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Personality and Academic Motivation: Replication, Extension, and Replication

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Abstract

Previous work examines the relationships between personality traits and intrinsic/extrinsic motivation. We replicate and extend previous work to examine how personality may relate to achievement goals, efficacious beliefs, and mindset about intelligence. Approximately 200 undergraduates responded to the survey with a 150 participants replicating the study two weeks later. When comparing data from the first and second collections, three of the five pathways for personality and achievement goals were replicated: neuroticism, openness, and agreeableness. For personality and efficacy three of the eight pathways remained significant from the first collection to the second. Openness was the only personality factor that significantly predicted participants' mindset about their intelligence. Results suggest certain personality traits may correspond with different motivational self-beliefs, but these results were neither reliable nor consistent.

Keywords: personality, motivation, self-efficacy, achievement goals, mindset.

Personalidad y Motivación Académica: Réplica, Extensión y Réplica

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Resumen

Investigación previa ha examinado las relaciones entre rasgos de la personalidad y la motivación intrínseca/extrínseca. Replicamos y extendemos ese trabajo previo para examinar cómo la personalidad se puede relacionar con objetivos de rendimiento, creencias de eficacia y actitud sobre la inteligencia. Aproximadamente, 200 estudiantes de grado respondieron a una encuesta con 150 participantes replicando el estudio dos semanas más tarde. Cuando se compararon los datos de la primera y segunda fases de recogida de información, tres de los cinco perfiles de personalidad y objetivos de rendimiento se replicaron: neuroticismo, apertura y simpatía. Para personalidad y eficacia, tres de los ocho perfiles permanecieron significativos entre la primera y segunda recogida de datos. Apertura fue el único factor de personalidad que predijo de forma significativa la actitud de los participantes sobre la inteligencia. Los resultados sugieren que ciertos rasgos de la personalidad se podrían corresponder con creencias motivacionales diferentes, pero estos resultados no fueron fiables ni constantes.

Palabras clave: personalidad, motivación, auto-eficacia, orientación de logro, actitud

Students' academic motivation plays an integral role in school achievement and school engagement, but there is ongoing discussion about students' motivational antecedents (Fiske, 2008; Pintrich, 2003; Weiner, 1990). Students' academic motivation may come from cognitive beliefs, past academic experiences, affective states, and socio-contextual influences (Ryan & Deci, 2000; Fiske, 2008; Pintrich, 2003). Academic motivation may also parlay with students' personality traits (Komarraju & Karua, 2005; Watanabe & Kanazawa, 2009). Previous studies correlate personality traits and academic motivation (Ariani, 2013; Clark & Schroth, 2010; De Feyter, Caers, Vigna & Berings, 2012; Hazrati-Viari, Rad & Torabi, 2012; Heaven, 1990; Komarraju & Karua, 2005; Komarraju, Karua & Schmeck, 2009; Watanabe & Kanazawa, 2009). Other research suggests that academic motivation does not correspond with personality traits (Matthews, Zeidner, & Roberts, 2006; Fiske, 2008; Pintrich, 2003; Weiner, 1990). The extant literature offers conflicting reports on whether personality aligns with academic motivation, which inhibits researchers and teachers from understanding what intrapersonal factors affect students' motivation and, ultimately, achievement.

For over 50 years, psychological research debated whether personality traits relate with academic motivation (Matthews et al., 2006). One argument suggests that self-determination theory supports a relationship between personality and academic motivation, whereby more intrinsically motivated people hold certain personality traits (Hazrati-Viari et al., 2012; Komarraju & Karua, 2009). These studies suggest a correlation between personality and motivation since an individual with a highly conscientious personality type may also have a higher degree of intrinsic motivation (Komarraju & Karua, 2005). Other work suggests that academic motivation is more influenced by contextual factors than inherit personality traits (Ciani, Summers, & Easter, 2008; Ciani, Middleton, Summers, & Sheldon, 2010). Further, though personality is a general trait, individual expressions of personality vary situationally, making it difficult to link specific personality traits with behaviors known to affect learning outcomes (Bem & Allen, 1974).

Previous work linking personality with academic motivation also relies upon a general definition of intrinsic motivation (see Table 1). A general view toward intrinsic motivation is no longer widely accepted within the field of academic motivation research (Pintrich, 2003; Weiner, 1990). Instead, intrinsic academic motivation consistent of multiple psychological constructs that simultaneously affect a student's desire to learn. In addition, few studies attempt study replication. The current study hopes to address these disparities by replicating and extending previous empirical findings with current achievement motivational theories (achievement goals, self-efficacy, and mindset). In addition, we replicate our own findings to test for reliability. Given the historical and current foci on personality and academic motivation, the study may provide additional support as to the role of students' personality in academic motivation.

