as curiosity, originality and creativity (Goldberg, 1993).

16. *Self-efficacy*: Beliefs or judgments about one's capabilities to organize and execute courses of action required to produce outcomes in specific situations or contexts (Bandura, 1986).

17. *Self-regulatory efficacy*: Self-efficacy beliefs about one's capability to use self-regulatory processes such as goal setting, self-monitoring, self-evaluation, and strategy use (Zimmerman, 2000).

18. *The Big Five personality traits*: The five broad personality dimensions that are considered to represent the various and diverse systems of personality description in a common framework (John & Srivastava, 1999). The dimensions are (a)

surgency or *extraversion*, (b) *agreeableness*, (c) *conscientiousness*, (d) *emotional stability*, and (e) *openness-intellect* (Goldberg, 1990).

Limitations and Delimitations

Limitations

One of the limitations in this study is related to the instruments used in the study. These are the Big Five Inventory (BFI; John, Donahue, & Kentle, 1991), Academic Self-Regulation Questionnaire (SRQ-A; Ryan & Connell, 1989), and the Self-Efficacy for Self-Regulated Learning subscale of the Children's Self-Efficacy Scale (Bandura, 2006). Although these instruments are among the most widely used and validated scales, they are not the only ones available to measure the constructs under investigation. For example, besides the BFI, there are several instruments that could be administered to measure the Big Five personality traits. These include but not limited to the 208-item HEXACO Personality Inventory (HEXACO-PI; Lee & Ashton, 2004), the 60-item NEO Five-Factor Inventory (NEO-FFI; Costa & McCrae, 1992), and the 96 items Revised NEO Personality Inventory (NEO-PI-R; Costa & McCrae, 1992). The replication of the proposed model across multiple personality inventory would be relevant to gain a more comprehensive understanding of relationship between personality and academic achievement. In addition, especially using the facet-level scales such as the HEXACO-PI and the NEO-PI-R would be helpful to examine the predictive role of specific facets on academic achievement.

Similarly, another limitation is that the only measure of academic achievement used in the present study was ACT or ACT Explore. One may argue that other assessment methods such as school grades, participation, course work, and absenteeism

may be differentially related to personality traits, academic motivation, and self-regulatory efficacy.

The participants were not randomly selected. The majority of the students were from the same region of the country that might cause the participant demographics to reflect only racial, ethnic and wealth distribution of that region. As a result, the findings may have a limited generalizability to all gifted student population.

Delimitations

The delimitation of this study is that the participants were only gifted students. Therefore, the sample was highly selective with regard to students' educational background and intelligence. Although the study did not measure students' IQ scores, it could be assumed that gifted students, even identified through various criteria, have high intellectual abilities. This selection has implications for the generalizability of the study findings.

Chapter 2

Literature Review

Gifted children can develop important academic skills, if they have access to appropriate levels of challenge and educational services either within the regular classroom or in gifted programs. Despite their abilities that make them likely to succeed academically, some gifted children falter when they meet the challenge of strenuous effort and, as a result, are labeled underachievers. If not supported with required investments in overcoming socio-emotional barriers, building academic self-efficacy, and deeply engaging the child in cognitive efficiency growth (Chaffey, 2009), underachievement may lead to even more serious problems. It is difficult to measure the exact magnitude of these problems, but what is known is that the nonproductiveness, especially in gifted children whose special abilities are recognized, often leads to frustration for parents, educators, and even the child (Davis & Rimm, 2004).

The necessary starting point in reversing gifted underachievement is to identify major determinants of academic achievement and the factors that contribute to students' positive academic performance, with the goal of creating appropriate environments and developing adequate interventions to promote student success (Robbins et al., 2004). For nearly a century educators and psychologists have consistently attempted to understand the possible causes and predictors of individual academic achievement (e.g., Binet & Simon, 1905; Busato, Prins, Elshout, & Hamaker, 2000; Chamorro-Premuzic & Furnham, 2003a; Thorndike, 1920). Ackerman and Heggestad (1997) suggested that

individual difference variables such as personality and intelligence can be used to explain

variance in academic achievement and understand the underlying processes by which

traits influence academic outcomes. According to Ackerman's (1996a) PPKI theory

(intelligence as processes, personality, knowledge, and interests), personality traits play a

significant role in knowledge development, in that they direct an individual's choice and

level of persistence to engage in intellectually stimulating activities and settings. This

theory implies that personality traits may influence academic achievement and, indeed,

studies have documented this relationship (Blickle, 1996; Caprara et al., 2011; Chamorro-

Premuzic & Furnham, 2003a).

The present study attempts to investigate the causal relations between personality

traits and academic achievement in gifted students, while exploring several mediation

relations that include self-regulatory efficacy and academic motivation. Chapter 2

provides a review of the salient literature and provides a theoretical framework associated

with personality traits, academic motivation and self-regulatory efficacy, and their

relations to giftedness and influence on academic achievement. The researcher based the

study design on the Big Five model, self-determination theory, and social cognitive

theory, as a joint theoretical foundation.

Personality

Human personality is a complex phenomenon. It has many aspects from an

individual's inner features and inner goals to social effects and relations to others. This

complexity makes it difficult to have a sufficiently comprehensive definition.

Nonetheless, the following definition encapsulates the essential elements of personality:

"Personality is the set of psychological traits and mechanisms within the individual that

are organized and relatively enduring and that influence his or her interactions with, and

adaptations to, the environment" (Larsen & Buss, 2002, p. 4). Two of the elements

captured in this definition are critical in the context of the present study. The first element

is that personality is a set of psychological traits. Psychological traits are characteristics

that define and describe ways in which individuals are similar to or different from each

other. In this regard, knowing the fundamental traits, their origins, their structure, and

their correlations and consequences in terms of experience and life outcomes is

important. The second element is that these psychological traits are within the individual,

which means that individuals carry their personality with themselves. Unlike another

subdiscipline of psychology, such as social psychology, in which the interest is on things

outside of the individual, personality psychology is concerned with how human

characteristics influence experiences and life outcomes (see Larsen & Buss, 2002).

The Big Five Model

Many psychology researchers have been concerned with identifying the basic

traits (also called *dispositions*) that make up personality. The conceptual framework of

the present study is based on the Big Five model (Goldberg, 1981; John & Srivastava,

1999; McCrae & Costa, 1996). The roots of the Big Five model lie in two research

traditions: the psycholexical approach and the questionnaire approach (De Raad &

Perugini, 2002; John & Srivastava, 1999). The Big Five model was discovered and

originally verified within psycholexical studies on the structure of personality, which

were founded on the lexical hypothesis that states all personality traits have become

encoded within the natural language (Cattell, 1943; Goldberg, 1981, 1990). The words

that people invented and use to describe individual differences are exactly same with how

the trait terms were used in the lexical approach. In the lexical approach, there are two clear criteria for identifying important traits (Larsen & Buss, 2002). One of these criteria is *synonym frequency*. Some attributes are described by many trait adjectives. So many synonyms that describe a given attribute with some nuanced differences suggest that a particular attribute is an important dimension of individual difference. "The more important is such an attribute, the more synonyms and subtly distinctive facets of the attribute will be found within any one language" (Saucier & Goldberg, 1996, p.24). For example, if not merely one or two, but rather eight or ten trait adjectives describe a particular attribute, it means that this attribute is a more important dimension of individual difference. Another criterion is *cross-cultural universality*. According to Goldberg (1981), if an individual difference is very important in human transactions, more languages will have a term for it. Additionally, "the most phenotypic [observable] personality attributes should have a corresponding term in virtually every language" (Saucier & Goldberg, 1996, p.23). For example, some trait terms are used only in a few languages, but are entirely missing from most. In contrast, other traits that are sufficiently important in all different cultures have been codified in terms in the languages of those cultures. This means that some traits have only local relevance, but others are universally important in human affairs. Factor analysis was the main tool most often applied in efforts to reduce a large set of words referring to personality attributes to a smaller set of basic personality dimensions (Strus, Cieciuch, & Rowinski, 2014).

The questionnaire approach has made a significant contribution to the expansion of the Big Five personality model, both conceptually and empirically. In this line of research, the five personality dimensions were operationalized in the questionnaires and

their relationship to other theoretical concepts was studied (Digman, 1990; John & Srivastava, 1999). Although the conceptualizations of the five personality dimensions within the psycholexical and questionnaire approaches were slightly different (Saucier & Goldberg, 1996), there has been strong convergence between the various five-factor models (De Raad & Perugini, 2002; Goldberg, 1990; John & Srivastava, 1999).

The Big Five factors have traditionally been labeled as (a) *surgency* or *extraversion*, (b) *agreeableness*, (c) *conscientiousness*, (d) *emotional stability* or *neuroticism*, and (e) *openness-intellect* (Goldberg, 1990). The most widely used measure of the Big Five has been developed by Costa and McCrae (1989) using a sentence-length item format and was named the NEO-PI-R. Although the names of traits in Costa and McCrae's measure (questionnaire approach) are different from those proposed by Goldberg (psycholexical approach), the underlying personality traits are nearly identical. The convergence between the factor structures of Goldberg's single-trait items and Costa and McCrae's sentence-length item format provides support for the robustness of the Big Five model.

Surgency or extraversion has been included as a higher-order factor in all major taxonomies of personality traits. This factor contrasts such traits as talkativeness, assertiveness, and activity level with traits such as silence, passivity, and reserve (Goldberg, 1993). Those who score high in extraversion tend to be sociable, active, and assertive (John & Srivastava, 1999), as well as dominant, competitive, and frank (Digman, 1990; Eysenck, 1978). Those with low scores in extraversion are typically termed *Introverts* and are more likely to be aloof, reserved, and independent (Costa & Widiger, 2002). Agreeableness is also an interpersonal trait dimension. Agreeableness

contrasts "a prosocial and communal orientation towards others with antagonism" (John & Srivastava, 1999, p. 121). Those who score high in this factor are described as more likely to be altruistic, tender-hearted, trusting, empathetic, and modest (Costa & Widiger, 2002). Those with low agreeableness scores are termed as disagreeable and are more likely to be hostile, indifferent, self-centered, spiteful, and jealous (Digman, 1990).

Conscientiousness refers to individual characteristics such as responsibility, organization, thoroughness, and reliability (Goldberg, 1993). It has also been linked to methodic and analytic learning (Di Giunta et al., 2013). Openness to experience refers to individual characteristics such as a positive attitude towards challenging learning experiences as opposed to being simple and narrow-minded (McCrae & Costa, 1999). It includes traits such as curiosity, originality and creativity (Goldberg, 1993). It has also been linked to deep approach to learning and elaborative learning (Komarraju, Karau, & Scmeck 2009). Neuroticism includes traits such as nervousness, moodiness, and temperamentality (Goldberg, 1993). The primary key adjective markers of this factor are calm, relaxed, and stable versus moody, anxious, and insecure (Goldberg, 1990).

Personality and Giftedness

How personality is related to giftedness is an important question that needs to be made explicit for the purpose of the present study. Eysenck's (1970) view of personality would be helpful to illuminate this question. There are a number of different definitions of personality. These definitions do not necessarily contradict each other; rather they attempt to explain the different aspects of this mysterious construct. The tripartite form of Eysenck's definition is one of the popular psychological definitions of personality:

Personality [is] a more or less stable and enduring organization of a person's

character, temperament, intellect, and physique, which determines his unique

adjustment to the environment. Character denotes a person's more or less stable

and enduring system of conative behavior (will); temperament his more or less

stable and enduring system of affective behavior (emotion); intellect, his more or

less stable and enduring system of cognitive behavior (intelligence)... (p. 9).

This definition highlights the relatively stable nature of person's dispositions over time.

Additionally, it focuses on a connection among three overarching behavioral systems of

human. The growing evidence of the relationship between the personality traits and the

cognitive functions such as intelligence sheds a partial light on this connection. Since

intelligence has been consistently recognized as an element of giftedness, the relationship

between personality and giftedness is far more intertwined than one would expect.

Research on the relationship between the Big Five personality traits and

intelligence is relevant to understand some aspects of these personality traits in gifted

students. The most consistent results have been found between openness and intelligence.

It has been observed that openness correlates more specifically with crystallized

intelligence (*Gc*; the ability to use skills, knowledge, and experience in new situations)

rather than fluid intelligence (*Gf*; the ability to use learned knowledge and experience;

Moutafi, Furnham, & Paltiel, 2005; Zeidner & Matthews, 2000). Individuals who are

highly open to experience usually are intellectually curious such that their motivation to

engage in intellectual pursuits may lead to an increase in their *Gc* (Ackerman, 1996b;

Matthews, Deary, & Whiteman, 2009).

The strong and consistent relationship between openness and intelligence is related to the nature of this particular personality factor. As noted previously, the Big Five taxonomy was developed empirically rather than theoretically (John, Naumann, & Soto, 2008). The statistical identification of five factors makes the interpretation process contentious, which in turn leads to some debates about the labels used for factors. By far, openness to experience is the factor surrounded by the most extensive debate. A widely accepted view is that this factor reflects the shared variance of the two lower level traits: openness to experience and intellect (DeYoung, Quilty, Peterson, & Gray, 2014). Therefore, the compound label Openness/Intellect is increasingly in use in studies. The distinction between these two traits is described as follows: "Intellect reflects the ability and tendency to explore abstract information through reasoning, whereas openness reflects the ability and tendency to explore sensory and aesthetic information through perception, fantasy, and artistic endeavor" (DeYoung et al., 2012, p.2). The reason for the largest correlation of this factor with intelligence is that descriptors of intelligence fall within this personality dimension (DeYoung et al., 2012). Recall that the tripartite form of Eysenck's (1970) definition described personality as a broad enough concept that covers conative, affective, and cognitive behaviors.

Several studies have reported a negative association between neuroticism and intelligence (Ackerman & Heggestad, 1997). The negative sign in this relationship was assumed to be due to the anxiety which is one of the sub-factors characterizing neuroticism. According to Eysenck (1994), anxiety may impair individual's cognitive performance. Therefore, this negative relationship is between neuroticism and intelligence test performance, rather than with actual intelligence (Stolarski et al., 2013).

Although in some studies, extraversion has been found to have a positive association with intelligence (Ackerman & Heggestad, 1997; Austin et al., 2002), several others reported a negative association (Moutafi et al., 2004; Wolf & Ackerman, 2005). Zeidner and Matthews (2000) argued that the reason to this inconsistency in the relationship between extraversion and intelligence may be the nature of an intelligence test.

Personality traits of gifted students. Personality, adjustment, and motivation of gifted students are special problems facing educators and parents (Feldhusen, 2003). Numerous authorities in the field of gifted education have noted that gifted individuals may often experience being 'different' from others (Coleman & Cross, 1988; Drews, 1965; Freeman, 2006). This view has been held for at least three decades. This difference has both genetic and environmental dimensions. Researchers have indicated that both genes and environment play a key role in the personality development (Larsen & Buss, 2002). The question of how nature and nurture work together is also highly relevant to understanding giftedness. In general, research has suggested that gifted students tend to show higher scores on measures of positive psychosocial and personal qualities than their non-gifted peers (Martin, Burns, & Schonlau, 2010; McCrae et al., 2002; Olszewski-Kubilius, Kulieke, & Krasney, 1988). The findings of these studies consistently demonstrate that negative stereotypes portraying gifted students as, for example, experiencing poor mental health, maladaptive psychosocial characteristics, and social difficulties lack research-based support.

Only a few studies investigated the differences in the Big Five personality traits between gifted and non-gifted groups. McCrae et al. (2002) investigated mean level changes in personality traits during adolescence in gifted students ($N = 230$) and

supplemented this study with cross-sectional studies of non-gifted American ($N = 1,959$)

and Flemish ($N = 789$) adolescents. Most scores in the gifted sample fell within the

average range. Neuroticism and extraversion scores were not high, nor were

agreeableness and conscientiousness scores low. There was a substantial increase in

openness in the gifted sample. McCrae et al. argued that the increase in openness might

be related not only to substantial growth in intelligence but also to an increased

receptiveness toward many aspects of experience during the period of adolescence. A

comparison of the gifted and non-gifted data at about age 16 revealed that gifted students

were about one half standard deviation lower than non-gifted students in neuroticism and

one half standard deviation higher in openness. In a recent study, Zeidner and Shani-

Zinovich (2011) examined the Big Five personality traits in a representative sample of

gifted and non-gifted Israeli high-school students. Consistent with McCrae et al.'s (2002)

study, gifted students scored higher than non-gifted students on openness, but scored

lower on neuroticism.

Personality and Academic Achievement

It is important to investigate the predictive role of personality traits in academic

achievement in gifted students, because personality, like intelligence, consistently affects

socially valued behaviors, and that performance in academic settings is determined by

factors relating to *willingness to perform* and *capacity to perform* (Blumberg & Pringle,

1982; Poropat, 2009; Traag et al., 2005). Two constructs in the present study -personality

and motivation- are reflected in willingness to perform (Blumberg & Pringle, 1982),

whereas another two constructs -giftedness and self-regulatory efficacy- are reflected in

capacity to perform, as it is related to knowledge, skills, and intelligence (Traag et al.,

2005). Gifted students are usually considered superior to their average peers in one or more domains in terms of knowledge, intelligence, and skills. And self-regulatory efficacy is described as one's capability of using skills such as goal setting, self-monitoring, self-evaluation, and strategy use (Zimmerman, 2000).

In recent years, there has been a renewed interest in investigating personality predictors of performance in different contexts, including school settings (e.g., Barrick & Mount, 2005; Caspi, Roberts, & Shiner, 2005; Steinmayer & Spinath, 2008). Caspi et al. (2005) listed four candidate processes that might explain the personality/achievement associations. First, personality/achievement associations may reflect "attraction" effects, whereby people actively choose educational or work experiences that have qualities concordant with their personalities. Second, personality/achievement associations may reflect "recruitment" effects, whereby people are selected or recommended for the achievement settings (e.g., schools or jobs) based on their personalities. Third, some personality/achievement associations might be the consequences of "attrition," whereby people leave the achievement settings because of the lack of concordance between their personality traits and achievement situations. Fourth, personality/achievement associations emerge as a result of direct, proximal effects of personality on performance. Because the first three processes are applicable to the situations where individuals have initiatives to choose activities, the fourth process is likely demand special research scrutiny in explaining academic achievement.

Research linking personality traits to academic achievement has a long history. Early studies of Gough and colleagues reported the strong predictive role of conscientiousness in academic achievement of both high school and college students

(Gough, 1964; Gough & Hall, 1964; Gough & Lanning, 1986). Contemporary research, too, suggests that personality traits are among important predictors of academic achievement (Ackerman & Heggestad, 1997; Busato et al., 2000; Caprara et al., 2011; Chamorro-Premuzic & Furnham, 2003a, b; De Feyter et al., 2012; Poropat, 2009; Zuffianò et al., 2013). Note that, personality traits predict academic achievement even when cognitive ability and intelligence are controlled (e.g., Duckworth & Seligman, 2005; Wagerman & Funder, 2007).

As noted, conscientiousness and openness have been found to be strong predictors of academic achievement in many studies (e.g., Caprara et al., 2011; Diseth, 2003; Noftle & Robins, 2007; Poropat, 2009). Agreeableness, neuroticism, and extraversion, however, have not shown consistent and conclusive results (Duff et al., 2004; Furnham et al., 2003; Poropat, 2009). Conard (2006) reported the association of conscientiousness with course performance, class attendance, and final grades. MacCann, Duckworth, and Roberts (2009) revealed that specific facets of conscientiousness were conducive to academic performance. Noftle and Robins (2007) examined relations between the Big Five personality traits and academic outcomes, specifically SAT scores and grade-point average (GPA). Openness was found to be the strongest predictor of SAT verbal scores. Conscientiousness was the strongest predictor of both high school and college GPA and it predicted college GPA even after controlling for high school GPA and SAT scores. Noftle and Robins' further analysis showed that conscientiousness and college GPA was mediated by increased academic effort and higher levels of perceived academic ability. Bidjerano and Dai (2007) found that conscientiousness explains 11% of the variance in GPA through the mediation of students' effort regulation. Poropat (2009) reported a

meta-analysis of personality-academic performance relationships based on the Big Five framework. The results indicated that academic performance was correlated with agreeableness, conscientiousness, and openness. Correlations between conscientiousness and academic performance were found to be largely independent of intelligence.

Despite the lack of consistency or conclusiveness of previous research regarding the predictive role of extraversion and neuroticism on academic achievement, several scholars demonstrated a negative but weak correlation between these personality traits and academic achievement. For example, Chamorro-Premuzic and colleagues reported that extraversion was weakly but negatively related to overall academic exam performance (Chamorro-Premuzic & Furnham, 2003b) and undergraduate students' statistics exam grades (Furhnam & Chamorro-Premuzic, 2004). Additionally, Chamorro-Premuzic et al. (2005) reported that extraversion was weakly associated with preference for group work and oral examinations. In the same study, Chamorro-Premuzic et al. found neuroticism to be weakly and negatively correlated with the preference for oral exams and continuous assessment methods. Neuroticism was weakly and negatively correlated with students' overall examination performance in a year (Chamorro-Premuzic & Furnham, 2003b) and their overall exam scores (Dwight et al., 1998).

Most studies, including meta-analyses, identified conscientiousness as a strong predictor of academic achievement (Noftle & Robins, 2007; Poropat, 2009). Openness, too, has been documented to be an important predictor of academic achievement (Noftle & Robins, 2007). The relationship between academic achievement and the other three personality traits (agreeableness, neuroticism, and extraversion) were reviewed carefully to determine the relevance of their inclusion into the analysis. Inconsistencies in the

results from the previous studies have been concluded to be related, in part, to the sample features and the use of various measures. Among the studies investigating the relationship between the Big Five personality traits and academic achievement, only a few used the standardized tests as a measure of achievement (Conard, 2006; Nofle & Robins, 2007; Wolfe & Johnson, 1995). Noftle and Robins' (2007) study is worth emphasizing as it was the only study using multiple measures of the Big Five personality domains and academic outcomes. One intriguing finding was that although agreeableness was not related to students' GPA scores in the results of multiple regression analyses predicting GPA, it was consistent but weak predictor of both SAT verbal and SAT math scores. The facet-level correlation results indicated that the Flexibility facet of agreeableness had a negative relation with SAT verbal scores ($r = -.14$).

Further review of the literature by specifically focusing on the studies analyzing mediation models suggested that agreeableness is an important personality trait to predict students' academic achievement. For example, De Feyter et al. (2012) investigated the moderating and mediating effects of self-efficacy and academic motivation. De Feyter et al. found that unlike conscientiousness that affected academic achievement indirectly through academic motivation, agreeableness had a significant direct effect on academic achievement ($\beta = .19$, $p < .01$). Zhou (2015) investigated the moderating effect of self-determination in the relationship between the Big Five personality traits and academic achievement. Zhou found that openness was an independent predictor of academic achievement, whereas conscientiousness and agreeableness affected achievement interactively by autonomous motivation. Although these studies revealed some mixed results regarding the role of agreeableness in predicting academic achievement, they

suggested the inclusion of this personality trait in the path model. Thus, the current study examined the impact of the Big Five personality traits on academic achievement in gifted students by focusing especially on conscientiousness, openness, and agreeableness.

Gender differences in personality traits. Gender differences in personality traits have been documented in many studies, and over many years. The literature is inconsistent in terms of gender differences in extraversion, because this personality factor combines both masculine and feminine traits. For example, Feingold (1994) concluded that females are slightly higher in extraversion, whereas Lynn and Martin (1997) reported that they are lower. In a cross-cultural study with college-age and adult samples ($N =$ 23,031), Costa, Terracciano, and McCrae (2001) found that women were higher in Warmth and men were higher in Assertiveness. This result suggested that clear gender differences are found in specific facets of extraversion.

Both extraversion and agreeableness are interpersonal traits. Dominance and love are axes of the Interpersonal Circumplex and have been found to be rotations of extraversion and agreeableness (McCrae & Costa, 1989). Extraversion combines dominance and love, whereas agreeableness combines submission and love (Costa et al., 2001). Because women are more submissive and loving, this classification suggests that they should score higher on measures of agreeableness. Research has supported this hypothesis (Budaev, 1999; Costa et al., 2001).

Conscientiousness refers to individual characteristics such as responsibility, organization, thoroughness, and reliability (Goldberg, 1993). It has also been related to methodic and analytic learning (Di Giunta et al., 2013). Research on gender differences in conscientiousness is rare. Feingold (1994) in his meta-analysis found seven studies

relevant to conscientiousness and concluded that females scored slightly higher than men. Costa et al. (2001) examined gender differences in six facets of conscientiousness. No facets of conscientiousness showed consistent gender differences for college-age and adult samples across cultures.

Neuroticism is a broad domain of which the primary key adjective markers are calm, relaxed, and stable versus moody, anxious, and insecure (Goldberg, 1990). Neurotic individuals are characterized as being anxious, nervous, emotional, and tensed. Research on gender differences on traits related to this domain has consistently reported that women score higher than men (Costa et al., 2001; Lynn & Martin, 1997; Ross & Van Willigen, 1996).

Openness to experience includes traits such as curiosity, originality and creativity (Goldberg, 1993) and is related to deep approach to learning and elaborative learning (Komarraju et al., 2009). Openness to experience has several facets relating, for example, to intellectual curiosity and emotional richness. There is empirical evidence that women are more sensitive to emotions. For example, Eisenberg and colleagues (1989) found that women have greater facial expression of emotion, and they are better able to decode nonverbal signals of emotion than men (McClure, 2000). Based on this empirical evidence, Costa et al. (2001) hypothesized that women are expected to score higher in Openness to Aesthetics and Feelings, and men, who are more intellectually oriented (Winstead, Derlega, & Unger, 1999), are expected to score higher in Openness to Ideas. Costa et al.'s findings supported this hypothesis.

Academic Motivation: Postulated as a Mediator of Personality Traits in

Achievement

Academic motivation in gifted students may often go unnoticed or even be dismissed unless there are clear signs of underachievement. The reason is that the products gifted students develop are more likely to be of high quality from a normative standard (Matthews & McBee, 2007). This type of dismissal problem arises from the false assumption that gifted students are inherently motivated and academically curious. Research has shown that academic motivation is independent of giftedness (Gottfried, Gottfried, Cook, & Morris, 2005; Schick & Phillipson, 2009). Some gifted students are highly motivated to learn, whereas others are not. The quality of academic motivation explains part of why an individual achieves highly, enjoys school, prefers optimal challenges, and generates creative products (Reeve, 2002). On the other hand, academic motivation is shaped by both internal personality characteristics and the social environment (i.e., family, school, peer groups; Baker et al., 1998; Deci & Ryan, 2008; Wentzel, 2002). Exploring the role of academic motivation as a mediator in the relationship between personality traits and academic achievement could help link these two important sets of findings. Academic motivation in this study is explored from a self-determination theory perspective.

Self-Determination Theory

Motivation is an exceedingly complex topic, including many interacting forces that can operate at abstract levels (Clark, 2008). There are a dozen theories of motivation that have emerged from different intellectual traditions (Weiner, 1992). According to Eccles and Wigfield (2002), modern theories of motivation focus more specifically on the

relation of beliefs, values, and goals with action. Eccles and Wigfield discussed twelve

theories of motivation, grouped into four broad categories: theories focused on

expectancies for success, theories focused on task value, theories that integrate

expectancies and values, and theories integrating motivation and cognition.

Self-determination theory (Deci & Ryan, 2000) is under the category of theories

that focus on task value. In other words, self-determination theory and other theories in

the same category seek the reasons why individuals engage in different activities. Self-

determination theory emphasizes humans' innate needs for autonomy, competence, and

relatedness (deCharms, 1976; Ryan & Deci, 2000a). People have a need for autonomy;

they perceive their behavior to be internally controlled, so they can have own choices in

actions. People have a need for competence, a desire to explore and attempt mastery of

skills (White, 1959). People also want to feel safe and be securely related to others (Ryan,

Deci, & Grolnick, 1995).

Self-determination theory posits that behavior can be intrinsically motivated,

extrinsically motivated, or amotivated (Deci & Ryan, 1985, 1991). *Intrinsic motivation*

stems from the innate psychological needs of competence and self-determination

(Vallerand et al., 1992). It refers to the fact of doing an activity for itself because of

interest and satisfaction from involvement (Deci, 1975; Deci & Ryan, 1985). According

to Deci and Ryan (1985), intrinsic motivation is maintained only when individuals feel

self-determined and competent. This hypothesis is supported by the evidence that

intrinsic motivation is reduced when there is external control and negative competence

feedback (Cameron & Pierce, 1994; Deci & Ryan, 1985). On the contrary, *extrinsic*

motivation pertains to behaviors that are regulated through external means such as

constraints and rewards (Vallerand et al., 1992). A third type of motivational construct in self-determination theory is *amotivation*, which simply means a relative absence of motivation or a lack of intention to act.

Internalization is the process of transferring the regulation of behavior from outside to inside the individual (Eccles & Wigfield, 2002). This process is important to understanding Deci and Ryan's (1985) discussion regarding how the motivational mechanism works. When individuals are self-determined and competent, their intrinsic motivation is fully maintained. In other words, their reasons for engaging in behavior are completely internalized (Grolnick et al., 2000). There are at least three types of extrinsic motivation which can be ordered along an autonomy and self-determination continuum from lower to higher levels: external (regulation coming from outside the individual), introjected (internal regulation based on feelings that one has to do the behavior), identified (internal regulation based on the utility on that behavior), and integrated (regulation based on what the individual thinks is valuable and important to the self) (see Figure 3; Ryan & Deci, 2000b). Note that even integrated regulation is not fully internalized and self-determined (Eccles & Wigfield, 2002).

Behavior	Nonself-determined				Self-determined
Type of Motivation	Amotivation	Extrinsic Motivation			Intrinsic Motivation
Type of Regulation	Non-regulation	External Regulation	Introjected Regulation	Identified Regulation	Integrated Regulation	Intrinsic Regulation
Locus of Causality	Impersonal	External	Somewhat External	Somewhat Internal	Internal	Internal

Figure 3. Motivation continuum in self-determination theory. Adapted from "Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions," by R. M. Ryan and E. L. Deci, 2000b, *Contemporary Educational Psychology, 25*, p. 61. Copyright 2000 by Academic Press.

