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Exploring Associations Between Student Academic Achievement, Worry, Personality, and Parental Warmth and Control

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ACADEMIC ACHIEVEMENT, WORRY, PERSONALITY, AND PARENTING

Abstract

Parenting styles are related to high academic achievement (AA) and worrying, and yet excessive worrying may be related to lower AA. This study evaluates the potential nuanced relationships between AA, worry, parental warmth and control, and conscientiousness. 273 college students self-reported their GPAs and ACT scores, level of worry, conscientiousness, and their caregivers' warmth and control. Parental warmth and control predicated AA, conscientiousness, and worry ($r^2 = .02 - .10$), especially for male caregivers. Conscientiousness ($R^2 = .08$) and worry ($R^2 = .03$) moderated the relationship between parenting for male caregivers and academic achievement. Implications discussed include informing parents of behaviors that may increase their children's academic success and psychological wellbeing.

Exploring Associations Between Student Academic Achievement, Worry, Personality, and Parental Warmth and Control

Many parents and other caregivers continually seek best practices to ensure that their children will be successful, fulfilled, happy and healthy contributing members of society. Parents go to great lengths to ensure that their children succeed academically (e.g., private tutors, ACT study courses). In fact, they are so concerned with increasing the academic success of their children that the private tutor industry in the United States has exceeded \$5 billion (Gordon, Morgan, Ponticell, & O'Malley, 2008). In addition, anxiety disorders have become the most common psychological disorders in children and adolescents (Beidel, 1991). Feelings of anxiety are consistently found to correlate negatively with subjective happiness (e.g., Ebrahimi, Ghasmian, & D'Souza, 2008; Warnecke, Baum, Peer, & Goreczny, 2014) and positively with depression (e.g., Warnecke, Baum, Peer, & Goreczny, 2014). Psychologists and other professionals seek to better understand anxiety by investigating what occurs simultaneously with it. Taken together, caregivers may be interested in knowing how they may modify their own behaviors to facilitate the academic success and psychological wellbeing of the children in their care.

The current study seeks to evaluate the relationships between these parenting characteristics, academic achievement (operationalized in the current study by college and high school GPAs and ACT scores), worry, and conscientiousness. Specifically, it is hypothesized that parental warmth will be positively related to academic achievement and negatively related to worry. Parental control is predicted to have a curvilinear relationship with academic achievement and be positively related to worry. In addition, worry is predicted to have a curvilinear relationship with academic achievement. Finally, conscientiousness will be related to academic

achievement and parental warmth and control. Specifically, academic achievement and parental warmth are predicted to have positive relationships with conscientiousness, while a negative correlation is predicted between parental control and conscientiousness.

Academic Achievement and Parenting Dimensions

A recent meta-analysis found that parenting is one of the most important factors associated with academic achievement (AA) (Masud, Thurasamy, & Ahmad, 2015). While there have been many studies on general parenting behaviors and others on school-specific parenting behaviors (e.g. parent-school communication, help with homework; Fan & Chen, 2001; Hill & Tyson, 2009), less research has focused on the parenting dimensions of warmth and control. Parental warmth involves being emotionally available to and supportive of one's children, expressing love and kindness toward them, as well as showing appreciation and affection (Skinner, Johnson, & Snyder, 2005). Parental control can be considered a combination of overprotection and psychological and behavioral control, characterized by behaviors such as prohibiting the child from disagreeing with the parent or making their own decisions, constantly needing to know what the child is doing, and babying or making the child feel dependent on the parent (Parker, Tupling, & Brown, 1979; Skinner, Johnson, & Snyder, 2005).

A 2016 meta-analysis including over 350,000 participants found that "better academic achievement was associated with high levels of parental responsiveness", which includes both warmth and "behavioral control"- when parents exercise control over their child's behaviors, including by setting constant expectations, consistently monitoring behavior, and using punishment if expectations are not met (Pinquart, 2016). Another meta-analysis, focusing on more than 30 individual parenting behaviors (rather than broad dimensions) found a relationship between behaviors showing parental warmth and high student AA ($r = 0.28$; Rosenzweig, 2001).

Taken together, these studies suggest that parental warmth behaviors tend to be related to high AA.

Other studies have concluded that high levels of parental monitoring (an aspect of behavioral control), parental responsiveness, and proactive behavioral control are all associated with high levels of AA (Lee, Yu, & Choi, 2012; Spera, 2005, 2006). Further, children raised in authoritative households are found to perform better academically than their peers (Silva, Dorso, Azhar, & Renk, 2008). Specifically, mothers' authoritative parenting was positively and significantly related to their child's high school ($r = .19$) and college ($r = .14$) GPAs, while fathers' authoritative parenting was similarly related to their child's high school GPA ($r = .19$; Silva et al., 2008).

Additionally, negative components of parental control have been linked to poor academic performance in children. For example, higher levels of psychological control ($r = -.23$), and harsh control ($r = -.16$) have correlated with poorer AA (Aunola & Nurmi, 2004; Piquart, 2016). Also, little to no control, as is found in permissive parenting styles, has been found to correlate with lower levels of AA (Dornbusch, Ritter, Leiderman, Roberts, & Fraleigh, 1987). The existing literature suggests a more complex relationship between parental control and AA than that of parental warmth and AA. While nearly all of the literature finds parental warmth and academic achievement to be positively correlated, studies on parental control offer varied results. Little to no control appears to negatively relate to academic achievement, while moderate to high parental control has been shown to both correlate positively and negatively with AA. Reflecting on this information, the following hypotheses about the relationships between parental warmth and control and academic achievement are proposed:

H₁: Parental warmth will be positively related to academic achievement.

H₂: Low parental control will be negatively related to academic achievement.

H₃: Moderate parental control will be positively related to academic achievement.

H₄: High parental control will be positively related to academic achievement.