Personality: A Brief Overview

The most commonly occurring personality factors include neuroticism, extroversion, agreeableness, openness, and conscientiousness (e.g., Costa & McCrae, 1985). Each of these personality factors are considered to be distinct from each other. Neuroticism refers to people who feel anxiety, hostility, depression, and impulsiveness (Judge, Higgins, Thoresen, & Barrick, 1999). Extroversion refers to an individual who is enthusiastic, sociable, active, and talkative (Komarraju & Karua, 2005). Agreeableness is being sympathetic, trusting, cooperative, and helpful (Komarraju & Karua, 2005). Openness to experience includes being imaginative, autonomous, nonconforming, and philosophical (Judge et al., 1999). Conscientiousness is characterized as someone who is organized, self-controlled, and purposeful (Komarraju & Karua, 2005). Most of the literature suggests that conscientiousness and openness predict motivation, but fewer studies explain how neuroticism, agreeableness, and extroversion link with motivation (Clark & Schroth, 2010; Komarraju & Karua, 2005; Komarraju et al., 2009). The NEO-FFI was the most commonly used measure for personality, but different scales were used to measure motivation. Conscientiousness consistently predicted both academic and intrinsic motivation regardless of measures used, but few other correlations between personality and motivation were found (see Table 1).

Table 1
Correlations between motivation and personality

Tests used to Measure Motivation	What the Tests Measure	Personality Measurement used to Correlate with Motivation	Correlations found between Personality and Intrinsic Motivation	Correlations found between Personality and Extrinsic Motivation
Academic Motivation Inventory	19 scales to measure motivation: thinking motives, achieving motives, persisting motives, competing motives, influencing motives, facilitating anxiety, grades orientation, economic orientation, desire for self-improvement, demanding, affiliating motives, withdrawing motives, approval motives, debilitating anxiety, dislike school, discouraged about school, male continuance, female continuance, and male GPA.	NEO FFI to measure personality	Consciousness and openness to experience (Komarraju & Karua 2005)	
Academic Motivation Scale	Measures: amotivation, three ordered subscales of extrinsic motivation: external, introjected, and identified regulation. Three unordered subscales of intrinsic motivation: to know, to accomplish things, to experience stimulation.	NEO FFI to measure personality (Komarraju & Karua 2005; Hazrati-Viari et al., 2012), 50 Big Five Factor Markers scale (Clark & Schroth 2010)	Consciousness and openness to experience (Komarraju & Karua, 2009, Hazrati-Viari et al., 2012). Consciousness, agreeableness, and extroversion (Clark & Schroth 2010).	Consciousness, neuroticism, extroversion (Komarraju & Karua, 2009). Consciousness (Hazrati-Viari et al., 2012).
Learning and Study Strategies Inventory	This motivation scale measures students' self-discipline, diligence, and willingness to apply the effort needed to successfully complete academic requirements.	NEO FFI to measure personality	Consciousness (De Feyter et al., 2012)	
Constructed a New Scale for the Study	Constructed an eight item intrinsic motivation scale. Which included questions like, "I am willing to undertake challenging jobs even if successfully performing them will not result in a promotion" (Watanabe & Kanazawa, 2009). Intrinsic and extrinsic motivation scales taken from 30 items from Lepper et al., (2005) (Ariani, 2013).	To assess levels of conscientiousness and openness to experience extracted twelve measures from McCrae and Costa's eighty bipolar adjective scales (Watanabe & Kanazawa, 2009). Personality had 44 items taken from Hart, Stasson, Mahoney, and Story (2007) (Ariani, 2013).	Consciousness and openness to experience (Watanabe & Kanazawa 2009; Ariani, 2013).	

Achievement Goals and Personality Traits

Goals are the academic purpose or motive that describes what a student hopes to achieve through in an academic endeavor (Ames, 1992; Pintrich, 2000). Current achievement goal theory suggests that individuals hold mastery and performance goals. Both mastery and performance goals can include either approach or avoid factors (Elliot, 1999; Finney, Pieper, & Barron, 2004). Mastery-approach goals refer to student's desire to develop their own intellectual abilities (Ames, 1992; Elliot & McGregor, 2001). Performance-approach goals are the impetus for outperforming others or demonstrating some level of competency (Ames, 1992; Senko, Hulleman, & Harackiewicz, 2011). Performance-avoid goals include students' desire to not appear academically inferior to others.

There is little research on achievement goal theory that attempts to relate with students' goals with their personality traits. The literature suggests that avoid goals positively correlate with neuroticism and extroversion personality traits (Komarraju & Karua, 2005). In addition, avoid goals negatively correlate with conscientiousness and openness to experience traits (Komarraju & Karua, 2005).