Self-determination theory has generated a considerable amount of research and appears rather pertinent for the field of education (e.g., Deci & Ryan, 1985; Deci, Vallerand, Pelletier, & Ryan, 1991; Ryan & Deci, 2000a; Vallerand et al., 1992). Two important conclusions can be drawn from several decades of empirical work on the utility of applying self-determination theory to educational settings: (1) autonomously motivated students thrive in an academic environment, and (2) students benefit when teachers support their autonomy (Reeve, 2002). The quality of a student's motivation leads to positive classroom outcomes, such as high academic achievement and greater creativity. For example, research has shown that, compared to control-motivated students, autonomously motivated students experience higher academic achievement (Miserandino, 1996), higher perceived competence (Ryan & Grolnick, 1986), preference for optimal challenge (Boggiano, Main, & Katz, 1988), pleasure from optimal challenge (Harter, 1978), and greater creativity (Amabile, 1985). A student's motivation partially

depends on the extent to which the teacher is autonomy-supportive (Eccles & Midgley, 1989). Compared to students with controlling teachers, students with autonomy-supportive teachers gain important educational benefits such as higher academic achievement (Flink, Boggiano, & Barrett, 1990), higher perceived competence (Ryan & Grolnick, 1986), greater conceptual understanding (Grolnick & Ryan, 1987), and greater creativity (Koestner, Ryan, Bernieri, & Holt, 1984).

Academic Motivation and Personality

Some gifted students possess an intrinsic desire and enthusiasm to learn and work on a given task, whereas some others seem bored and disengaged. The previous section highlighted research on what factors make gifted students lose or suppress their intrinsic motivation. This section is about personality factors that explain this difference. Understanding the role of academic motivation in the relationship between personality traits and academic achievement may be central to developing more effective instructional practices. In the present study, academic motivation is hypothesized to be a mediator in the relationship between personality traits and academic achievement. Therefore, demonstrating the literature review on the association of academic motivation with personality traits is important.

Several studies investigated personality variables that may be related to different aspects of academic motivation. Achievement motivation has consistently been found to have a positive association with conscientiousness and extraversion, and a negative association with neuroticism, impulsiveness, and fear of failure (Busato, Prins, Elshout, & Hamaker, 1999; De Guzman, Calderon, & Cassaretto, 2003; Heaven, 1989; Kanfer, Ackerman, & Heggestad, 1996). Payne, Youngcourt, and Beaubien (2007) reported that

students with high scores on conscientiousness, extraversion, and openness have the strong learning goal orientations, whereas those with high neuroticism and low extraversion scores are most likely to pursue avoidance performance goals and experience fear of failure.

A considerable number of studies investigated the association between Big Five personality traits and the types of motivation in self-determination theory. Note that some motivation instruments used in these studies were not directly based on self-determination theory. Nevertheless, the study findings are relevant to review here, because the classification of motivational factors is somewhat consistent with extrinsic motivation, intrinsic motivation, and amotivation. For example, Komarraju and Karau (2005) examined the relationship between the Big Five personality traits and individual differences in three core factors of the Academic Motivations Inventory (engagement, achievement, and avoidance; Moen & Doyle, 1977). Engaged students seek knowledge for self-improvement and tend to be interested in learning and sharing ideas. Achievement-oriented students value competence, seek challenge, and enjoy outperforming others. Avoidant students take courses for extrinsic reasons; they usually are discouraged about school and worry about failure. The results revealed that engagement was related to both openness and extraversion. Achievement was best explained by conscientiousness, neuroticism, and openness. Avoidance was best explained by neuroticism, extraversion, and by an inverse relationship with conscientiousness and openness. Based on the results, Komarraju and Karau argued that conscientious and open students are less likely to be avoidant in their motivation.

Extraverts may be more concerned with social aspects of school life and neurotic students tend to avoid many aspects of academic life as they view education as a means to an end.

Philips, Abraham, and Bond (2003) investigated the relationship between personality traits and motivation, and their role in predicting students' examination performance. The items measuring academic motivation were based on Sheldon and Elliott's (1998) four-factor model, which classifies motivation types similarly to the taxonomy used in self-determination theory. These were *controlled extrinsic* ("I work because of the rewards (e.g. a good career, or the approval of others, or prestige that a degree will bring me"), *controlled introjected* ("I feel that I ought to work for my degree; I work because I would feel ashamed, guilty, or anxious if I didn't"), *autonomous identified* ("I work because I really believe that getting a degree is important and something of value in its own right"), and *autonomous intrinsic* ("I work because of the satisfaction and enjoyment that studying for my degree gives me"). The final structural equation model revealed that controlled introjected motivation was positively predicted by extraversion and neuroticism and negatively by conscientiousness, and both autonomous identified motivation and autonomous intrinsic motivation were positively predicted by conscientiousness.

Komarraju et al. (2009) examined the role of personality traits in predicting college students' motivation and achievement. In this study, Komarraju et al. used the Academic Motivation Scale (Vallerand et al., 1992), the instrument based on the self-determination theory, instead of the Academic Motivations Inventory (Moen & Doyle, 1977). Conscientiousness emerged as central to intrinsic motivation, extrinsic motivation, and amotivation. Openness was also positively associated with intrinsic motivation.

Extraversion was positively related with extrinsic motivation. Conscientiousness and agreeableness were negatively associated with amotivation. The findings of Komarraju et al.'s study suggest that disciplined and well-organized students are most likely to be motivated. Students with strong social needs may pursue their education as a means to an end. Agreeable students are more likely to display cooperative and social behaviors in the classroom; therefore the lack of motivation in these students is less likely to occur.

In a recent study, Clark and Schroth (2010) used a seven-scale model of motivation as proposed by Vallerand et al. (1992), which considers multiple facets of intrinsic motivation. Clark and Schroth examined the relations between the Big Five personality traits and academic motivation among first-year college students. Results revealed that intrinsically motivated students tended to be extraverted, agreeable, conscientious, and open to new experiences; although these trends varied depending on the specific type of intrinsic motivation. Those who were extrinsically motivated tended to be extraverted, agreeable, conscientious, and neurotic; depending on the type of extrinsic motivation. Amotivated students tended to be disagreeable and careless.

Academic Motivation and Academic Achievement

An important line of educational and psychological research has focused on inner resources for academic achievement. The inner resources include various motivationally relevant cognitive and affective constructs such as perceived competence and perceived autonomy. Intentionality is a central element in motivation. It is a characteristic feature of our consciousness that determines how we act toward a goal or engage in a particular behavior (Atkinson, 1964). Along with control understanding (believing in behavior-outcome dependence), perception of competence is a prerequisite of intentionality

(Grolnick, Ryan, & Deci, 1991). A student who is willing to achieve an important outcome in the academic domain must believe that he is sufficiently competent to execute the action toward this goal. Although perceived autonomy is not the prerequisite of intentionality, it has a critical role in understanding the initiation and regulation of the given action within the realm of intentional behavior, namely whether it is autonomous versus controlled behavior (Deci & Ryan, 1987). Autonomous behavior describes the initiation and regulation of action that is emanated from one's core sense of self, whereas controlled behavior is referred to be based on outside pressure or coercion (Grolnick et al., 1991).

Grolnick et al. (1991) found that perceived competence, control understanding, and perceived autonomy predicted children's academic performance. Fortier and colleagues (1995) reported the indirect effect of perceived academic competence and perceived academic self-determination on students' school performance through the mediation role of autonomous academic motivation. In other words, students who feel academically competent and self-determined develop an autonomous motivation toward education which in turn leads them to perform better in school.

Various theoretical perspectives have been used to investigate the intrinsic-extrinsic motivation, its structure, determinants, and consequences. Self-determination theory proposed a taxonomy of types of regulation for extrinsic motivation which differ in the degree to which they represent autonomy (Ryan & Deci, 2002). This taxonomy portrayed intrinsic and extrinsic motivation as on a continuum rather than as dichotomous phenomena (see Figure 3). The developmental process of internalization along this continuum suggests that identified regulatory styles are promoted in autonomy-

supportive social contexts. The type of internalization in controlling classrooms tends to

be nonexistent (i.e., external regulation) or less complete (i.e., introjected in character),

whereas in autonomy-supportive classrooms, the type of internalization tends to be

identified in character resulting in greater self-determination (Reeve, 2002), which in turn

leads to higher academic performance (Soenens & Vansteenkiste, 2005).

A number of studies examined the relations between academic achievement and

different types of motivation on the continuum. Karsenti and Thibert (1995) investigated

this relationship in a sample of high school students. Results revealed a significant

negative correlation between amotivation and academic achievement (GPA; $r = -.28$).

Additionally, results indicated a significantly higher correlation between intrinsic

motivation and achievement for male students ($r = .20$) than for female students ($r = .10$).

This association also differed among senior-high school students ($r = .25$) and junior-high

school students ($r = .09$). Karsenti and Thibert argued that "motivation does not occur

under the same conditions for boys and girls nor does if for younger and older students"

(p. 10). Robinson (2003) used a multiple regression model to predict academic

achievement (GPA) of university students by intrinsic motivation, extrinsic motivation,

and amotivation. Results revealed that only amotivation and intrinsic motivation were

significantly associated with GPA. This model accounted for 10% of the variance in

GPA.

Several studies documented the relations between academic motivation and

academic achievement within more sophisticated mechanisms by using path analyses and

structural equation modeling. For example, Komarraju et al. (2009) examined the role of

the Big Five personality traits in predicting college students' academic motivation and

achievement (GPA). This study revealed a complex and intriguing pattern of associations. Intrinsic motivation was the only type of motivation significantly predicting GPA by explaining 4% of the variance. Komarraju et al. also conducted mediation analyses to examine whether personality traits mediated the relationship between motivation and GPA. Of the five personality traits, only conscientiousness was found to be a significant partial mediator of the relationship between intrinsic motivation and GPA.

Academic Motivation and Giftedness

The importance of academic motivation is especially salient for gifted students. Although the role of motivation has been widely emphasized in both the behavior and the identification of gifted students, there is a substantial and extremely frustrating question about this role that needs to be clarified (McNabb, 2003). Winner (1996, 2000) argued that gifted students have a deep intrinsic motivation to master the domain in which they have high ability. In his three-ring conception of giftedness, Renzulli (1978) identified *task commitment* as one of the three components of gifted behavior. These descriptions cause some confusion in understanding underachievement (Gagn*é*, 1991). At the crux of this issue is acknowledgement that giftedness does not guarantee gifted behavior (McNabb, 2003). In other words, gifted students are not necessarily expected to be high achievers. Therefore, the critical issue is this: What makes gifted students to lose or suppress their intrinsic motivation?

Boredom is a major concern of gifted students that may cause a decrease in intrinsic motivation. One reason for boredom in school is the lack of academic challenge (Peine & Coleman, 2010). Gifted students who do not find academic tasks interesting and

challenging gradually become demotivated and disengaged from classroom learning (Baker et al., 1998; Feldhusen & Kroll, 1991; Plucker & McIntire, 1996). Teachers or parents who are not aware of gifted students' academic needs are likely to create a controlling environment that does not fulfill students' autonomy, competence, and relatedness needs. To be more specific, when gifted students are not provided with challenging tasks and are not exposed to new fields of interest, they are controlled by teachers and forced to follow lessons that are painstakingly slow and repeat some specific subjects in which they had already acquired the majority of content.

The optimal match between the challenge level of the task and the level of student's skills is critical in appealing to gifted students' intrinsic interests. Csikszentmihalyi (1991), in his theory of flow, argued that the balance between the level of challenge and the level of one's capability is needed to achieve the flow state, which is defined as "having a sense that one's skills are able to manage the challenges at hand in a goal focused, rule bound task that provides clear feedback as to how one is performing" (p.71). Any imbalance will lead to a different state that may be associated with a number of negative emotional factors (Csikszentmihalyi, Abuhamdeh, & Nakamura, 2005).

Boredom and a range of other nonintellective factors help explain why some gifted students underachieve or never reach the level of success of which they seem so capable. Research on motivation has addressed both stable motivational characteristics of individuals and the situational characteristics of environments and tasks that may influence one's motivation (Clinkenbeard, 2012). Clinkenbeard (1996, 2006) suggested that research and theory on motivation and gifted students can be classified into personal and environmental categories. Self-determination research supports this classification.

According to the Hierarchical Model of Intrinsic and Extrinsic Motivation (Vallerand, 1997), one of the critical features of motivation is that it yields important consequences occurring at three levels of generality: the global level, the contextual level, and the situational level. At the global level, motivation is considered an individual difference that applies across situations, whereas at the contextual and situational levels, different contexts or situations influence motivation. This categorization suggests that both the psychological side and the environmental side are important for understanding of the motivation of gifted students. The following section highlights the literature on the relationship between academic motivation and personality by focusing on the psychological side.

Gender differences in academic motivation. Gender differences are not pronounced in studies of self-determination motives. Self-determination theory hypothesizes the same underlying psychological needs for men and women. However, societal and cultural influences can contribute to greater salience of specific motives for each gender (Frederick-Recascino, 2002). There are different patterns of traditional emphasis placed on different genders. For example, while men are expected to be competent in domains related to sports and mechanical ability, women showed higher scores in motivation related to physical attractiveness and appearance (Frederick, 1991; Frederick & Ryan, 1993). Within an educational context, however, there is no empirical support for gender difference in self-determination motives.

Self-Regulatory Efficacy: Postulated as a Mediator of Personality Traits in Achievement

Besides academic motivation, self-regulatory efficacy is hypothesized to mediate the relationship between personality traits and academic achievement. Self-determination theory explains human behavior in terms of three basic psychological needs. To view the predictive role of personality traits on academic achievement and its mediation solely by academic motivation would be a truncated image of an important psychological mechanism. Individuals possess self-directive capabilities that enable them to exercise some control over their actions (Bandura, 1986). These self-directive capabilities are important means for exercising influence over one's own behavior, even much more than are intention and desire. Although self-determination theory sheds light on responsible and conscientious behavior that allows individuals to function effectively within their social groups (Koestner & Losier, 2002), adding another mediator variable – self-regulatory efficacy – into the proposed model allows the researcher to have a comprehensive picture of the predictive role of personality traits on academic achievement. Additionally, an evidence-based relationship between academic motivation and self-regulatory efficacy has a potential to explain a more systemic psychological mechanism underlying the relationship between personality traits and academic achievement.

Social Cognitive Theory

A number of different models have been proposed to explain the self-regulation process (Schunk & Zimmerman, 1994; Zimmerman & Schunk, 1989). These models generally include self-assessment through self-monitoring, instrumental cognitive and metacognitive guides, goal setting, and self-motivational strategies (Caprara et al., 2008). Social cognitive theory introduced one of such models. This theory argues that cognitive,

vicarious, self-regulatory, and self-reflective processes play a central role in human functioning. People are not reactive organisms shaped by environmental forces; rather they are self-reflective and self-organizing in the processes of adaptation and change.

Both self-determination theory and social cognitive theory share the fundamental assumption of the individual as an active and self-regulating organism. Internalization is an innate growth tendency posited in self-determination theory that explains people's vitality, development, and psychological adaptation (Deci & Ryan, 2000). Socially-valued regulations that are initially perceived as being external are integrated through internalization (Koestner & Losier, 2002). Drawing heavily on social cognitive theory, it was argued that self-regulation is the core mechanism that provides the potential for self-directed changes in the behavior (Pajares, 2002a).

One of the primary goals of education should be development of the capability for self-directed learning in students. Gaining this capability is vital, because it contributes to students' intellectual growth beyond their formal education and continues to do so throughout the life span. Metacognitive theorists have focused on the various aspects of self-regulation and suggested a number of strategies to develop self-correction skills (e.g., Brown, 1978; Paris & Newman, 1990). Bandura (1997) argued that self-corrective use of cognitive strategies explains only a small part of the self-regulation: It neglects "self-referent, affective, and motivational processes that play a vital role in cognitive development and functioning" (p. 223). Social cognitive theory expands the conception of self-regulation. Social cognitive theory integrates cognitive, metacognitive, and motivational mechanisms of self-regulation (Bandura, 1986). Having self-regulatory skills and knowledge is different from being able to persistently put them into practice

(Caprara et al., 2008). Possessing self-regulatory skills and knowledge will not make much sense, if a student does not have a firm belief in self-regulatory efficacy (i.e., if they are not able to apply self-regulatory skills in dealing with difficult situations and stressors).

Today, students can exercise greater personal control over their own learning, thanks to the accelerated pace of social, informational, and technological changes (Caprara et al., 2008). Capability for self-directed learning and self-regulation is a key factor in the construction of knowledge. The quality of students' self-regulatory skills depends in part on their self-efficacy beliefs (Pajares, 2002b). Students with high self-efficacy also engage in more effective self-regulatory strategies (Pajares, 2002a). Bandura (1977) was the first to draw attention to the relationship between self-regulation and self-efficacy beliefs. Bandura (1986) suggested that self-efficacy beliefs affect students' self-regulated learning strategies.

Self-Regulatory Efficacy and Academic Motivation

Self-regulatory efficacy is important to guide and motivate oneself to accomplish tasks that one knows how to do (Bandura, 2006). How do motivation and cognition work together? Motivation theorists are increasingly interested in this critical question. There are two major issues on which these theorists focus: Some theorists have studied the ways that individuals regulate their behavior to meet learning goals (e.g., Boekaerts, Pintrich, & Zeidner, 2000; Schunk & Zimmerman, 1994), whereas other theorists have been concerned about the links between motivation and cognitive strategies (e.g., Alexander, Kulikowich, & Jetton, 1994; Pintrich, Marx, & Boyle, 1993).

Bandura's (1986) social cognitive theory introduces several important concepts that provide some insight into the understanding of psychosocial processes that are intimately involved in student motivation and achievement. One of these concepts is self-efficacy. Self-efficacy beliefs provide the foundation for motivation and personal accomplishments (Pajares, 2002a). People possess self-reflective capabilities that enable them to exercise control over their motivations and behaviors (Bandura, 1991). Without such capabilities, desire or intention itself does not have much effect on human behavior (Bandura & Simon, 1977).

Skills and knowledge are very important for self-appreciation. However, people's accomplishments are generally better predicted by their self-efficacy beliefs than their skills and knowledge or previous attainments (Pajares, 2002a). Analyzing the role of self-regulatory efficacy in the relationship between personality, motivation, and academic achievement is critical, because it contributes to accomplishments both motivationally and through support of strategic thinking, and raises academic goals, personal standards for the quality of work, and beliefs in capabilities for academic achievement (Caprara et al., 2008; Zimmerman & Bandura, 1994; Zimmerman et al., 1992).

Self-Regulatory Efficacy and Academic Achievement

One of the core properties of human agency within the conceptual framework of social cognitive theory is the capacity to regulate one's motivation and action through self-reactive influence (Caprara et al., 2008). The level of motivation, affective states, and actions are linked more to beliefs rather than what is objectively true (Bandura, 1997). The way people behave is based on beliefs about their own capabilities, not their actual knowledge and skills (Pajares, 2002a). Students who are not comfortable with their

capabilities to exercise adequate control over their motivation and behavior tend to undermine their efforts (Bandura, 1986). In contrast, students who are comfortable with their learning capabilities are more likely to work harder, persist longer when they face difficulties, and achieve at a higher level (Schunk & Pajares, 2002). The reason some students perform poorly may be either the lack of requisite skills or the lack of self-efficacy to make optimal use of them. This helps to explain why some high ability individuals suffer due to self-doubt about their capabilities they actually possess.

Research has verified that general efficacy beliefs contribute independently to academic performance rather than simply reflecting cognitive skills (Bandura, 1997). Collins (1982) found that, of students with equal mathematical ability, students with stronger self-efficacy beliefs solved more problems and did so more accurately than students who doubted their efficacy. Bouffard-Bouchard, Parent, and Larivée (1991) reported that regardless of whether students were of high or average cognitive ability, students with higher self-efficacy managed their time better and were more persistent than students with lower perceived efficacy.

In social cognitive theory, self-regulated learning processes are assumed to be crucial in the realm of academic achievement (Bandura, 1986; Schunk, 1984; Zimmerman, 1983). Achievement is theorized to be heavily dependent on the use of self-regulation, especially in competitive or evaluative settings (Zimmerman, 1981). Schnell, Ringeisen, Raufelder, and Rohrmann (2015) investigated the impact of adolescents' self-efficacy and self-regulated goal attainment process on school performance by using Schwarzer's (1998) theory of self-regulatory attainment processes. Schwarzer's framework, based on social cognitive theory, specifies how self-efficacy beliefs share and

determine successful self-regulation. Schnell et al. found a decisive role of self-efficacy for self-regulatory goal attainment processes and academic performance. Their findings provided empirical evidence for the importance of self-efficacy beliefs and self-regulated learning components in school contexts.

Zimmerman and Martinez-Pons (1986, 1988) investigated how high school students used self-regulatory strategies for learning in different contexts such as in the classroom, when studying for exams, when working on assignments at home, and when poorly motivated. Students who were good self-regulators did much better academically than students who were poor self-regulators. High achievers were better users of all the self-regulative strategies. Low achievers rely on rote memorization, which does not help them transfer their learning to different situations (Pintrich & DeGroot, 1990).

Self-regulatory efficacy also has a central role in one's academic self-development. Caprara et al. (2008) examined the developmental course of self-regulatory efficacy and its contribution to academic achievement in a sample of 412 students ranging in age from 12 to 22 years. Results revealed a progressive decline in self-regulatory efficacy as students advance through the educational system. An increase in the complexities of academic demands with increasing levels of schooling leads to some adaptational pressures on students which in turn shake their sense of efficacy. High levels of self-regulatory efficacy in junior high school contributed to students' junior high school achievement and their self-regulatory efficacy in high school. The lower the decline in self-regulatory efficacy, the higher were school grades. Another notable finding of Caprara et al.'s study was that self-regulated efficacy retained its relation to

academic achievement and continuance in school after prior academic performance and socioeconomic level were controlled.

Gender differences in self-regulatory efficacy. Limited research has focused on gender differences in self-regulated learning. Caprara et al. (2008) conducted a longitudinal analysis to investigate the role of self-regulatory efficacy in academic continuance and academic achievement. Both the initial level of self-regulatory efficacy and the degree of decline varied as a function of gender. Female students reported higher self-regulatory efficacy than male students and showed a lesser decline as they progressed in the educational system. These results supported the previous research showing that female students have greater perceived efficacy to regulate their academic activities compared to male students (Pastorelli et al., 2001). Additionally, Caprara et al.'s study revealed that the gap between female and male students widens as students progress through school.

Summary

In sum, evidence from many studies indicates that there are explicit and consistent relationships between personality traits, academic motivation, self-regulatory efficacy, and academic achievement. In the past studies, a number of different structural models have been proposed to investigate the interplay among these constructs. In the present study, academic motivation and self-regulatory efficacy are hypothesized to serve as mediators of the relationship between personality traits and academic achievement. In addition, academic motivation is hypothesized as a mediator linking self-regulatory efficacy and academic achievement. The premise to this study is derived from the Big Five, self-determination, and socio-cognitive literature.

Chapter 3

Method

Purpose

The purpose of this study was to examine the predictive role of the Big Five personality traits on the academic achievement of gifted students, and investigate whether self-regulatory efficacy and academic motivation serve as mediators. Three research questions were developed to address this purpose.

Research Questions

1. How are gifted students' personality traits, self-regulatory efficacy, academic motivation, and academic achievement related to one another?

2. How do personality, academic motivation, and self-regulatory efficacy differ by grade and gender?

3. In what ways do gifted students' personality traits, self-regulatory efficacy, and academic motivation predict their academic achievement?

Seven hypotheses were used to address the third research question:

Hypothesis 1. Agreeableness, conscientiousness, and openness will be positively related to academic achievement.

Most studies, including meta-analyses, identified conscientiousness as a strong predictor of academic achievement (Noftle & Robins, 2007; Poropat, 2009). Openness, too, has been documented to be an important predictor of academic achievement (Noftle & Robins, 2007). Although agreeableness was not consistently related to academic

achievement measured by GPA and other school-based evaluation methods, it was found to be a predictor of both SAT verbal and SAT math scores (Noftle & Robins, 2009). In addition, the studies analyzing mediation models suggested that agreeableness is an important personality trait to predict students' academic achievement (De Feyter et al., 2012; Zhou, 2015).

Hypothesis 2. Agreeableness, conscientiousness, and openness will be positively related to autonomous motivation.

Previous research has shown that the autonomous types of motivation was positively predicted by agreeableness, conscientiousness, and openness (Clark & Schroth, 2010; Komarraju et al., 2009; Philips et al., 2003).

Hypothesis3. Agreeableness and conscientiousness will be negatively related to controlled motivation.

Previous research has shown that the controlled types of motivation was negatively predicted by conscientiousness and agreeableness (Clark & Schroth, 2010; Komarraju et al., 2009; Philips et al., 2003).

Hypothesis 4. Autonomous motivation will be positively related to academic achievement, whereas controlled motivation will be negatively related to academic achievement.

Despite the existence of a complex pattern of associations between academic motivation and academic achievement, academic outcomes have often been found to be positively predicted by the autonomous types of motivation and negatively predicted by the controlled types of motivation (Grolnick et al., 1991; Karsenti & Thibert, 1995; Komarraju et al., 2009; Robinson, 2003).

Hypothesis 5. Conscientiousness will predict self-regulatory efficacy.

Conscientious people are characterized by their perseverance and precise manner of working (De Feyter et al., 2012). These facets of conscientiousness are believed to enhance students' achievement.

Hypothesis 6. Self-regulatory efficacy will be positively related to autonomous motivation.

Self-efficacy beliefs provide the foundation for motivation and personal accomplishments (Pajares, 2002a). People possess self-reflective capabilities that enable them to exercise control over their motivations and behaviors (Bandura, 1991).

Hypothesis 7. Self-regulatory efficacy will be positively related to academic achievement.

Research has verified that general efficacy beliefs contribute independently to academic performance rather than simply reflecting cognitive skills (Bandura, 1997). In social cognitive theory, self-regulated learning processes are assumed to be crucial in the realm of academic achievement (Bandura, 1986; Schunk, 1984; Zimmerman, 1983). Achievement is theorized to be heavily dependent on the use of self-regulation, especially in competitive or evaluative settings (Zimmerman, 1981).

Participants

The participants of this study were 161 gifted middle and high school students who had participated in Northwestern University's Midwest Academic Talent Search (NUMATS) and/or the Northwestern University Center for Talent Development (CTD) programs during the Academic Year 2014-2015. In total, 257 parents gave consent for their children to take part in this research. The number of students who took the survey

was 170. Of these students, nine were not included in the study. Four students did not have their ACT or ACT Explore scores in the NUMATS dataset. Another five students had a large number of missing values in the survey.

Of those reporting gender, 56.4% ($n = 88$) were males and 43.6% ($n = 68$) were females. Five students did not report their gender. Middle school students made up 80.9% ($n = 123$) of the sample; high school students 19.1% ($n = 29$). The participant students were overwhelmingly White. Asian, African American, and Hispanic students were other ethnicities in this sample. Eighty-nine percent ($n = 144$) of the sample have been participated in their schools' gifted and talented programs. All students reported that they were identified as gifted.

NUMATS is a talent search and identification program that utilizes above-grade-level tests for 5th-12th grade students to provide a more accurate measurement of students' aptitudes and achievement levels. Because of possible ceiling effects, these students' aptitudes and achievement levels are less likely to be accurately assessed through grade-level standardized testing or similar school-related tests. To be eligible for the NUMATS program, students need to meet a minimum of one criterion of the followings: (a) have previously participated in a talent identification program similar to NUMATS, (b) qualify for their school's gifted/talented program, (c) have been nominated by a teacher or parent for advanced aptitudes in verbal or mathematical reasoning, consistently demonstrating a high level of performance on demanding coursework, or strong desire for more challenging academic experience, or (d) meet grade-level assessment criteria (90th percentile or above) in either verbal, reading or math on a nationally normed or state achievement test.

Sample Selection

This study was conducted in collaboration with the Northwestern University CTD. The participants for this study were recruited through the NUMATS, which has a database containing students' demographic, family, contact information, and ACT or ACT Explore scores. Approximately 5,000 students were invited to participate in this study via an email sent out by the CTD. The email included the recruitment invitation letter and a link to the consent forms, which were created in Qualtrics, a web-based survey service. Each of these documents was approved by the William and Mary School of Education Internal Review Committee (EDIRC). The parents who allowed their children to participate in the study entered their e-mail addresses in Qualtrics. The researcher sent out the second email along with a link to the assent form and online survey in Qualtrics.

After the first round of emails, 145 students have consented to participate in the study. Because there was some distance between this number and the desired sample size, the CTD Marketing and Communication department sent out the invitation emails again by excluding the list of emails of the consented students. In total, 257 students have consented to take part in this study. The response rate from the parents was 5.1%. Of these students, 170 completed the survey.

Instrumentation

Academic Achievement. The ACT or ACT Explore scores were used as a measure of academic achievement. Indicators included students' subject mean scores (math, science, reading, English) in the ACT or ACT Explore and the composite scores. The ACT and ACT Explore are normally used to assess students' achievement and

college readiness. In the NUMATS program these tests have been used as above-grade-level tests to identify gifted students and assess their academic achievement. The ACT and ACT Explore are based on the same assessment blueprint and utilize the same scoring structure, which allows consistent analysis.

      Personality Traits. The Big Five Inventory (BFI; John, Donahue, & Kentle, 1991) was used to measure students' personality traits (Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness) defined by the Big Five personality model. The BFI is a 44-item survey using a 5-point Likert scale (from 1= strongly disagree to 5 = strongly agree) with five subscales, representing five personality traits. Extraversion contrasts such traits as talkativeness, assertiveness, and activity level with traits such as silence, passivity, and reserve (e.g., "I see myself as someone who is talkative"). Agreeableness contrasts traits such as kindness, trust, and warmth with traits such as hostility, selfishness, and distrust (e.g., "I see myself as someone who is helpful and unselfish with others"). Conscientiousness contrasts such traits as organization, thoroughness, and reliability with traits such as carelessness, negligence, and unreliability (e.g., "I see myself as someone who perseveres until the task is finished"). Neuroticism is characterized by upsetability and is the polar opposite of emotional stability (e.g., "I see myself as someone who is depressed, blue"). Finally, Openness is characterized by originality, curiosity, and ingenuity (e.g., "I see myself as someone who is original, comes up with new ideas").

      Internal consistencies for the BFI subscales were reported with Cronbach's alpha .as 86 for extraversion, .79 for agreeableness, .82 for conscientiousness, .87 for neuroticism, and .83 for openness. (John, Naumann, & Soto, 2008). Convergent validity

correlations between the self-report and peer-report BFI scales were reported in Rammstedt and John's (2007) study. Overall, these correlations averaged .56 in external validity.