Worry as the Cognitive Component of Anxiety

Worry can be defined as “a chain of negative thoughts about uncertain future events” and has been established as the “primary diagnostic criterion for generalized anxiety disorder (GAD)” and a major cognitive component of anxiety (Spence, 2015). Though worry as a causal factor of anxiety is still debated, the general consensus in worry and anxiety literature is that worry is a cardinal feature of anxiety, whose influence with other non-cognitive facets (such as emotional and physiological responses) should be further researched (Purdon & Harrington, 2006). Similar correlations between worry, parental warmth and control, and academic achievement may be found, as worry has repeatedly been referenced as a large part of anxiety. It has also been reported that worry interferes with daily functioning (Stavosky & Borkovec, 1987), which could be manifest in a negative correlation between worry and AA. While not all college students would consider themselves generally anxious, many admit to having worrisome thoughts (Spence, 2015). For these reasons, the current study focuses on measuring worry as the cognitive component of anxiety.

Worry and Parenting Dimensions

The number of childhood mental disorder diagnoses seems to be ever-increasing, and anxiety disorders are the most frequent mental disorders experienced by children and adolescents (Beesdo, Knappe, & Pine, 2009). This, combined with the fact that anxiety and worry commonly occur with depression and other mood disorders, makes understanding factors that contribute to anxiety an important and urgent public health concern (McGrew, 2016). Researchers have considered for many years that parenting may play a significant role in the development of anxiety in children. For example, parents who are high in control while low in warmth often have

children who end up struggling with chronic worry that can lead to anxiety disorders (Bögels, Bamelis, & van der Bruggen, 2008). Some researchers suggest that “perfectionist” parents are often overcontrolling and therefore increase the risk of their children developing anxiety (Affrunti & Woodruff-Borden, 2015). Further, parental rejection and avoidance (low warmth characteristics), especially by fathers, are among the “best predictors of anxiety in children” (Vulic-Protorić & Macuca, 2006; McGrew 2016). Rork and Morris (2009) also found evidence of a “moderate association between parental control and child anxiety symptoms”, such as chronic worry, but failed to find such evidence for a relationship between parental warmth and child anxiety (Rork & Morris, 2009). However, this study did reference numerous other published articles that found that children of more controlling and less warm parents often exhibited high levels of social anxiety and internalizing symptoms (self-focused negative behaviors) (Bruch & Heimberg, 1994; Dadds & Barrett, 1996; Eastburg & Johnson, 1990).

Parental overprotection (high control) and rejection (low warmth) have been found to be positively correlated with anxiety (Stevens, Bardeen, & Murdock, 2015). This supports earlier research finding high control and low warmth to be significantly correlated with anxiety symptoms, such as chronic worrying, in children (Muris & Merckelbach, 1998). Overall, the results of the existing literature are contradictory when it comes to the significance of the correlation between parental warmth and child anxiety (Ginsburg & Schollossberg, 2002; Rork & Morris, 2009). Therefore, the current study offers the following hypotheses:

H₅: Parental warmth will be negatively related to worry.

H₆: Parental control will be positively related to worry.

Worry and Academic Achievement

Overall mental health levels have been shown to significantly predict AA (DeBerard, Spielmans, & Julka, 2004). However, much of the existing psychological literature has failed to

find strong correlations specifically between general anxiety measures and college achievement. Researchers tend to be more successful in finding significant relationships when using more specific anxiety measures, such as test anxiety or social anxiety. Similarly, the current study uses another specific aspect of anxiety: its cognitive component- worry.

College students' anxiety has been found to be significantly and negatively related to both high school and college GPA ($r = -.15$ and $r = -.13$, respectively; Silva et al., 2008). This finding supports previous literature that suggests anxiety correlates negatively with, and therefore may impair, cognitive performance (Dobson & Kendall, 1993). Other studies, however, suggest that anxiety may benefit AA based on the motivation to avoid failure (Pekrun, Goetz, & Titz, 2002). Some students may benefit academically by increased motivation from their anxiety, while others may be hindered by it (Pekrun et al., 2002). The literature is conflicting, suggesting that anxiety may be both helpful and harmful to AA. It seems there is a complex relationship between worry and AA- perhaps there is an undetermined worry level that changes worry from being beneficial and motivating to hindering and problematic. Alternatively, it could be that some aspect on the individual level (say parenting or personality) may influence the relationship between AA and anxiety. Researchers have found a curvilinear relationship between arousal and performance to exist (Yerkes & Dodson, 1908). Because worry comes with autonomic arousal symptoms (Toh & Vasey, 2017), it's possible that a similar relationship may appear between worry and AA (performance). Therefore, the following hypothesis is offered:

H₇: There will be a curvilinear relationship between worry, a more specific measure of anxiety, and academic achievement. Very low and very high worry scores will correlate with lower academic achievement, while moderate worry scores will correlate with higher academic achievement.

Personality, Academic Achievement, and Worry

An additional variable to consider when evaluating the interactions between academic

achievement, parenting, and worry is personality, as personality has been shown to be related to all of these constructs. Personality is relatively stable throughout one's life, influences behaviors and interactions, and defines who one is (Larsen & Buss, 2010). The Five-Factor Model or Big Five theory of personality has five broad traits: extraversion, agreeableness, conscientiousness, emotional stability, and openness-intellect (Larsen & Buss, 2010). The empirical evidence for this theory is second to none, has achieved the greatest consensus of any personality trait theory in history, and is endorsed by many psychologists in the field (Larsen & Buss, 2010).

When examining the Five Factor Model of personality in relation to AA an important construct is conscientiousness. Conscientious individuals are those who are “organized, neat, orderly, practical, prompt, [and] meticulous” as opposed to being disorganized, impractical, etc. (Larsen & Buss, 2010, p. 79). Conscientiousness is continually found to be one of the strongest personality predictors of AA. In fact, a recent meta-analysis found that conscientiousness is the “most consistent and stable personality predictor for academic achievement” (Poropat, 2009). In addition, research has found that 44% of the variance in the students' GPAs could be explained by their intelligence and their conscientiousness, leading them to describe conscientiousness as “*the crucial noncognitive trait in school achievement*” (Dumfart & Neubauer, 2016). An even larger (nearly 80,000 high school seniors) study also found that conscientiousness and GPA were correlated ($r = .31$; Tirre, 2017). In 2018, conscientiousness was again found to have a significant relationship with GPA (Hart, 2018). Previous research has also found that good grades are best predicted by a combination of high conscientiousness and high emotional stability (low neuroticism; Larsen & Buss, 2010). Therefore, the following hypothesis is offered:

H₈: Conscientiousness will correlate positively with academic achievement.