Mindset and Personality

Individuals often hold domain-specific beliefs about the malleability of one's abilities, which are termed implicit theories of ability, or mindsets (Dweck, 1999; Yeager & Dweck, 2012). Mindset orientations are either fixed or growth. When an individual believes their ability cannot change, then they hold a fixed mindset. In contrast, an individual has a growth mindset when that individual believes ability can be improved or altered. Students with a growth mindset often have higher academic achievement and greater academic resiliency (Yeager & Dweck, 2012).

Mindset may also correspond with students' personality (Furnham, Chamorro-Premuzic, & McDougall, 2003). Conscientiousness significantly correlates with mindset, and to a lesser degree extraversion (Furnham et al., 2003), and Personality can shape ideas about mindsets for intelligence (Furnham et al., 2003).

Efficacious Self-Beliefs and Personality

Efficacious self-beliefs are domain-specific perceptions regarding the extent to which individuals feel competency over their own abilities (Bandura, 1977, 1986). This study utilizes two specific efficacious beliefs: academic self-efficacy and teacher efficacy. Academic self-efficacy beliefs are subject-specific concepts of one's ability. Teacher efficacy is a teacher's self-perception to positively affect student learning and classroom management (Tschannen-Moran, & Woolfolk-Hoy, 2001; Tschannen-Moran, Woolfolk-Hoy, & Hoy, 1998).

As noted by Klassen, Tze, Betts, and Gordon (2011), the sources of teacher efficacy are not fully understood. Some work suggests a reciprocal relationship between teacher efficacy and classroom instructional practices (Holzberger, Philipp, & Kunter, 2013). More commonly, research suggests that self-efficacy beliefs stem from mastery experiences, vicarious experiences, verbal persuasion, and one's mood (Bandura, 1997; Chen & Usher, 2013; Usher, 2009). Currently, some research seems to suggest that personality may play a role with a person's self-efficacy such as, personality traits could be an additional source of efficacious beliefs since intrapersonal factors can affect self-efficacy (Ariani, 2013; Clark & Schroth, 2010; Furnham et al., 2003).

Present Study

The current work hopes to address some historical and contemporary issues regarding the relationships between academic motivation and personality. We replicate previous work suggesting that certain personality traits correspond with intrinsic and extrinsic motivation. We extend this work by examining how personality might relate with achievement goals, efficacious beliefs and mindset about intelligence. These analyses are then replicated two weeks later to see if whether our results were reliable. To our knowledge, this is the first study to replicate its own results regarding personality and academic motivation. Findings should provide additional understanding as to the potential role of personality in students' academic motivation.

Methods

Participants

The study included two waves of data collection. In both wave 1 and wave 2, participants were undergraduates at a large university participating in required coursework for a teacher education program. Wave 1 data collection included 205 participants ($n_{\text{women}} = 156, 76\%$; $n_{\text{men}} = 48, 23\%$, $n_{\text{other gender}} = 1, 1\%$), with 92 self-reporting as Non-Hispanic/White (45%), 69 Hispanic/Latino/a (34%), 14 multicultural (7%), 12 indigenous persons (6%), “other” 8 (4%), 7 Black/African American (3%), and 3 Asian American (1%). Ages ranged from 18 to 63 years old ($M = 24$ years old; $Mdn =$ of 22 years old).

Wave 2 data collection included 162 participants ($n_{\text{women}} = 126, 78\%$; $n_{\text{men}} = 36, 22\%$). Wave 2 included 150 participants from wave 1 (73% retention rate) and 12 new participants (7% of second wave participants). Wave 2’s participants self-reported as 72 non-Hispanic/White (44%), 59 Hispanic/Latino/a (36%), 12 multicultural (7%), 9 indigenous persons (6%), 4 “other” (3%), 3 Black/African American (2%), and 3 Asian American (2%). Ages were from 18 to 63 years old ($M = 24$ years old; $Mdn = 21$ years old).

Measures

Personality. Participants’ self-ratings of personality came from the Little Big-5 Questionnaire (Little & Wanner, 1996). The instrument measures the five major personality traits: neuroticism, openness, agreeableness, conscientiousness, and extroversion (Costa & McCrae, 1985). The questionnaire included 43 items measuring neuroticism (9 items; e.g., “I often worry about what others might think of me.”), openness (9 items; e.g., “I am open to new experiences.”), agreeableness (9 items; e.g., “I try to see the good in everyone.”), conscientiousness (9 items; e.g., “Even when a task is difficult I want to solve it anyway.”), and extroversion (7 items; e.g., “I prefer to be together with others than to be alone.”). Likert-like scales ranged from 1 (strongly disagree) to 7 (strongly agree). All scales had good internal reliabilities in both waves of data collection (see Table 2).