Academic Motivation. Academic Self-Regulation Questionnaire (SRQ-A; Ryan & Connell, 1989) was used to measure students' academic motivation. The SRQ-A is a four questions, 32-item survey, using a 4-point Likert scale (from 1= not at all true to 5 = very true). The four questions are about why students do various school related behaviors (e.g., "Why do I try to do well in school?"). Each question is followed by eight responses that represent four types of motivation or regulatory styles: external regulation, introjected regulation, identified regulation, and intrinsic motivation (e.g., "Because that's what I'm supposed to do"). Validation of the SRQ-A is presented by Ryan and Connell (1989). Subscales can be used separately or in combination to form an overall score called the relative autonomy index (RAI; Ryan & Connell, 1989). External regulation and introjected regulation are the controlled subscales and identified regulation and intrinsic motivation are the autonomous subscales. Given this categorization, the two "super" categories of motivation can also be used. The research questions being investigated in the present study can be adequately addressed with these two categories: autonomous motivation and controlled motivation.

Studies have found that the SRQ-A scales have a good degree of reliability and validity (Alivernini, 2012; Guay, Lessard, & Dubois, 2016). More specifically, Ryan and Connell's (1989) results supported the simplex correlation patterns between the four types of motivation subscales (i.e., adjacent motivation types are more strongly and positively correlated than more distally placed types). Additionally, as regards concurrent

and criterion validity, Ryan and Connell (1989) reported that the SRQ-A scales correlate with other motivational questionnaires such as Harter's (1981) Scale of intrinsic versus extrinsic orientation in the classroom.

Self-Regulatory Efficacy. Self-Efficacy for Self-Regulated Learning subscale of the Children's Self-Efficacy Scale (CSES; Bandura, 2006) was used to measure students' self-regulatory efficacy. The CSES was developed to measure school-aged adolescents' and pre-adolescents' perceptions of their self-efficacy, in other words their beliefs about their ability to attain something. The CSES contains 37 items and seven subscales. The Self-Efficacy for Self-Regulated Learning subscale, consisting of 11 items, aims to measures children's beliefs about their efficacy to assemble environments beneficial to learning and to plan and organize academic activities (e.g., "How well can I get myself to study when there are other interesting things to do."). The validity and reliability of the CSES have been examined by a number of studies and were reported to have been strong (e.g., Choi, Fuqua, & Griffin, 2001; Miller, Coombs, & Fuqua, 1999).

Data Collection Procedure

Approval for this study was sought through the EDIRC at the William and Mary. A copy of the research proposal and instruments was submitted for review and approval. For initial recruitment of students, the invitation letters along with a link to the online consent form were sent out to the parents via email by the CTD staff. Parents were asked to provide their e-mail addresses if they allowed their children to take part in the study. The survey instruments were administered online using Qualtrics software. The parents who gave their consents received the second email along with a link to the Qualtrics online survey. The online data collection period was started in the third week of January,

2016 and ended in the third week of March, 2016. The Qualtrics survey included four

online pages: (1) assent form, (2) instructions and identification (i.e., name, last name,

and e-mail address) and demographics (i.e., gender, race/ethnicity, and grade), (3) BFI,

(4) SRQ-A and CSES. The students' ACT or ACT Explore scores were gathered from the

CTD and were matched with their responses collected on the survey. Data collected for

the study was stored on a secure server maintained by the researcher only. All student

information was aggregated and de-identified.

Research Design

The purpose of the present study was to examine the predictive role of three Big

Five personality traits (conscientiousness, agreeableness, and openness) on the academic

achievement of gifted students, and investigate whether self-regulatory efficacy,

controlled motivation, and autonomous motivation serve as mediators. Autonomous

motivation was also hypothesized to mediate the influence of self-regulatory efficacy on

academic achievement. Figure 4 illustrates the proposed mediation model depicted as a

statistical diagram.
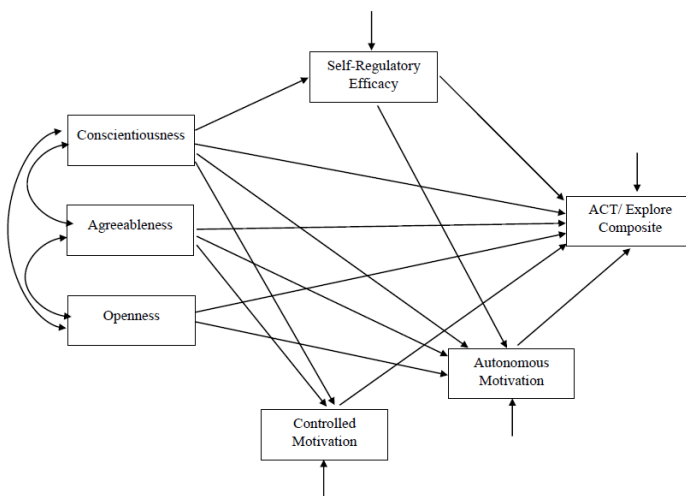
Figure 4. A proposed mediation model depicted as a statistical diagram.

Dependent Variables

Figure 4 illustrates that the indicator of academic achievement in this study is the dependent variables. As noted previously, indicators of academic achievement were students' ACT/ ACT Explore composite scores.

Independent Variables

The predictors in the mediation model as depicted in Figure 4 are three personality traits: Agreeableness, Conscientiousness, and Openness. Each of these personality traits were hypothesized to directly influence students' academic achievement. These variables are also continuous variables, as they are not restricted to particular values other than limited by the accuracy of the BFI.

Endogenous and Exogenous Variables

Any variable in the statistical diagram that has an arrow pointing at it is a dependent or outcome variable and any variable that has an arrow pointing away from it is a predictor or independent variable. In some models that capture complex and dynamic relationships, a variable can be both outcome and predictor, meaning that the same variable can be a dependent in one equation but an independent in another equation. In the language of structural equation modeling, dependent and independent variables are similar to but not the same as *exogenous* and *endogenous* variables. An endogenous variable is an outcome variable by definition, but an endogenous variable cannot also be an exogenous variable in structural equation terms (Hayes, 2013). An endogenous variable acts as a dependent variable in at least one equation, whereas exogenous variables are always independent variables in the SEM equations. In the hypothesized mediation model, the indicators of academic achievement, self-regulatory efficacy,

autonomous motivation, and controlled motivation are endogenous variables, whereas the three Big Five personality traits are exogenous variables.

Mediator Variables

A mediation model is a causal system in which independent or predictor variable(s) is proposed as influencing a dependent or outcome variable through intervening variable(s). In the hypothesized model, self-regulatory efficacy, autonomous motivation, and controlled motivation were conceptualized as potential mediators of the relationships between personality traits and academic achievement. Autonomous motivation also represented a possible mechanism by which self-regulatory efficacy influences academic achievement. Note that self-regulatory efficacy and autonomous motivation can also be considered as dependent variables and independent variables in different equations that will be calculated in the analysis of the hypothesized model.

Data Analysis

The purpose of this study was investigated through three distinct research questions. To address each of these questions, a number of different statistical techniques were used. This section provides the description of each analysis in detail.

Missing Data

It is always ideal to work with complete data sets, however, in the real world missing values occur for many reasons, such as hardware failure and case attrition. The researcher made a committed effort to create a clear and unambiguous survey that may prevent missing responses. Data were analyzed for missing observations and accuracy. The researcher analyzed missing data patterns by the Missing Values procedure of SPSS. The expectation-maximization (EM) algorithm was used to replace missing scores. The

EM algorithm has two steps: expectation and maximization. In the expectation step, missing values are imputed by predicted scores in a series of regressions. In the maximization step, the whole imputed data set is submitted for maximum likelihood (ML) estimation. Prior to the EM algorithm, cases with more than 10% missing values (without demographics) were excluded from the analysis. Additionally, the listwise deletion method was used for all cases with completely missing outcome variables.

Research Question 1

The first research question was "How are gifted students' personality traits, self-regulatory efficacy, academic motivation, and academic achievement related to one another?" A bivariate Pearson's correlation was conducted to examine the interrelatedness of these variables. A two-tailed test with a .05 significance level was selected.

Research Question 2

The second research question was "How do personality, academic motivation, and self-regulatory efficacy differ by grade and gender?" To answer this research question, a one-way analysis of variance (ANOVA) and t-test were performed by using SPSS 22.0 (IBM SPSS, 2013).

Research Question 3

The third research question was "In what ways do gifted students' personality traits, self-regulatory efficacy, and academic motivation predict their academic achievement?" A path analysis model was used to test the hypothesized mediation model in Figure 4 by using IBM SPSS Amos 22.0, Structural Equation Modeling (SEM) program (IBM SPSS, 2013). Although path analysis is the oldest member of the SEM

family, it is still a widely used structural model that represents hypotheses about effect priority. Presented in Figure 4 is a recursive path model of presumed effects of the Big Five personality traits on academic achievement directly and indirectly through self-regulatory efficacy, autonomous motivation, and controlled motivation. Additionally, self-regulatory efficacy was hypothesized to have an influence on autonomous motivation. The reason this model is called recursive is that its disturbances are independent and no variable is represented as both a cause and effect of another variable (Kline, 2011). Table 1 shows the number and types of free parameters for the recursive path model of Figure 4.

The goodness-of-fit statistics that were used to test the path analysis models were χ^2 (minimum discrepancy between hypothesized model and the sample data), the Comparative Fit Index (CFI; Bentler, 1990), the Tucker-Lewis Index (TLI; Tucker & Lewis, 1973), and the root mean square error of approximation (RMSEA; Steiger & Lind, 1980). A CFI value > .90 was originally suggested to be representative of a well-fitting model (Bentler, 1992), yet a cutoff value close to .95 has been advised more recently (Hu & Bentler, 1999). Consistent with the CFI, the TLI values close to .95 are indicative of good fit (Hu & Bentler, 1999). RMSEA is recognized as one of the most informative criteria in covariance structure modeling (Byrne, 2010). This index is sensitive to the number of estimated parameters in the model (i.e., the complexity of the model; Byrne, 2010). RMSEA values less than .05 indicate good fit, values as high as .08 represent reasonable fit, and values ranging from .08 and .10 indicate mediocre fit (Browne & Cudeck, 1993; MacCallum, Browne, & Sugawara, 1996).

Table 1

Number and Types of Free Parameters for the Recursive Path Model of Figure 4

Model	Direct effects on endogenous variables	Exogenous variables		Total
		Variances (Ω)	Covariances	
Figure 4	CON→SRE, AGR→A-M, CON→AU-M, CON→CO-M, OPN→AU-M, AGR→AA, CON→AA, OPN→AA, AGR→CO-M, SRE→AU-M, SRE→AA, AU-M→AA, CO-M →AA	AGR, CON, OPN, D_{SRE}, D_{AU-M}, D_{CO-M}, D_{AA}	N/A	20

Note: AGR = Agreeableness, CON = Conscientiousness, OPN = Openness, SRE = Self-Regulatory Efficacy, CO-M = Controlled Motivation, AU-M = Autonomous Motivation, AA = Academic Achievement. D_{SRE}, D_{AU-M}, D_{CO-M}, and D_{AA} are disturbance variances.

Chapter 4

Results

The purpose of this study was to examine the predictive role of the Big Five personality traits on the academic achievement of gifted students, and investigate whether self-regulatory efficacy and academic motivation serve as mediators in this relationship. The Big Five model (Goldberg, 1981; John & Srivastava, 1999; McCrae & Costa, 1996), Social-Cognitive Theory (Bandura, 1986), and Self-Determination Theory (Deci & Ryan, 2000) were the primary theoretical frameworks used in this study. Three research questions have been developed to address the purpose of the study. In addition, seven hypotheses were used to address the third research question.

Research Questions

1.　How are gifted students' personality traits, self-regulatory efficacy, academic motivation, and academic achievement related to one another?

2.　How do personality, academic motivation, and self-regulatory efficacy differ by grade and gender?

3.　In what ways do gifted students' personality traits, self-regulatory efficacy, and academic motivation predict their academic achievement?

Hypothesis 1. Agreeableness, conscientiousness, and openness will be positively related to academic achievement.

Hypothesis 2. Agreeableness, conscientiousness, and openness will be positively related to autonomous motivation.

Hypothesis3. Agreeableness and conscientiousness will be negatively related to controlled motivation.

Hypothesis 4. Autonomous motivation will be positively related to academic achievement, whereas controlled motivation will be negatively related to academic achievement.

Hypothesis 5. Conscientiousness will predict self-regulatory efficacy.

Hypothesis 6. Self-regulatory efficacy will be positively related to autonomous motivation.

Hypothesis 7. Self-regulatory efficacy will be positively related to academic achievement.

Missing Data

Missing values were observed for all instruments: BFI, SRQ-A, and CSES. Although the sample size ($N = 161$) is adequate for SEM and other analysis techniques used in the present study, it is not large enough to choose listwise deletion while dealing with all missing observations. The EM algorithm using SPSS 22.0 was implemented to replace missing values for the cases with less than 10% missing data. Prior to the EM algorithm, 4 cases with completely missing ACT or ACT Explore scores were deleted. In addition, 5 cases with more than 10% missing values were excluded from the analysis. Table 2 presents the detailed numbers of cases with and without missing data for each indicator variables.

Table 2

Frequency of missing values for each indicator variables

	ACT/E	BFI	SRQ-A	CSES
Number of cases with no missing data	161	148	154	154
Number of cases with missing data less than 5%	N/A	8	4	0
Number of cases with missing data greater than 5% but less than 10%	N/A	5	3	7
Number of cases with missing data greater 10%	4	5	0	0

Note: N = 161. ACT/E = ACT or ACT Explore, CSES denotes only the Self-Efficacy of Self-Regulated Learning subscale.

To establish the relationship between missing data mechanism and observed values, the researcher assessed the data differences between cases who responded to some variable and cases who did not respond to some variable. The types of missing data fit into three major classes: (1) data are *missing completely at random* (MCAR; missingness is unrelated to the variable missing data or the variables in the dataset), (2) *missing at random* (MAR; missingness on a variable may depend on other variables but does not depend on the variable itself), and (3) *not missing at random* (NMAR; the data that is neither MCAR nor MAR, missingness is related to the reason it is missing). The EM algorithm is applicable when the data are MCAR or MAR. Little's MCAR test (Little, 1988) revealed that missing data on BFI, SRQ-A, and the CSES Self-Efficacy of Self-Regulated Learning subscale are completely missing at random, suggesting that EM is applicable.

Descriptive Statistics

Normality and Outliers

The most commonly used SEM techniques assume multivariate normality (Ullman, 2006). Without the normality of the univariate distributions, the multivariate distributions cannot be normal. Even when the univariate distributions are normal, one can have multivariate nonnormality. Therefore, it is helpful to assess both univariate and multivariate normality indexes. There are two ways in which a distribution can deviate from normal: (1) skewness and (2) kurtosis. Skewness is a lack of symmetry and kurtosis is pointyness (i.e., the degree to which scores cluster in the tails of the distribution) (Field, 2005). Skewness and kurtosis for exogenous and endogenous variables are presented in Table 3. The Kolmogorov-Smirnov test was used to explore whether the distributions of variables deviate from a comparable normal distribution. The non-significant test ($p > .05$) indicates that the distribution is not significantly different from a normal distribution (i.e., it is probably normal; Field, 2005). For agreeableness, neuroticism, self-regulatory efficacy, autonomous motivation, ACT/ACT Explore math, and ACT/ACT Explore reading, the Kolmogorov-Smirnov tests were highly significant, indicating that the distributions were not normal.

Mardia's (1970) coefficient was used to evaluate multivariate normality in the path analysis. A normalized score of Mardia's coefficient greater than 3.00 is an indicative of nonnormality (Bentler, 2001). The normalized estimate of Mardia's coefficient = 2.21. This is a z score which is not greater than 3.00. This score indicates that the variables' multivariate distribution is normal, $p > .05$.

Table 3

Skewness and kurtosis statistics for exogenous and endogenous variables

Construct Variable	Skewness		Kurtosis		$K\text{-}S^a$
		SE		SE	
Personality Traits					
Extraversion	-.120	.191	-.878	.380	.079*
Agreeableness	-.145	.191	-.230	.380	.115
Conscientiousness	-.191	.191	-.096	.380	.058*
Neuroticism	.037	.191	-.280	.380	.087
Openness	-.156	.191	-.362	.380	.058*
Academic Motivation					
Controlled Regulation	-.208	.191	-.565	.380	.070*
Autonomous Regulation	-.494	.191	-.328	.380	.083
Self-Regulatory Efficacy	-.869	.191	1.10	.380	.090
Academic Achievement					
ACT/Explore Composite	.191/-.295	.244/.299	-.361/1.420	.483/.589	.077*/.108*
ACT/Explore English	.219/-.024	.244/.299	-.069/-.228	.483/.589	.080*/.129*
ACT/Explore Science	.064/.052	.244/.299	-.162/.016	.483/.589	.094*/.129*
ACT/Explore Math	.354/.189	.244/.299	-.743/1.724	.483/.589	.122/.232
ACT/Explore Reading	.188/.247	.244/.299	-.892/.307	.483/.589	.137/.161

Note: N=161. K-S = Kolmogorov-Smirnov test. Of 161 students, 97 students had ACT scores and 64 students had ACT Explore scores.

* $p > .01$, [a] Lilliefors Significance Correction

      Outliers, too, describe abnormal data behavior. Multivariate outliers were evaluated through the use of Mahalanobis distance. Mahalanobis distance is the distance between a case and the centroid and the detection is achieved by comparing the robust

estimation of the parameters in this distance and a critical value of the chi-square distribution (Rousseeuw & Van Zomeren, 1990). Mahalanobis distance was found to be less than a critical distance ($p > .05$) suggesting that there were no multivariate outliers in this dataset.

Validity

In this section, the first-order CFA models were examined to validate the factorial structures of the BFI and the SRQ-A. SPSS Amos 22.0 (IBM SPSS, 2013) was used for the CFA analysis. The goodness-of-fit statistics used to test the CFA models were χ^2 (minimum discrepancy between hypothesized model and the sample data), the Comparative Fit Index (CFI; Bentler, 1990), the Tucker-Lewis Index (TLI; Tucker & Lewis, 1973), and the root mean square error of approximation (RMSEA; Steiger & Lind, 1980). A CFI value > .90 was originally suggested to be a representative of a well-fitting model (Bentler, 1992), yet a cutoff value close to .95 has been advised more recently (Hu & Bentler, 1999). Consistent with the CFI, the TLI values close to .95 are indicative of good fit (Hu & Bentler, 1999). RMSEA is recognized as one of the most informative criteria in covariance structure modeling (Byrne, 2010). This index is sensitive to the number of estimated parameters in the model (i.e., the complexity of the model; Byrne, 2010). RMSEA values less than .05 indicate good fit, the values as high as .08 represent reasonable fit, and the values ranging from .08 and .10 indicate mediocre fit (Browne & Cudeck, 1993; MacCallum et al., 1996).

The BFI is composed of five factors or subscales: extraversion, agreeableness, conscientiousness, neuroticism, and openness, each measuring one personality trait. Because the Big Five personality factors have been accepted widely in the personality

74

literature, there is a strong legitimacy of CFA use tied to the conceptual and empirical

rationale. Estimation of the hypothesized five-factor model suggested the lack of an

adequate model-to-data fit: χ^2 (892, N=161) = 1760.25, $p < .01$, RMSEA=.078, CFI=.83,

and TLI=.81. The goodness-of-fit indices were consistent in their reflection of an ill-

fitting model. A review of modification indices suggested covariances between the error

terms of the following items: FFM9R $\leftrightarrow$ FFM34R, FFM30 $\leftrightarrow$ FFM44, FFM21R $\leftrightarrow$

FFM31R, FFM23R $\leftrightarrow$ FFM43R, and FFM19 $\leftrightarrow$ FFM39 (see Figure 5). Each of these

measurement error covariances represented systematic measurement error that derived

from a high degree of overlap in item content. For example, both FFM9R (i.e., "I see

myself as someone who is relaxed, handles stress well") and FFM34R (i.e., "I see myself

as someone who remains calm in tense situations") ask whether a person believes he/she

is able to manage their stress levels. The incorporation of the error covariances made a

substantially large improvement to model fit, χ^2 (887, N=161) = 1409.11, $p < .01$,

RMSEA=.071, CFI=.90, and TLI=.89. None of the resulting modification indices

suggested strongly misspecified parameter that would result in a further significant

improvement in the model. Given the complexity of the model and the small sample size,

the findings of CFA, TLI, and RMSEA values suggested an acceptable model-to-data fit.

Figure 5. The final CFA model of 44-item BFI structure with correlated error terms. For presentation clarity, covariances between factors are omitted. E = Extraversion, N = Neuroticism, A = Agreeableness, C = Conscientiousness, O = Openness. The list of BFI items is presented in Appendix I.

The SRQ-A was developed to assess individual differences in the types of motivation or regulation. Unlike personality traits, the types of motivation are not "trait" concepts, nor are they "state" concepts that fluctuate easily as a function of time and place. The SRQ-A has four subscales: external regulation, introjected regulation, identified regulation, and intrinsic motivation. Various scoring approaches have been adopted by researchers to assess the processes of these motivational regulations. One approach is to use the scores from each of the subscales to determine their unique effects on an outcome measure (Taylor et al., 2014). Because multicollinearity issues have been reported in the use of this approach (e.g., Brunet, Sabiston, Castonguay, Ferguson, & Besette, 2012), the motivational regulations have been suggested to be grouped into two theoretically-driven dimensions of motivation, namely autonomous motivation and controlled motivation (Vansteenkiste, Zhou, Lens, & Soenens, 2005). External regulation and introjected regulation are grouped in the controlled motivation dimension, whereas identified regulation and intrinsic motivation are grouped in the autonomous motivation dimension.

A third approach has been to create the RAI by weighting each subscale and summing the weighted scores to obtain one score (Ryan & Connell, 1989). Although this is a common scoring approach that offers valuable insight about the degree of agreement and differentiation of the autonomous and controlled motivation dimensions, representing the motivation continuum by a single construct has been questioned by the researchers (e.g., Bono & Judge, 2003; Vansteenkiste et al., 2005; Wilson, Sabiston, Mack, & Blanchard, 2012). Edwards (2002) argued that such combination of theoretically distinct constructs makes its interpretation conceptually ambiguous and prone to bias. This can

limit the understanding of the differential antecedents, processes, and outcomes of the autonomous and controlled motivation types, which stem from the opposite loci of causality (Brunet, Gunnell, Gaudreau, & Sabiston, 2015). Brunet et al. (2015) used polynomial regression analysis with response surface methodology to examine the extent to which autonomous motivation and controlled motivation as separate constructs. They found that the associations between motivation and outcomes in academic contexts are not captured by simply examining autonomous motivation or controlled motivation or using a combined score.

The research questions being investigated in the present study can be adequately addressed with the two motivational dimensions: autonomous motivation and controlled motivation. The CFA was used to validate the factorial structure of this two-factor model and compare it with the four-factor model. The initial results yielded a very poor model-to-data fit for the four-factor model: χ^2 (458, N=161) = 1294.47, $p < .01$, RMSEA=.098, CFI=.80, and TLI=.78. Several large modification indices argued for the presence of error covariances. In the subsequent analysis, suggested covariances between error terms improved the model substantially, χ^2 (453, N=161) = 1020.12, $p < .01$, RMSEA=.092, CFI=.83, and TLI=.81, but the model-to-data fit remained poor. Figure 6 shows the four-factor CFA model with correlated error terms. The two-factor model was created by imposing correlations between the two subscales of the same "super" category to be perfect ($r =1$). The CFA results for this nested model were χ^2 (455, N=161) = 985.91, $p < .01$, RMSEA=.089, CFI=.85, and TLI=.82. Although the results slightly favored the two-factor model, the magnitude of the difference in chi-square was very small as measured by Cohen's effect size ($\omega < .1$), where $\omega = \sqrt{\Delta \chi^2 / N * \Delta df}$.
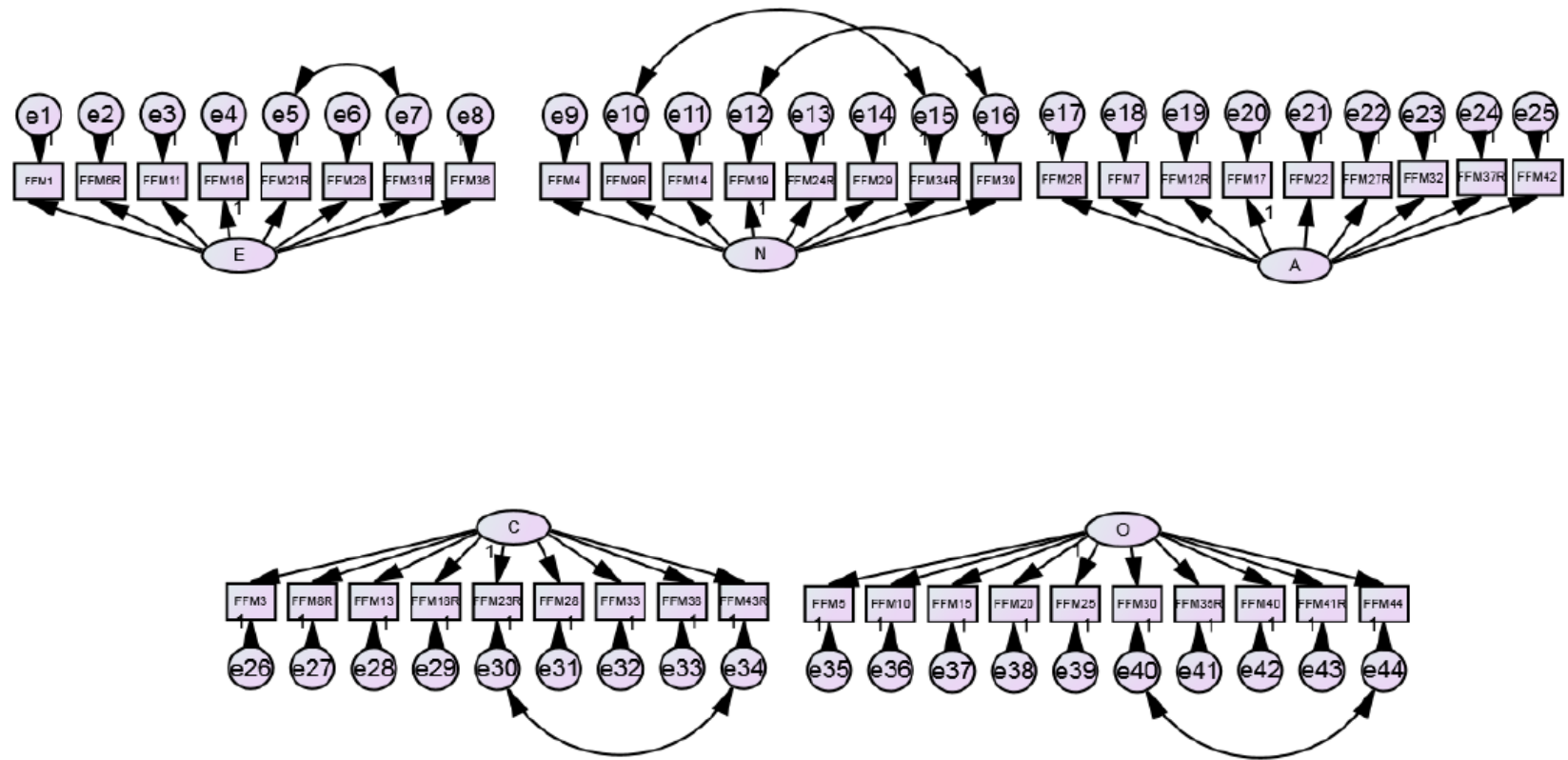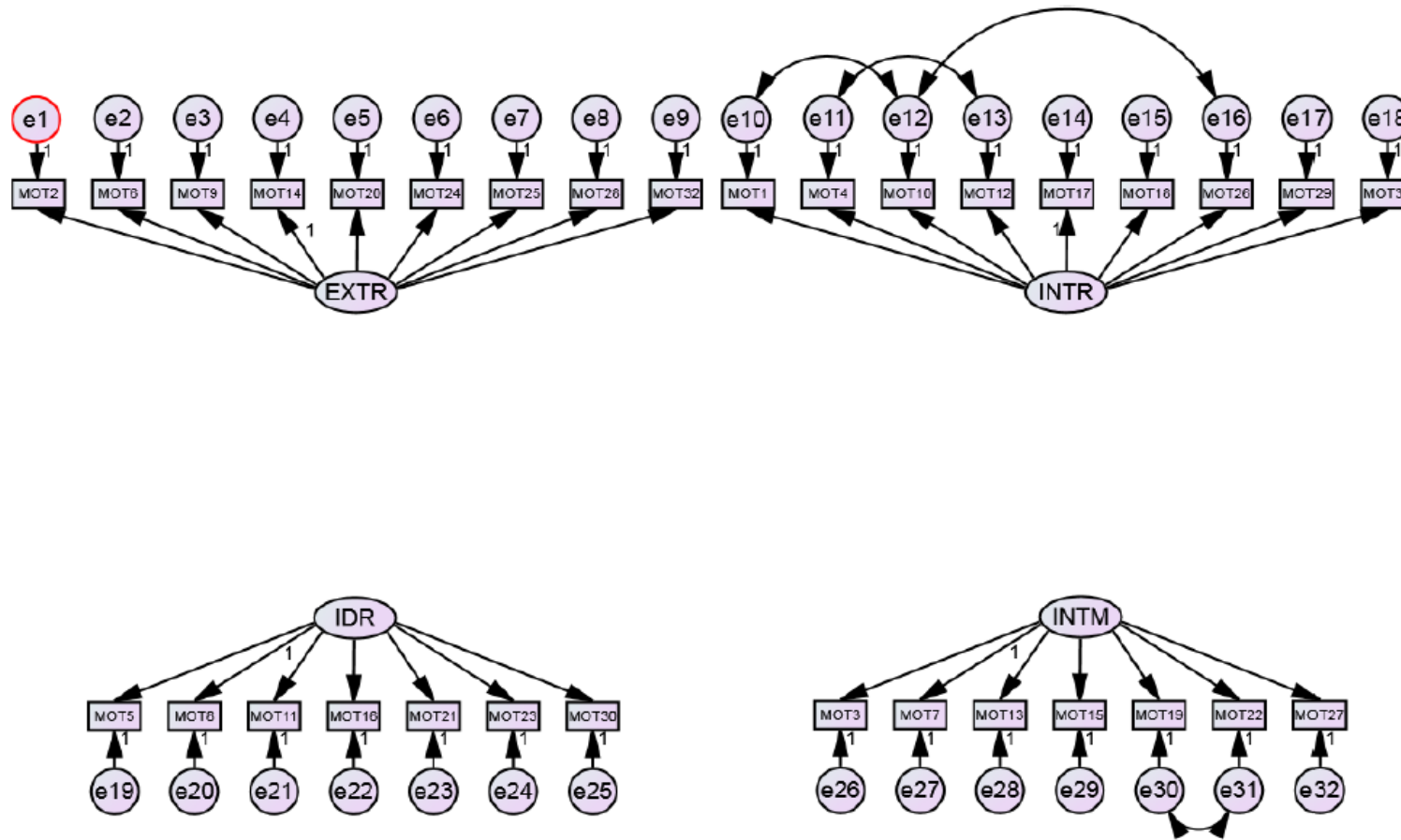
Figure 6. The four-factor CFA model of 32-item SRQ-A structure with correlated error terms. For presentation clarity, covariances between factors are omitted. The nested two-factor model was created by imposing correlations between the two subscales of the same "super" category to be perfect (*r*=1). EXTR and INTR are the types of controlled motivation, and IDR and INTM are the types of autonomous motivation. EXTR = External Regulation, INTR = Introjected Regulation, IDR = Identified Regulation, INTM = Intrinsic Motivation. The list of SRQ-A items is presented in Appendix II.