There is very little research on the relationships between conscientiousness and parental

warmth and control. Each Big 5 personality trait, conscientiousness included, is about 50% heritable (Bouchard & Loehlin, 2001; Caspi, Roberts, & Shiner, 2005; Larsen & Buss, 2010). This suggests that there is a tendency for such personality traits – their presence and strength – to run in families. Yet, it is important to acknowledge that individuals with increased genetic-relatedness (e.g., monozygotic twins with 100% genetic similarity) also share more similar environments. Thus, it is difficult to separate the true influence of genes from environment on the development of these personality traits. However, there is evidence to suggest that individual differences in environmental reactivity, including approach-withdrawal tendencies, interact with the environment in complex ways to contribute to personality development (Scarr & McCartney, 1984). When children are young, the vast majority of their environment is dictated by their parents, suggesting that the ways parents act around their children may play an important role in the development of their personalities.

Recent research suggests that perceived parental warmth, overreactivity, and psychological control (more generally, “control”) is significantly related to children’s personality, especially Big 5 traits (Egberts, Prinzie, Deković, de Haan, & van den Akker, 2015). Specifically, a longitudinal study found conscientiousness to be positively related to parental warmth, but negatively related to parental overreactivity, an element of parental control (Egberts et al., 2015). Previous research found similar results, with overreactivity being negatively related to conscientiousness and parental warmth again being positively related to conscientiousness (de Haan, Deković, & Prinzie, 2012). Another longitudinal study discovered high warmth and low hostility combined to predict “alpha linked” personality traits in children (Schofield, Conger, R., Donnellan, Jochem, Widaman, & Conger, K., 2012). This “alpha factor of personality”, suggested by Digman (1997), consists of traits that facilitate competency and socialization,

specifically conscientiousness, agreeableness, and low neuroticism (Schofield et al., 2012).

H₉: Parental warmth will be positively correlated with conscientiousness.

H₁₀: Parental control will be negatively correlated with conscientiousness.

A Moderation Model

Considering the aforementioned literature and hypotheses, a comprehensive model is proposed (Figure 1). This model states that parental warmth and control predict student academic achievement and that conscientiousness and worry moderate that relationship. Four different predicted interactions further develop this hypothesized moderation model. First, it is predicted that individuals low in conscientiousness will have improved AA as parental control increases, while parental control will not have a significant effect on the AA of those high in conscientiousness. A similar interaction is predicted between parental warmth and conscientiousness: individuals low in conscientiousness will have increased AA as parental warmth increases, while those high in conscientiousness will have little to no change. Interactions between parenting and worry are also expected. For those with low levels of worry, a curvilinear relationship is predicted between parental control and academic achievement. For those with high levels of worry, AA is predicted to increase as parental control does. The academic achievement of both low- and high-level worriers is predicted to increase with parental warmth, with a greater change in AA in high level worriers.

Method

Participants

Participants were college students between the ages of 18 and 24 at two southeastern universities in the United States. Those under 18 were excluded as to avoid the inclusion of minors, and those 25 and above were excluded because the sample is focused on college aged

students and older participants would have likely been further removed in time from having lived with their parents. This exclusion is important as participants should be able to accurately recall their parents' behavior and those who no longer live with their parents are possibly both less accurate in their reports, and less influenced by their parents' behaviors.

Participants were recruited in multiple methods. Professors publicized the study to their classes and students in the Honors program, and the first author posted a link to the study's survey in a daily electronic newsletter sent to university students and on the first author's social media platforms. Many participants recruited through professors were compensated by receiving extra credit points in one or more of their courses. There was no monetary compensation for participating. Participants completed an informed consent document and were reminded that they may opt out of participating at any time without penalty, and that they may skip items that made them feel uncomfortable. All responses were anonymous.

A total of 273 participants completed the questionnaire. Demographic questions revealed that 81% of the participants identified as female. 46.5% were first year students, while 20.9% were sophomores, 11.7% were juniors, and 20.9% were seniors. The majority of participants specified their race/ethnicity as Caucasian (85.7%) with the next highest representation being Black or African American (9.5%). 70.9% of the sample reported that their parents were married.

Procedure

Participants were invited to complete an electronic questionnaire asking demographic questions, questions about their academic achievement, retrospective questions about the ways their parents behaved, a worry inventory, and multiple personality inventories. Prior to beginning the questionnaire, participants were required to read and agree to information about Informed Consent. Following the conclusion of the questionnaire, a screen was displayed with all

information necessary for debriefing, including the name and contact information of the researchers and where participants may find the results of the study upon its completion. Contact information for the counseling center was also included in the debriefing section.

Measures

Academic Achievement. Academic Achievement was measured by self-reported high school GPA at time of graduation, current college GPA, and highest achieved ACT score. First year students who did not yet have a college GPA were asked to leave that item blank. In one instance, a participant entered an apparent SAT score (i.e., 1050) rather than an ACT score. An official concordance table created by the College Board and ACT was used to convert the SAT score to a composite ACT score (i.e., 20).

Parental Warmth and Parental Control. Parental Warmth and Parental Control were measured using 36 items from the Adapted Parents as Social Context Questionnaire (Adolescent Report; Skinner, Johnson, & Snyder, 2005), the Parental Bonding Instrument (PBI; Parker, Tupling, & Brown, 1979), and three items added by the researcher (“My primary caregiver always wanted to know what I was doing, where I was, who I was with, etc.”; “Overall, my primary caregiver was warm toward me”; “Overall, my primary caregiver was controlling of me”). Prior to responding to these questions, participants were asked to identify their Primary Male Caregiver (e.g., Father, Grandfather, Uncle), Primary Female Caregiver (e.g., Mother, Aunt, Grandmother), and, if applicable, an Additional Primary Caregiver (e.g., Step-Mother) and offer individual ratings for each caregiver identified. All items were rated on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). A mean of the items for each caregiver was used in data analysis. Male and female caregiver scores were analyzed independently, as is common practice in this line of research (Egberts et al., 2015; Pinquart,

2016; Skinner, Johnson, & Snyder, 2005).

