

MOTIVATIONAL PROCESSES AND PERFORMANCE:
THE ROLE OF GLOBAL AND FACET PERSONALITY TRAITS

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ABSTRACT

The conscientiousness and neuroticism dimensions of the Five Factor Model (FFM) have been shown to be predictive of performance (Barrick & Mount, 1991; Paunonen & Ashton, 2001). This research examined three relatively unexplored issues, including (a) the impact of conscientiousness and neuroticism on motivational processes and performance; (b) the criterion-related validity of facet measures of conscientiousness and neuroticism as predictors of motivation and performance; and (c) whether conscientiousness, neuroticism, and their facets impact changes in motivational processes between performance episodes.

Undergraduate psychology students ($N = 220$) completed measures of self-set goals and self-efficacy beliefs on two occasions, prior to the first and second examinations of the Fall semester in 2001. Separate testing sessions were conducted in which the participants completed a personality inventory and a cognitive ability test. Structural equation modeling was used to test all hypotheses. Results indicated that both conscientiousness and neuroticism predicted motivational processes and also accounted for unique variance in performance, with conscientiousness having stronger effects than neuroticism. Additionally, results provided evidence for the usefulness of facet-level operationalizations of personality constructs (e.g., achievement-striving, competence, and anxiety) as predictors of motivation and performance compared with global measures. Finally, changes in self-efficacy beliefs were predicted by conscientiousness-related constructs, but not by neuroticism-related constructs. Personality factors had no impact on goal revision. Implications and recommendations for future research in the personality and motivation domains are discussed.

Over the past ten years abundant research has shown that individual differences in personality are important predictors of performance. Recent meta-analytic studies (Barrick & Mount, 1991; Barrick, Mount, & Judge, 1999; Hertz & Donovan, 2000; Salgado, 1997) have consistently reported significant relationships between axes of the Five Factor Model (FFM) of personality and important work behaviors, with conscientiousness and neuroticism having the strongest effects. It has been proposed (Kanfer, 1990) that personality traits do not impact performance directly, but through more proximal constructs such as situationally specific self-efficacy (Bandura, 1997) and goals (Locke & Latham, 1990). Accordingly, a challenge faced by current researchers is to delineate more precisely the relationships between the personality, motivation, and performance domains (Austin & Klein, 1996). To date, most of the empirical work addressing this issue has focused on the conscientiousness dimension of the FFM; several studies have shown that goals and/or self-efficacy either partially or fully mediate the conscientiousness/performance relationship (Barrick, Mount, & Strauss, 1993; Gellatly, 1996; Martocchio & Judge, 1997). Less is understood about the effects of neuroticism on motivation and performance (Judge, Erez, & Bono, 1998) although some research suggests a negative neuroticism/motivation relationship (Ahrens, Zeiss, & Kanfer, 1988). The first contribution of the present investigation was to explore the personality-motivation-performance relationships in greater depth, using measures of both conscientiousness and neuroticism.

Although conscientiousness, like the other dimensions of the FFM, is a higher level composite of several first-order traits (Paunonen, 1998), there has been little

investigation of the discriminant validity of these facet traits as predictors of motivation or performance (Hough, 1997). In recent years, a growing body of scholars have argued that the criterion-related validity of personality testing can be enhanced when personality is operationalized at the facet, rather than the global level (Hurtz & Donovan, 2000; Paunonen, 1998; Schneider, Hough, & Dunnette, 1996). The second contribution of this research was to examine the unique relationships of the facets of conscientiousness and neuroticism with motivation and performance. Theoretical linkages between personality facets and motivational constructs will be detailed in a later section.

It is commonly accepted that the relationship between task-specific motivation and performance is dynamic and reciprocally causal (Bandura, 1997; Carver & Scheier, 1998; Locke & Latham, 1990). That is, not only does motivation impact performance, but performance impacts subsequent motivation (Locke & Latham, 1990; Phillips, Hollenbeck, & Ilgen, 1996). Generally speaking, high performance will lead to sustained or increased motivation and low performance will result in decreased motivation. However, this set of relationships has proven to be very complex (Campion & Lord, 1982; Phillips et al., 1996; Vancouver, Thompson, & Williams, 2001); at times, individuals do not conform to these rules very closely. A tenet of the present investigation is that changes in motivation (increases or decreases) can be predicted by personality after controlling for the effects of performance. Thus, a third purpose of this study is to evaluate the effects of conscientiousness, neuroticism, and their facets on changes in motivational variables (i.e., goals and self-efficacy) over time. The following sections of the paper will discuss and review recent empirical findings

concerning the personality/performance relationship, the structures of conscientiousness and neuroticism, self-efficacy and goals, and the motivation-performance cycle.