Because the CFA did not indicate an adequate model, exploratory factor analysis (EFA) was used to further examine the factor structure of the SRQ-A scores. A principal-axis procedure with varimax rotation was performed to eliminate the influence of error variance (Thompson & Daniel, 1996). The Kaiser-Meyer-Olkin measure of sampling adequacy was adequate (.85) and the Bartlett test of sphericity was significant (3201.79, $P < .001$). The initial extraction resulted in seven factors with eigenvalues greater than 1. This extraction produced two viable factors and five factors with several nonsalient loadings. For example, the seventh and eighth factors had only one item on each with factor loadings below .35. The other three factors had a few items with median loadings not exceeding .4. The scree test (Cattell, 1966) suggested either two- or three-factor solutions. The two-factor solution was more meaningfully interpretable than the three-factor solution. In addition, this solution was very similar to the original hypothesized factors. The only difference was that MOT31 (i.e., I try to do well in school, because I will feel really proud of myself if I do well) which was originally associated with controlled motivation, fell under autonomous motivation. Although MOT31 was the introjected regulation item, examination of its content suggests that it can well be interpreted as identified regulation. One's desire to feel proud of themselves does not necessarily represent the controlled type of motivation. The two-factor solution, presented in Table 4, accounted for 45.17% of the variance in the scores.

The two-factor model CFA was also rerun making autonomous motivation and controlled motivation hierarchical rather than making the correlations between the two subscales of the same dimension equal to 1. In other words, autonomous motivation and controlled motivation were tested as the two higher order factors. Consistent with the

previous results, the CFA suggested suggesting that the four subscales should be grouped into dimensions of motivation (i.e., autonomous motivation and controlled motivation), χ^2 (455, N=161) = 1026.54, $p < .01$, RMSEA=.091, CFI=.86, and TLI=.81.

Table 4

The two-factor SRQ-A factor matrix of an orthogonal solution after varimax rotation

	Factor	
	1	2
MOT27	.774	
MOT23	.714	
MOT30	.710	
MOT15	.699	
MOT5	.689	
MOT16	.678	
MOT11	.670	
MOT13	.664	-.347
MOT8	.653	
MOT7	.651	-.345
MOT3	.645	
MOT31	.616	
MOT19	.534	
MOT18	.513	
MOT12	.512	
MOT22	.511	
MOT4	.490	
MOT29	.451	.358
MOT21	.369	
MOT25		.782
MOT2		.691
MOT9		.676
MOT28		.668
MOT26	.312	.651
MOT14		.632
MOT10	.303	.624
MOT1	.347	.574
MOT17		.563
MOT24		.561
MOT20		.528
MOT32		.425
MOT6		.388
Extraction Method: Principal Axis Factoring.		

In conclusion, presented with the CFA and EFA findings, it behooves the researcher at this point to cautiously use the SRQ-A. The potential factors that led to the poor CFA fit with both the full and nested models should be read carefully in order to evaluate the findings and finally develop implications and recommendations. Motivational constructs may be excessively complex. Perhaps one reason for the poor CFA fit with autonomous motivation and controlled motivation categories is the large number of overlapping items included in this model. This contention would be substantially supported when we consider that the SRQ-A asks four questions and each question is followed by very similar responses that represent the four regulatory styles. Another reason might be that the SRQ-A had a completely different factor structure with the gifted sample. Although this was not theoretically explicable, further exploration was needed to determine the number of factors and the inclusion of motivation items to be used for the rest of analysis. The EFA findings suggested no substantial modifications in the hypothesized two-factor model. Finally, given that Cronbach's alpha values for autonomous motivation ($\alpha = .92$) and controlled motivation ($\alpha = .88$) were strong (see the upcoming section for reliability results), this poor fit does not seem to have any implications for the estimation of internal consistency reliability. Based on the factor analyses and reliability findings, it seems reasonable to opt to endorse the plausibility of the two-factor SRQ-A.

Reliability

The BFI, the Self-Efficacy for Self-Regulated Learning subscale of CSES, and the SRQ-A were used to examine gifted students' personality traits, self-regulatory efficacy, and academic motivation, respectively. The Cronbach's alpha values for the Big Five

factors ranged from .76 to .86, with a median reliability of .85 (see Table 5). The

Cronbach's alpha coefficient for the Self-Efficacy for Self-Regulated Learning subscale

of the CSES was .88. Reliability analysis for the SRQ-A with two subscales yielded

strong Cronbach's alpha values of .88 for Controlled Motivation and .92 for Autonomous

Regulation. Internal consistency of each subscale was also evaluated with the *Cronbach's*

alpha if item deleted. When the item FFM35 (i.e., I see myself as someone who prefers

work that is routine) was omitted from the openness subscale, the Cronbach's alpha value

was improved from .76 to .79. Because the same item also had poor factor loading (.22),

it was excluded from the rest of the analyses.

Table 5

Cronbach's Alpha Coefficients

Scales and Factors	α
Big Five Inventory	
Extraversion	.86
Agreeableness	.82
Conscientiousness	.84
Neuroticism	.83
Openness	.76 - .79[a]
Children's Self-Efficacy Scale	
Self-Efficacy for Self-Regulated Learning	.88
Academic Self-Regulation Questionnaire	
Controlled Regulation	.88
Autonomous Regulation	.92

[a] when item # 35 deleted.

Correlations

The first research question was "How do gifted students' personality traits, self-

regulatory efficacy, academic motivation, and academic achievement related to one

another?" Bivariate (Pearson) Correlations were conducted to answer this question and examine the strengths of relationships between the Big Five personality traits and all other measured variables (see Table 6).

Neuroticism was negatively related to self-regulatory efficacy ($r = -.27$, $p < .01$). All other personality traits, however, were positively and significantly associated with self-regulatory efficacy. Conscientiousness had the strongest association with self-regulatory efficacy ($r = .73$, $p < .01$). Openness and extraversion had much weaker associations with self-regulatory efficacy ($r = .15$ and $r = .17$, respectively, $p < .05$). Openness and extraversion were also negatively associated with controlled motivation. Neuroticism, however, had a strong and positive correlation with controlled motivation. Conscientiousness and agreeableness had significant positive relationships with autonomous motivation, but no significant correlations with controlled motivation were found.

With regard to the academic achievement, the findings indicated that agreeableness, conscientiousness, and openness were significantly related to the composite score. The relationships between agreeableness and all ACT/ACT Explore scores were significant and negative. Extraversion yielded a significant negative correlations with only English and Reading scores, but these relationships were weak ($r = -.18$ and $r = -.19$, respectively, $P < .05$). Conscientiousness was significantly and positively associated with all ACT/ACT Explore scores. Openness had a significant positive relationship with all indicators of academic achievement, except with Math. Neuroticism did not yield any significant association with ACT/ACT Explore scores.

Autonomous motivation and self-regulatory efficacy were positively correlated with the ACT/ACT Explore composite and its subtests scores, except that there was no significant correlation between self-regulatory efficacy and English. Controlled motivation was negatively associated with the composite, Math, Science, and English. Although self-regulatory efficacy correlated positively with autonomous motivation (r = .54, *P* < .01), it did not relate significantly to controlled motivation. There was also no significant relationship between autonomous motivation and controlled motivation.

Table 6

Means, standard deviations, and intercorrelations among indicator variables

Indicator variable	EXT 1	AGR 2	CON 3	NEU 4	OPN 5	SESRL 6	CO-M 7	AU-M 8	MATH 9	SC 10	ENG 11	READ 12	COMP 13
1	-												
2	.22**	-											
3	.05	.43**	-										
4	-.40**	-.50**	-.29**	-									
5	.33*	.39**	.19*	-.23*	-								
6	.17*	.23**	.73**	-.27**	.15*	-							
7	-.22**	-.09	.01	.36**	-.27**	.07	-						
8	.18*	.34**	.50**	-.27**	.28**	.54**	-.01	-					
9	-.07	-.34**	.32**	.08	.13	.18*	-.36**	.15*	-				
10	-.11	-.24**	.29**	-.04	.20*	.21**	-.21**	.25**	.77**	-			
11	-.18*	-.21**	.27**	-.07	.20*	.05	-.22**	.25**	.69**	.71**	-		
12	-.19*	-.35**	.17*	.05	.39**	.23**	.02	.17*	.56**	.62**	.67**	-	
13	-.16	-.33**	.22**	-.01	.33**	.28**	-.32**	.23**	.86**	.89**	.89**	.83**	-
M	3.48	3.58	3.54	2.75	3.88	5.37	2.88	2.95	21.40/ 16.95	22.30/ 18/03	22.43/ 17.55	23.86/ 17.54	22.63/ 17.63
SD	.75	.61	.66	.72	.52	1.02	.56	.63	4.69/ 3.60	4.84/ 3.36	5.49/ 3.98	6.35/ 3.57	4.73/ 2.97

Note: N = 161. EXT = Extraversion, AGR = Agreeableness, CON = Conscientiousness, NEU = Neuroticism, OPN = Openness, SESRL = Self-Regulatory Efficacy, EX-RG = External Regulation, IN-RG = Introjected Regulation, ID-RG = Identified Regulation, IN-MO = Intrinsic Motivation, CO-M = Controlled Motivation, AU-M = Autonomous Motivation, MATH = ACT/ACT Explore Mathematics Score, SC = ACT/ACT Explore Science Score, ENG = ACT/ACT Explore English Score, READ = ACT/ACT Explore Reading Score, COMP = ACT/ACT Explore Composite Score. Of 161 students, 97 students had ACT scores and 64 students had ACT Explore scores.

** $p < .01$ (two-tailed), * $p < .05$ (two-tailed)

ANOVA and T-Test

The second research question asked if personality traits, academic motivation, and self-regulatory efficacy differ by grade and gender. Table 7 presents the means and standard deviations for personality traits, autonomous motivation, controlled motivation, and self-regulatory efficacy, specified by grade level and gender. A one-way ANOVA was used to determine whether there were statistical differences in the Big Five personality traits and academic motivation between middle and high school students and between male and female students. The results indicated that only extraversion differed by grade level. Younger students scored significantly higher than older students on extraversion, $F(1, 151) = 8.59$, $p < .01$, $\omega = .21$ (Figure 7). No significant difference was found in other personality traits and motivation types between grade levels. There were significant differences between male and female students in extraversion and neuroticism. Male students were more extraverted than female students, $F(1, 155) = 16.47$, $p < .01$, $\omega = .30$, and female students were more neurotic than their male counterparts, $F(1, 155) = 16.71$, $p < .01$, $\omega = .31$ (Figure 8). Although there was no significant difference between male and female students in autonomous motivation, male students were found to have less controlled motivation than females, $F(1, 154) = 5.79$, $p < .05$, $\omega = .17$ (Figure 9). On average, middle school students had greater self-regulatory efficacy ($M = 5.40$, $SD = 1.00$) than high school students ($M = 5.29$, $SD = 1.15$). However, this difference was not significant $t(158) = .52$, $p > .05$. Female students had greater self-regulatory efficacy ($M = 5.56$, $SD = .85$) than male students ($M = 5.26$, $SD = 1.12$), but this difference was not significant too, $t(154) = -1.82$, $p > .05$.

Table 7

Means and standard deviations for personality traits, autonomous motivation, controlled motivation, and self-regulatory efficacy by grade level and gender

	Grade Level		Gender	
	Middle School (*N*=123) *M* (*SD*)	High School (*N*=29) *M* (*SD*)	Female (*N*=68) *M* (*SD*)	Male (*N*=88) *M* (*SD*)
Extraversion	3.55 (.72)	3.11 (.86)	3.21 (.77)	3.69 (.69)
Agreeableness	3.61 (.59)	3.44 (.70)	3.54 (.63)	3.62 (.60)
Conscientiousness	3.59 (.64)	3.47 (.74)	3.66 (.62)	3.49 (.67)
Neuroticism	2.72 (.68)	2.80 (.86)	3.00 (.65)	2.55 (.70)
Openness	3.90 (.50)	3.71 (.55)	3.93 (.53)	3.85 (.52)
Self-Regulatory Efficacy	5.40 (1.00)	5.29 (1.15)	5.56 (.85)	5.26 (1.12)
Controlled Motivation	2.86 (.60)	2.98 (.46)	3.01 (.46)	2.79 (.63)
Autonomous Motivation	3.00 (.63)	2.74 (.64)	2.95 (.67)	2.96 (.62)

Note. *M* = Mean, *SD* = Standard Deviation.
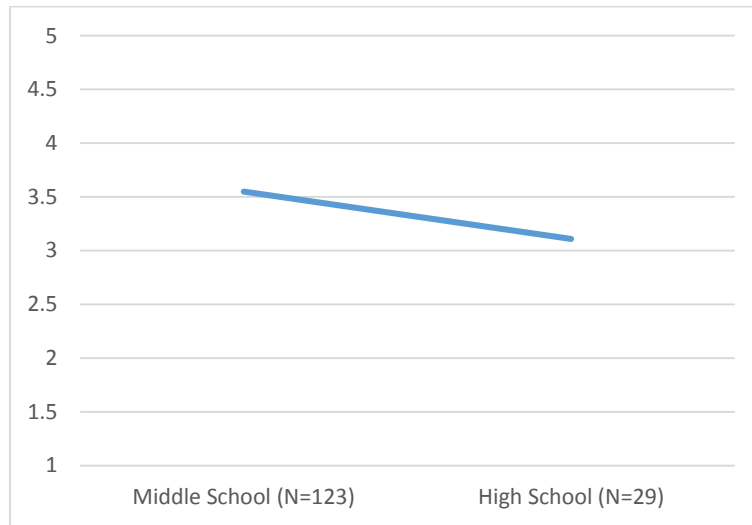
Figure 7. Mean difference between middle and high school students in extraversion.
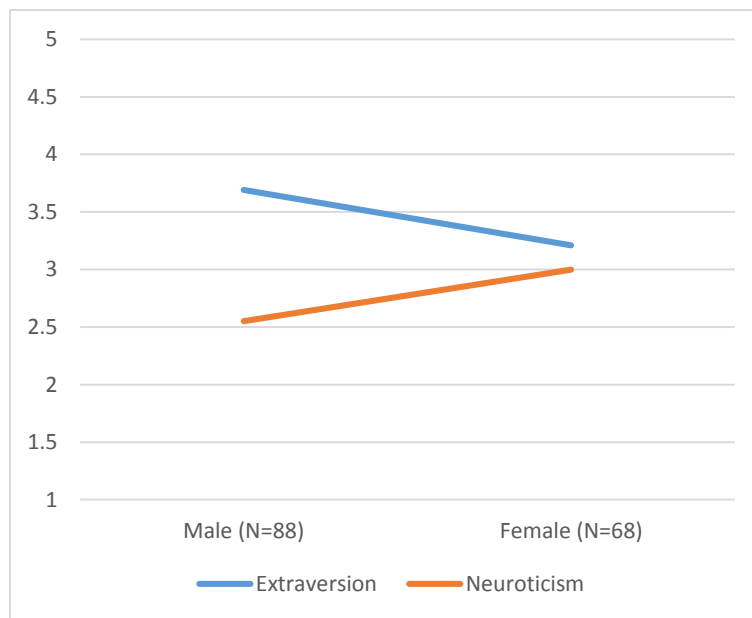
Figure 8. Mean differences between male and female students in extraversion and

neuroticism.
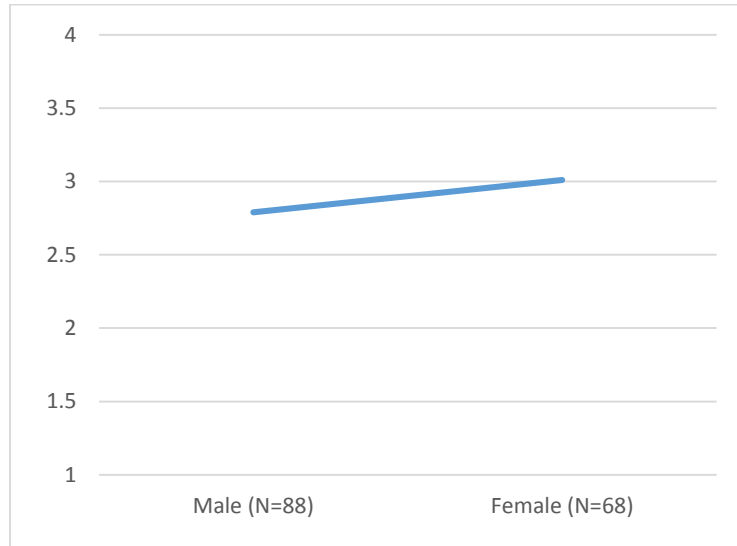
Figure 9. Mean difference between male and female students in controlled motivation.

A Path Model

The third research question was: "In what ways do gifted students' personality traits, self-regulatory efficacy, and academic motivation predict their academic achievement?" Seven hypotheses were developed to investigate this question.

Hypothesis 1. Agreeableness, conscientiousness, and openness will be related positively to academic achievement.

Hypothesis 2. Agreeableness, conscientiousness, and openness will be related positively to autonomous motivation.

Hypothesis3. Agreeableness and conscientiousness will be related negatively to controlled motivation.

Hypothesis 4. Autonomous motivation will be related positively to academic

achievement, whereas controlled motivation will be related negatively to

academic achievement.

Hypothesis 5. Conscientiousness will positively predict self-regulatory efficacy.

Hypothesis 6. Self-regulatory efficacy will be positively related to autonomous

motivation.

Hypothesis 7. Self-regulatory efficacy will be positively related to academic

achievement.

A recursive path analysis model was used to test these hypotheses. Presented in

Figure 10 is the hypothesized model of presumed causes and effects. Three personality

traits were expected to affect academic achievement directly and indirectly through

mediators. The candidate mediators were self-regulatory efficacy, autonomous

motivation, and controlled motivation. In addition, the model depicts the hypothesis of

mediation of self-regulatory efficacy through both motivation variables. Instead of a

partial latent structural regression model (SRM), the researcher chose to use a manifest

variables model due to the relatively small sample size (N=161), which is unsatisfactory

for a latent SRM with six latent indicators and 19 manifest variables (i.e., three parcels

for each latent indicator and the observed achievement score). More complex latent

models, or those with more parameters, require larger sample sizes (Kline, 2011). When

the sample size for ML estimation is relatively small, the weak precision of parameters is

likely occur (Hair, Anderson, Tatham, & Black, 1998; MacCallum & Austin, 2000).
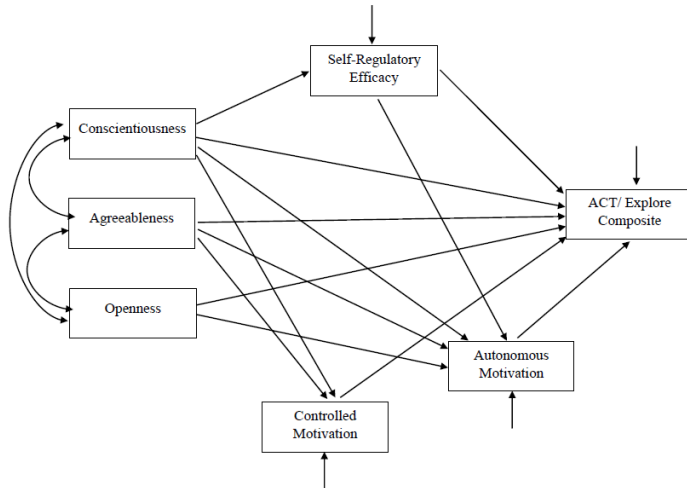
Figure 10. A hypothesized path analysis model depicted as a statistical diagram.

The tested model with standardized path coefficients is presented in Figure 11. The proposed model was found to have poor fit with the data, χ^2 (5, N=161) = 15.569, p = .008, RMSEA=.115, CFI=.97, and TLI=.88. All three personality traits had a significant direct effect on academic achievement. The paths from conscientiousness and agreeableness to controlled motivation and autonomous motivation, and from self-regulatory efficacy to academic achievement were nonsignificant. These paths were trimmed, yielding improved, yet still poor model fit, χ^2 (10, N=161) = 26.885, p = .003, RMSEA=.103, CFI=.96, and TLI=.91. A review of modification indices suggested that a path between openness and controlled motivation might improve the model fit. This additional path was statistically significant and the model fit changed substantially with this new path, χ^2 (9, N=161) = 15.216, p = .085, RMSEA=.066, CFI=.98, and TLI=.96 (Figure 12). The fit indices show there is a good fit of the model. RMSEA provides a confidence interval. In the final model, a confidence interval ranged from 0 to .121, suggesting that the RMSEA value is within this interval.
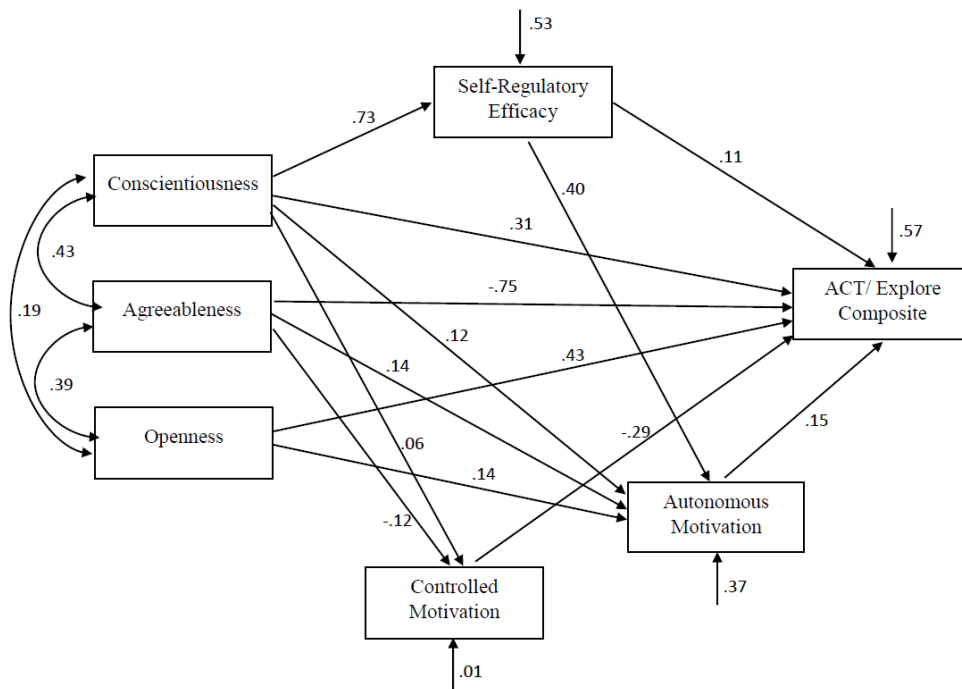
Figure 11. Tested hypothesized model with standardized path coefficients provided.
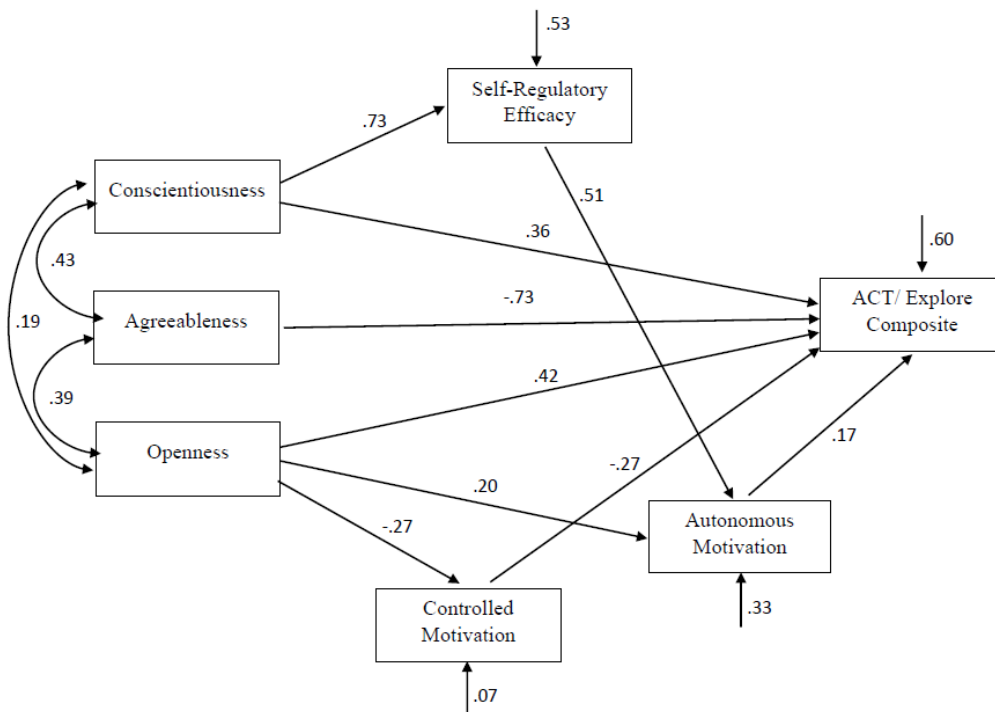
Figure 12. Final path model with standardized path coefficients provided.

Table 8

Values for selected fit statistics for three path models

	χ^2	df	RMSEA (90% CI)	CFI	TLI
The hypothesized model (13 paths)	15.569[a]	5	.115 (.053-.182)	.97	.88
The trimmed model (10 paths)	26.885[b]	10	.103 (.057-.151)	.96	.91
The final model (9 paths)	15.216[c]	9	.066 (0-.121)	.98	.96

Note. CI, confidence interval.
[a]$p = .008$; [a]$p = .003$; [a]$p = .085$.

Parameter estimates are worth considering, because even in a good fitting model, it is entirely possible to have weak relationships between variables. In the earlier section, the correlation results provided a wide variety of relationship strengths. Because the hypothesized path model was based on the extant literature, two personality traits – neuroticism and extraversion– were not represented in the path model.

The first hypothesis (H1) stated that agreeableness, conscientiousness, and openness would be related positively to academic achievement. Although all three personality traits significantly predicted the ACT/ACT composite score, as hypothesized, the finding that agreeableness had a negative path to the academic achievement did not fully support H1.

The second hypothesis (H2) tested whether agreeableness, conscientiousness, and openness were related positively to autonomous motivation. The results indicated that only openness had a positive significant path to autonomous motivation ($r = .20, p < .01$). The contribution of conscientiousness to autonomous motivation was only indirect

through self-regulatory efficacy. These findings revealed that H2 was only partially supported.

The third hypothesis (H3) proposed that agreeableness and conscientiousness would be related negatively to controlled motivation. H3 was totally rejected, because the findings from the final model revealed no significant paths from these two personality traits to controlled motivation.

The fourth hypothesis (H4) stated that autonomous motivation would be related positively to academic achievement and controlled motivation would be related negatively to academic achievement. H4 was fully supported by the results. Looking at the standardized parameters from the final model, significant relationships can be seen in the specified paths. Controlled motivation had a negative path to academic achievement, whereas the path from autonomous motivation to academic achievement was positive, confirming H4.

The fifth hypothesis (H5) tested whether conscientiousness positively predicts self-regulatory efficacy. The result of a strong positive path from conscientiousness to self-regulatory efficacy supported this hypothesis.

The sixth hypothesis (H6) proposed that self-regulatory efficacy would be positively related to autonomous motivation. A strong and positive link between self-regulatory efficacy and autonomous motivation was found, a result that confirms H6.

The seventh hypothesis (H7) stated that self-regulatory efficacy would be positively related to academic achievement. The results revealed that there was nonsignificant path from self-regulatory efficacy and academic achievement. Self-

regulatory efficacy had only an indirect effect on achievement through autonomous motivation.

Finally, one intriguing finding was that openness negatively predicted controlled motivation, although it was not hypothesized. This significant path improved the model substantially, while also identifying an additional indirect path between openness and achievement. This result suggested that the relationship between openness and academic achievement is more complex than predicted. All the parameter estimates, the standard errors, as well as the associated confidence intervals are presented in Table 9.

Table 9

Path analysis parameter estimates, their standard errors and significance

Parameters	Unstandardized			Standardized
	Value	SE	*p*	Value
(CON-AA)	2.649	.430	.001	.364
(AGR-AA)	-5.744	.464	.001	-.729
(OPN-AA)	3.843	.528	.001	.416
(CON-SRE)	1.122	.084	.001	.726
(OPN-CM)	-.286	.082	.001	-.265
(OPN-AM)	.248	.084	.002	.205
(SRE-AM)	.316	.040	.001	.512
(CM-AA)	-2.345	.444	.001	-.273
(AM-AA)	1.327	.428	.003	.174
Epsilon-SRE	.489	.055	.001	.527
Epsilon-CM	.290	.032	.001	.070
Epsilon-AM	.263	.029	.001	.333
Epsilon-AA	9.128	1.021	.001	.602
(CON-AGR)	.171	.034	.001	.428
(CON-OPN)	.066	.027	.016	.194
(AGR-OPN)	.124	.027	.001	.394

Note: $N = 161$. AGR = Agreeableness, CON = Conscientiousness, OPN = Openness, SRE = Self-Regulatory Efficacy, CM = Controlled Motivation, AM = Autonomous Motivation, AA = Academic Achievement (ACT/ACT Explore Composite Score).

Summary

Chapter 4 addressed three research questions that were developed to fulfill the purpose of the study. The first question asked about the relationships between the Big Five personality traits and all other measured variables. Bivariate correlations were used to examine the strengths of these relationships. Agreeableness, conscientiousness, and

openness were found to have significant associations with the ACT/ACT Explore composite and subtest scores. Neuroticism did not have a significant relationship with any of the achievement indicators. Extraversion was negatively related to the ACT English and Reading subtests, but no associations were found with other subtests and the composite scores. All five personality traits were significantly associated with self-regulatory efficacy and autonomous motivation. Only neuroticism had negative relationships with these variables. Both self-regulatory efficacy and autonomous motivation were positively related to the composite and a majority of the subtests. Only the correlation between self-regulatory efficacy and the ACT English was nonsignificant. Openness and extraversion were negatively related to controlled motivation, whereas neuroticism was related positively to this motivation type. The relationship between controlled motivation and academic achievement was found to be negative.