Worry. To measure worry, the cognitive component of anxiety, the 16-item Penn State Worry Questionnaire (PSWQ) was used (Meyer, Miller, Metzger, & Borkovec, 1990). The PSWQ has been determined to have “excellent psychometric properties” in non-clinical samples (Boysan, Keskin, & Beşiroğlu, 2008), such as the population being evaluated in the present study. Additionally, the PSWQ has been found to have high internal consistency, correlation scores with the Beck Anxiety Inventory of .46 (Boysan et al., 2008), and high test-retest reliability (Spence, 2015). Participants rated the extent to which each of the statements was true for them using a 7-point Likert scale (1 representing “Very Untrue of me” and 7 representing “Very True of me”). A mean worry score was calculated by averaging responses to each item and used in data analysis.

Personality. Conscientiousness measured using items from the International Personality Item Pool (IPIP), a collaborative, scientific website with personality inventories that has grown increasingly popular and prolific in personality research (Goldberg et al., 2006).

Conscientiousness of the Five Factor model of personality traits, was measured based on 10 items from IPIP based on Costa and McCrae’s NEO-PI-R Domains (1992). Participants rated the extent to which each of the statements was true for them using a 7-point Likert scale (1 representing “Very Untrue of me” and 7 representing “Very True of me”). A mean personality trait score was calculated and used in data analysis.

Results

Data Cleaning

Before hypothesis testing, data were checked for missing data and outliers. There was not a significant amount (> 5%) of missing data. Items about additional caregivers and college GPA

had a lower response rate, as expected. Data was checked for both univariate and multivariate outliers. Box plots were constructed and examined. To test for multivariate outliers, a z-score range was calculated using Mahalanobis distance to evaluate two cases that had been flagged as univariate outliers. These cases were discovered to be outside of the z-score range for variables related to the main hypotheses. These cases, numbers 122 and 164, were deleted and excluded from further analysis. Table 1 includes correlations, means, standard deviations, and reliability estimates.

Hypothesis Testing

The first hypothesis, that parental warmth would be positively related to academic achievement, was supported for high school GPA and male warmth ($r = .13, p < .05, r^2 = .02$), college GPA and male warmth ($r = .17, p < .05, r^2 = .03$), and college GPA & female warmth ($r = .17, p < .05, r^2 = .03$). Female warmth and high school GPA were not significantly correlated ($r = -.10, p > .05, r^2 = .01$). Hypotheses 2, 3, and 4 were tested by first coding parental control into three levels (low = 1 Standard Deviation (*SD*) below the mean, high = 1 *SD* above the mean, moderate = all others). Hypothesis 2, that low parental control would be negatively related to AA, was not supported as the only significant correlation found between low parental control and any of the academic achievement measures was a negative correlation between low female control and college GPA ($r = .16, p < .05, r^2 = .03$). Hypothesis 3, that moderate parental control would be positively related to AA, was partially supported as a significant correlation was found between moderate male control and college GPA ($r = .16, p < .05, r^2 = .03$), but an additional negative correlation between moderate female control and ACT score ($r = -.13, p < .05, r^2 = .02$). Hypothesis 4, that high parental control would be positively related to AA, was not supported as significant *negative* correlations were found for high male control and college GPA ($r = -.31, p <$

.01, $r^2 = .01$), and high female control and both high school and college GPA ($r = -.16, p < .05, r^2 = .03; r = .20, p < .05, r^2 = .04$). When not split into levels of control, significant negative correlations were found between female control and high school GPA ($r = -.19, p < .01, r^2 = .04$), and both female and male control and college GPA ($r = -.22, p < .01, r^2 = .048; r = -.32, p < .01, r^2 = .10$).

Hypothesis 5, that there would be a negative relationship between parental warmth and worry, was not supported, as there were no significant relationships found between worry and parental warmth. A significant positive relationship was revealed between worry and male control ($r = .20, p < .01, r^2 = .04$), supporting hypothesis 6, that parental control would be positively related to worry. However, no significant correlation was found between worry and female control. Hypothesis 7, that there would be a curvilinear relationship between worry and academic achievement, was first tested by creating multiple scatterplots comparing worry (x-axis) and each of the three academic achievement variables (y-axis). None of the scatterplots illustrated a curvilinear relationship. Additionally, when Pearson correlation coefficients were calculated for these variables, no significant relationships were found.

For hypothesis 8, that conscientiousness would be positively correlated with AA, a significant positive relationship was found between conscientiousness and high school GPA ($r = .21, p < .01, r^2 = .04$), offering partial support. The results from testing Hypothesis 9, that parental warmth and conscientiousness would be positively correlated, revealed that there was a positive relationship between parental warmth and conscientiousness (male warmth $r = .25, p < .01, r^2 = .06$; female warmth $r = .36, p < .01, r^2 = .13$). Hypothesis 10, that parental control would be negatively correlated with conscientiousness, was supported by results revealing that there was a negative relationship between parental control and conscientiousness (male control r

= -.24, $p < .01$, $r^2 = .06$; female control $r = -.32$, $p < .01$, $r^2 = .10$). Although the aforementioned effect sizes are small, they are similar to what has been found in the previous literature (e.g. Aunola & Nurmi, 2004; Pinquart, 2016; Silva et al., 2008). In constructs as complex and multifaceted as the ones studied here, even accounting for a small portion of the variance can help further understanding.

Model Testing

PROCESS, a regression path analysis modeling tool, was used in SPSS to test hypothesis 11- the moderation model. A total of 24 unique models were created and tested with hierarchical regression for significant moderation relationships. For example, the first model tested conscientiousness as a moderator between male control and college GPA. The next tested conscientiousness as a moderator between male control and high school GPA. The process was repeated until each combination of variables was analyzed. A 95% confidence interval was used.