Personality and Performance

Early reviews of the personality/job performance relationship (Guion & Gottier, 1965; Schmitt, Gooding, Noe, & Kirsch, 1984) yielded relatively weak validity coefficients. One of the shortcomings of the research in this period was the lack of a unifying theoretical framework of personality around which findings could be organized. The emergence of the Five-Factor Model (FFM; Digman, 1990) as the dominant model of personality in the 1990's allowed a more systematic cumulation of findings than had been possible previously. The FFM postulates that the uppermost level of the personality hierarchy is comprised of five orthogonal factors: conscientiousness, neuroticism, extraversion, agreeableness, and openness to experience.

Two of the FFM factors, conscientiousness and emotional stability (i.e., neuroticism) have shown the strongest relationships with job performance ($r = .23$ and $r = .12$, respectively), as reported in a second-order meta-analysis by Barrick, Mount, and Judge (1999). The relationship between job performance and conscientiousness has been particularly well established, beginning with the seminal Barrick and Mount (1991) meta-analysis. Notably, it has also been shown (Day & Silverman, 1989) that the conscientiousness/job performance relationship is unrelated to the ability/performance relationship; ability is conceptualized as a "can-do" construct, whereas conscientiousness is thought to affect performance through motivational, "will-

do” processes (Barrick, Mount, & Strauss, 1993; Borman, White, Pulakos, & Oppler, 1991).

Less is understood about the role motivational processes play in the relationship between neuroticism and job performance. Barrick et al. (1999) concluded that neuroticism affects individuals’ sense of well-being at work and susceptibility to stress. Neurotic individuals experience physical and emotional distress caused by prolonged negative moods and adverse reactions to unpleasant events in their lives (Suls, Green, & Hills, 1998). Clearly, these outcomes are likely to have negative implications for job performance, including absenteeism and difficulties with interpersonal relationships. It is possible that the same neuroticism-related symptoms (e.g., stress, negative affectivity) have important effects upon individuals’ motivational thoughts and behaviors; however, with few exceptions (e.g., Ahrens, Zeiss, & Kanfer, 1988) this issue has not received much empirical attention.

It might be supposed, based on the reading of the meta-analytic studies of the past ten years (Barrick & Mount, 1991; Barrick et al., 1999; Ones, Schmidt, & Viswesvaran, 1993; Salgado, 1997; Tett, Jackson, & Rothstein, 1991) that personality’s relevance for prediction of job performance can be adequately modeled at the level of the FFM. For example, conscientiousness, like general mental ability, has been proposed as a universal predictor of job performance across all occupations (Mount & Barrick, 1995; Ones & Viswesvaran, 1996; Salgado, 1997). According to these authors, breaking conscientiousness down into its constituent facets is not a practical strategy for enhancing the predictive validity of this construct for job performance. Ones and Viswesvaran (1996) use a two-pronged argument to support this position. First, the

bandwidth-fidelity distinction (Cronbach & Gleser, 1957) suggests that a broad construct (i.e., conscientiousness) is a more suitable predictor of a complex criterion (job performance) than narrower predictor constructs. According to this logic, whereas a subtrait of conscientiousness (e.g., dutifulness) may be useful for predicting a particular job behavior (punctuality), it is better to use the global construct for predicting overall performance. Second, narrow personality constructs typically are measured with lower reliability than broad constructs; to ensure equivalent levels of reliability for narrow constructs would require extremely long personality inventories, which managers of organizations are not likely to endorse.