The second research question asked if personality, motivation, and self-regulatory efficacy differed by grade and gender. ANOVA and t-test were used to answer this question. The results revealed that middle school students scored significantly higher than high school students on extraversion. No differences were found between grade levels on other personality traits and motivation types. Female students scored higher on neuroticism and lower on extraversion compared to their male counterparts. In addition, female students had more controlled type of motivation than male students. There were no significant differences in self-regulatory efficacy between grade levels or gender.

The third question was about the interplay between personality traits, self-regulatory efficacy, academic motivation, and academic achievement. Self-regulatory efficacy, controlled motivation, and autonomous motivation were hypothesized to serve

as mediators in the relationships between personality traits and academic achievement. A path analysis model was used to test the seven hypotheses that build on the research question. The hypotheses were generated from the findings of the relevant literature. Of the Big Five traits, conscientiousness, agreeableness, and openness were presented in the model. All three personality traits had direct effects on academic achievement. The indirect effects of these traits through specific pathways were estimated. The upcoming chapter provides an in-depth interpretation of the results presented in Chapter 4 and discusses transferability of these findings to practice.

Chapter 5

Discussion, Implications, and Conclusion

The purpose of this study was to examine the predictive role of the Big Five personality traits on the academic achievement of gifted students, and investigate whether self-regulatory efficacy and academic motivation serve as mediators in this relationship. The primary theoretical frameworks used in this study were the Big Five model (Goldberg, 1981; John & Srivastava, 1999; McCrae & Costa, 1996), Social-Cognitive Theory (Bandura, 1986), and Self-Determination Theory (Deci & Ryan, 2000). Three research questions have been developed to address the purpose of the study. In addition, seven hypotheses were used to address the third research question.

Research Questions

1.   How are gifted students' personality traits, self-regulatory efficacy, academic motivation, and academic achievement related to one another?

2.   How do personality, academic motivation, and self-regulatory efficacy differ by grade and gender?

3.   In what ways do gifted students' personality traits, self-regulatory efficacy, and academic motivation predict their academic achievement?

Hypothesis 1. Agreeableness, conscientiousness, and openness will be positively related to academic achievement.

Hypothesis 2. Agreeableness, conscientiousness, and openness will be positively related to autonomous motivation.

Hypothesis3. Agreeableness and conscientiousness will be negatively related to controlled motivation.

Hypothesis 4. Autonomous motivation will be positively related to academic achievement, whereas controlled motivation will be negatively related to academic achievement.

Hypothesis 5. Conscientiousness will predict self-regulatory efficacy.

Hypothesis 6. Self-regulatory efficacy will be positively related to autonomous motivation.

Hypothesis 7. Self-regulatory efficacy will be positively related to academic achievement.

Discussion

The Big Five Personality Traits

The present study adds to the limited domain of research assessing personality traits of gifted students using the BFI, and to the incremental validity of these traits in predicting academic achievement. The descriptive results revealed that the gifted students had the highest mean scores on openness and the lowest scores on neuroticism. The mean scores on all personality traits were above the mid-score of 3, except neuroticism. The normality tests indicated that the students' scores on agreeableness was negatively skewed. Neuroticism was positively skewed, suggesting that relatively few students reported high levels of neuroticism. Of the personality traits measured by the BFI, extraversion, openness and conscientiousness had a distribution that did not deviate from normality to a significant degree.

Mean scores on the Big Five provide a general indication of the gifted students'

personality traits. On average, the gifted students had high levels of openness and low

level of neuroticism, as expected. The association of giftedness with these two

personality traits is somewhat clear from the intelligence literature. Personality research

has consistently documented links between intelligence, openness, and neuroticism.

Neuroticism was reported to have very modest negative association with intelligence

(e.g., Ackerman & Heggestad, 1997; DeYoung, 2011), whereas openness has shown

positive and moderate correlation (e.g., Goff & Ackerman, 1992).

In general, cognitive ability has the strongest relationship with the openness

domain, both empirically and conceptually. Research has shown that measures of

intelligence and other aspects of cognitive ability are modestly but consistently related to

openness (Moutafi, Furnham, & Crump, 2003, 2006). In addition, openness has also been

conceptualized as "Intellect" which makes the domain's connection to creativity, depth of

thought, abstract thinking, and other intellective qualities clear (Noftle & Robins, 2007).

Although giftedness is a fluid term that has multiple meanings, intelligence testing still

plays a large role in defining gifted child. Because the sample in the present study was

selected from identified gifted students, it was expected that the students would have high

scores on openness. This result is consistent with the previous studies that investigated

personality profiles of gifted students (Mammadov, Ward, Cross, & Cross, in press;

McCrae et al., 2002; Zeidner & Shani-Zinovich, 2011).

The findings from research on psychological types of gifted students based on the

Myers-Briggs Types of Indicator (MBTI; Myers & McCaulley, 1985a) provide further

explanation for the high openness scores in gifted students (for a synthesis, see Sak,

2004). The MBTI is based on Carl Jung's (1971) theory of psychological types and is used to identify people's basic preferences in relation to their perceptions and judgments. Perceiving and judging are the two opposite poles of a perceiving-judging process through which a person deals with the outer world (Spoto, 1995). A perception-type person is spontaneous, receptive, and understanding and has a flexible way of life, whereas a judging type is systematic, well organized, and orderly and has a planned way of life (Myers & McCaulley, 1985a). Research has shown that in contrast to the general population who prefers judging, gifted learners generally prefer perceiving to judging in planning their lives (S. A. Gallagher, 1990; Hawkins, 1997; Myers & McCaulley, 1985b). Perceptive types are characterized to be more open to new information (Myers & McCaulley, 1985a) and more curious about new situations (Sak, 2004).

The high mean scores on extraversion and conscientiousness strongly support the findings of previous studies with both gifted and average students. Although gifted students score differently than other students on the other personality traits, the existing literature suggests no statistical difference on extraversion and conscientiousness. For example, although Zeidner and Shani-Zinovich (2011) found that gifted high-school students scored higher than non-gifted peers on openness, and lower on neuroticism and agreeableness; the study did not reveal significant differences between these two groups on extraversion and conscientiousness. In general, the relationships between these two personality traits and intelligence or other indicators of giftedness are either inconsistent or negligible (Ackerman & Heggestad, 1997; Chamorro-Premuzic & Furnham, 2003b; Shiner & Masten, 2002). Furthermore, the finding that extraversion did not deviate from the normal was not surprising. Extraversion had the largest standard deviation ($SD = .75$),

103

suggesting the greatest variation in the degree of extraversion among gifted children. This result indicates that gifted students should not seem to be introverted as largely believed (Baudson & Preckel, 2013; Sak, 2004).

To sum, we should not overlook the fact that the gifted population is not homogeneous. Within this group, there definitely are a number of profiles that differ from each other in terms of their personality traits and tendencies. For example, Mammadov et al. (in press) investigated gifted student profiles on personality traits as measured by the BFI ($N = 410$). The latent profile analysis yielded three distinct profiles. Although the overall sample had the highest mean score on openness ($M=3.85$), one profile ($N=76$) was typified as the least open with the mean score of 2.88. In the present sample too, different personality profiles of students are likely to exist. Therefore, the earlier discussions based on the average student scores should be read cautiously. While it is critical not to stereotype gifted students, it can be helpful to have some awareness of the common patterns that may warrant further exploration.

Correlations

Academic motivation. In the present study, academic motivation was measured by the SRQ-A, which has four subscales: external regulation, introjected regulation, identified regulation, and intrinsic motivation. These subscales represent differing levels of autonomy. External regulation and introjected regulation are considered relatively controlled forms of motivation, whereas identified regulation and intrinsic motivation reflect autonomous activity. The comparison of two nested CFA models suggested that the two-factor structure model (controlled motivation and autonomous motivation) fits

better to the data than the four-factor model. Thus, the two-factor model was used for correlation and path analysis.

Controlled motivation was negatively related to extraversion and openness, and positively related to neuroticism. The lack of relation to agreeableness and conscientiousness was somewhat surprising. Autonomous motivation was negatively related to neuroticism, and positively related to other personality traits. Controlled motivation had the strongest correlation with neuroticism (r = .36), whereas autonomous motivation correlated best with conscientiousness (r = .50). These findings are largely consistent with previous studies (Komarraju et al., 2009; McGeown et al., 2014). Conscientiousness is associated with sustained effort and goal setting (Barrick, Mount, & Strauss, 1993) and effort regulation (Bidjerano & Dai, 2007), suggesting that conscientious students are academically self-disciplined, therefore are more likely to have autonomous motivation. Extraverted students have higher energy levels and a positive attitude that may lead to a desire to learn and understand (Poropat, 2009). On the other hand, extraverted students would have more interest in socialization and might prefer social activities over schoolwork. This latter perspective, combined with the previous evidence, suggests that extraverted students would have a desire to learn when they are engaged in academic tasks. For example, a challenging task that requires effort beyond the general scope of the regular classroom setting might be stimulating to extraverted gifted students.

Neurotic people are characterized as being anxious, emotionally unstable, nervous, tense, and plagued by guilt. A positive relationship between neuroticism and controlled motivation can be explained by neurotic students' possible sensitivity to

tensions that generate guilty thoughts. Neurotic students with controlled motivation may engage in learning activities to avoid feelings of guilt (Assor, Vansteenkiste, & Kaplan, 2009). Bidjerano and Dai (2007) argued that neurotic students may use a defensive pessimism strategy to manage their anxiety when anticipating a failure. Therefore, instead of avoiding academic engagement, they can gear up their efforts to preempt this failure. Finally, open students are more intellectually curious and therefore may have a greater desire to learn and explore. The previous research has shown that students who had higher levels of openness were more intrinsically motivated (McGeown et al., 2014). To conclude, these findings add evidence to suggest that the Big Five personality traits are related to academic motivation.

      Self-regulatory efficacy. Self-regulatory efficacy is one's belief about their self-regulatory skills in learning. As noted earlier, this belief can be acquired by mastery experience, vicarious experience, verbal persuasion, or psychological feedback (Bandura, 1977). Because self-efficacy belief is based on experience and does not lead to unreasonable risk taking, it should not be considered the same as positive illusions or unrealistic optimism. Therefore, high self-efficacy leads to venturesome behavior only when it is within the reach of one's capabilities (Conner & Norman, 1995). This argument suggests that students' self-regulatory efficacy closely reflects their actual self-regulatory skills in learning. Thus, the findings of the present study can be discussed by referring to the literature on the relationship between the Big Five personality traits and the use of self-regulated learning strategies.

      Self-regulatory efficacy had positive relationships with agreeableness and conscientiousness, and a negative relationship with neuroticism ($p < .01$). Of these

personality traits, agreeableness was found to be linked to compliance with instructions, effort, and staying focused on learning tasks (Vermetten, Lodewijks, & Vermunt, 2001). Vermetten et al. (2001) argued that because of the high level of compliance and cooperativity, agreeable students are more likely to regulate their study habits in response to external demands. The relationship between neuroticism and self-regulatory efficacy might be more complex than is commonly appreciated. In general, neuroticism tends to freeze higher-order cognitive functioning which relates this personality dimension to poor critical thinking skills, analytic ability, and conceptual understanding (Bidjerano & Dai, 2007). Self-regulatory efficacy had the strongest correlation with conscientiousness ($r = .73, p < .01$). This relationship was supported by the extant literature and will be discussed in a later section about the path analyses findings.

Finally, no significant relation between self-regulatory efficacy and controlled motivation was found. The finding that there was a positive correlation with autonomous motivation ($r = .54, p < .01$) was expected. Based upon this result, the possibility that autonomous motivation might occupy an intermediate position between self-regulatory efficacy and academic achievement could be claimed. The findings from path analyses supported this claim. Because the path model involves conscientiousness as an exogenous variable, the relationship between self-regulatory efficacy and autonomous motivation is a subject of discussion in that later section too.

Personality traits and academic achievement. The present study sheds new light on the relation between the Big Five personality traits and academic achievement. This study is the first to report this relationship in a sample of gifted students. Three personality traits – openness to experience, agreeableness, and conscientiousness – were

associated with ACT composite scores. One intriguing finding was that the relationships between agreeableness and ACT scores, including subject tests, were negative. Although only a few studies have found small to medium associations between agreeableness and academic performance, all relationships were reported to be positive (Conard, 2006; Hair & Graziano, 2003; Gray & Watson, 2002). The present study used the standardized test scores and all of the cited studies used GPA or course grades as a measure of academic achievement. Perhaps the difference in the sign of correlation was partly due to the use of various criteria for academic achievement. The findings from Noftle and Robins' (2007) study are important to note. Noftle and Robins examined relations between the Big Five personality traits and academic outcomes, specifically SAT scores and GPA. Agreeableness was positively related to GPA and negatively related to SAT scores.

The positive relationship between agreeableness and GPA or course grades might be due to the effects of socially desirable agreeableness-linked behaviors on teachers' evaluations of students' performances (Poropat, 2014). We might expect agreeableness to influence one's strategies in relating to teachers (Hair & Graziano, 2003). The findings from the studies using GPA or course grades are consistent with this perspective. This social-desirability-related halo effect cannot occur in the standardized tests. Based on the correlational data it is not relevant to speculate about the negative relationship between agreeableness and ACT scores. One possible interpretation is related to the fact that agreeable students are cooperative and reward cooperative behaviors. Agreeableness is characterized by concern for a group over one's individual desires and interests (Wagner & Moch, 1986). In contrast, less agreeable students are more likely to compete than cooperate. This difference lies well within the dissimilar natures of school-based

evaluation methods and standardized tests. Although students are expected to share, listen, and cooperate in a classroom setting to get higher performance evaluations, they compete with each other when taking the standardized test. In other words, the human evaluator (teacher) is biased by the personality of the student, but the standardized test is not.

In contrast to the abundance of research investigating relations between the Big Five dimensions and academic achievement, it is surprising that only a few studies used standardized tests such as SAT (Conard, 2006; Nofle & Robins, 2007; Wolfe & Johnson, 1995). The link between personality and achievement has been demonstrated from a heavy reliance on students' GPA or course grades. None of the previous studies used ACT, nor were their samples made up of gifted students. Therefore, we might expect some inconsistencies between the findings of this and previous studies. The finding that openness was positively related to academic achievement was consistent with Conard (2006) and Noftle and Robins (2007), but not with Wolfe and Johnson (1995) which indicated that low agreeableness was the only significant predictor of total SAT scores. Of the five personality traits, only neuroticism did not have a significant relation to academic achievement. Noftle and Robins (2007) separately examined the correlates of SAT verbal and SAT math scores. They found that neuroticism was a negative significant predictor of both SAT verbal and SAT math. Noftle and Robins also reported that agreeableness, conscientiousness, and extraversion were negatively related to SAT math. In contrast, in the present study, extraversion was neither related to ACT composite nor to ACT math. In addition, conscientiousness was positively related to ACT math and agreeableness was negatively related to ACT math. Note that some critical relations in

Noftle and Robins' study were weak, but they were significant in a very large sample (*N*=10,487).

Conscientiousness was positively associated with ACT scores. In general, conscientiousness emerges as the most robust predictor of students' GPA and course grades (Barchard, 2003; Chamorro-Premuzic & Furnham, 2003a, 2003b; Conard, 2006; Furnham et al., 2003). All these studies have reported a positive association between conscientiousness and academic achievement. Conscientiousness has several facets that suggest close examination of the relationship with ACT scores. These are achievement-striving, persevering, and self-controlled aspects. The role of self-regulatory efficacy as a mediator was expected to contribute to our understanding of the nature of this association. The following section will discuss this role in more detail. Other facets of conscientiousness, such as being orderly or organized, are more likely to be related to GPA or course grades.

Openness to experience was positively related to the ACT composite ($p < .01$), ACT reading ($p < .01$), ACT English ($p < .05$), and ACT science ($p < .05$) scores. The students who are high in openness tended to score higher on the ACT composite, specifically on the verbal part of the ACT. One interpretation of the lack of association of openness with the ACT math and the strong association with the verbal part of the ACT might have to do with the differential relation of math/science and verbal tests to intelligence. Noftle and Robins (2007) found similar associations between openness and the two sections of the SAT. Noftle and Robins argued that the verbal section may be related more strongly to *Gc* and the math section may be related more strongly to *Gf* due to their vocabulary- and reasoning-related contents, respectively. The findings from

Ashton, Lee, Vernon, and Jang's (2000) study support this argument: They reported from moderate to strong relations between openness and aspects of *Gc* and only a weak (or no) relation with aspects of *Gf*. Even in meta-analysis, openness was found to have a moderate and significant correlation with *Gc* (*r* = .30 in Ackerman & Heggestad, 1997).

Unlike other personality traits, neuroticism was completely unrelated to achievement. This replicates most of the previous findings and also fits well with the studies in the middle and secondary school samples (Di Giunta et al., 2013; Zhou, 2015). Only a few studies reported significant relations between neuroticism and academic achievement (Chamorro-Premuzic & Furnham, 2003b; Ridgell & Lounsburry, 2004). Given that neuroticism reflects adjustment and anxiety, it is reasonable to expect that this personality dimension would be negatively related to academic achievement. People who are high on neuroticism are more anxious, which may interfere with attention to academic tasks and thereby reduce academic performance (De Raad & Schouwenburg, 1996). In addition, research has shown that emotional stability is associated with self-efficacy (Judge & Bono, 2002) and self-efficacy is positively correlated with achievement (Robbins et al., 2004). This latter correlation suggests that emotional stability should be similarly associated with achievement. Nonetheless, such arguments are inconclusive because the correlations cited in the studies are not strong enough. Further examination regarding the role of anxiety or self-efficacy is needed to make these arguments stronger.

A Path Analysis Model

The results of the path analysis model should neither be overestimated nor underestimated. On one hand, these results are limited to the gifted students and should not be generalized to the whole population. The final path model showing the interplay of

investigated constructs might be sensitive to many other factors that were not involved in this study. On the other hand, these results are consistent with the important part of extant literature that emphasizes the role of personality, self-regulatory efficacy, and motivation in predicting academic achievement. This study went beyond the existing research in two ways: first, by examining the interaction among these variables, and second, by specifically focusing on gifted students. Because the hypothesized path model was developed from previous research with general population samples, the refinements in the model should be discussed based on our knowledge of gifted students.

Of the Big Five personality traits, conscientiousness, openness, and agreeableness were hypothesized to have predictive value on academic achievement. The decision of inclusion of only these traits into the path model was based on the findings from previous research, specifically the studies that used the standardized tests as a measure of academic achievement. The correlation results of the present study suggested that these personality traits had statistically significant relations with the ACT scores. Although the correlational results accorded well with the previous studies, the path analyses revealed that indirect effects play a critical role in understanding the relationship between the Big Five personality traits and academic achievement. All three personality traits that were tested in the hypothesized model had both direct and indirect effects on students' ACT composite scores. Self-regulatory efficacy, controlled motivation, and autonomous motivation were mediators in these relations. Nonsignificant paths were trimmed from the hypothesized model and an additional path between openness and controlled motivation was added, resulting in the more parsimonious model as shown in Figure 12: χ^2 (9, N=161) = 15.216, P = .085, RMSEA=.066, CFI=.98, and TLI=.96.

Conscientiousness. As hypothesized, conscientiousness had a positive direct effect on ACT composite. In addition, this relationship was simultaneously mediated by self-regulatory efficacy and autonomous motivation. Self-regulatory efficacy did not have a direct effect on achievement, rather its effect was positively mediated by autonomous motivation. The relationship between conscientiousness and self-regulatory efficacy was very strong. This predictive power of conscientiousness on self-regulatory efficacy was most probably due to the self-controlled aspect of conscientiousness. Conscientious students are characterized by their perseverance and precise manner of working (De Feyter et al., 2012). These facets of conscientiousness are believed to strongly enhance students' achievement in standardized tests or other assessment methods.

The positive association of conscientiousness with academic achievement is consistent with the extant literature. The mediator role of both self-regulatory efficacy and autonomous motivation in this relationship, however, was first documented in this study. Conscientiousness predicted students' self-regulatory efficacy, which then positively affected autonomous motivation and, through that influence, affected their academic achievement. There was no significant path from self-regulatory efficacy to controlled motivation, although it might be expected to be significant and negative. Autonomous motivation and controlled motivation are two conceptually opposite states of motivation. Autonomous motivation pertains to a full sense of volition and willingness, whereas controlled motivation involves acting with pressure while performing a behavior (Deci & Ryan, 2000) or pursuing a goal (Sheldon, 2002). These two states of motivation differ from each other in terms of their relations to the "self." Because autonomous motivation concerns the personal endorsement of the behavioral

regulation and controlled motivation makes reference to external demands (Vansteenkiste et al., 2010), it well may be theoretically meaningful to associate self-regulatory efficacy with only autonomous motivation.

The relationship between conscientiousness, academic motivation, and academic achievement has been documented in several studies (De Feyter et al., 2012; Komarraju et al., 2009). For example, De Feyter et al. (2012) hypothesized that academic motivation would mediate the relationship between personality traits, including conscientiousness, and academic achievement and this mediation through academic motivation would in turn depend on conscientiousness (moderated mediation). Conscientiousness was a strong predictor of motivation, which then positively influenced academic achievement. Komarraju et al. (2009) demonstrated a different model in which conscientiousness mediates the relationship between intrinsic motivation and GPA. Komarraju et al. concluded that it is in combination with conscientiousness that academic motivation has a strong effect on achievement. Although the tested models differ from each other, the results of significant relations between these three constructs in the present study are somewhat consistent with these studies.

One critical finding of the present study was that self-regulatory efficacy did not have a direct effect on students' ACT composite scores. Autonomous motivation was a mediator in this relationship. This finding suggests that the gifted students' beliefs of their self-regulatory skills for learning positively affect their autonomous motivation, which then leads to increase in their performance in the standardized tests. This finding can be interpreted in two ways. First, although the association between self-regulatory efficacy and achievement has been documented in previous studies, the role of

motivation as a mediator explains that, in fact, this influence is not direct, rather it is

mediated by autonomous motivation. Research has shown that self-regulatory efficacy

contributes to students' motivation and the academic success they experience

(Zimmerman 1989, 1994; Zimmerman & Bandura, 1994; Zimmerman & Martinez-Pons,

1990). However, there was not any evidence of the full mediation role of academic

motivation in this tripartite relationship. Students who believe they are capable of

regulating their learning work harder and persist longer (Pajares, 2002a). The findings of

this study suggest that these characteristics can occur only when a student is intrinsically

motivated. In the controlled setting where behaviors are regulated through external means

such as rewards or constraints, it is less likely that a student can select the more

challenging goals and persevere in the face of adversity. Second, because the sample of

the present study is composed of only gifted students, whether the lack of direct effect of

self-regulatory efficacy on achievement is limited to this group of students is unknown. It

can be argued that the mediator role of autonomous motivation is more salient in gifted

students, which potentially suppresses the direct relationship. One important feature of

motivation is that the environment can have a substantial impact on our many

motivations (Vallerand & Ratelle, 2002). Although so many controversial views exist

about the stable motivational characteristics of gifted students, there is substantial and

consistent evidence regarding the role of environment and tasks on gifted students'

motivation at the contextual and situational levels (e.g., Mammadov & Topcu, 2014).

Boredom and a range of other nonintellective factors may have a devastating role on

gifted students' academic motivation. Gifted students with strong beliefs of their self-

regulatory skills may feel autonomy in a deeper and more fundamental way to achieving their goal compared to their non-gifted counterparts.

Openness. The most complex relationship in the model was found between openness to experience and academic achievement. This personality trait had a direct effect on the ACT composite score. In addition, both controlled motivation and autonomous motivation served as mediators in this relationship. The results of the previous studies on the relation of openness to academic achievement are mixed, perhaps due to the different measures of achievement. The finding that openness has a positive direct effect on achievement is consistent with several studies such as Komarraju and Karau (2005), Noftle and Robins (2007), and Zhou (2015). Noftle and Robins's study is one of the few studies that used the standardized test (i.e., SAT) to measure students' academic achievement. Openness to experience was positively related to both SAT verbal and SAT math scores. In the same study, openness was negatively related to high school GPA. This and other mixed results suggest that the role of openness on achievement changes based on the various evaluation methods. The factors contributing to one's achievement at school are not necessarily the same with the factors for getting high scores on the standardized tests.

Openness to experience which positively accompanied with autonomous motivation and negatively accompanied with controlled motivation made significant contributions to academic achievement both directly and indirectly. The indirect links between openness and achievement through autonomous motivation and controlled motivation provides a critical explanation beyond what was known until now about this association. Openness enhances autonomous motivation while minimizing controlled

regulation, both of which lead to the increased achievement scores. According to Hodgins and Knee (2002), individuals who function autonomously and are open to experience show less evidence of trying to escape awareness of the present moment with distracting activities or with compulsive behaviors regarding food, sex, and work. It can be argued that the students who are open to new experiences have higher thresholds for experiencing anxiety or failure in respect to their academic performance. Hodgins and Knee also argued that autonomously functioning individuals may respond less readily and with less intensity to a given emotion (e.g., anxiety, failure) compared to those who are functioning in a more control-oriented manner.

Agreeableness. The path analysis revealed that agreeableness had only a direct effect on academic achievement. In other words, the association of agreeableness with the ACT scores was not mediated by other variables. Although the final model presents important evidence of a strong negative association between agreeableness and achievement, this finding is not conclusive. Because personality must manifest itself through a behavior (mediator) to affect achievement (Conard, 2006), it is difficult to claim that agreeableness has only a direct influence on achievement. Unlike conscientiousness and openness, agreeableness is an interpersonal trait dimension. This personality factor contrasts "a prosocial and communal orientation toward others with antagonism" (John & Srivastava, 1999, p. 121). Therefore, the real mediators of the relationship between agreeableness and academic achievement might be the constructs that reflect this interplay more in a social context. This model, as all other models, is imperfect to some extent, because no model can completely and accurately account for all influences on some outcome of interest (Hayes, 2013; MacCallum, 2003). Future

iterations of this study with additional steps that include mediators of social functioning

are needed to fully understand the role of agreeableness on academic achievement.

<div align="center">**Implications for Policy and Practice**</div>

Educational leaders and practitioners should be aware that conscientiousness,

openness, and agreeableness have impact on students' academic achievement. Self-

regulatory efficacy, controlled motivation, and autonomous motivation play a critical role

in this interplay. The potential implications of the results of the present study are related

to creating an educational environment for the gifted learners that reinforces a productive

personality by developing self-regulatory skills and enhancing autonomous motivation.

The How of Self-Regulated Learning

Each mediator was carefully selected and investigated to understand the

psychological mechanism by which the Big Five personality traits predict academic

achievement. In the path analysis model, self-regulatory efficacy and autonomous

motivation were found to mediate the association between conscientiousness and

academic achievement. Highly conscientious students tend to have strong beliefs of their

self-regulatory skills in learning, which lead to more autonomous goal pursuits and,

through that influence, positively contribute to students' academic achievement.

Conscientiousness supports and optimizes achievement, because its operational content

includes planning, organization, and consolidation (McIlroy et al., 2015). These

characteristics can be taught or trained. To do so, what is needed is the understanding and

promoting of effective self-regulation. An increase in the level of conscientiousness may

enhance one's beliefs in their self-regulatory skills.

As noted earlier, self-regulation is a process in which thoughts, emotions, behaviors, and social contextual surroundings are organized and managed to attain some desired goal or future state (Pintrich & De Groot, 1990; Zimmerman, 2000). There are a number of theories of self-regulation that vary considerably in their specific foci. Reeve, Ryan, Deci, and Jang (2008) categorized these theories into why theories (i.e., for what reasons do people engage in behaviors?), what theories (i.e., what goals do people seek to attain for themselves?), and how theories (i.e., how do people enact effective self-regulation?). The focus on the how of self-regulation is critical for educators and parents to help children learn to keep themselves on track toward their desired academic outcomes. Given the strong relation between self-regulatory behaviors and conscientiousness, the how of self-regulation might also address the question of how conscientiousness can be cultivated. However, to shed light on this question, one should treat conscientiousness as a set of behaviors, rather than a trait (see Jackson et al., 2010 for the behavioral indicators of conscientiousness).

Every day students have a range of experiences at home, at school and within society, which may enhance or undermine their autonomous motivation. If these experiences are dominated with negative interactions and engagements that hinder the successful internalization of extrinsic motivation for learning, the students are likely to have little or no willingness to be self-regulating. To teach students self-regulatory skills that will keep them on target with a learning-related goal or activity, researchers have developed approaches by drawing on different perspectives, including social-cognitive theory (Schunk, 2001; Zimmerman, 2000). For example, Zimmerman and Kitsantas (2005) proposed a model that provides guidance to develop students' self-regulatory

skills. In this model, teachers initiate self-regulation interventions that being with explicit

instruction and modeling. After listening and watching, the students are asked to emulate

what they have learned. While students imitate teachers, they receive corrective feedback,

guidance, and scaffolding. Over the emulation period, students learn the ways to generate

their own goals, planning, learning strategies, monitoring, and evaluating. In addition,

students acquire more adaptive sources of task-related motivation (i.e., integrated

regulation and intrinsic motivation). The ultimate goal of this model for students is to

become able to use their self-regulatory skills and task-related motivation on their own in

ill-structured settings.

Developing Autonomous Motivation

The present research revealed a strong relationship between self-regulatory

efficacy and autonomous motivation, suggesting that students with strong beliefs of self-

regulatory skills in learning attribute their motivation actions to an internal perceived

locus of causality. One might claim that approaches that enhance students' self-regulatory

skills will also automatically facilitate their autonomous motivation due to this

relationship. Although this claim is true, the researcher believes that developing self-

regulatory skills through the acquisition of effective methods for learning alone is not

sufficient to address the basic psychological needs underlying autonomous motivation.

This belief is consistent with the concept of *autonomous self-regulation* that was first

used by the self-determination theory researchers (e.g., Reeve et al., 2008). In discussing

Zimmerman and Kitsantas's (2005) "social cognitive path to self-regulatory skill" (p.

519), Reeve et al. (2008) suggested that students who developed self-regulatory skills in

their learning will need to develop autonomous motivation for doing so. An important

implication of this, according to Reeve et al., is that teachers support students' autonomous motivation while teaching self-regulatory skills. Given in Table 10 is the list of empirically validated specific autonomy-supportive instructional behaviors (Deci, Spiegel, Ryan, Koestner, & Kauffman, 1982; Reeve & Jang, 2006).