Worry's role as a moderator between male control and ACT score was approaching significance ($R^2 = .03$, $F(3, 238) = 2.37$, $p = .07$). Specifically, adding the interaction term significantly added to the amount of explained variance ($R^2\Delta = .02$, $F(1, 238) = 5.07$, $p < .05$; Figure 2). For low worriers (average of 3.90 or below), as male control increased, ACT score decreased. For high worriers (average of 6.46 or above), male control had very little effect on ACT score. Second, conscientiousness was found to significantly moderate the relationship between male warmth and college GPA ($R^2 = .08$, $F(3, 144) = 4.33$, $p = .01$). Specifically, adding the interaction term significantly added to the amount of explained variance ($R^2\Delta = .04$, $F(1, 144) = 6.79$, $p < .01$; Figure 3). For participants low in conscientiousness (3.89 or below), as male warmth increased, there was a significant increase in college GPA. For those high in conscientiousness (5.76 and above), however, as male warmth increased, there was a slight

decrease in college GPA.

Discussion

The purpose of the current study was to better understand the relationships between variables related to parenting and academic achievement. Each hypothesis and corresponding results shed light on the complexity of the relationship and the additional variables that play a role. First, it was hypothesized that parental warmth would be positively related to academic achievement. This hypothesis was supported by the significant positive correlations found between male warmth and high school and college GPA, and between female warmth and college GPA. It is intriguing to note that no significant correlation was found with ACT scores, arguably the academic achievement measure with the most variability. Correlations between parental warmth and academic achievement were stronger when based on male warmth and the relationship between female warmth and high school GPA was insignificant. The positive correlations found between parental warmth and academic achievement (high school and college GPAs) are consistent with existing meta-analyses which also found significant positive relationships between warm parenting behaviors and various academic achievement measures (Pinquart, 2016; Rosenzweig, 2001).

The lack of support for a varying relationship of academic achievement to parental control based upon the level of control was an unexpected finding. Overall, parental control was consistently found to be negatively correlated with academic achievement. Perhaps the reason the hypotheses, informed by existing literature, were not supported lies within the measure of control used. It is possible that, while behavioral and psychological control, measured here, negatively predict academic achievement, other types of control may yield different results.

There was no significant negative relationship found between parental warmth and worry.

This was surprising as existing literature has found low warmth parental characteristics to be positively related to anxiety, and even claim they are some of the “best predictors of anxiety” (Vulic-Protorić & Macuca, 2006; McGrew 2016). However, the research on parental warmth and worry is minimal. Slightly more research has been conducted looking at how parental control relates to worry. The current study found a positive relationship between worry and male control and no relationship between female control and worry, in line with previous research that fathers’ behavior is particularly important in predicting anxiety (Vulic-Protorić & Macuca, 2006; McGrew 2016) and that parental control and anxiety tend to be positively related (Bögels et al., 2008; Rork & Morris, 2009; Stevens, Bardeen, & Murdock, 2015). The discovery of a similar relationship between parental control and worry as that of parental control and anxiety lends support to the idea that worry is an aspect of the broader construct of anxiety.

Worry and academic achievement were not related in the current study. This is inconsistent with previous research that has found at least a linear relationship between anxiety and academic achievement and cognitive performance (Silva et al., 2008; Dobson & Kendall, 1993; Pekrun et al., 2002). Perhaps the correlation disappears when the focus is shifted to individual elements of anxiety, such as its cognitive component- worry. Another possible explanation is that, because so many participants reported high levels of worry, there was not enough variability in the sample to find a correlation. Either way, additional research into worry and academic achievement is needed to better understand their relationship.

When examining worry in this dataset, it is important to note the average level of worry reported by participants. Assuming that worry, like most psychological constructs, exists in normal distribution in the population, the mean worry score should fall somewhere around 3.5 (based on ratings on a 7-point Likert-type scale). However, the mean worry score for the current

sample was 5.14 ($SD = 1.28$) and the distribution was non-normal and negatively skewed. The data were not collected during a particularly stressful time in the life of college students (i.e., after mid-terms and significantly before finals). It is concerning to find descriptive statistics that reflect such a high rate of worry in students. Potentially this is simply reflective of a reality for most college students- worry is commonplace. It is also relevant to mention that a large portion of the recruited population were Honors students. Perhaps this group experiences more worry than other students. It is important to see if this prevalence exists in other college populations and to then investigate ways college students may be helped in decreasing their daily worry.

There was a significant positive correlation between conscientiousness and high school GPA, but not with college GPA or ACT score. This is surprising given that conscientiousness is continually found by other researchers to be one of the strongest personality predictors of academic achievement (Dumfart & Neubauer, 2016; Hart, 2018; Poropat, 2009; Tirre, 2017). However, it seems that much of the existing literature is using high school GPA as the measure of academic achievement, while fewer researchers consider college GPA and ACT scores. It's possible that no relationship was found here between conscientiousness and college GPA simply because there was not enough data, as first-year students (almost half of the sample) did not have a college GPA at the time of data collection (only 56% of participants provided a college GPA).

The current study found positive correlations between parental warmth and conscientiousness, with female warmth as a stronger predictor than male warmth. A possible explanation is that mothers may be more influential in the development of their children's personalities than their fathers tend to be. It is also possible that motherly warmth is an expected cultural norm and is therefore more anticipated by children than warmth expressed by their fathers (McGillicuddy-De Lisi, & de Lisi, 2007). Either way, it is important to recognize that

parenting behaviors that exhibit warmth have the potential to positively predict beneficial personality traits in children.

A negative correlation was found between parental control and conscientiousness, consistent with previous literature (Egberts et al., 2015; de Haan, Deković, & Prinzie, 2012). These findings show that the (controlling) behaviors of the female parent may again play a larger role in the development of the child's personality than that of the male parent.

Finally, the moderation model testing revealed partial support for the proposed model, and in interesting ways. Of the 24 different ways the model was tested, two were notable. First, worry was found to (marginally) significantly moderate the relationship between male control and academic achievement (when measured by ACT scores), but not in the way predicted. For those who scored low on the worry inventory, ACT scores decreased as male control increased; whereas there was no significant difference in the ACT scores of high worry scorers as male control changed. This interaction seems to show that there is a greater connection between male parental control and academic achievement for those students who are less frequent worriers than those who worry more often. The finding emphasizes the importance of father figures working to minimize their controlling behaviors, especially around children that tend not to worry a lot. Perhaps this relationship could be explained by parents' controlling behaviors worrying their children and thereby increasing the worries of normally "low worriers", whereas those who are continually worried about many things may not be as influenced by controlling parental behavior.