Table 2
Descriptive Statistics

Scale	Wave 1			Wave 2		
	M	SD	α	M	SD	α
Personality						
Openness	5.74	.64	.78	5.67	.71	.85
Agreeableness	5.94	.62	.86	5.86	.63	.89
Conscientiousness	5.41	.81	.81	5.41	.80	.85
Extroversion	4.84	.79	.75	4.79	.82	.81
Neuroticism	4.15	1.08	.84	4.08	.99	.85
Achievement Goals						
Mastery-approach	5.77	.80	.90	5.80	.86	.93
Performance-approach	3.78	1.34	.92	3.87	1.38	.94
Performance-avoid	4.07	1.42	.86	4.09	1.40	.90
Efficacious Beliefs						
Self-efficacy	5.95	.74	.88	6.01	.81	.93
Teacher efficacy	7.20	.95	.91	7.22	1.01	.94
Mindset	4.50	1.08	.94	4.46	1.18	.96

Achievement Goals. Three scales from the Pattern of Adaptive Learning Scales measured students' achievement goals: mastery-approach, performance-approach, and performance-avoid (PALS; Midgley, et al., 2000). The mastery-approach and performance-approach scale includes five items each (e.g., mastery-approach, "One of my goals in class is to learn as much as I can."; e.g., performance-approach, "One of my goals is to show others that I'm good at my class work."), whereas the performance-avoid scale had four items (e.g., "One of my goals in class is to avoid looking like I have trouble doing the work").

The achievement goals scales are one of the most prominent and validated achievement goal measures (Huang, 2011, 2012; Midgley, et al., 1998). PALS items are designed to be subject specific. Therefore, items referenced participants' educational psychology course. Response scales were Likert-like (7 = strongly disagree to 1 = strongly agree). Internal reliabilities were strong across both wave 1 and wave 2 (see Table 2).

Mindset. Four items gauged participants' mindset for intelligence (e.g., "You have a certain amount of intelligence, and you can't really do much to change it."); Dweck, 1999). Prior studies validated and extensively employed the instrument (Blackwell, Trzesniewski, & Dweck, 2007; Chiu, Hong, & Dweck, 1997; Dweck, 1999; 2006; 2012). Scores were on a 6-point scale from 1 = strongly disagree to 6 = strongly agree. Scores were then reverse-coded, so that higher scores indicate a growth mindset. The present study's descriptive statistics and internal reliabilities are found in Table 2.

Efficacious Beliefs. Two types of efficacious beliefs were measured in this study: academic self-efficacy and teacher efficacy. Academic self-efficacy items came from PALS (Midgley, et al., 2000). Five questions assessed students' academic self-efficacy. The wording of all five items reflected students' academic self-efficacy for their educational psychology class (e.g., "Even if the work is hard in my educational psychology class, I can learn it"). Internal reliabilities were strong (see Table 2). Previous work suggests the scale to be both valid and reliable (Patrick Hicks, & Ryan, 1997; Ryan, Gheen, & Midgley, 1998).

The second efficacious beliefs scale measured pre-service teachers' beliefs regarding their teacher efficacy. Twelve items measured self-perceptions of effective classroom management and pedagogical ability (e.g., "How much can you do to motivate students who show low interest in school work?"). Only a single factor is computed with this scale for pre-service teachers as noted in Fives and Buehl (2010). All items came from the Teachers' Sense of Efficacy Scale (Fives & Buehl, 2010), which was based on the work of Tschannen-Moran and Woolfolk-Hoy (2001). Prior work validates the Teachers' Sense of Efficacy as an accurate measurement of teacher efficacy (Fives & Buehl, 2010; Tschannen-Moran & Woolfolk-Hoy, 2001).

Procedure

Wave 1 and wave 2 of data collection were at the end of the fall semester. Average delay between data collections was 14 days. Participants answered all surveys online. Participants received partial credit for a psychology course in return for their participation. All students' information was collected anonymously.

Results

Three separate sets of analyses are presented regarding personality and academic motivation. The first set of analyses examines the relationships among personality characteristics and achievement goals. The second set of analyses investigates the relationships among participants' personality traits and their efficacious beliefs. The final set of analyses involves the role of personality in contributing to participants' mindset. For all sets of analyses, the results from waves 1 and 2 are presented.