Teacher-student rapport is critical when creating an autonomous environment. The quality of student's motivation depends, in part, on the quality of this rapport (Eccles & Midgley, 1989). Given that autonomous motivation arises from the needs for self-determination and competence (Deci & Ryan, 1985), autonomy-supportive teachers are likely to be expected to focus on these needs while trying to understand the quality of their relationships with students. Teachers who value and respect students' autonomous motivation and self-determination are not always autonomy supportive. Supporting students' autonomy requires an array of interpersonal skills (Reeve, 2002). These skills include taking the perspective of the students, acknowledging their feelings, and so on (Deci, 1995; Deci, Eghrari, Patrick, & Leone, 1994).

Based on the findings from the present study, the researcher argues that students' personality traits should be considered in efforts to understand how autonomy-supportive behaviors benefit students. The associations of personality traits with controlled and autonomous types of motivation were substantially different from each other. For example, neuroticism was positively related to controlled motivation, whereas openness had a strong and positive association with autonomous motivation. These results suggest that neurotic students might have some extrinsic goals such as an attempt to gain contingent approval, whereas open students seem to have relatively intrinsic goals that directly satisfy their basic psychological needs of autonomy, competence, and

relatedness. This example implies that teachers should know how students with different personality traits express their interests during task engagements through their nonverbal behavior. Knowing the trait features of students and the ways their personalities lead them to deal with academic endeavors may help teachers to effectively address students' needs.

Table 10

Empirically validated autonomy-supportive instructional behaviors (Reeve et al., 2008)

Act of Instruction	Description
Listening	Time teacher spends listening to students' voice during instruction
Asking what students need	Frequency with which teachers asks what the students need
Creating independent work time	Time teacher allows students to work independently and in their own way
Encouraging students'-voice	Time students spend talking about the lesson during instruction
Seating arrangements	The provision of seating arrangements in which the students – rather than the teacher – are positioned near the learning materials
Providing rationales	Frequency with which teacher provides rationales to explain why a particular course of action, way of thinking, or way of feeling might be useful
Praise as informational feedback	Frequency of statements to communicate positive effectance feedback about the students' improvement or mastery
Offering encouragements	Frequency of statements to boost or sustain students' engagement
Offering hints	Frequency of suggestions about how to make progress when students seem stuck
Being responsive	Being responsive to student-generated questions, comments, recommendations, and suggestions
Perspective-taking statements	Frequency of empathic statements to acknowledge the students' perspectives or experiences

Gifted Students as Autonomous Learners

The previous section discussed the importance of autonomy supportive teaching and provided a set of specific instructional behaviors that foster students' inner motivational resources. This part will keep to bring up the same issue, while specifically focusing on the gifted students.

Meeting the cognitive, social, and emotional needs of gifted students can be a challenge. Educators should not only know their learners well, but also need to understand how personal characteristics, capabilities, and the extent to which they provide opportunities to address these needs are interrelated. As noted previously, personality traits remain stable or at least not easily malleable during the course of the academic year. However, despite the reasonably invariant nature of personality, school practice can be modified to respond to students' needs when their personality traits are identified and the mediating roles of self-regulatory efficacy, controlled motivation, and autonomous motivation are understood. The results revealed that autonomous motivation is a critical mediator of the effects of conscientiousness and openness on academic achievement. Controlled motivation, too, contributed to our understanding of the complex association between openness and achievement. Given these findings, it becomes even more important to consider creating a more autonomous and less controlled learning environment for student success.

Because gifted students often possess unique intellectual skills and special interests that set them apart from their non-gifted peers, one of the common suggestions made for this group of students is that they should receive an educational program different from that presented to typical students (J. J. Gallagher, 2003). There are several

models of good school practice for guiding "what to do" for gifted learners. One of these models is the *Autonomous Learner Model* (ALM; Betts, 1985; Betts & Kercher, 1999), which is relevant to the context of the present study and also worth mentioning in terms of its emphasis on autonomy and self-regulation.

The ALM was developed and revised by Betts and colleagues (Betts, 1985; Betts & Kercher, 1999; Betts & Knapp, 1981) with a goal of facilitating "the growth of students as independent, self-directed learners, with the development of skills, concepts, and positive attitudes within the cognitive, emotional, social, and physical domains" (Betts & Kercher, 1999, p.43). The ALM divides into the five major dimensions summarized in Figure 13. The *orientation* dimension is crucial to the development of the autonomous learner, because students, teachers, school leaders, and parents are acquainted with central concepts in gifted education such as intelligence, giftedness, talent, and creativity. The orientation dimension also was designed to guide students to understand their own self-concepts, self-esteems, and gifts and talents.

The second dimension, *individual development*, focuses more clearly on skills, concepts, and attitudes that should be given to students for their development as life-long independent and self-directed learners. Self-regulatory efficacy, intrinsic motivation, and integrated identification can be considered as the critical elements of this dimension. Individual development has six specific areas. The first two areas highlight the importance of self-regulated learning, self-regulatory skills, and self-regulatory efficacy. The first area (i.e., *inter/intra personal*) of individual development is an extension of self/personal development from orientation. The development of self-efficacy, self-concept, and self-esteem is an on-going pursuit in the ALM. The second area is *learning*

skills, which focuses on the skills necessary to function as an autonomous learner (Betts, 2003).

Although not discussed in the ALM model, intrinsic motivation, internalization, and integrated identification also are an integral part of the discussion on individual development. Productivity is an essential component of this dimension (Betts & Kercher, 1999) and the hallmark of the gifted child. According to Tannenbaum (1983), gifted students have the potential to become producers of knowledge. Development of many different products is the primary indicator of a knowledge producer (Betts, 2003). The products can be developed if students know how to dedicate themselves to deliberate practice. The extent to which students are able to dedicate themselves to deliberate practice will hinge upon the degree to which they are identified toward the domain (Koestner & Losier, 2002). It is important to distinguish between intrinsic motivation and integrated identification, although both of them are types of autonomous motivation. Intrinsic motivation promotes a focus on short-term goals and yields energizing emotions such as interest and excitement, whereas identification is more about the orientation toward the long-term significance of one's current pursuits (Koestner & Losier, 2002). The value of becoming identified in a domain is very high throughout the journey of a gifted student in becoming an autonomous learner and a knowledge producer.
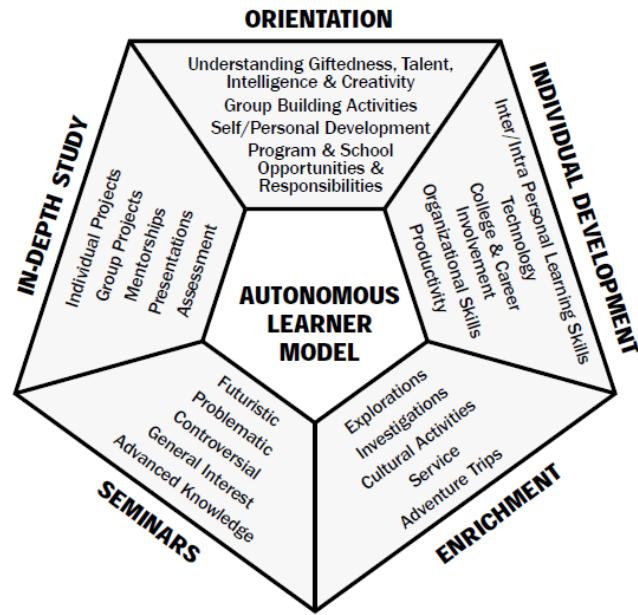
Figure 13. Autonomous Learner Model (Betts & Kercher, 1999).

Educational Leaders as the Principle Upholders of Gifted Education

The previous sections highlighted several potential implications for practice. The core elements of those implications were (1) promoting self-regulated learning and teaching students how to keep themselves on target with a learning-related goal or activity, (2) using autonomy-supportive instructional behaviors to nurture students' inner motivational resources, and (3) facilitating the growth of gifted students as independent and self-directed learners. Although each of these elements has proven to be a crucial undertaking, they are not straightforward as it might first seem to be. Teachers' willingness to accept the merits of these student-centered approaches is critical, but not enough to implement the practice. Teachers should be trained to put the abovementioned methods and models into practice in a classroom setting. Doing this requires allocation of resources and administrative and policy support.

127

Administrative leaders and other decision-makers in policy and practice are key for gifted education programs to succeed. Their perceptions and attitudes toward gifted education programming are critical to make the gifted services part of the school's mission (Hertberg-Davis & Callahan, 2008; Reed & Westberg, 2003). Research explains some of the reasons educational leaders may engage or disengage administrative leadership in gifted education (Grantham, Collins, & Dickson, 2014). There is a dire need to provide educational leaders and policy makers with strong evidence on the importance of gifted education. Research showing the interplay between key cognitive, psychological and social constructs differ in gifted and average population could help us make the claim that gifted students are at risk. The present research promises important insights for our understanding of how personality traits interact with other motivational and socio-cognitive components in predicting academic achievement in gifted students. However, more recent and relevant research, especially comparison research between gifted and average students, is needed to recognize the fact.

Conclusion

The present study investigated the predictive role of the Big Five personality traits on academic achievement. Self-regulatory efficacy, controlled motivation, and autonomous motivation served as mediators in these relationships. The present study was the first to study the interplay between these constructs. Yet another uniqueness of this study is that the sample was gifted students. The results of this study have established the existence of the psychological mechanism that explains personality-achievement relationship. Of the Big Five personality traits, conscientiousness and openness were found to have both direct and indirect impacts on academic achievement.

Conscientiousness was mediated by self-regulatory efficacy and autonomous motivation, whereas openness was mediated by controlled motivation and autonomous motivation. Unlike conscientiousness and openness, agreeableness had only a direct effect on academic achievement.

The present study contributes to the research field by revealing important relationships between specific constructs that have been suggested by personality, social cognitive, and self-determination theories. With academic motivation and self-regulatory efficacy established as important mediators of the association between Big Five personality traits and academic achievement, future researchers should be able to further investigate this interplay with larger samples to clarify the causal direction of effects and the mediating processes. In addition, future considerations of individual differences with respect to academic achievement will need to consider using other measures. For example, the BFI is a short personality inventory that does not measure multiple facets of traits. However, those facets could be of great importance in explaining inconsistencies across study findings.

Finally, educators should be aware of their students' different personality traits. Given that personality is more malleable in childhood and adolescence than in adulthood (Roberts & DelVecchio, 2000), educators should be taught how to facilitate students' optimal personality development. Even if investing in such interventions require supportive policies for long-term impact, educators can be trained to identify personality traits and their behavioral indicators. Personality traits are important antecedents of self-regulatory efficacy and academic motivation. Educators play an important role in promoting self-regulated learning (Peeters et al., 2014) and fostering intrinsic motivation

and task engagement (Reeve, 2002). They should be trained to enhance students' efficacy by developing their self-regulatory skills through internalization of effective strategies for learning. In addition, teachers should learn how to be more autonomy supportive with students. Educational leaders have a key responsibility to make these happen effectively. They should give proactive attention to these requirements and ensure that their teachers are well-equipped to integrate self-regulatory and motivational resources into the school curriculum.

Appendix A

The BFI Scale

*I see myself as someone who...

FFM1 = is talkative
FFM2 = tends to find fault with others
FFM3 = does a thorough job
FFM4 = is depressed, blue
FFM5 = is original, comes up with new ideas
FFM6 = is reserved
FFM7 = is helpful and unselfish with others
FFM8 = can be somewhat careless
FFM9 = is relaxed, handles stress well
FFM10 = is curious about many different things
FFM11 = is full of energy
FFM12 = starts quarrels with others
FFM13 = is a reliable worker
FFM14 = can be tense
FFM15 = is ingenious, a deep thinker
FFM16 = generates a lot of enthusiasm
FFM17 = has a forgiving nature
FFM18 = tends to be disorganized
FFM19 = worries a lot
FFM20 = has an active imagination
FFM21 = tends to be quiet
FFM22 = is generally trusting
FFM23 = tends to be lazy
FFM24 = is emotionally stable, not easily upset
FFM25 = is inventive
FFM26 = has an assertive personality
FFM27 = can be cold and aloof
FFM28 = perseveres until the task is finished
FFM29 = can be moody
FFM30 = values artistic, aesthetic experiences
FFM31 = is sometimes shy, inhibited
FFM32 = is considerate and kind to almost everyone
FFM33 = does things efficiently
FFM34 = remains calm in tense situations
FFM35 = prefers work that is routine
FFM36 = is outgoing, sociable
FFM37 = is sometimes rude to others
FFM38 = makes plans and follows through with them
FFM39 = gets nervous easily
FFM40 = likes to reflect, play with ideas

FFM41 = has few artistic interests
FFM42 = likes to cooperate with others
FFM43 = is easily distracted
FFM44 = is sophisticated in art, music, or literature

Reverse Coded Items: FFM2, FFM6, FFM8, FFM9, FFM12, FFM18, FFM21, FFM23, FFM24, FFM27, FFM31, FFM34, FFM35, FFM37, FFM41, FFM43

Appendix B

The SRQ-A Scale

The Scale (standard version)

WHY I DO THINGS

Name: _____   Age: _____

Grade: _____   ( ) Boy or Girl ( )   Teacher: _____

A. Why do I do my homework?

1.   Because I want the teacher to think I'm a good student.

Very true   Sort of true   Not very true   Not at all true

2.   Because I'll get in trouble if I don't.

Very true   Sort of true   Not very true   Not at all true

3.   Because it's fun.

Very true   Sort of true   Not very true   Not at all true

4.   Because I will feel bad about myself if I don't do it.

Very true   Sort of true   Not very true   Not at all true

5.   Because I want to understand the subject.

Very true   Sort of true   Not very true   Not at all true

6.   Because that's what I'm supposed to do.

Very true   Sort of true   Not very true   Not at all true

7.   Because I enjoy doing my homework.

Very true   Sort of true   Not very true   Not at all true

8.   Because it's important to me to do my homework.

Very true   Sort of true   Not very true   Not at all true

B. Why do I work on my classwork?

    9.   So that the teacher won't yell at me.

    Very true   Sort of true   Not very true   Not at all true

    10.   Because I want the teacher to think I'm a good student.

    Very true   Sort of true   Not very true   Not at all true

    11.   Because I want to learn new things.

    Very true   Sort of true   Not very true   Not at all true

    12.   Because I'll be ashamed of myself if it didn't get done.

    Very true   Sort of true   Not very true   Not at all true

    13.   Because it's fun.

    Very true   Sort of true   Not very true   Not at all true

    14.   Because that's the rule.

    Very true   Sort of true   Not very true   Not at all true

    15.   Because I enjoy doing my classwork.

    Very true   Sort of true   Not very true   Not at all true

    16.   Because it's important to me to work on my classwork.

    Very true   Sort of true   Not very true   Not at all true

C. Why do I try to answer hard questions in class?

    17.   Because I want the other students to think I'm smart.

    Very true   Sort of true   Not very true   Not at all true

    18.   Because I feel ashamed of myself when I don't try.

Very true Sort of true   Not very true   Not at all true

19. Because I enjoy answering hard questions.

Very true Sort of true   Not very true   Not at all true

20. Because that's what I'm supposed to do.

Very true Sort of true   Not very true   Not at all true

21. To find out if I'm right or wrong.

Very true Sort of true   Not very true   Not at all true

22. Because it's fun to answer hard questions.

Very true Sort of true   Not very true   Not at all true

23. Because it's important to me to try to answer hard questions in class.

Very true Sort of true   Not very true   Not at all true

24. Because I want the teacher to say nice things about me.

Very true Sort of true   Not very true   Not at all true

D. Why do I try to do well in school?

25. Because that's what I'm supposed to do.

Very true Sort of true   Not very true   Not at all true

26. So my teachers will think I'm a good student

Very true Sort of true   Not very true   Not at all true

27. Because I enjoy doing my school work well.

Very true Sort of true   Not very true   Not at all true

28. Because I will get in trouble if I don't do well.

Very true Sort of true   Not very true   Not at all true

29. Because I'll feel really bad about myself if I don't do well.

Very true   Sort of true   Not very true   Not at all true

30.   Because it's important to me to try to do well in school.

Very true   Sort of true   Not very true   Not at all true

31.   Because I will feel really proud of myself if I do well.

Very true   Sort of true   Not very true   Not at all true

32.   Because I might get a reward if I do well.

Very true   Sort of true   Not very true   Not at all true

Scoring the SRQ-A (standard version). First, you calculate the subscale score for each of the four subscales by averaging the items that make up that subscale. Very true is scored 4; Sort of true is scored 3; Not very true is scored 2; and Not at all true is scored 1. The four subscales are: external regulation, introjected regulation, identified regulation, and intrinsic motivation. Listed below are the item numbers associated with each of the four subscales.

External Regulation: 2, 6, 9, 14, 20, 24, 25, 28, 32
Introjected Regulation: 1, 4, 10, 12, 17, 18, 26, 29, 31
Identified Regulation: 5, 8, 11, 16, 21, 23, 30
Intrinsic Motivation: 3, 7, 13, 15, 19, 22, 27

Appendix C

The Self-Efficacy for Self-Regulated Learning subscale of the CSES

MSPSE14= How well can you finish homework assignments by deadlines?

MSPSE15= How well can you study when there are other interesting things to do?

MSPSE16= How well can you concentrate on school subjects?

MSPSE17= How well can you take class notes of class instruction?

MSPSE18= How well can you use the library to get information for class assignments?

MSPSE19= How well can you plan your school work?

MSPSE20= How well can you organize your school work?

MSPSE21= How well can you remember information presented in class and textbooks?

MSPSE22= How well can you arrange a place to study without distractions?

MSPSE23= How well can you motivate yourself to do school work?

MSPSE24= How well can you participate in class discussions?

SESRL = (MSPSE14+ MSPSE15+ … + MSPSE24)/11

Appendix D

Assent Form

William & Mary
School of Education

STUDENT AGREEMENT TO PARTICIPATE IN RESEARCH

You are being asked to participate in a research study conducted by the researchers from Center for Gifted Education (CFGE) at William & Mary in collaboration with the Northwestern University Center for Talent Development (CTD). This study involves filling out a survey that will take about 20 minutes. The questions on the survey will help us learn about how your personality, motivation, and self-efficacy relate to your academic achievement. Your answers will help us to better understand the factors that contribute to positive academic performance with the goal of creating appropriate environments to promote student success. Your responses will be kept strictly confidential and we will never release information about individuals' responses to the survey.

Should you have any questions about this research study, you may contact Sakhavat Mammadov at 716-292-2488 (smammadov@email.wm.edu) or Tracy L. Cross at 757-221-2210 (tlcross@wm.edu). We want to answer any questions you might have about our research. If you have any concerns about the research, you may also contact Thomas J. Ward, the William & Mary Institutional Review Board (IRB) representative, at 757-221-2358 (tjward@wm.edu).

We do not think there will be any risk to you from taking part in this research. You do not have to participate in this research. Only students with parent permission who have agreed to participate will be included in our study. If you decide not to participate, you will not be penalized in any way. When filling out the survey, you may skip any questions you do not feel comfortable answering and you may stop at any time.

Please enter your first name, middle initial, and last name, if you assent to participate in this study.

Appendix E

Consent Form

PARENT CONSENT TO PARTICIPATE IN RESEARCH

Principal Investigator: Sakhavat Mammadov
Co-Principal Investigators: Tracy L. Cross

Study Title: Personality Predictors of Academic Achievement in Gifted Students: Mediation by Socio-Cognitive and Motivational Variables.

We are researchers at the Center for Gifted Education (CFGE) at William & Mary. In collaboration with the Northwestern University Center for Talent Development (CTD), we are conducting the study on the relationship between gifted students' personality traits, academic motivation, self-efficacy for self-regulated learning, and academic achievement. The study will help us to better understand the factors that contribute to students' positive academic performance with the goal of creating appropriate environments and developing adequate interventions to promote student success.

What will your child do in this study?

Your child will be asked to complete an online survey called **Personality Predictors of Academic Achievement (PPAA)**. There are no "right" or "wrong" answers on the survey. Students may complete the survey at home. Completing the survey takes approximately 20 minutes.

What are the possible risks or discomforts to students?

There are no anticipated risks to participation. The only inconvenience is the time that the participants spend completing the questionnaires.

What are the possible benefits for study participants?

The primary benefit of participation is the opportunity to contribute to exploration of major psychological determinants of academic achievement in gifted students. Students and parents can request a summary report about the findings of this study. The report will also include possible explanations of the results as well as implications for parenting and home-school relations. The constructs that will be investigated in this study can greatly contribute to a person's academic achievement and their dynamic interplay can affect a person's ability to perform in school and

function independently. Learning about these relationships will allow us to better support students' academic endeavors.

Financial Information

Participation in this study will involve no cost to students or parents. Students and parents will not be paid for participating.

Voluntary Participation

Your child's participation in this study is completely voluntary. When completing the survey, your child may skip any questions s/he doesn't feel comfortable answering. Your decision whether or not to allow your child to take part will not affect your current or future relationship with Center for Gifted Education (CFGE) at William & Mary and the Northwestern University Center for Talent Development (CTD).

If you want to speak with someone who is not directly involved in this research, or if you have questions about your rights as a research subject, contact the William & Mary Institutional Review Board (EDIRC) representative Thomas J. Ward (tjward@wm.edu).

Confidentiality and privacy rights

The records of this research will be kept confidential, to the extent permitted by law. Surveys and student information will be kept securely on the researchers' password-protected computers and only the researchers will have access to your child's personal information. No personal information from this research will be shared with anyone, including your child's school. Students will not be identified in any publications or presentations from this research.

Whom should I call if I have questions or concerns about this research study?

Please be aware that under the Protection of Pupils Rights Act 20 U.S.C. Section 1232 (c)(1)(A), you have the right to preview a copy of the survey instruments that will be used in this study. If you would like to do so, you may contact Sakhavat Mammadov at 716-292-2488 (smammadov@email.wm.edu) or Tracy L. Cross at 757-221-2210 (tlcross@wm.edu) to obtain a copy of the materials.

Parent consent for child's participation in the study

I have read this form and the study has been explained to me. I have been given the opportunity to ask questions and my questions have been answered. If I have additional questions, I have been told whom to contact. I agree to let my child be in the study described above. I also give my permission to the Northwestern University Center for Talent Development (CTD) to release my child's ACT/Explore scores for the study.

If you agree your child may participate in this study, please enter your e-mail address below:

Appendix F

Invitation Letter

Invitation to Participate in a Research Study

Dear parents/guardians,

Your child is invited to participate in a study called "Personality Predictors of Academic Achievement in Gifted Students: Mediation by Socio-Cognitive and Motivational Variables" being conducted by the researchers from the Center for Gifted Education at William and Mary in collaboration with the Northwestern University Center for Talent Development (CTD).

The research project is designed to examine predictive roles of personality traits on academic achievement in gifted students. It also examines whether students' academic motivation and self-efficacy mediate the relationship between personality traits and achievement. These constructs are worth examining, because each can greatly contribute to a person's academic achievement and their dynamic interplay can affect a person's ability to perform in school and function independently.

Your child is eligible for this study because s/he took part in the Northwestern University Midwest Academic Talent Search (NUMATS) program and/or Center for Talent Development (CTD) summer, weekend, or distance learning programs. The primary benefit of participation in the study is the opportunity to contribute to the exploration of major psychological determinants of academic achievement in gifted students. If you would like to receive a summary report about the findings of this study, including possible explanations of the results and implications for parenting and home-school relations, please indicate your interest on the permission form.

To learn more about this study, please review the parent consent form at https://wmsurveys.qualtrics.com/SE/?SID=SV_1ZTWQejM6qCV8Tr. If you agree your child may participate in this study, you will be asked to enter your e-mail address into the E-mail field at the end of the parent consent form. Upon agreement to participate in the study, you will receive the second email along with a link to the survey. The questions on the survey concern students' perceptions about themselves in a variety of situations (e.g., "I see myself as someone who is curious about many different things) and the reasons why they do their school work (e.g., "I do my homework, because I want to understand the subject). Completing the survey takes approximately 20 minutes.

If you have any questions, please feel free to contact Sakhavat Mammadov at 716-292-2488 (smammadov@email.wm.edu). If you have any questions or concerns about your child's rights as a research subject, you may contact William and Mary IRB representative Thomas J. Ward (tjward@wm.edu, 757-221-2358).

Please remember that your child's participation in this study is completely voluntary. When completing the survey, your child may skip any questions s/he doesn't feel comfortable answering. Your decision whether or not to allow your child to take part

will not affect your current or future relationship with Center for Gifted Education (CFGE) at William & Mary and the Northwestern University Center for Talent Development (CTD).

Thank you for your time and consideration. We look forward to hearing from you.

Sakhavat Mammadov, M.A.
Ph.D. Candidate, Gifted Education
Graduate Research Assistant, Center for Gifted Education
William & Mary
P.O. Box 8795
Williamsburg, VA 23187
716-292-2488 (p)

Tracy L. Cross, Ph.D.
Jody and Layton Smith Professor of Psychology and Gifted Education
Executive Director, Center for Gifted Education
William & Mary
P.O. Box 8795
Williamsburg, VA 23185
(757) 221-2210 (p)

References

Abramson, L. Y., Seligman, M. E. P., & Teasdale, J. D. (1978). Learned helplessness in humans: Critique and reformulation. *Journal of Abnormal Psychology, 87*, 49-74.

Ackerman, P. L. (1996a). A theory of adult intellectual development: Process, personality, interests, and knowledge. *Intelligence, 22*, 229–259.

Ackerman, P. L. (1996b). Intelligence as process and knowledge: An integration for adult development and application. In W. Rogers, & A. Fisk, et al. (Eds.), *Aging and skilled performance: Advances in theory and application* (pp. 139–156). Hillsdale, NJ: Erlbaum.

Ackerman, P. L., & Goff, M. (1994). Typical intellectual engagement and personality: Reply to Rocklin. *Journal of Educational Psychology, 86*, 150–153.

Ackerman, P. L., & Heggestad, E. D. (1997). Intelligence, personality, and interests: Evidence for overlapping traits. *Psychological Bulletin, 121*, 219–245.

Akaike, H. (1973). Information theory and an extension of the maximum likelihood principle. In B. N. Petrov & F. Csake (Eds.). *Second international symposium on information theory* (pp. 267-281). Budapest, Hungary: Akademiai Kiado.

Alexander, P. A., Kulikowich, J. M., & Jetton, T. L. (1994). The role of subject-matter knowledge and interest in the processing of linear and nonlinear texts. *Review of Educational Research,* 64, 201- 252.

Alivernini, F. (2012). Assessment of academic motivation. In N. M. Seel (Ed.), *Encyclopedia of the sciences of learning* (pp. 321-323). New York, NY: Springer.

Amabile, T. M. (1985). Motivation and creativity: Effect of motivational orientation on

    creative writers. *Journal of Personality and Social Psychology, 48*, 393-399.

Ashton, M.C., Lee, K., Vernon, P.A., & Jang, K. (2000). Fluid intelligence, crystallized

    intelligence, and the Openness/Intellect factor. *Journal of Research in*

    Personality, 34, 198-207.

Assor, A., Vansteenkiste, M., & Kaplan, A. (2009). Identified versus introjected approach

    and introjected avoidance motivations in school and in sports: The limited

    benefits of self-worth strivings. *Journal of Educational Psychology*, *101*, 482-

    497.

Atkinson, J. W. (1964). *An introduction to motivation.* Princeton, NJ: Van Nostrand.

Austin, E. J., Deary, I. J., Whiteman, M. C., Fowkes, F. G. R., Pedersen, N., Rabitt, P., …

    McInnes, L. (2002). Relationships between ability and personality: Does

    intelligence contribute positively to personal and social adjustment? *Personality*

    and Individual Differences, 32, 1391–1411.

Baker, J. A., Bridger, R., & Evans, K. (1998). Models of underachievement among gifted

    preadolescents: The role of personal, family, and school factors. *Gifted Child*

    Quarterly, 42, 5-15.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change.

    Psychological Review, *84*, 191-215.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.*

    Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1991). Social cognitive theory of self-regulation. *Organizational Behavior*

    and Human Decision Processes, 50, 248-287.

Bandura, A. (1997). *Self-efficacy: The exercise of control.* New York, NY: Freeman.

Bandura, A. (2006). Guide for constructing self-efficacy scales. In F. Pajares & T. Urdan (Eds.), *Self-efficacy beliefs of adolescents* (pp. 307-337). Greenwich, CT: Information Age Publishing.

Bandura, A., & Simon, K. M. (1977). The role of proximal intentions in self-regulation of refractory behavior. *Cognitive Therapy and Research, 1*, 177-193.

Bandura, A., Barbaranelli, C., Caprara, G. V., & Pastorelli, C. (1996). Mechanisms of moral disengagement in the exercise of moral agency. *Journal of Personality and Social Psychology, 71*, 364-374.

Bandura, A., Barbaranelli, C., Caprara, G. V., & Pastorelli, C. (2001). Self-efficacy beliefs as shapers of children's aspirations and career trajectories. *Child Development*, *72*, 187-206.

Barchard, K. A. (2003). Does emotional intelligence assist in the prediction of academic success? *Educational and Psychological Measurement, 63*, 840-858.

Barrett, M., & Boggiano, A. K. (1988). Fostering extrinsic orientations: Use of reward strategies to motivate children. *Journal of Social and Clinical Psychology*, *6*, 293–309.

Barrick, M. R., & Mount, M. K. (2005). Yes, personality matters: Moving on to more important matters. *Human Performance, 18*, 359–372.

Barrick, M. R., Mount, M. K., & Strauss, J. P. (1993). Conscientiousness and performance of sales representatives: Test of the mediating effects of goal setting. *Journal of Applied Psychology, 78,* 715–722.

Baudson, T., & Preckel, F. (2013). Teachers' implicit personality theories about the

gifted: An experimental approach. *School Psychology Quarterly*, *28*, 37-46.

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 107*, 238-246.

Bentler, P. M. (1992). On the fit of models to covariances and methodology to the Bulletin. *Psychological Bulletin, 112,* 400-404.

Bentler, P.M. (2001). *EQS 6 structural equations program manual*. Encino, CA: Multivariate Software.

Betts, G. T. (1985). *The Autonomous Learner Model for the gifted and talented*. Greeley, CO: ALPS.

Betts, G. T. (2003). The Autonomous Learning Model for high school programing. *Gifted Education Communicator: A Journal for Educators and Parents.* California Association for the Gifted. Retrieved from http://giftededucationcommunicator.com

Betts, G. T., & Kercher, J. K. (1999). *Autonomous Learner Model: Optimizing ability.* Greeley, CO: ALPS.