Second, conscientiousness was found to significantly moderate the relationship between male warmth and college GPA. For individuals who scored low in conscientiousness, as male warmth increased, there was a significant increase in college GPA. For those high in

conscientiousness, however, as male warmth increased, there was a slight decrease in college GPA. This finding suggests that male caregivers displaying warm behaviors may be more important in the academic success of children who are not already driven toward success with their high levels of conscientiousness. It may be more difficult for parents to remain warm around children with low levels of conscientiousness (as they are often disorganized, negligent, or inattentive), but this research illustrates just how helpful it could be in relation to their academic success.

Limitations & Future Research

As with most research, this study had various limitations. First, all data was collected via self-report from the participants. Despite multiple reminders throughout the questionnaire of anonymity and the importance of providing accurate information, it is quite possible that some participants may not have been completely honest when responding to items. This is particularly likely to be a problem when it comes to academic achievement measures, as, almost inevitably, some participants would have provided socially desirable results (e.g., reporting higher GPAs). It is also possible that a student report of parenting dimensions may not have been the most effective or accurate measure. Perhaps parents would answer quite differently on such inventories, creating different parental warmth and control averages. However, it is reasonably likely that the students' perception of their parents' behaviors would be more related to their academic achievement, worry, and personality, than that of their parents.

An additional limitation is the sample used in this study. First, the small sample size may have contributed to different findings between the present study and previous research. Further, since the participants were from just two universities in the Southeastern United States, external validity (generalizability) is limited to similar populations. The results of this study should not be

applied without restraint to groups that do not reflect similar demographics (predominately White, female, American, etc.). To remedy this, future research should replicate the study with other samples from different populations. Of particular interest would be to replicate in cultures differing from that of the current population. For example, parents in many Asian cultures are considered to be quite strict and controlling (Chao & Kanatsu, 2008), yet there is also a perception that children of these parents tend to excel academically (an opposite correlation from the findings in this study) (Peng & Wright, 1994). Investigating the same variables in a younger population may help determine at what point in development different personality traits emerge and if/when age is an important consideration in the strength of the relationships.

A further limitation to be improved upon is the method of measuring academic achievement. Many high schools compute GPAs using differing methods. For example, while an “A” may be quantified by a 90-100% at one school, another may require a 93% for the same grade. So, while a student attending the second school may achieve an identical percentage grade (say a 92%), they would have a lower GPA than the student at the first school. A similar disconnect may exist for college GPAs, as grading scales are often left up to the discretion of individual professors. While ACT scores are standard across the board, standardized tests come with their own set of problems and limitations (biased by race, socio-economic status, and even gender). None of these measures are perfect for quantifying academic achievement. Future studies should search for alternative measures that may more strongly reflect the underlying construct being discussed.

An additional limitation is the connection between anxiety and worry. While worry may be more prevalent in college students than anxiety, allowing for greater variability and increased chances of significant findings, it does not encompass all that anxiety entails. It would be

interesting to see if the same correlations that exist between worry, anxiety's cognitive component, and the other variables would exist with other aspects of anxiety, such as physical and emotional factors. It would also be logical to conduct future research including the worry and/or anxiety levels of parents and their potential correlations with the previously included variables. Parents' personalities would also be relevant to consider, as they may be an even stronger predictor of children's personalities than parents' behaviors. Evaluating Big 5 personality traits less related to academic achievement and anxiety would also provide a more complete perspective of personality's role in all of these things.

It would also be beneficial to replicate the current study with a younger population or perhaps in a classroom setting. With the significant amount of time children spend with teachers during their formative years, there is potential for teachers' behavior to correlate with the investigated variables as well. It would especially be relevant to examine a potential relationship between teacher warmth and control and student academic achievement at various grade levels.

Applications & Implications

The most obvious applications for the current study are informing how parents might behave so that they may increase the likelihood that their children will develop positive personality traits, less worrisome tendencies, and high levels of academic achievement. According to these results, if parents behave warmly toward their children, they are more likely to have high academic achievement and higher levels of conscientiousness. The current study informs parents that controlling behaviors may increase the probability of their children having poorer levels of academic achievement and conscientiousness, paired with higher rates of worry.

Additionally, information and recommendations from these data could potentially improve the problem of the economic disparity in education. A common problem in education is

the lack of accessibility of improvement tools for those without significant financial assets. As discussed previously, the private tutor industry the United States exceeds \$5 billion (Gordon et al., 2008). This, in combination with private school systems, expensive prep books, and the ever-increasing costs of higher education, intensifies the economic divide in education. Families with low incomes often cannot afford such educational materials that could increase their children's likelihood of academic success, potentially leading to higher incomes and breaking free of the cycle of poverty. Knowing how to act warmly and minimally controlling toward children is something equally accessible to all parents, and this research is showing that it is related to better academic achievement.

Generally speaking, parents want their children to grow to become happy and successful individuals. These findings may help them do so. Not only is high academic achievement important while children are in school, but it is also known to predict college major and individual earnings in careers (Olitsky, 2014). Increasing the likelihood of children having academic success can also relate to positive long-term outcomes as GPA has been found to predict career adaptability (Veres & Szamoskozi, 2017), pro-social and helpful behaviors (Lyons & Bandura, 2017), and job performance (Dyer, 1987; Markou, 2016). Parents who want their children to be healthy and happy individuals should particularly practice behaviors that may foster high conscientiousness, as this trait can be a key concept in understanding health (Friedman, 2019). Conscientiousness has been found to correlate with low levels of adiposity, healthier metabolisms, and better performance on physical assessments (Sutin, Stephan, & Terracciano, 2018). Finally, subjective well-being, a key component in measuring the psychological construct of happiness, has been found to be positively related to conscientiousness (Soto, 2015).

As described, the applications for and implications of the current study are numerous and diverse. Taken together, the results from this research can help inform parents and families of ways they might behave to help prepare their children for happy, healthy, and successful lives.

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ACADEMIC ACHIEVEMENT, WORRY, PERSONALITY, AND PARENTING

Tables

Table 1. Correlation Table with N, Means, Standard Deviations, and Reliabilities.