Preliminary Data Analyses

We tested for potential differences between participants who did and did not complete both waves of data collection. For personality, a Multivariate Analysis of Variance (MANOVA) suggested no significant differences between participants with one or two data points, $F(5, 199) = 1.49, p = .19$. A MANOVA suggested no differences for achievement goals, $F(3, 201) = 2.49, p = .06$, nor for teacher efficacy and self-efficacy, $F(2, 202) = .35, p = .71$. An analysis of variance suggested no difference in mindset for those participating in one or both waves of data collection, $F(1, 203) = .08, p = .79$. These results suggest little difference between students who completed one or both waves of data collection.

Personality and Achievement Goals

A path analyses tested the relationships among participants' personality traits and achievement goals (see [Figure 1](#)).

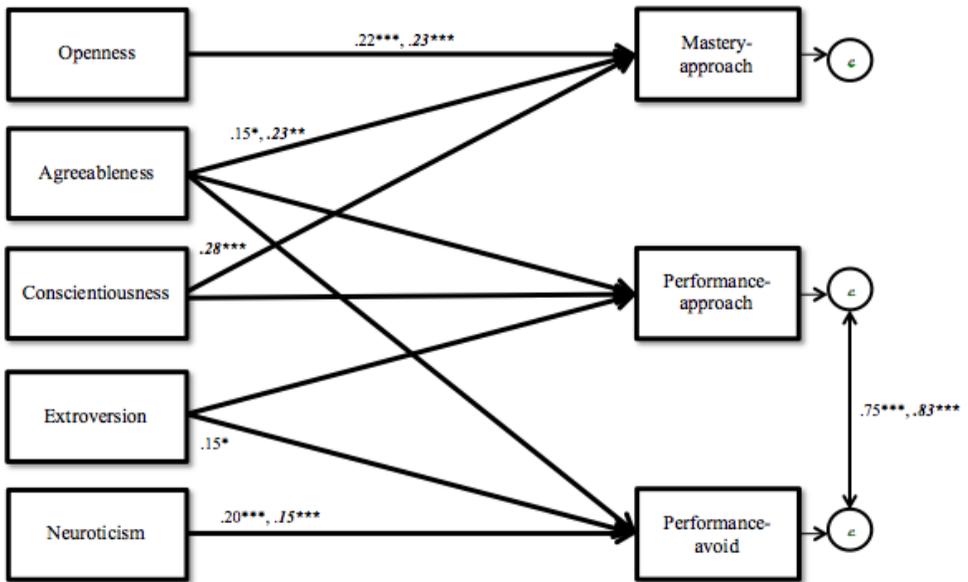


Figure 1. Path analysis between personality and achievement goals. Correlations among personality traits are inside Table 2. Non-italicized coefficients are from wave 1. Italicized and bolded coefficients are from wave 2. *** $p \leq .001$, * $p \leq .05$.

As part of the path analysis, we correlated certain personality traits with each other in the first second waves of data collection. These correlations were based upon prior research showing significant interrelationships among personality traits (Ariani, 2013; Clark & Schroth, 2010; De Feyter et al., 2012; Hazrati-Viari et al., 2012; Komarraju & Karua, 2005; Komarraju et al., 2009; Watanabe & Kanazawa, 2009). Correlational results are found in Table 3 for both waves of data.

Table 3
Correlations among variables in figures 1 and 2

	Openness	Agreeableness	Conscientiousness	Extroversion	Neuroticism
Openness	--	.40***, .45***	.36***, .38***	.17*, .28***	n/a
Agreeableness	.45***, .40**	--	.32***, .29***	.28***, .40***	n/a
Conscientiousness	.38***, .36***	.29***, .32***	--	.16*, .13^{n.s.}	-.17**, -.19**
Extroversion	.28***, .17*	.40***, .28***	.13 ^{n.s.} , .16*	--	n/a
Neuroticism	n/a	n/a	-.19**, -.17*	n/a	--

Note. Figure 1 data are below the diagonal, whereas Figure 2 scores are above the diagonal. First wave data is on the left, with second wave data bolded, italicized, and on the right. n/a = correlations were not run. *** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$, ^{n.s.} non-significant.

Path analysis fit indices for wave 1 suggested adequate model fit, $\chi^2 (11, n = 205) = 23.60, p = .02, CFI = .96, RMSEA = .08$. Significant and positive paths included the relationship between openness and agreeableness with mastery-approach goals. Extroversion and neuroticism positively related with performance-avoid goals. In the first wave of data collection, no personality traits related with performance-approach goals.

Wave 2 of data collection replicated some, but not all, of the paths between personality traits and achievement goals. Model fit was slightly improved in the second wave of data collection, $\chi^2 (11, n = 162) = 9.21, p = .60, CFI = .90, RMSEA = .01$. As in wave 1, openness and agreeableness positively and significantly related with mastery-approach goals. The positive relationship between neuroticism and performance-avoid goals was also replicated in the second wave of data collection. In contrast, extroversion did not relate with performance-avoid goals. Unlike wave 1, conscientiousness did significantly relate with mastery-approach goals. In sum, three of the five pathways (60%) were replicated between waves 1 and 2.