Recently, however, an increasing number of writers (Ashton, Jackson, Paunonen, Helmes, & Rothstein, 1995; Hough & Schneider, 1996; Kanfer & Ackerman, 2000; Paunonen & Ashton, 2001; Schneider, Hough, & Dunnette, 1996; Stewart, 1999) have argued that the global FFM dimensions are too broad to predict important job performance behaviors. Part of the rationale for this argument is that, contrary to Ones and Viswesvaran's position, job performance is not a unitary, complex construct. Rather, it is a multifaceted construct with a complex latent structure (Campbell, McCloy, Oppler, & Sager, 1993; Hough, 2001). Consequently, aggregation of personality facets into global dimensions results in the loss of specific variance that may be valuable in the prediction of performance (Paunonen, 1998). Paunonen and Ashton (2001) suggested that aggregation of facet traits into global categories can actually reduce personality/performance correlations when some of the facets are negatively correlated with performance and others are positively correlated with performance.

Whether personality facets predict job performance better than global measures is an empirical issue that has just begun to attract researchers' attention. Contrary to Ones and Viswesvaran's (1996) position, recent studies have shown that facet measures of personality can account for more variance in performance, including sales volume (Stewart, 1999) and academic performance (Paunonen & Ashton, 2001), than global measures. However, examination of the predictive validity of personality facets has received surprisingly little empirical testing (Hough, 1997).

Conscientiousness

Although there continues to be controversy over the correct labeling of the global categories of the FFM (John, 1990), there appears to be general consensus regarding their broad interpretation. Like the other global dimensions of the FFM, conscientiousness is a complex construct that resists unitary definition. Most theorists (e.g., Digman, 1990; Hough, 1997) conceptualize conscientiousness broadly as a bidimensional construct, representing individual differences in dependability and achievement orientation. Thus, employees can be conscientious by virtue of being dependable (e.g., punctual, well-organized, loyal), oriented toward achievement (e.g., driven to succeed, ambitious), or both. It is not surprising that conscientiousness is more highly correlated with job performance than any other FFM factor; however, the fact that these two dimensions are included in the same general construct has led to criticisms of the FFM taxonomy. For example, Hough (1997) suggests that grouping achievement and dependability under a common personality construct diminishes both the criterion-related and construct validity of each. Investigators can avoid such potential confounds by measuring conscientiousness at the facet level.

The FFM originally emerged from factor analytic studies of trait terms occurring in natural language (Digman, 1996); as such, each of the five factors can be regarded as an aggregation of lower-level traits. Conscientiousness is operationalized as a composite of six facets in Costa and McCrae's (1992) NEO-PI-R personality inventory (competence, order, dutifulness, deliberation, self-discipline, and achievement-striving). These facets fall roughly into the two broad dimensions of conscientiousness described above (Hough, 1997). The first five facets reflect the "dependability" aspect of conscientiousness; achievement-striving represents the ambition side of conscientiousness. Sample items from the scales are given below to illustrate their general content.

The *competence* scale (e.g., "I pride myself on my sound judgment") measures individuals' perceptions of their overall capability, sensibility and prudence. Competent people are generally self-confident and high in internal locus of control (Costa, McCrae, & Dye, 1991). High scorers on the *order* scale (e.g., "I keep my belongings neat and clean") are methodical and well-organized. They see themselves as thorough and efficient at task performance. The *deliberation* scale contains items that are oriented toward caution (e.g., "I always consider the consequences before I take action"). Highly deliberate individuals avoid hasty, impulsive decisions; one potential shortcoming of such individuals may be a lack of spontaneity. Finally, the *dutifulness* scale is intended to tap the respondent's adherence to ethical principles, or conscience (e.g., "I'd really have to be sick before I'd miss a day's work"). High scorers see themselves as scrupulous in fulfilling their moral obligations.

The other two facets of the conscientiousness dimension are more volitional in character. Volition, or will, concerns the initiation and maintenance of actions related to goal attainment (Locke & Latham, 1990); additionally, task perseverance and determination at overcoming obstacles are in part a function of volition (Heckhausen, 1991). Stewart (1999) suggests that the *achievement-striving* scale (e.g., “I have a clear set of goals and work toward them in an orderly fashion”) taps volitional processes. High scorers on this scale are diligent and purposeful; such individuals tend to be highly ambitious and goal driven. Similarly, the *self-discipline* scale measures the respondent’s determination to bring tasks to completion (e.g., “Once I start a project, I almost always finish it”). Highly self-disciplined individuals avoid procrastination, and have the capability of resisting boredom and distractions.