	N	MN	SD	HPA	CPA	ACT	MW	MC	FW	FC	Worr	Con	Age	Year	Gen	Rac	PMS	Sib	LWP	
C GPA	154	3.33	.48	.33**																
ACT	252	25.48	3.98	.35**	.49**															
MW	260	5.51	1.32	.13*	.17*	.04	(.97)													
MC	260	3.26	1.05	-.11	-.32**	-.08	-.63**	(.90)												
FW	266	6.05	1.01	-.10	.17*	-.05	.27**	-.15*	(.96)											
FC	266	3.50	1.21	-.19**	-.22**	-.01	-.24**	.34**	-.55**	(.92)										
Worry	270	5.13	1.28	.12	.02	.00	-.08	.20**	-.05	.12	(.94)									
Con	270	4.87	.93	.21**	0.14	-.01	.25**	-.24**	.36**	-.32**	-.17**	(.91)								
Age	262	19.37	1.43	.01	.28**	.14*	-.07	.02	.01	-.02	-.03	.04								
Year	268	2.05	1.19	.08	.29**	.20**	-.06	.02	.04	-.04	.05	.03	.90**							
Gender	270	1.21	.45	-.16**	.03	.14*	.02	-.14*	-.08	.00	-.36**	-.04	-.11	-.14*						
Race	268	1.58	1.48	-.05	-.14	-.13*	.00	-.02	.07	-.00	.00	-.07	-.05	-.09	-.05					
PMS	269	1.41	.79	-.13*	-.17*	-.15*	-.27**	.17**	-.07	.09	-.06	-.08	.10	.03	-.04	.21**				
Siblings	270	1.88	1.54	-.03	-.09	-.08	0.06	.01	-.11	.04	-.02	-.06	-.05	-.06	-.07	-.03	.11			
LWP	270	1.59	.49	.04	.10	.22**	-.02	-.08	-.09	.04	-.05	-.07	.07	.04	-.04	-.09	.05	.07		
MOA	154	18.08	1.28	0.0	-.16	.05	-.12	.04	-.01	.01	-.19*	.12	.29**	.18*	.04	.07	.07	-.17*	.07	

Note. SD = standard deviation; HPA = high school GPA; C GPA = college GPA; MW = male warmth; MC = male control; FW = female warmth; FC = female control; Worr = Worry; Con = conscientiousness; Gen= Gender; PMS = parent's marital status; Sib= number of siblings; LWP = live with parents; MOA = move out age. Internal consistency reliability estimates along the diagonal.

* $p < .05$

** $p < .01$

Figures

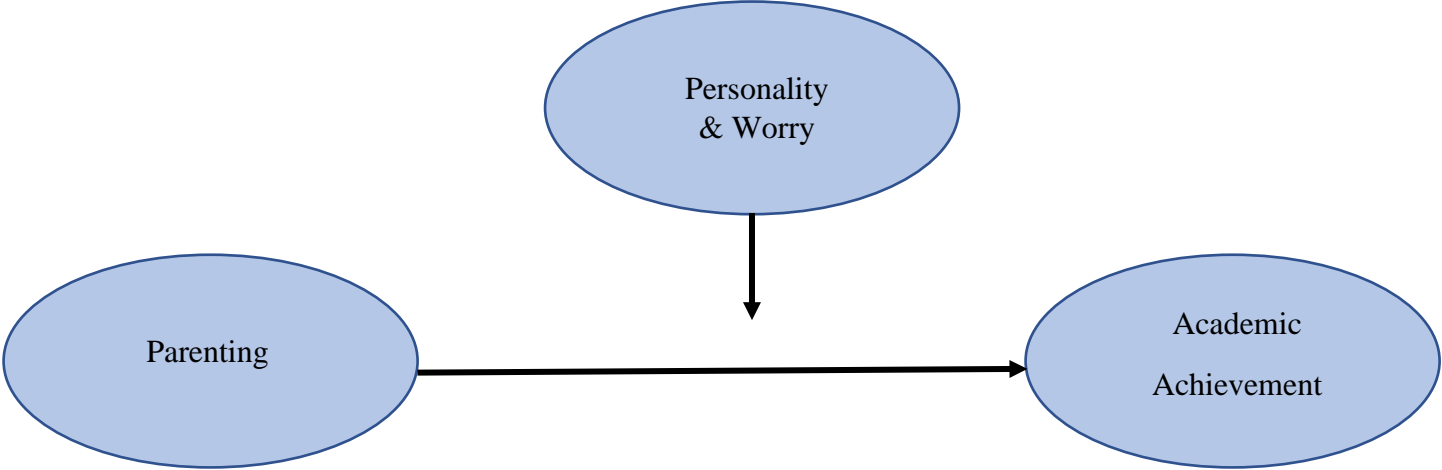


Figure 1. Moderation Model.