Personality and Mindset

The second set of analyses examined whether personality traits might relate with participants' mindset toward their intelligence. As there was only a single outcome variable (mindset), we ran a regression analysis for both wave 1 and 2. All five personality traits were entered simultaneously as predictor variables.

Results from the wave 1 included a significant regression model, $F (5, 199) = 3.81, p = .003$. Though the model was significant, results suggested that personality traits explained only a small portion of the variance, $Adj. R^2 = .06$. Indeed, only a single personality trait predicted students' mindset. Openness was positively related with having a growth mindset, $\beta = .16, p = .04$.

Wave 2 replicated results from wave 1. The wave 2 model was significant, $F (5, 155) = 4.77, p < .001$. As per the first wave of data, the model explained only a portion of the variance, $Adj. R^2 = .11$. Openness was the only significant predictor in the second wave, $\beta = .28, p = .002$, which

corresponds with results from wave 1. These findings suggest that personality traits may play a small role in how students perceive their intelligence mindset, specifically that students with greater openness to experiences might also have more of a growth mindset.

Personality and Efficacious Beliefs

The final analysis examined how personality traits related with efficacious beliefs, specifically teacher efficacy and academic self-efficacy (See Figure 2). As with the first set of analyses, this path analysis included correlated personality traits in both waves of data collection. The same correlations among personality traits were run in this and the first set of analyses (See Table 3).

Path analysis findings suggested the model fit the data well in wave 1, $\chi^2(3, n = 205) = 4.22, p = .24, CFI = .99, RMSEA = .05$. Results of the first wave of data suggested significant pathways between teacher efficacy and participants' agreeableness and extroversion. Academic self-efficacy significantly related with openness and agreeableness. It may also be of interest that teacher efficacy was unrelated with self-efficacy, which suggests pre-service teacher distinguish between their efficacious beliefs in teaching and being successful in class. This result was replicated in wave 2.

Wave 2 suggested a significant path analysis model, $\chi^2(3, n = 162) = 2.62, p = .45, CFI = .99, RMSEA = .01$. In wave 2, several more paths were significant than in the wave 1. A newly significant pathway appeared between teacher efficacy and conscientiousness. For self-efficacy, newly significant pathways in wave 2 included a positive relationship with conscientiousness and negative relationships with extroversion and neuroticism. In addition, agreeableness and openness again related with self-efficacy in wave 2. The path between teacher efficacy and openness was replicated, but agreeableness was no longer significant in wave 2. These results indicate that three of the eight (38%) significant pathways between personality and efficacious beliefs appear in both waves 1 and 2.

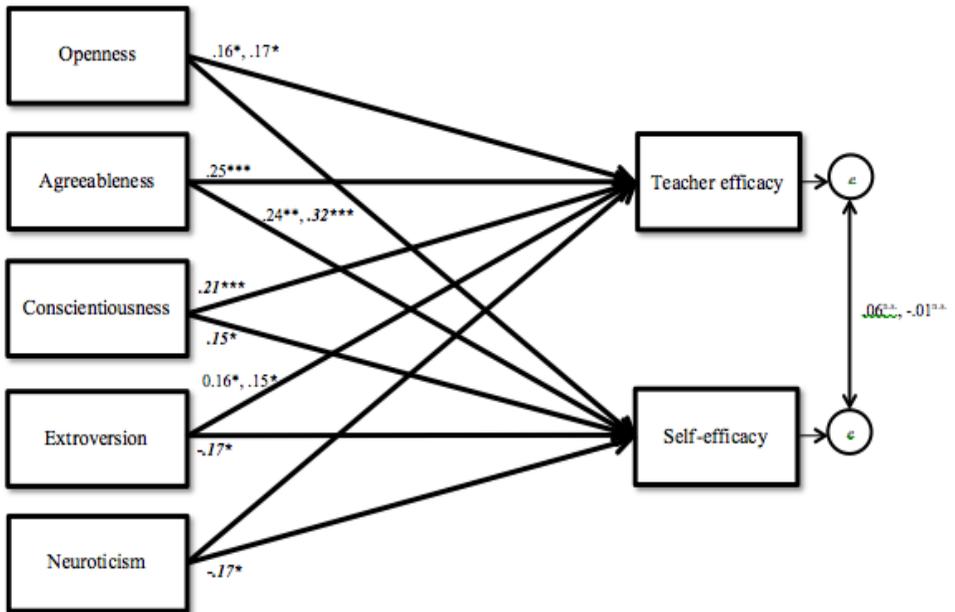


Figure 2. Path analysis between personality and efficacious beliefs. Correlations among personality traits are inside Table 2. Non-italicized coefficients are from wave 1. Italicized and bolded coefficients are from wave 2. *** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$.