Betts. G. T., & Knapp, J. (1981). *The Autonomous Learner Model: A secondary model. In secondary programs for the gifted and talented*. Los Angeles, CA: National/State-Leadership Training Institute for the Gifted and Talented.

Bidjerano, T., & Dai, D. Y. (2007). The relationship between the Big-Five model of personality and self-regulated learning strategies. *Learning and Individual Differences, 17*, 69–81.

Binet, A., & Simon, T. (1905). Methodes nouvelles pour le diagnostique du niveau intellectual des anormaux [New methods for the diagnosis of the intellectual

levels of subnormals] (E. S. Kite, Trans.). In J. J. Jenkins, & D. G. Paterson (Reprint Eds.), *Studies in individual differences, the search for intelligence* (pp. 90 –96). New York, NY: Appleton–Century–Croft (reprinted in 1961).

Black, A. E., & Deci, E. L. (2000). The effects of instructors' autonomy support and students' autonomous motivation on learning organic chemistry: A self-determination theory perspective. *Science Education, 84,* 740–756.

Blickle, G. (1996). Personality traits, learning strategies, and performance. *European Journal of Personality, 10*, 337–352.

Blumberg, M., & Pringle, C. D. (1982). The missing opportunity in organizational research: Some implications for a theory of work performance. *Academy of Management Review, 7,* 560–569.

Boekaerts, M., Pintrich, P. R., & Zeidner, M. H. (2000). *Handbook of self-regulation.* San Diego, CA: Academic Press.

Boggiano, A. K., Main, D. S., & Katz, P. A. (1988). Children's preference for challenge: The role of perceived competence and control. *Journal of Personality and Social Psychology, 54*, 134-141.

Bono, J. E., & Judge, T. A. (2003). Self-concordance at work: Toward understanding the motivational effects of transformational leaders. *Academy of Management Journal, 4*, 554–571.

Bouffard-Bouchard, T., Parent, S., & Larivée, S. (1991). Influence of self-efficacy on self-regulation and performance among junior and senior high-school age students. *International Journal of Behavioral Development, 14*, 153-164.

Bozdogan, H. (1987). Model selection and Akaike's Information Criterion (AIC): The

 general theory and its analytical extensions. *Psychometrica, 52*, 345-370.

Brown, A. L. (1978). Knowing when, where, and how to remember. A problem of

 metacognition. In R. Glaser (Ed.), *Advances in instructional psychology* (Vol. 1,

 pp. 77-165). Hillsdale, NJ: Lawrence Erlbaum Associates.

Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A.

 Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 136-162).

 Beverly Hills, CA: Sage.

Brunet, J., Gunnell, K. E., Gaudreau, P., & Sabiston, C. M. (2015). An integrative

 analytical framework for understanding the effects of autonomous and controlled

 motivation. *Personality and Individual Differences, 84*, 2-15.

Brunet, J., Sabiston, C. M., Castonguay, A., Ferguson, L., & Bessette, N. (2012). The

 association between physical self-discrepancies and women's physical activity:

 The mediating role of motivation. *Journal of Sport & Exercise Psychology, 34*,

 102–132.

Budaev, S. V. (1999). Sex differences in the Big Five personality factors: Testing an

 evolutionary hypothesis. *Personality and Individual Differences, 26*, 801-813.

Busato, V. V., Prins, F. J., Elshout, J. J., & Hamaker, C. (1999). The relation between

 learning styles, the Big Five personality traits, and achievement motivation in

 higher education. *Personality and Individual Differences, 26*, 129–140.

Busato, V. V., Prins, F. J., Elshout, J. J., & Hamaker, C. (2000). Intellectual ability,

 learning style, achievement motivation and academic success of psychology

students in higher education. *Personality and Individual Differences, 29*, 1057–1068.

Byrne, B. M. (2010). *Structural equation modeling with AMOS* (2nd ed.). New York, NY: Routledge.

Cameron J, & Pierce, W. D. (1994). Reinforcement, reward, and intrinsic motivation: A metaanalysis. *Review of Educational Research, 64*, 363-423.

Caprara, G. V., Vecchione, M., Alessandri, G., Gerbino, M., & Barbaranelli, C. (2011). The contribution of personality traits and self-efficacy beliefs to academic achievement: A longitudinal study. *British Journal of Educational Psychology, 81*, 78-96.

Caprara, G. V., Fida, R., Vecchione, M., Del Bove, G., Vecchio, G. M., Barbaranelli, C., & Bandura, A. (2008). Longitudinal Analysis of the role of perceived self-efficacy for self-regulated learning in academic continuance and achievement. *Journal of Educational Psychology*, *100*, 525–534.

Caspi, A., Roberts, B. W., & Shiner, R. L. (2005). Personality development: Stability and change. *Annual Review of Psychology, 56*, 453–484.

Cattell, R. B. (1943). The description of personality: Basic traits resolved into clusters. *Journal of Abnormal and Social Psychology, 38*(4), 476-506.

Cattell, R. B. (1966). The scree-test for the number of factors. *Multivariate Behavioral Research, 1,* 245-276.

Chaffey, G. W. (2009). Gifted but underachieving: Australian indigenous children. In T. Balchin, B. Hymer, & J. Matthews (Eds.), *The Routledge International Companion to Gifted Education* (pp. 106-111). New York, NY: Routledge.

Chamorro-Premuzic, T., & Furnham, A (2008). Personality, intelligence and approaches

    to learning as predictors of academic performance. *Personality and Individual*

    Differences, 44, 1596–1603.

Chamorro-Premuzic, T., & Furnham, A. (2003a). Personality predicts academic

    performance: Evidence from two longitudinal university samples. *Journal of*

    Research in Personality, *37*, 319-338.

Chamorro-Premuzic, T., & Furnham, A. (2003b). Personality traits and academic

    examination performance. *European Journal of Personality*, *17*, 237-250.

Chamorro-Premuzic, T., Furnham, A., Dissou, G., & Heaven, P. (2005). Personality and

    preference for academic assessment: A study with Australian University students.

    Learning and Individual Differences, *15*, 247-256.

Choi, N., Fuqua, D. R., & Griffin, B. W. (2001). Exploratory analysis of the structure of

    scores from the multidimensional scales of perceived self-efficacy. *Educational*

    and Psychological Measurement, 61, 475-489.

Clark, M. H., & Schroth, C. A. (2010). Examining relationships between academic

    motivation and personality among college students. *Learning and Individual*

    Differences, 20, 19–24.

Clark, S. E. (2008). The importance (necessity) of computational modelling for

    eyewitness identification research. *Applied Cognitive Psychology, 22,* 803-813.

Cleary, T. A. (1992). Gender differences in aptitude and achievement test scores. In

    Educational Testing Service (Ed.), *Sex equity in educational opportunity,*

    achievement, and testing: Proceedings of the 1991 ETS Invitational Conference

    (pp. 51-90). Princeton, NJ: Educational Testing Service.

Clinkenbeard, P. R. (2012). Motivation and gifted students: Implications of theory and research. *Psychology in the Schools, 49*, 622-630.

Clinkenbeard, P. R. (1996). Research on motivation and the gifted: Implications for identification, programming, and evaluation. *Gifted Child Quarterly, 40*, 220 – 221.

Clinkenbeard, P. R. (2006, May). *Motivation and the gifted: Research versus practice.* Paper presented at the biennial Wallace Research Symposium on Talent Development, Iowa City, IA.

Colangelo, N. (2003). Counseling gifted students. In N. Colangelo & G. A. Davis (Eds.), *Handbook of gifted education* (pp. 373 – 387). Boston, MA: Allyn & Bacon.

Coleman, L. J., & Cross, T. L., (1988). Is being gifted a social handicap? *Journal for the Education of the Gifted, 11*, 41-56.

Collins, J. L. (1982, March). *Self-efficacy and ability in achievement behavior.* Paper presented at the annual meeting of the American Educational Research Association, New York, NY.

Conard, M. A. (2006). Aptitude is not enough: How personality and behavior predict academic performance. *Journal of Research in Personality*, *40*, 339–346.

Conklin, A.M. (1940). *Failures of highly intelligent pupils: A study of their behavior.* New York: Teachers College, Columbia University

Connell, R. W. (1989). Cool guys, swots and wimps: The interplay of masculinity and education. *Oxford Review of Education, 15*, 291–303.

Conner, M., & Norman, P. (1995). *Predicting Health Behaviour: Research and Practice with Social Cognition Models*. Buckingham, England: Open University Press.

Costa, P. T. Jr., & McCrae, R. R. (1989). *The NEO-PI/NEO-FFI manual supplement*. Odessa, FL: Psychological Assessment Resources.

Costa, P. T. Jr., & McCrae, R. R. (1992). *NEO PI-R professional manual: Revised NEO PI-R and NEO-FFI*. Odessa, FL: Psychological Assessment Resources, Inc.

Costa, P. T., & Widiger, T. A. (2002). *Personality disorders and the five-factor model of personality* (2nd ed.). Washington, DC: American Psychological Association.

Costa, P. T., Terracciano, A., & McCrae, R. R. (2001). Gender differences in personality traits across cultures: Robust and surprising findings. *Journal of Personality and Social Psychology, 81*, 322-331.

Cross, T. L. (2011). *On the social and emotional lives of gifted children* (4th ed.). Waco, TX: Prufrock Press.

Csikszentmihalyi, M. (1991). *Flow: The psychology of optimal experience*. New York, NY: Harper Perennial.

Csikszentmihalyi, M., Abuhamdeh, S., & Nakamura, J. (2005), "Flow". In A. Elliot (Ed.), *Handbook of competence and motivation* (pp. 598-698). New York, NY: The Guilford Press.

Davis, G., & Rimm, S. (*2004*). *Education of the gifted and talented* (5th ed.). Boston, MA: Allyn and Bacon.

De Feyter, T., Caers, R., Vigna, C., & Berings, D. (2012). Unraveling the impact of the Big Five personality traits on academic performance: The moderating and mediating effects of self-efficacy and academic motivation. *Learning and Individual Differences, 22*, 439-448.

De Fruyt, F., Van Leeuwen, K., Bagby, R. M., Rolland, J., & Rouillon, F. (2006).

    Assessing and interpreting personality change and continuity in patients treated

    for major depression. *Psychological Assessment, 18*, 71-80.

De Guzman, I. N., Calderon, A., & Cassaretto, M. (2003). Personality and academic

    achievement in university students. *Revista de Psicologia, 21,* 119-143.

De Raad, B., & Perugini, M. (2002). *Big Five Assessment*. Seattle, WA: Hogrefe and

    Huber Publishers.

De Raad, B., & Schouwenburg, H. C. (1996). Personality in learning and education: A

    review. *European Journal of Personality, 10*, 303-336.

Deary, I. J., Strand, S., Smith, P., & Fernandes, C. (2007). Intelligence and educational

    achievement. *Intelligence, 35*, 13–21.

deCharms, R. (1968). *Personal causation*. New York, NY: Academic.

deCharms, R. (1976). *Origins and pawns at school.* New York, NY: John Wiley & Sons.

Deci, E. L. (1971). Effects of externally mediated rewards on intrinsic motivation.

    Journal of Personality and Social Psychology, 18, 105-115.

Deci, E. L. (1975). *Intrinsic motivation.* New York, NY: Plenum Press.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human*

    behavior. New York, NY: Plenum Press.

Deci, E. L., & Ryan, R. M. (1987). The support of autonomy and the control of behavior.

    Journal of Personality and Social Psychology, 53, 1024-1037.

Deci, E. L., & Ryan, R. M. (1991). A motivational approach to self: Integration in

    personality. In R. Dienstbar (Ed.), *Nebraska symposium on motivation* (Vol. 38,

    pp. 237-288). Lincoln, NE: University of Nebraska Press.

Deci, E. L., & Ryan, R. M. (1992). The initiation and regulation of intrinsically motivated

    learning and achievement. In A. K. Boggiano & T. S. Pittman (Eds.),

    Achievement and motivation. A social-development perspective (pp, 9-36). New

    York, NY: Cambridge University Press.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs

    and the self-determination of behavior. *Psychological Inquiry, 11*(4), 227-268.

Deci, E. L., & Ryan, R. M. (2008). Self-determination theory: A macrotheory of

    motivation, human development, and health. *Canadian Psychology, 49*, 182-185.

Deci, E. L., Connell, J. P., & Ryan, R. M. (1989). Self-determination in a work

    organization. *Journal of Applied Psychology, 74*, 580-590.

Deci, E. L., Eghrari, H., Patrick, B. C., & Leone, D. R. (1994). Facilitating

    internalization: The self-determination theory perspective. *Journal of Personality,*

    62, 119-142.

Deci, E. L., Nezlek, J., & Sheinman, L. (1981). Characteristics of the rewarder and

    intrinsic motivation of the rewardee. *Journal of Personality and Social*

    Psychology, 40, 1-10.

Deci, E. L., Spiegel, N. H., Ryan, R. M., Koestner, R., & Kauffman, M. (1982). Effects

    of performance standards on teaching styles: Behavior of controlling teachers.

    Journal of Educational Psychology, 74, 852–859.

Deci, E. L., Vallerand, R. J., Pelletier, L. G., & Ryan, R. M. (1991). Motivation and

    education: The self-determination perspective. *The Educational Psychologist, 74*,

    852-859.

DeYoung, C. G., Grazioplene, R. G., & Peterson, J. B. (2012). From madness to genius: The openness/intellect trait domain as a paradoxical simplex. *Journal of Research in Personality*, *46*, 63–78.

DeYoung, C. G., Quilty, L. C., Peterson, J. B., & Gray, J. R. (2014). Openness to experience, intellect, and cognitive ability. *Journal of Personality Assessment*, *96*, 46–52.

Di Giunta, L., Alessandri, G., Gerbino, M., Kanacri, P. L., Zuffiano, A., & Caprara, G. V. (2013). The determinants of scholastic achievement: The contribution of personality traits, self-esteem, and academic self-efficacy. *Learning and Individual Differences, 27*, 102-108.

Digman, J. M. (1990). Personality structure: Emergence of the five-factor model. *Annual Review of Psychology, 41*, 417-440.

Diseth, A. (2003). Personality and approaches to learning as predictor of academic achievement. *European Journal of Personality, 17*, 143-155.

Diseth, A., & Samdal, O. (2014). Autonomy support and achievement goals as predictors of perceived school performance and life satisfaction in the transition between lower and upper secondary school. *Social Psychology of Education, 17*, 269-291.

Drews, E. M. (1965). Counseling for self-actualization in gifted girls and young women. *Journal of Counseling Psychology, 12*, 167-175.

Duckworth, A. L., & Seligman, M. E. P. (2005). Self-discipline outdoes IQ in predicting academic performance of adolescents. *Psychological Science, 16*, 939-944.

Duckworth, A. L., & Seligman, M. E. P. (2006). Self-discipline gives girls the edge:

   Gender in self-discipline, grades, and achievement test scores. *Journal of

   Educational Psychology, 98*, 198–208.

Duff, A., Boyle, E., Dunleavy, K., & Ferguson, J. (2004). The relationship between

   personality, approach to learning and academic performance. *Personality and

   Individual Differences, 36,* 1907-1920.

Dwight, S. A., Cummings, K. M., & Glenar, J. L. (1998). Comparison of criterion-related

   validity coefficients for the Mini-Markers and Goldberg's Markers of the Big

   Five Personality Factors. *Journal of Personality Assessment*, *70*(3), 541-550.

Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual

   Review of Psychology, 53*, 109–132.

Eccles, J., & Midgley, C. (1989). Stage-environment fit: Developmentally appropriate

   classrooms for young adolescents. In C. Ames & R. Ames (Eds.), *Research on

   motivation in education: Goals and cognitions* (Vol. 3, pp. 139-186). New York,

   NY: Academic Press.

Edwards, J. R. (2002). Alternatives to difference scores: Polynomial regression analysis

   and response surface methodology. In F. Drasgow & N. Schmitt (Eds.),

   *Measuring and analyzing behavior in organizations: Advances in measurement

   and data analysis* (pp. 350–400). San Francisco, CA: Jossey-Bass.

Eisenberg, N., Fabes, R. A., Schaller, M., & Miller, P. A. (1989). Sympathy and personal

   distress: Development, gender differences, and interrelations of indexes. *New

   Directions for Child Development, 44*, 107- 126.

Eysenck, H. J. (1970). *The structure of human personality* (3rd Ed.). London, England:

    Methuen.

Eysenck, H. J. (1994). Personality and intelligence: Psychometric and experimental

    approaches. In R. J. Sternberg, & P. Ruzgis (Eds.), *Personality and intelligence*

    (pp. 3–31). New York, NY: Cambridge University Press.

Feingold, A. (1994). Gender differences in personality: A meta-analysis. *Psychological*

    Bulletin, 116, 429-456.

Feldhusen, J. F., & Kroll, M. D. (1991). Boredom or challenge for the academically

    talented in school. *Gifted Education International, 7*, 80-81.

Feldhusen, J.F. (2003). Talented youth at the secondary level. In N. Colangelo & G.A.

    Davis (Eds.), *Handbook of gifted education* (3rd ed., pp. 229-237). Boston, MA:

    Allyn & Bacon.

Field, A. (2005). *Discovering statistics using SPSS* (2nd ed.). Thousand Oaks, CA: SAGE

    Publications.

Finch, M. E. H., Speirs Neumeister, K. L., Burney, V. H., & Cook, A. L. (2014). The

    relationship of cognitive and executive functioning with achievement in gifted

    kindergarten children. *Gifted Child Quarterly, 58*(3), 167-182.

Flink, C., Boggiano, A. K., & Barrett, M. (1990). Controlling teacher strategies:

    Undermining children's self-determination and performance. *Journal of*

    Personality and Social Psychology, 59, 916-924.

Ford, D. Y. (1995). *A study of achievement and underachievement among gifted,*

    potentially gifted, and regular education black students. Storrs, CT: The

    University of Connecticut, National Research Center on the Gifted and Talented.

Fortier, M. S., Vallerand, R. J., & Guay, F. (1995). Academic motivation and school

performance: Toward a structural model. *Contemporary Educational Psychology*,

20, 257-274.

Frederick, C. M. (1991). *An investigation of the relationship among participation*

motives, level of participation, and psychological outcomes in the domain of

physical activity (Unpublished doctoral dissertation). University of Rochester,

Rochester, NY.

Frederick, C. M., & Ryan, R. M. (1993). Differences in motivation for sport and exercise

and their relations with participation and mental health. *Journal of Sport*

Behavior, 16, 124-146.

Frederick-Recascino, C. M. (2002). Self-determination theory and participation

motivation research in the sport and exercise domain. In E. L. Deci & R. M. Ryan

(Eds.), *Handbook of self-determination research* (pp. 277-294). Rochester, NY:

The University of Rochester Press.

Freeman, J. (2006). Giftedness in the long term. *Journal for the Education of the Gifted,*

29, 384-403.

Funder, D. C. (2001). Personality. *Annual Review of Psychology, 52*, 197–221.

Furnham, A., & Chamorro-Premuzic, T. (2004). Personality and intelligence as predictors

of statistics examination grades. *Personality and Individual Differences*, *37*, 943-

955.

Furnham, A., & Monsen, J. (2009). Personality traits and intelligence predict academic

school grades. *Learning and Individual Differences, 19*, 28–33.

Furnham, A., Chamorro-Premuzic, T., & McDougall, F. (2003). Personality, cognitive

ability, and beliefs about intelligence as predictors of academic performance.

Learning and Individual Differences, 14, 47–64.

Gagné, F. (1991). Toward a differentiated model of giftedness and talent. In N. Colangelo

& G. A. Davis (Eds.), *Handbook of gifted education* (pp. 65-80). Boston, MA:

Allyn and Bacon.

Gallagher, J. J. (2003). Issues and challenges in the education of gifted students. In N.

Colangelo & G. A. Davis (Eds.), *Handbook of gifted education* (3rd ed., pp.11-

23). Boston, MA: Allyn & Bacon.

Gallagher, S. A. (1990). Personality patters of the gifted. *Understanding Our Gifted, 3*,

11-13.

Gentry, M., & Owen, S. V. (2004). An investigation of the effects of total school cluster

grouping on identification, achievement, and classroom practices. In S. M. Reis &

L. E. Brody (Eds.), *Grouping and acceleration practices* (pp. 115-146). Thousand

Oaks, CA: Corwin Press.

Goff, M., & Ackerman, P. (1992). Personality–intelligence relations: assessment of

typical intellectual engagement. *Journal of Educational Psychology, 84*, 537–552.

Goldberg, L. R. (1981). Language and individual differences: The search for universals in

personality lexicons. In L. Wheeler (Ed.). *Review of personality and social

psychology* (Vol. 2, pp. 141-165). Beverly Hills, CA: Sage.

Goldberg, L. R. (1990). An alternative "description of personality": The Big-Five factor

structure. *Journal of Personality and Social Psychology, 59*, 1216-1229.

Goldberg, L. R. (1993). The structure of phenotypic personality traits. *American Psychologist*, *48*, 26-34.

Gottfried, A. W., Gottfried, A. E., Cook, C. R., & Morris, P. E. (2005). Educational characteristics of adolescents with gifted academic intrinsic motivation: A longitudinal investigation from school entry through early adulthood. *Gifted Child Quarterly, 49*, 172-186.

Gough, H. G. (1964). Academic achievement in high school as predicted from the California Psychological Inventory. *Journal of Educational Psychology, 55,* 174–180.

Gough, H. G., & Hall, W. B. (1964). Prediction of performance in medical school from the California Psychological Inventory. *Journal of Applied Psychology, 48,* 218–226.

Gough, H. G., & Lanning, K. (1986). Predicting grades in college from the California Psychological Inventory. *Educational and Psychological Measurement, 46,* 205–213.

Grantham, T. C., Collins, K. H., & Dickson, K. T. (2014). Administrative leadership in gifted education. In J. A. Plucker & C. M. Callahan (Eds.), *Critical issues and practices in gifted education: What the research says?* (pp. 29-46). Waco, TX: Prufrock Press.

Gray, E. & Watson, D. (2002). General and specific traits of personality and their relation to sleep and academic Performance. *Journal of Personality*, *70*, 177-207.

Grolnick, W. S., & Apostoleris, N. H. (2002). What makes parents controlling? In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 161-181). Rochester, NY: The University of Rochester Press.

Grolnick, W. S., & Ryan, R. M. (1987). Autonomy in children's learning: An experimental and individual difference investigation. *Journal of Personality and Social Psychology, 52*, 890-898.

Grolnick, W. S., Ryan, R. M., & Deci, E. L. (1991). Inner resources for school achievement: Motivational mediators of children's perception of their parents. *Journal of Educational Psychology, 83*, 508-517.

Grolnick, W.S., Gurland, S.T., Jacob, K.F., & Decourcey, W. (2002). The development of self-determination in middle childhood and adolescence. In A. Wigfield & J. S. Eccles (Eds.), *Development of achievement motivation* (pp. 147-171). San Diego, CA: Academic Press.

Guay, F., Lessard, V., & Dubois, P. (2016) How can we create better learning contexts for children? Promoting students' autonomous motivation as a way to foster enhanced educational outcomes. In W. C. Liu, J. C. K. Wang, & R. M. Ryan (Eds.), *Building autonomous learners: Perspectives from research and practice using self-determination theory* (pp. 83-107). Singapore: Springer.

Hair Jr., J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate data analysis* (5th ed.). Upper Saddle River, NJ: Prentice-Hall.

Hair, E. C., & Graziano, W. (2003). Self-esteem, personality and achievement in high school: A prospective longitudinal study in Texas. *Journal of Personality, 71*, 971-994.

Harter, S. (1978). Pleasure derived from optimal challenge and the effects of extrinsic

    reward on children's difficulty level choices. *Child Development, 49*, 788-799.

Harter, S. (1981). A new self-report scale of intrinsic versus extrinsic orientation in the

    classroom: Motivational and informational components. *Developmental*

    Psychology, 17, 300-312.

Hawkins, J. (1997). Giftedness and psychological types. *Journal of Secondary Gifted*

    Education, 9, 57-67.

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process*

    analysis. New York, NY: The Guilford Press.

Heaven, P. L. (1989). Attitudinal and personality correlates of achievement motivation

    among high school students. *Personality and Individual Differences, 11*, 705–710.

Hertberg-Davis, H. & Callahan, C.M. (2008). A narrow escape: Gifted students'

    perceptions of Advanced Placement and International Baccalaureate programs.

    Gifted Child Quarterly, 52, 199-216.

Hodgins, H. S., & Knee, C. R. (2002). The integrating self and conscious experience. In

    E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp.

    87-100). Rochester, NY: University Of Rochester Press.

Hofstee, W. K. B. (2001). Personality and intelligence: Do they mix? In J. Collis & S.

    Messick (Eds.*), Intelligence and personality: Bridging the gap in theory and*

    measurement (pp. 43-60). Mahwah, NJ: Erlbaum.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indices in covariance structure

    analysis: Conventional versus new alternatives. *Structural Equation Modeling, 6*,

    1-55.

Hwang, Y. S., Echols, C., & Vrongistinos, K. (2002). Multidimensional academic

    motivation of high achieving African American students. *College Student*

    Journal, 36(4), 544-554.

Hyde, J. S. (2005). The gender similarities hypothesis. *American Psychologist, 60*, 581–

    592.

Hyde, J. S., & Linn, M. C. (Eds.). (1986). *The psychology of gender: Advances through*

    meta-analysis. Baltimore, MD: John Hopkins University.

IBM SPSS (2013). *IBM SPSS statistics for Windows, Version 22.0*. Armonk, NY: IBM

    Corp.

Jackson, J. J., Hill, P. L., Payne, B. R., Roberts, B. W., & Stine-Morrow, E. A. L. (2012).

    Can an old dog learn (and want to experience) new tricks? Cognitive training

    increases openness in older adults. *Psychology and Aging*, *27*, 286–292.

Jackson, J. J., Wood, D., Bogg, T., Walton K. E., Harms, P. D., & Roberts, B. W. (2010).

    What do conscientious people do? Development and validation of the Behavioral

    Indicators of Conscientiousness (BIC). *Journal of Research in Personality, 44*,

    501-511.

John, O. P., & Srivastava, S. (1999). The Big-Five trait taxonomy: History, measurement,

    and theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), *Handbook of*

    personality: Theory and research (Vol. 2, pp. 102–138). New York: Guilford

    Press.

John, O. P., Donahue, E. M., & Kentle, R. L. (1991). *The Big Five Inventory – Versions*

    4a and 54. Berkeley, CA: University of California, Berkeley, Institute of

    Personality and Social Research.

John, O. P., Naumann, L. P., & Soto, C. J. (2008). Paradigm shift to the integrative Big Five trait taxonomy: History: measurement, and conceptual issue. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (pp. 114–158). New York, NY: Guilford.

Judge, T. A., & Bono, J. E. (2002). A rose by any other name: Are self-esteem, generalized self-efficacy, neuroticism, and locus of control indicators of a common construct? In B. W. Roberts & R. T. Hogan (Eds.), *Personality psychology in the workplace* (pp. 93–118). Washington, DC: American Psychological Association.

Jung, C. G. (1971). Psychological types. In H. Read, M. Fordham, G. Adler, & W. McGuire (Eds.), *The collected works of C. G. Jung* (pp. 3-7). Princeton, NJ: Princeton University Press.

Kanfer, R., Ackerman, P. L., & Heggestad, E. D. (1996). Motivational skills and self-regulation in learning: A trait perspective. *Learning and Individual Differences, 8,* 185–209.

Karsenti, T., & G. Thibert (1995, April). *What type of motivation is truly related to school achievement?* Paper presented at the American Educational Research Association Annual Convention, San Francisco, CA.

Kaufman, J. C., Agars, M. D., & Lopez-Wagner, M. C. (2008). The role of personality and motivation in predicting early college academic success in non-traditional students at a Hispanic-serving institution. *Learning and Individual Differences, 18,* 492−496.

Kilic-Bebek, E. (2009). *Explaining math achievement: Personality, motivation, and trust* (Unpublished doctoral dissertation). Cleveland State University, Cleveland, OH.

Kline, R. B. (2011). *Principles and practice of structural equation modeling* (3rd ed.). New York, NY: The Guilford Press.

Koestner, R., & Losier, G. F. (2002). Distinguishing three ways of being internally motivated: A closer look at introjections, identification, and intrinsic motivation. In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 101-121). Rochester, NY: The University of Rochester Press.

Koestner, R., Ryan, R. M., Bernieri, F., & Holt, K. (1984). Setting limits on children's behavior: The differential effects of controlling versus informational styles on intrinsic motivation and creativity. *Journal of Personality, 52*, 233-248.

Kohlberg, L. (1966). A cognitive-developmental analysis of children's sex-role concepts and attitudes. In E. E. Maccoby (Ed.), *The development of sex differences* (pp. 82-173). Stanford, CA: Stanford University Press.

Komarraju, M., & Karau, S. J. (2005). The relationship between the big five personality traits and academic motivation. *Personality and Individual Differences, 39*, 557-567.

Komarraju, M., Karau, S. J., & Scmeck, R. R. (2009). Role of the Big Five personality traits in predicting college students' academic motivation and achievement. *Learning and Individual Differences, 19*, 47–52.

Kuncel, N. R., Credé, M., & Thomas, L. L. (2005) The validity of self-reported grade point averages, class ranks, and test scores: A meta-analysis and review of the literature. *Review of Educational Research, 75*, 63-82.

Laidra, K., Pullman, H., & Allik, J. (2007). Personality and intelligence as predictors of academic achievement: A cross-sectional study from elementary and secondary school. *Personality and Individual Differences, 42*, 441-451.

Larsen, R. J., & Buss, D. M. (2002). *Personality psychology: Domains of knowledge about human nature*. Boston, MA: McGraw-Hill.

Lee, K., & Ashton, M. C. (*2004*). Psychometric properties of the HEXACO personality inventory. *Multivariate Behavioral Research, 39*, 329-358.

Little, R. J. A. (1988) A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association, 83*, 1198-1202.

Lo, Y., Mendell, N. R., & Rubin, D. B. (2001). Testing the number of components in a normal mixture. *Biometrika, 88*, 767-778.

Lynn, R., & Martin, T. (1997). Gender differences in extraversion, neuroticism, and psychoticism in 37 countries. *Journal of Social Psychology, 137*, 369-373.

Mac an Ghaill, M. (1994). *The making of men: Masculinities, sexualities, and schooling*. Buckingham, England: Open University Press.

MacCallum, R. C. (2003). Working with imperfect models. *Multivariate Behavioral Research, 38*, 113-139.