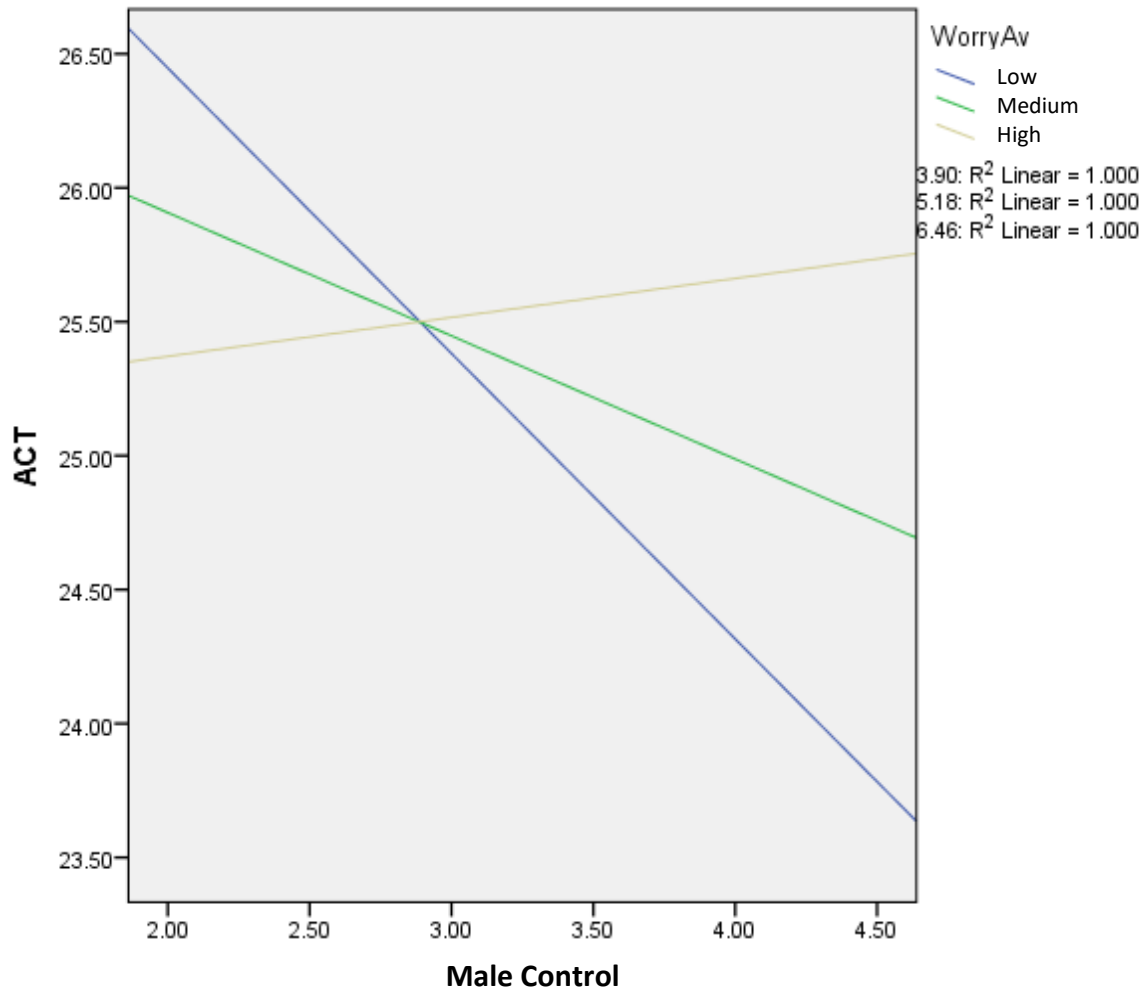


Figure 2. Interaction between Male Control and Worry moderating ACT score.

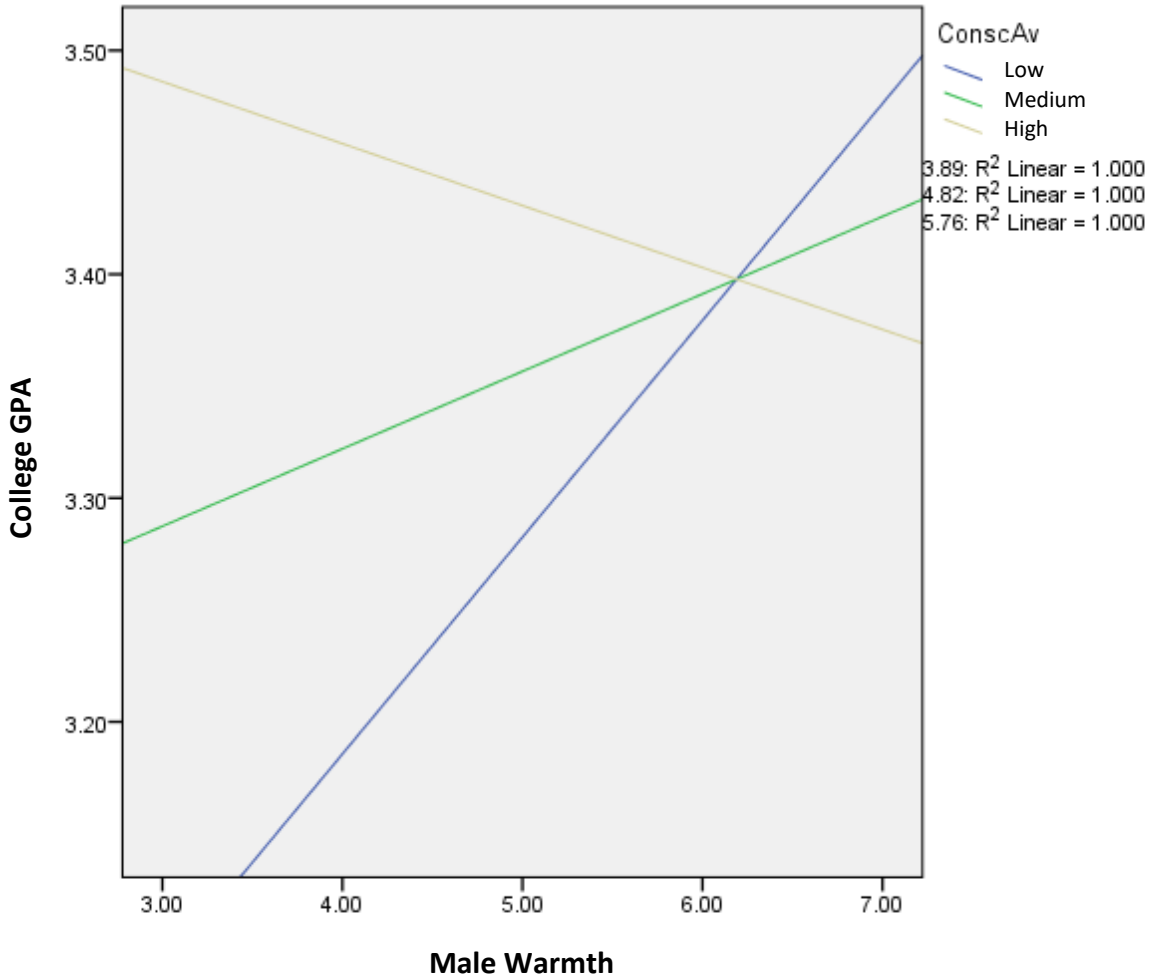


Figure 3. Interaction between Male Warmth and Conscientiousness moderating College GPA.