Discussion

The study hoped to both replicate and extend previous research on how personality traits might relate to academic motivation. In addition, the study attempted to replicate its own findings by conducting the same analyses two weeks between participants' two data collections. Results of this study continue prior work as well as expanding upon previous research between personality and academic motivation by utilizing contemporary academic motivation theory to address outstanding issues regarding whether inherent personality traits align with academic motivation. The current study found

that prominent current motivational theories (achievement goals, teacher efficacy, and self-efficacy) may have slight relationships with students' personality traits. Mindset appears to have a more robust relationship with one aspect of personality, namely openness. Still, there was scarce replication of these relationships between academic motivation theories and personality traits within this study. As such, we are quite hesitant to suggest that academic motivation may be strongly linked with students' own personality traits. Instead, results suggest inconsistent findings among participants' personality traits and multiple academic motivation constructs across data points. Despite the prominence of inconsistent results, these findings may help inform, though not entirely resolve, a 50 year old debate about whether students' academic motivational antecedents come from their personality traits. Further, the study's findings may also help explain theoretical discrepancies in prior empirical research.

Previous literature suggested that personality traits should align with some aspects of academic motivation (Komarraju & Karua, 2005; Watanabe & Kanazawa, 2009), whereas other studies suggest no relationship between academic motivation and students' personality traits (Matthews, Zeidner, & Roberts, 2006; Fiske, 2008; Pintrich, 2003; Weiner, 1990). If personality traits do correspond with academic motivation, then there should be reliability across time and across multiple motivational theories. There may likely be some consistency in certain personality traits correlating with the different motivational constructs. Indeed, the literature suggests that conscientiousness, extroversion, openness, and agreeableness often relate with intrinsic motivation (Clark & Schroth, 2010; Komarraju & Karua, 2005). Except for openness, the literature also suggests that these same personality traits align with extrinsic motivation. The current study's results provide little support for these past results, despite some past findings suggesting a relationship between personality traits and academic motivation. The discrepancy in findings between past results and the present findings may well have to do with different theoretical orientations toward academic motivation. Indeed, the present study's findings can be supported by current understanding of academic motivation theory.

Contemporary understanding of academic motivation suggests that contextual factors have a strong influence on students' desire to learn and

persist through academic difficulties (Ciani, Summers, & Easter, 2008; Ciani, Middleton, Summers, & Sheldon, 2010). Academic motivation is now understood to be nuanced beyond the two larger motivational constructs often used in other studies (intrinsic motivation and extrinsic motivation; Deci & Ryan, 1985; Pintrich, 2003). More contemporary academic motivation theory suggest that students simultaneously experience multiple motivational constructs pertaining to school. These different types of academic motivation can be strongly influenced by teachers creating environments conducive to supporting students' sense of autonomy of their learning, which increases students' academic motivation (Ames, 1992; Deci & Ryan, 1985). Prior work (as noted in Table 1) did not examine the many varied motivational theories. Hence, the relationship between academic motivation and personality traits may appear in a more a generalizable sense, such as those people with a highly conscientious personality type and intrinsic motivation (Komarraju & Karua, 2005), but these findings do not account for the more complicated and current understanding of how academic motivation to learn parlays with students' multiple motivational self-beliefs and different classroom contexts.

To a limited degree, the present study also accounts for environmental influences that can affect students' motivation to learn (Ames, 1992; Pintrich, 2003). The present study applied multiple motivational theories to a single course. This choice presumed that environmental factors may affect the students' motivation within the course (e.g., teacher and classmates increasing or decreasing students' academic motivation to varying degrees across classrooms). The study's inconsistent relationships among personality traits and motivational theories highlights how personality traits may appear to correspond with academic motivation, but for only certain motivational self-beliefs, at certain times, and for only certain students. Hence, it is possible that classroom context may be a factor complicating any possible relationships between academic motivation and personality traits. This was further exemplified in the inconsistent results found across the two data collections.

The study attempted replication using the same students and motivational constructs within the same course. Replication was inconsistent among personality traits and motivational theories. These findings provide further

support for current understanding of students' academic motivation, such that a student's desire to learn is more likely to change due to environmental influences (Ciani, Middleton, Summers, & Sheldon, 2010; Deci & Ryan, 1985). We highlight these findings and inconsistencies for each of the study's academic motivation theories below.