MacCallum, R. C., & Austin, J. T. (2000). Applications of structural equation modeling in psychological research. *Annual Reviews of Psychology, 51*, 201–226.

MacCallum, R. C., Browne, M. W., & Sugawara, H., M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods, 1*, 130-49.

MacCann, C., Duckworth, A. L., & Roberts, R. (2009). Empirical identification of the major facets of conscientiousness. *Learning and Individual Differences*, *19*, 451–458.

Magidson, J. F., Roberts, B. W., Collado-Rodriguez, A., & Lejuez, C. W. (2014). Theory-driven intervention for changing personality: Expectancy value theory, behavioral activation, and conscientiousness. *Developmental Psychology, 50*, 1442-1450.

Maltby, J., Day, L., & Macaskill, A. (2007). *Personality, individual differences and intelligence* (2nd ed.) Harlow, England: Prentice Hall.

Mammadov, S., & Topcu, A. (2014). The role of e-mentoring in mathematically gifted students' academic life: A case study. *Journal for the Education of the Gifted, 37*, 220-244.

Mammadov, S., Ward, T. J., Cross, T. L., & Cross, J. R. (in press). Use of latent profile analysis in studies of gifted students. *Roeper Review.*

Mardia, K. V. (1970). Measures of multivariate skewness and kurtosis with applications. *Biometrika, 57,* pp. 519–530.

Martin, L. T., Burns, R. M., & Schonlau, M. (2010). Mental disorders among gifted and nongifted youth: A selected review of the epidemiological literature. *Gifted Child Quarterly, 54*, 31–41.

Matthews, G., Deary, I., & Whiteman, A. (2009). *Personality traits*. Cambridge, UK: Cambridge University Press.

Matthews, M. S., & McBee, M. T. (2007). School factors and the underachievement of
gifted students in a talent search summer program. *Gifted Child Quarterly, 51*,
167-181.

McCall, R. B., Evahn, C., & Kratzer, L. (1992). *High school underachievers: What do
they achieve as adults?* Newbury Park, CA: Sage.

McClure, E. B. (2000). A meta-analytic review of sex differences in facial expression
processing and their development in infants, children, and adolescents.
Psychological Bulletin, 126, 424-453.

McCoach, D. B., & Siegle, D. (2003). Factors that differentiate underachieving gifted
students from high-achieving gifted students. *Gifted Child Quarterly, 47*, 144-
154.

McCrae, R. R., & Costa, P. T. Jr. (1987). Validation of the five-factor model of
personality across instruments and observers. *Journal of Personality and Social
Psychology, 52,* 81−90.

McCrae, R. R., & Costa, P. T. Jr. (1999). A five-factor theory of personality. In L. A.
Pervin & O. P. John (Eds.), *Handbook of personality* (pp. 139–153). New York,
NY: Guilford.

McCrae, R. R., & Costa, P. T. Jr. (1989). Rotation to maximize the construct validity of
factors in the NEO Personality Inventory. *Multivariate Behavioral Research, 24*,
107–124.

McCrae, R. R., & Costa, P. T., Jr. (1996). Toward a new generation of personality
theories: Theoretical contexts for the Five-Factor Model. In J. S. Wiggins (Ed.),

The Five-Factor Model of personality: Theoretical perspectives (pp. 51-87). New York, NY: Guilford Press.

McCrae, R. R., Costa P. T. Jr., Terracciano, A., Parker, W. D., Mills, C. J., De Fruyt, F., & Mervielde, I. (2002). Personality trait development from age 12 to age 18: Longitudinal, cross-sectional and cross-cultural analyses. *Journal of Personality and Social Psychology, 83*, 1456-1468.

McCrae, R. R., Costa, P. T. Jr., Terracciano, A., Parker, W. D., Mills, C. J., De Fruyt, F., … Mervielde, I. (2002). Personality trait development from age 12 to age 18: Longitudinal, cross-sectional, and cross-cultural analyses. *Journal of Personality and Social Psychology, 83*, 1456–1468.

McGeown S. P., Putwain, D., Simpson, E. G., Boffey, E., Markham, J., & Vince, A. (2014). Predictors of adolescents' academic motivation: Personality, self-efficacy and adolescents' characteristics. *Learning and Individual Differences, 32*, 278–286.

McIlroy, D., Poole, K., Ursavas, Ö. F., & Moriarty, A. (2015). Distal and proximal associates of academic performance at secondary level: A mediation model of personality and self-efficacy. *Learning and Individual Differences, 38*, 1-9.

McNabb, T. (2003). Motivational issues: Potential to performance. In N. Colangelo & G.A. Davis (Eds.). *Handbook of gifted education* (3rd Ed., pp. 417-423). Boston, MA: Allyn & Bacon, Inc.

Miller, J. W., Coombs, W. T., & Fuqua, D. R. (1999). An examination of psychometric properties of Bandura's Multidimensional Scales of Perceived Self-Efficacy. *Measurement and Evaluation in Counseling and Development, 31*, 186-197.

Miserandino, M. (1996). Children who do well in school: Individual differences in

    perceived competence and autonomy in above-average children. *Journal of*

    Educational Psychology, 88, 203-214.

Moen, R., & Doyle, K. O., Jr. (1977). Construction and development of the academic

    motivations inventory (AMI). *Educational and Psychological Measurement, 37*,

    509–512.

Moore, W. D., Hahn, W. G., & Brentnall, L. C. (*1978*). Academic achievement of gifted

    children: A comparative approach. *Exceptional Children, 44*, 618-619.

Moutafi, J., Furnham, A., & Crump, J. (2003). Demographic and personality predictors of

    intelligence: A study using the NEO Personality Inventory and the Myers–Briggs

    Type Indicator. *European Journal of Personality*, *17*, 79–94.

Moutafi, J., Furnham, A., & Crump, J. (2006). What facets of openness and

    conscientiousness predict fluid intelligence score? *Learning and Individual*

    Differences, *16*, 31–42.

Moutafi, J., Furnham, A., & Paltiel, L. (2004). Why is conscientiousness negatively

    correlated with intelligence? *Personality and Individual Differences, 37*, 1013–

    1022.

Moutafi, J., Furnham, A., & Paltiel, L. (2005). Can personality factors predict

    intelligence? *Personality and Individual Differences, 38*, 1021–1033.

Musselman, J.W. (1942). Factors associated with the underachievement of high school

    pupils of superior intelligence. *Journal of Experimental Education, 11*, 53–68.

Myers, I. B., & McCaulley, M. H. (1985a). *Manual: A guide to the development and use of the Myers-Briggs Type Indicator*. Palo Alto, CA: Consulting Psychologists Press.

Myers, I. B., & McCaulley, M. H. (1985b). *Gifted students from Arlington County: A guide to the development and use of the Myers-Briggs Type Indicator*. Palo Alto, CA: Consulting Psychologists Press.

NAGC (2010a). Redefining giftedness for a new century: Shifting the paradigm. Retrieved from https://www.nagc.org/sites/default/files/Position%20Statement/Redefining%20Giftedness%20for%20a%20New%20Century.pdf

NAGC (2010b). Pre-K-grade 12 gifted programming standards. Retrieved from: http://www.nagc.org/sites/default/files/standards/K-12%20programming%20standards.pdf

Neisser, U., Bouchard, T., Boykin, N., Ceci, S. J., Halpern, D. F., Loehlin, J. C., … Urbina, S. (1996). Intelligence: Knowns and unknowns. *American Psychologist, 51*, 77-101.

Noftle, E. E., & Robins, R. W. (2007). Personality predictors of academic outcomes: Big Five Correlates of GPA and SAT scores. *Journal of Personality and Social Psychology, 93*, 116-130.

O'Connor, M. C. & Paunonen, S. V. (2007). Big Five personality predictors of post-secondary academic performance. *Personality and Individual Differences, 43*, 971–990.

Olani, A. (2009). Predicting first year university students' academic success. *Electronic Journal of Research in Educational Psychology, 7*, 1053-1072.

Olszewski-Kubilius, P. M., Kulieke, M. J., & Krasney, N. (1988). Personality dimensions of gifted adolescents: A review of the empirical literature. *Gifted Child Quarterly, 32*, 347–352.

Pajares, F. (2002a). Overview of social cognitive theory and of self-efficacy. Retrieved from http://www.emory.edu/education/mfp/eff.html

Pajares, F. (2002b). Gender and perceived self-efficacy in self-regulated learning. *Theory into Practice, 41*(2), 116-125.

Pajares, F. (2007). Motivational role of self-efficacy beliefs in self-regulated learning. In B. J. Zimmerman & D. H. Schunk (Eds.), *Motivation and self-regulated learning: Theory, research, and applications* (pp. 111 - 140). New York, NY: Erlbaum.

Pajares, F., & Urdan, T. (Eds.). (2006). *Adolescence and education: Self-efficacy beliefs of adolescents.* Greenwich, CT: Information Age.

Pajares, F., & Valiante, G. (2001). Gender differences in writing motivation and achievement of middle school students: A function of gender orientation? *Contemporary Educational Psychology, 26*, 366-381.

Pajares, F., Britner, S., & Valiante, G. (2000). Writing and science achievement goals of middle school students. *Contemporary Educational Psychology, 25*, 406-422.

Pajares, F., Miller, M.D., & Johnson, M.J. (1999). Gender differences in writing self-beliefs of elementary school students. *Journal of Educational Psychology, 91*, 50-61

Paris, S., & Newman, R. (1990). Developmental aspects of self-regulated learning. *Educational Psychologist, 25*, 87–102.

Pastor, D. A., & Gagné, P. (2013). Mean and covariance structure mixture models. In G. R. Hancock & R. O. Mueller (Eds.), *Structural equation modeling: A second course* (2nd ed., pp. 343-393). Greenwich, CT: Information Age.

Pastorelli, C., Caprara, G. V., Barbaranelli, C., Rola, J., Rozsa, S., & Bandura, A. (2001). Structure of children's perceived self-efficacy: A cross-national study. *European Journal of Psychological Assessment, 17*, 87-97.

Payne, S. C., Youngcourt, S. S., & Beaubien, J. M. (2007). A meta-analytic examination of the goal orientation nomological net. *Journal of Applied Psychology, 92,* 128–150.

Peeters, J., De Backer, F., Reina, V. R., Kindekens, A., Buffel, T., & Lombaerts, K. (2014). The role of teachers' self-regulatory capacities in the implementation of self-regulated learning practices. *Procedia - Social and Behavioral Sciences, 116,* 1963-1970.

Peine, M., & Coleman, L. (2010). The phenomenon of waiting in class. *Journal of Gifted Education, 34*, 220-244.

Perkins, R., Kleiner, B., Roey, S., & Brown, J. (2004). *The high school transcript study: A decade of change in curricula and achievement, 1990–2000* (Report No. NCES 2004455).Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Phillips, P., Abraham, C., & Bond, R. (2003). Personality, cognition, and university students' examination performance. *European Journal of Personality, 17*, 35−448.

Pintrich, P. R., & De Groot, E. V. (1990). Motivation and self-regulated learning components of academic performance. *Journal of Educational Psychology, 82*, 33-40.

Pintrich, P. R., Cross, D. R., Kozma, R. B., & McKeachie, W. J. (1986) Instructional Psychology. *Annual Review of Psychology, 37*, 611-651.

Pintrich, P. R., Marx, R. W., Boyle, R. A. (1993). Beyond cold conceptual change: the role of motivational beliefs and classroom contextual factors in the process of conceptual change. *Review of Educational Research, 63*, 167–99.

Plucker, J. A., & McIntire, J. (1996). Academic survivability in high-potential, middle school students. *Gifted Child Quarterly, 40*, 7-14.

Pomerantz, E. M., Altermatt, E. R., & Saxon, J. L. (2002). Making the grade but feeling distressed: Gender differences in academic performance and internal distress. *Journal of Educational Psychology, 94*, 396 – 404.

Poropat, A. E. (2009). A meta-analysis of the five-factor model of personality and academic performance. *Psychological Bulletin*, *135*, 322–338.

Poropat, A. E. (2014). A meta-analysis of other-rated personality and academic performance. *Learning and Individual Differences, 34*, 24-32.

Puklek Leypušček, M., Zupančič, M., & Sočan, G. (2013). Predicting achievement in mathematics in adolescent students: The role of Individual and social factors. *Journal of Early Adolescence, 3*3, 523-551.

Putwain, D., Sander, P., & Larkin, D. (2013). Academic self-efficacy in study-related skills and behaviors: Relations with learning-related emotions and academic success. *British Journal of Educational Psychology, 83*, 633-650.

Rammstedt, B, & John, O. P. (2007). Measuring personality in one minute or less: A 10-item short version of the Big Five Inventory in English and German. *Journal of Research in Personality, 41*, 203-212.

Ratelle, C. F., Guay, F., Vallerand, R. J., Larose, S., & Sen*é*cal, C. (2007). Autonomous, controlled, and amotivated types of academic motivation: A person-oriented analysis. *Journal of Educational Psychology, 99*, 734-746.

Reed, S. E., & Westberg, K. L., (2003). Implementing enrichment clusters in a multiage school: Perspectives from a principal and consultant. *Gifted Child Today, 26*(4), 26-29.

Reeve, J. (2002). Self-determination theory applied to educational settings. In E. L. Deci, & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 183-205). Rochester, NY: The University of Rochester Press.

Reeve, J.*, & Jang, H. (2006)*. What teachers say and do to support students' autonomy during a learning activity. *Journal of Educational Psychology, 98*, 209-218

Reeve, J., Jang, H., Carrell, D., Jeon, S., & Barch, J. (2004). Enhancing students' engagement by increasing teachers' autonomy support. *Motivation and Emotion, 28*, 147–169.

Reeve, J., Ryan, R., Deci, E. L., & Jang, H. (2008). Understanding and promoting autonomous self-regulation: A self-determination theory perspective. In D. H. Schunk & B. J. Zimmerman (Eds.), *Motivation and self-regulated learning: Theory, research, and applications* (pp. 223-244). New York, NY: Erlbaum.

Reis, S. M. (2003). Reconsidering regular curriculum for high achieving students, gifted underachievers, and the relationship between gifted and regular education. In J. H.

Borland (Ed.). *Rethinking gifted education* (pp. 186-200). New York, NY:
Teacher's College Press.

Renzulli, J. S. (1978). What makes giftedness? Reexamining a definition. *Phi Delta Kappan, 60*, 180-184.

Renzulli, J. S., Reid, B. D., & Gubbins, E. J. (1990). *Setting an agenda: Research priorities for the gifted and talented through the year 2000*. Storrs, CT: The National Research Center on the Gifted and Talented, University of Connecticut.

Ridgell, S. D., & Lounsbury, J. W. (2004). Predicting academic success: general intelligence, Big Five personality traits, and work drive. *College Student Journal*, *38*, 607-619.

Ritchie, S.J., & Bates, T.C. (2013). Enduring links from childhood mathematics and reading achievement to adult socioeconomic status. *Psychological Science, 24*, 1301–1308.

Robbins, S. B., Lauver, K., Le, H., Davis, D., Langley, R., & Carlstrom, A. (2004). Do psychosocial and study skill factors predict college outcomes? A meta-analysis. *Psychological Bulletin, 130*, 271-288.

Roberts, B. W., & DelVecchio, W. F. (2000). The rank-order consistency of personality traits from childhood to old age: A quantitative review of longitudinal studies. *Psychological Bulletin, 126*, 3–25.

Robinson, N. M. (2003). *Academic motivation and its relationship to personality variables and achievement* (Unpublished doctoral dissertation). Southern Illinois University, Carbondale, IL.

Ross, C. E., & Van Willigen, M. (1996). Gender, parenthood, and anger. *Journal of Marriage and the Family, 58*, 572-584.

Rousseeuw P. J., & Van Zomeren B.C. (1990). Unmasking multivariate outliers and leverage points. *Journal of the American Statistical Association*, *85*, 633-651.

Rubenstein, L. D., Siegle, D., Reis, S. M., McCoach, D. B., & Burton, M. G. (2012). A complex quest: The development and research of underachievement interventions for gifted students. *Psychology in the Schools, 49*, 678–694.

Ryan, R. M., & Connell, J. P. (1989). Perceived locus of causality and internalization: Examining reasons for acting in two domains. *Journal of Personality and Social Psychology, 57*, 749-761.

Ryan, R. M., & Deci, E. L. (2000a). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*, 68–78.

Ryan, R. M., & Deci E. L. (2000b). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25*, 54–67.

Ryan, R. M., & Grolnick, W. S. (1986). Origins and pawns in the classroom: Self-report and projective assessments of individual differences in children's perceptions, *Journal of Personality and Social Psychology, 50*, 550-558.

Ryan, R. M., Deci, E. L., & Grolnick, W. S. (1995). Autonomy, relatedness, and the self: Their relation to development and psychopathology. In D. Cicchetti & D. J. Cohen (Eds.), *Developmental psychopathology: Theory and methods* (Vol 1, pp. 618-655). New York, NY: Wiley.

Ryan. R. M., & Deci, E. L (2002). Overview of self-determination theory: An organismic
dialectial perspective. In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 3-33). Rochester, NY: The University of Rochester
Press.

Sak, U. (2004). A synthesis of research on psychological types of gifted adolescents.
Journal of Secondary Gifted Education, 15, 70-79.

Saucier, G., & Goldberg, L. R. (1996). The language of personality: Lexical perspectives
on the Five-Factor Model. In J. S. Wiggins (Ed.), *Theoretical perspectives on the
Five-Factor Model* (pp. 21-50). New York, NY: Guilford Press.

Schick, H., & Phillipson, S. N. (2009). Learning motivation and performance excellence
in adolescents with high intellectual potential: What really matters? *High Ability
Studies, 20*, 15-37.

Schnell, K., Ringeisen, T., Raufelder, D., & Rohrmann, S. (2015). The impact of
adolescents' self-efficacy and self-regulated goal attainment processes on school
performance – do gender and test anxiety matter? *Learning and Individual
Differences*, *38*, 90-98.

Schunk, D. H. (1984). Self-efficacy perspectives on achievement behavior. *Educational
Psychologist, 19*, 48-58.

Schunk, D. H. (2001). Social cognitive theory and self-regulated learning. In B. J.
Zimmerman & D. H. Schunk (Eds.), *Self-regulated learning and academic
achievement: Theoretical perspectives* (2nd ed., pp. 125–151). Mahwah, NJ:
Lawrence Erlbaum Associates, Inc.

Schunk, D. H., & Pajares, F. (2002). The development of academic self-efficacy. In A.

    Wigfield & J. Eccles (Eds.), *Development of achievement motivation* (pp. 16–31).

    San Diego, CA: Academic Press.

Schunk, D. H., Zimmerman, B. J. (1994). *Self-Regulation of Learning and Performance*.

    Hillsdale, NJ: Erlbaum.

Schwarzer, R. (1998). Optimism, goals, and threats: How to conceptualize self-regulatory

    processes in the adoption and maintenance of health behaviors. *Psychology &*

    Health, 13, 759–766.

Seeley, K. (2004). Gifted and talented students at risk. *Focus on Exceptional Children,*

    37, 1-8.

Shamshuddin, S., Reddy, V. D., & Rao, D. B. (2007). *Value and academic achievement.*

    New Delhi, India: Discovery.

Sheldon, K. M. (2002). The self-concordance model of healthy goal striving: When

    personal goals correctly represent the person. In E. L. Deci & R. M. Ryan (Eds.),

    Handbook of self-determination research (pp. 65–86). Rochester, NY: The

    University of Rochester Press.

Sheldon, K. M., & Elliott, A. J. (1998). Not all personal goals are personal: Comparing

    autonomous and controlled reasons for goals as predictors of effort and

    attainment. *Personality and Social Psychology Bulletin, 24*, 546–557.

Shiner, R. L., & Masten, A. S. (2012). Childhood personality as a harbinger of

    competence and resilience in adulthood. *Development and Psychopathology, 24*,

    507-528.

Siegle, D., & McCoach, D. B. (2001). Promoting a positive achievement attitude with

　　gifted and talented students. *The social and emotional development of gifted

　　children: What do we know?* Waco, TX: Prufrock Press.

Soenens, B., & Vansteenkiste, M. (2005).Antecedents and outcomes of self-

　　determination in 3 life domains: The role of parents' and teachers' autonomy

　　support. *Journal of Youth and Adolescence*, *34*, 589–604.

Spoto, A. (1995). *Jung's typology in perspective* (Rev. ed). Wilmette, IL: Chiron.

Steiger, J. H., & Lind, J. C. (1980, May). *Statistically based tests for the number of

　　factors*. Paper presented at the annual spring meeting of the Psychometric Society,

　　Iowa City, IA.

Sternberg, R. J., & Kaufman, J. C. (1998). Human abilities. *Annual Review of

　　Psychology, 49*, 479-502.

Sternberg, R. J., Grigorenko, E. L., & Bundy, D. A. (2001). The predictive value of IQ.

　　Merrill-Palmer Quarterly, 47, 1–41.

Stolarski, M., Zajenkowski, M., & Meisenberg, G. (2013). National intelligence and

　　personality: Their relationships and impact on national economic success.

　　Intelligence, 41, 94-101.

Strus, W., Cieciuch, J., Rowiński, T. (2014). The circumplex of personality metatraits: A

　　synthesizing model of personality based on the Big Five. *Review of General

　　Psychology, 18*, 273–286.

Subotnik, R. F., Olszewski-Kubilius, P., & Worrell, F. C. (2011). Rethinking giftedness

　　and gifted education: A proposed direction forward based on psychological

　　science. *Psychological Science in the Public Interest*, *12*, 3-54.

Taylor, G., Jungert, T., Mageau, G. A., Schattke, K., Dedic, H., Rosenfield, S., &
Koestner, R. (2014). A self-determination theory approach to predicting school
achievement over time: The unique role of intrinsic motivation. *Contemporary
Educational Psychology, 39*, 342–358.

Thorndike, E. L. (1920). Intelligence examinations for college entrance. *Journal of
Educational Research, 1*, 329–337.

Traag, T., van der Valk, J., van der Velden, R., de Vries, R., & Wolbers, M. H. J. (2005).
Why does education matter? Explaining the effect of the highest level of
education attained by school leavers on their labor market position. *Pedagogische
Studiën, 82,* 453–469.

Trautwein, U., Ludtke, O., Roberts, B. W., Schnyder, I., & Niggli, A. (2009). Different
forces, same consequences: Conscientiousness and competence beliefs are
independent predictors of academic effort and achievement. *Journal of
Personality and Social Psychology, 97*, 1115–1128.

Ullman, J. B. (2006). Structural equation modeling: Reviewing the basics and moving
forward. *Journal of Personality Assessment, 87*, 35-50.

Usher, E. L., & Pajares, F. (2008). Self-efficacy for self-regulated learning: A validation
study. *Educational and Psychological Measurement, 68*, 443-463.

Vallerand, R. J. (1997). Toward a hierarchical model of intrinsic and extrinsic
motivation. In M. P. Zanna (Ed.), *Advances in experimental social psychology*
(Vol. 29, pp. 271-360). San Diego, CA: Academic Press.

Vallerand, R. J., & Ratelle, C. F. (2002). Intrinsic and extrinsic motivation: A

hierarchical model. *Handbook of self-determination research* (pp. 37-63).

Rochester, NY: The University of Rochester Press.

Vallerand, R. J., Blais, M. R., Briere, N. M., & Pelletier, L. G. (1989). Construction and

validation of the Motivation Toward Education Scale. *Canadian Journal of

Behavioural Science Revue Canadienne*, *21*, 323-349.

Vallerand, R. J., Gagn*é*, F., Senecal, C., & Pelletier, L. G. (1994). A comparison of

school intrinsic motivation and perceived competence of gifted and regular

students. *Gifted Child Quarterly, 38*, 172-175.

Vallerand, R. J., Pelletier, L. G., Blais, M. R., Briere, N. M., Senecal, C., & Vallieres, E.

F. (1992). The academic motivation scale: A measures of intrinsic, extrinsic, and

amotivation in education. *Educational and Psychological Measurement, 52*,

1003-1017.

Van Houtte, M. (2004). Why boys achieve less at school than girls: The difference

between boys' and girls' academic culture. *Educational Studies, 30*, 159–173.

Vansteenkiste, M., Smeets, S., Soenens, B., Lens, W., Matos, L., & Deci, E. L. (2010).

Autonomous and controlled regulation of performance-approach goals: Their

relations to perfectionism and educational outcomes. *Motivation and Emotion, 34*,

333-353.

Vansteenkiste, M., Zhou, M., Lens, W., & Soenens, B. (2005). Experiences of autonomy

and control among Chinese learners: Vitalizing or immobilizing. *Journal of

Educational Psychology, 97*, 468–483.

Vecchione, M., Alessandri, G., & Marsicano, G. (2014). Academic motivation predicts educational attainment: Does gender make a difference? *Learning and Individual Differences*, *32*, 124-131.

Vermetten, I. E., Lodewijks, H. G., & Vermunt, J. D. (2001). The role of personality traits and goal orientations in strategy use. *Contemporary Educational Psychology, 26*, 149-170.

Wagerman, S. A., & Funder, D. C. (2007). Acquaintance reports of personality and academic achievement: A case for conscientiousness. *Journal of Research in Personality, 41*, 221–229.

Wagner, J. A., & Moch, M. A. (1986). Individualism-collectivism: Concept and measures. *Group and Organization Studies, 11*, 280-303.

Wentzel, K. R. (2002). Are effective teachers like good parents? Teaching styles and student adjustment in early adolescence. *Child Development, 73*, 287-301.

White, R. W. (1959). Motivation reconsidered: The concept of competence. *Psychological Review, 66*, 297-333.

Whitmore, J. R. (1980). *Giftedness, conflict, and underachievement.* Boston, MA: Allyn & Bacon

Williams, G. C. (2002). Improving patients' health through supporting the autonomy of patients and providers. In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination theory* (pp. 233-254). Rochester, NY: The University of Rochester Press.

Wilson, P. M., Sabiston, C. M., Mack, D. E., & Blanchard, C. M. (2012). On the nature and function of scoring protocols used in exercise motivation research: An

empirical study of the behavioral regulation in exercise questionnaire. *Psychology of Sport and Exercise, 13*, 614–622.

Winner, E. (1996). *Gifted children: Myths and realities*. New York, NY: Basic Books.

Winner, E. (2000). The origins and ends of giftedness. *American Psychologist, 55*, 159-169.

Winstead, B. A., Derlega, V. J., & Unger, R. K. (1999). Sex and gender. In V. J. Derlega, B. A. Winstead, & W. H. Jones (Eds.), *Personality: Contemporary theory and research* (2nd ed., pp. 257-281). Chicago, IL: Nelson-Hall.

Wolf, M. B., & Ackerman, P. L. (2005). Extraversion and intelligence: A meta-analytic investigation. *Personality and Individual Differences, 39*, 531–542.

Wolfe, R. N., & Johnson, S. D. (1995). Personality as a predictor of college performance. *Educational and Psychological Measurement, 55*, 177-185.

Zeidner, M., & Matthews, G. (2000). Intelligence and personality. In R. Sternberg (Ed.), *Handbook of intelligence* (pp. 581–610). New York, NY: Cambridge University Press.

Zeidner, M., & Shani-Zinovich, I. (2011). Do academically gifted and nongifted students differ on the Big-Five and adaptive status? Some recent data and conclusions. *Personality and Individual Differences, 51*, 566-570.

Zhou, M. (2015). Moderating effect of self-determination in the relationship between Big Five personality and academic performance. *Personality and Individual Differences, 86*, 385-389.

Zimmerman, B. J. (1981). Social learning theory and cognitive constructivism. In I. E. Sigel, D. M. Brodzinsky, & R. M. Golinkoff (Eds.), *New directions in Piagetian theory and practice* (pp. 39-49). Hillsdale, NJ: Erlbaum.

Zimmerman, B. J. (1983). Social learning theory: A contextualist account of cognitive functioning. In C. J. Brainerd (Ed.), *Recent advances in cognitive developmental theory* (pp. 1-49). New York, NY: Springer.

Zimmerman, B. J. (1989). Models of self-regulated learning and academic achievement. In B. J. Zimmerman & D. H. Schunk (Eds.), *Self-regulated learning and academic achievement: Theory, research, and practice* (pp. 1-25). New York, NY: Springer.

Zimmerman, B. J. (1994). Dimensions of academic self-regulation: A conceptual framework for education. In D. H. Schunk & B. J. Zimmerman (Eds.), *Self-regulation of learning and performance: Issues and educational applications* (pp. 3-21). Mahwah, NJ: Erlbaum.

Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 13-39). San Diego, CA: Academic Press.

Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into Practice, 41*, 64-70.

Zimmerman, B. J., & Bandura, A. (1994). Impact of self-regulatory influences on writing course attainment. *American Educational Research Journal, 31*, 845-862.

Zimmerman, B. J., & Kitsantas, A. (2005). Homework practices and academic
        achievement: The mediating role of self-efficacy and perceived responsibility
        beliefs. *Contemporary Educational Psychology, 30*, 397–417.

Zimmerman, B. J., & Martinez-Pons, M. (1986). Development of a structured interview
        for assessing students' use of self-regulated learning strategies. *American
        Educational Research Journal, 23,* 614–628.

Zimmerman, B. J., & Martinez-Pons, M. (1988). Construct validation of a strategy model
        of student self-regulated learning. *Journal of Educational Psychology, 80*, 284-
        290.

Zimmerman, B. J., & Martinez-Pons, M. (1990). Student differences in self-regulated
        learning: Relating grade, sex, and giftedness to self-efficacy and strategy use.
        Journal of Educational Psychology, 82, 51-59.

Zimmerman, B. J., & Schunk, D. H. (1989). *Self-regulated learning and academic
        achievement: Theory, research, and practice.* New York, NY: Springer-Verlag.

Zimmerman, B. J., Bandura, A., & Martinez-Pons, M. (1992). Self-motivation for
        academic attainment: The role of self-efficacy beliefs and personal goal setting.
        American Educational Research Journal, 29, 663-676.

Zimmerman, B.J., & Schunk, D.H. (2004). Self-regulating intellectual processes and
        outcomes: Social cognitive perspective. In D.Y. Dai, & R.J. Stenberg (Eds.),
        *Motivation, emotion, and cognition: Integrative perspectives on intellectual
        functioning and development* (pp. 323-350). Mahwah, NJ: Erlbaum.

Zuffianò, A., Alessandri, G., Gerbino, M., Luengo Kanacri, B. P., Di Giunta, L., Milioni,
        M., & Caprara, G. V. (2013). Academic achievement: The unique contribution of

self-efficacy beliefs in self-regulated learning beyond intelligence, personality

traits, and self-esteem. *Learning and Individual Differences, 3,* 158-162.