Empirical evidence supports Hough’s (1997) contention that facet measures of conscientiousness are more predictive of performance than global measures. Stewart (1999) reported that, whereas global conscientiousness predicted sales performance uniformly, facets of conscientiousness accounted for incremental variance in performance (sales volume) dependent upon employee tenure. Specifically, the *order* subtrait was related to sales volume for newly hired employees; the *achievement-striving* subtrait was related to sales volume for longer-term employees. According to Stewart (1999), *order* is important for new, or “transition” employees (Murphy, 1989) because methodical planning and effective time management are particularly critical at this stage. Conversely, *achievement-striving* becomes more important for longer-term (“maintenance”; Murphy, 1989) employees, because work at this later stage requires less structured planning and more goal commitment and persistence.

More recently, Moon (2001) used a decision-making task to test criterion-related validities for facet-level traits (*dutifulness* and *achievement-striving*) versus global conscientiousness. The criterion was escalation of commitment to a task with a sunk-cost component. Whereas dutifulness was negatively related to escalation of commitment, achievement was positively related to the criterion. The global conscientiousness dimension, by contrast, was unrelated to escalation of commitment, showing that the subtraits of conscientiousness accounted for more variance in commitment than did the global construct. Thus, Stewart (1999) and Moon (2001) have demonstrated that analysis of personality at the facet level can reveal important information that may be obscured at the global level.

In an academic setting, Paunonen and Ashton (2001) found that the achievement-striving facet was more highly correlated with undergraduate's final grades than a composite measure of conscientiousness. Paunonen and Nicol (2001) reported that the self-discipline facet had a significantly higher correlation with undergraduate grade point average than did global conscientiousness, accounting for an additional 7.7% of the criterion variance. Paunonen's studies supplement the theoretical writings of Hough and the empirical work of Stewart (1999) and Moon (2001), suggesting that there is practical value in analyzing conscientiousness at the facet level.

Neuroticism

To Freud, Jung, Horney, and other early personality theorists, neuroticism was the trait construct of predominant interest (Hogan & Roberts, 2001). The negative relationship between neuroticism and job performance is probably attributable to the

tendency of neurotic individuals to experience psychological and physical distress, including depressive and anxiety-related symptoms (Barrick et al., 1999). Neurotic individuals are also less tolerant of stress, higher in negative affectivity, and lower in self-esteem (Costa & McCrae, 1992). It has been shown that such tendencies are related to counter-productive work behaviors, including disciplinary problems (Hough, Eaton, Dunnette, Kamp, & McCloy, 1990) and procrastination (Beswick & Mann, 1994).

Interestingly, although neuroticism is second only to conscientiousness as a predictor of job performance (Barrick & Mount, 1991; Hurst & Donovan, 2000; Salgado, 1997), there has been no systematic research on the criterion-related validities of the individual subtraits of neuroticism. The facets of neuroticism in the NEO-PI-R (Costa & McCrae, 1992) are anxiety, depression, angry hostility, self-consciousness, impulsiveness, and vulnerability.

Individuals high in *depression* (e.g., “Too often, when things go wrong, I get discouraged and feel like giving up”) exhibit chronic negative affect, low energy, and hopelessness. They tend to be lower in self-esteem, and to set lower goals (Ahrens, Zeiss, & Kanfer, 1988; Hollenbeck & Brief, 1987). The major implication of depression for work-related behaviors is employee withdrawal, usually manifested as low job commitment or high emotional distress (Lowman, 1996).

Conversely, *anxiety* is an energized state (Carver & Scheier, 1998); high scorers (e.g., “I often feel tense or jittery”) tend to dwell inordinately on feared outcomes, and to suffer from nervous tension. Additionally, they are more susceptible to phobias, generalized anxiety, and compulsive disorders. *Vulnerability* is a measure of a person’s

ability to handle stressful situations (e.g., “I can handle myself pretty well in a crisis”). Highly vulnerable individuals show a propensity for panic or hopelessness when under pressure. High-anxiety and vulnerable employees are susceptible to performance decrements caused by excessive stress and worry (Matthews, Schwan, Campbell, Saklofske, & Mohammed, 2000). Anxiety is also related to low self-efficacy regarding academic performance (Smith, Arnkoff, & Wright, 1990) and training performance (Martocchio, 1994).