Achievement Goals

The present study's findings suggest that students' achievement goals align with three personality traits at both time points. This supports other work that found that agreeableness and openness align with intrinsic motivation (De Feyter, Caers, Vigna & Berings, 2012; Hazrati-Viari, Rad & Torabi, 2012), and neuroticism corresponds with performance-avoid goals (Komarraju & Karua, 2005). Still, two other relationships between personality traits and achievement goals were not replicated. In addition, no coefficient loadings were particularly strong, with all loadings at or below $\beta = .23$. These results particularly dubious of given the strength that the classroom setting has over achievement goal adoption ($\beta \geq .24$; Ciani, Summers, & Easter, 2008; Ciani, Middleton, Summers, & Sheldon, 2010). Hence, results could be interpreted as certain personality factors statistically corresponding to achievement goal adoption, but with limited practical significance.

Mindset

Previous work suggested that one's mindset toward intelligence correlated with the conscientiousness personality trait (Furnham, Chamorro-Premuzic & McDougall, 2003). Previous work suggested that conscientiousness may align with mindset when one believes that effort and work habits lead to greater ability (Furnham et al., 2003). That is growth mindset can exist when students believe their hard work leads to greater performance. This is one of the few studies examining the role that personality may have on mindset beliefs. The current study adds to the literature by suggesting that openness might align with mindset, but conscientiousness did not correspond with mindset beliefs about intelligence. Instead, we suggest that those who are

open to new experiences may have more optimistic viewpoints, which could also be seen in optimistically believing that intellectual abilities can improve as well. This assertion would need additional research for confirmation. As well, more work would provide additional support, or refute, the possibility that the work habits of conscientious students parlay into growth mindset adoption.

Efficacious Beliefs

To our knowledge, very little research examines the role of personality in students' self-efficacy and pre-service teachers' teacher-efficacy. Other work suggests that both intrapersonal factors can enhance or detract one's efficacious self-beliefs (Bandura, 1986; Holzberger, Philipp, & Kunter, 2013; Usher, 2009). Hence, it may be plausible that other intrapersonal factors, such as one's personality, might alter self-efficacy beliefs.

The current study's results provided conflicting results concerning potential relationships between personality traits, self-efficacy, and teacher-efficacy. Agreeableness, openness, and extroversion aligned with efficacious beliefs at both time points, but for different efficacy beliefs (extroversion with teacher efficacy, whereas openness and agreeableness with self-efficacy). Conscientiousness and neuroticism aligned with the efficacy scales at only the second data collection point. Results suggest that certain personality factors could pertain to sources of self-efficacy beliefs, but we are critical of this possible rationale since different personality traits corresponded with different efficacious beliefs. Instead, if personality traits were aligned with efficacious beliefs, then there should be consistency across time points, personality traits, and the efficacy scales. The results from the present study provide little support that personality corresponds with self-efficacy since only 38% of the paths were replicated at both time points.

Limitations and Future Directions

The current study is the first to expand personality research with several currently prominent academic motivation theories. Our results provide little support that personality aligns with achievement goals, mindset, nor self-efficacious beliefs. Still, these findings are not without critique. Foremost, the current sample consisted mostly of female teacher education students. Though the sample was fairly ethnically diverse, additional work is needed to see if participants' results are only representative of those going into the teaching profession and to test for potential gender differences.

Unlike previous work, the current results included the attempted replication of findings across two time points. The two-week delay between data collection opens the possibility that some self-beliefs could change, and therefore alter relationships with personality traits. More longitudinal research with different time intervals might provide greater light on whether this two-week delay offered too much time for students to alter their self-beliefs.

The current study utilized domain-specific academic motivation instruments. This choice allowed to measure whether fairly domain-general personality traits would align with domain-specific motivational beliefs. This also leaves open the possibility that domains not considered in the present study could correspond with personality traits. It may be that personality could correspond with achievement goals for other classes, mindsets toward other beliefs, and various self-efficacy beliefs. Additional research would help suggest whether personality traits might pertain to specific academic motivation domains, or only the more general academic motivational beliefs measured in previous work (Clark & Schroth, 2010; Hazrati-Viari et al., 2012; Heaven, 1990; Komarraju et al., 2009).

Conclusion

The study was one of the first to test and replicate the potential relationships between students' personality traits and academic motivation. Results suggest that certain personality traits might correspond with different motivational self-beliefs. In addition, results were not always reliable across

the time points, nor were results consistent across academic motivational beliefs. This suggests that the role of personality in students' academic motivation may have less impact than other environmental and intrapersonal antecedents. The study's findings offer additional evidence that, while personality traits may be fairly stable and domain-general, academic motivation is generally domain-specific and malleable.

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