The *angry hostility* scale (e.g., “I often get angry at the way people treat me”) measures individuals’ susceptibility to frustration and anger. High scorers tend to be touchy and irritable, handling even moderately provoking situations with difficulty. People with high *self-consciousness* scores (e.g., “In dealing with other people, I always dread making a social blunder”) are uncomfortable around others. Their shyness makes them particularly sensitive to ridicule. The *impulsiveness* scale taps the individual’s ability to resist temptation (e.g., “I sometimes eat myself sick”). Additionally, such individuals show low tolerance for frustration, and a predisposition for negative mood states. In this respect the NEO-PI-R differs from other FFM measures, in which impulsiveness is indicative of spontaneity, a facet of (low) conscientiousness (e.g., the Personality Research Form; Jackson, 1984).

In sum, although global neuroticism predicts job performance, it is possible that, similar to conscientiousness, individual subtraits impact performance to varying degrees and for different reasons. For example, it is probable that individuals high in depression underperform others in part because of motivational difficulties (e.g., low personal performance standards). In contrast, individuals scoring high on the anxiety,

impulsiveness, or vulnerability subscales may perform poorly due to the negative mood states and the distracting effects of worry over potential failure in evaluative situations (e.g., test performance; Bossong, 1994). The hostility and self-consciousness subtraits may not impact task performance directly, but may have important effects on performance in interpersonal contexts.

Self-Efficacy, Goals, and Performance

A basic premise of the proposed study is that personality affects performance largely through its effects on motivation. The motivation/performance model used here is derived from Bandura (1997; Wood & Bandura, 1989) and Locke and Latham (1990). According to these authors, self-efficacy and goal level are the most proximal predictors of performance. The level of performance in turn impacts subsequent self-efficacy evaluations and goal choices. This model has proven to be extremely robust empirically (Locke & Latham, 1990), with several studies supporting these links (Chen, Gully, Whiteman, & Kilcullen, 2000; Phillips & Gully, 1997; Thomas & Mathieu, 1994). For example, studies in academic settings have consistently shown that self-efficacy is positively correlated with self-set goal level and that both self-efficacy and goal level have independent relationships with performance in coursework (Klein, 1991; Mone, 1994; Phillips & Gully, 1997; Thomas & Mathieu, 1994).

According to social cognitive theory (SCT), self-efficacy (a belief in personal capability to perform at a given level on a specific task) is one of the most important determinants of performance. Bandura (1991; 1997) considers self-efficacy to be task-specific, although some research has provided evidence for a generalized self-efficacy construct (Chen et al., 2000). As an evaluation of task-specific capabilities, a critical

component of self-efficacy is the individual's belief that he or she can perform the subtasks required for successful overall performance. Thus, according to SCT, individuals' beliefs regarding their abilities relative to situational features are critical determinants of performance. The primary source of such evaluations is past experience (i.e., "enactive mastery"; Gist, 1987), although self-efficacy can also be enhanced through role models, verbal persuasion, or self-monitoring of physiological states (Bandura, 1997). Research has shown that stable individual differences, including causal attributions (Thomas & Mathieu, 1994) and goal orientation (Phillips & Gully, 1997) are also important antecedents of self-efficacy beliefs. Self-efficacy is similar to the expectancy construct (perceived probability of success at a task given a certain level of effort), but it is broader in scope, stemming from individuals' beliefs in their overall level of competence (Wood & Locke, 1987).

A large body of research (Bandura, 1997) has shown that self-efficacy is positively related to performance. In a meta-analysis across 114 studies, Stajkovic and Luthans (1998) report a weighted average correlation of $r = .38$ between self-efficacy and work-related performance. Studies have shown that self-efficacy impacts performance through goals, and also independently of goals (e.g., Chen et al., 2000; Phillips & Gully, 1997).

Few relationships in the organizational behavior literature have been as extensively explored as that between goals and task performance (Locke & Latham, 1990). Experimental studies have consistently shown a positive linear relationship between goal difficulty and task performance, which only levels off when participants reach their maximal ability levels (Mento, Steel, & Karren, 1978; Tubbs, 1986; Wood,

Mento, & Locke, 1987). According to Locke and Latham (1990), difficult goals engender greater direction of attention and strategy generation than easy goals. It has also been shown repeatedly that specific goals are more conducive to high performance than vague (“do your best”) goals (Mento et al., 1978; Tubbs, 1986). Specific goals are effective because they provide individuals with clearer performance standards than general goals (Klein, 1989).

Locke, Shaw, Saari, & Latham (1981) proposed that self-set goals may be more effective than assigned goals for detecting the effects of individual differences on goals and related constructs. Individual differences are expected to be reflected in goal selection, because people do not typically choose goals they feel unwilling or unable to achieve. Several researchers in recent years have used self-set goal designs to explore the relationships between motivation, performance, and individual difference constructs, including need for achievement (Phillips & Gully, 1997), generalized self-efficacy (Chen et al., 2000), and conscientiousness (Barrick et al., 1993). Hollenbeck and Brief (1987) showed that individual differences predict self-set goal level, such that individuals with high task-specific self-efficacy set higher goals than others.

Consistent with previous research (e.g., Chen et al., 2000; Phillips & Gully, 1997), the present investigation hypothesized that self-efficacy will be positively related to goal level, goal level would be positively related to performance, and goals would partially mediate the relationship between self-efficacy and performance. Additionally, because cognitive ability has been shown to be an important determinant of self-efficacy (Chen et al., 2000; Phillips & Gully, 1997) and task performance (Hunter &

Hunter, 1984), it was expected to be positively related to these variables in the present investigation.

Hypothesis 1: There will be a positive relationship between self-efficacy and goal level.

Hypothesis 2: There will be a positive relationship between goal level and performance.

Hypothesis 3: Goal level will partially mediate the relationship between self-efficacy and performance.

Hypothesis 4: There will be a positive relationship between ability and performance.

Hypothesis 5: There will be a positive relationship between ability and self-efficacy.

Single-occasion tests of the impact of motivation on performance give an incomplete picture of the relationships between these constructs, as task performance tends to impact subsequent self-efficacy beliefs and goals. For example, according to goal-setting theory, individuals who experience success in previous endeavors have a greater belief in their abilities (self-efficacy), and hence set higher performance goals, in an upward spiral (Locke & Latham, 1990; Phillips, Hollenbeck, & Ilgen, 1996). At the end of each performance cycle, individuals compare their actual performance levels with their goals or standards. Depending on the outcome of this comparison, individuals either maintain their goals (no revision), abandon their goals (downward revision), or raise their goals (upward revision) (Phillips et al., 1996). According to SCT, successful performance usually results in upward revision, and unsuccessful

performance leads to downward revision. It is less clear when no revision will occur (Phillips et al., 1996). In short, SCT suggests that changes in goals and self-efficacy from Time 1 to Time 2 are largely a function of performance at Time 1.

In a recent empirical study, Thomas and Mathieu (1994) made a distinction between “within-episode” and “between-episode” processes to characterize the dynamic relationships between motivation and performance. Within-episode processes concern the relationships between individual differences, self-efficacy, goals, and performance. Between-episode processes refer to changes in self-efficacy and goals from Time 1 to Time 2. Thomas and Mathieu (1994) examined the impact of goal achievement and causal attributions on changes in self-efficacy for academic test performance. They found that individual differences (i.e., stable, internally caused performance attributions) impacted changes in self-efficacy. The present study adopts Thomas and Mathieu’s (1994) terminology, and examines the role of personality in predicting within and between episode motivational processes.

Personality, Self-Efficacy, Goals, and Performance

The present investigation examines the relationships between personality, self-efficacy, goals, and performance. Three possibilities are explored. First, in terms of within-episode processes, conscientiousness, neuroticism, and their facets are hypothesized to predict initial levels of self-efficacy, goals, and performance. Second, the effects of personality on performance are expected to be partially mediated by self-efficacy and goals. Third, in terms of between-episode processes, it is hypothesized that conscientiousness, neuroticism, and their facets will predict changes in self-efficacy and goal level after controlling for performance.

As discussed above, ample empirical evidence exists suggesting that conscientiousness is an important predictor of performance. Of course, validity coefficients do not address the question of *how* conscientiousness affects performance. Researchers have suggested that the primary mechanisms behind the conscientiousness/performance relationship are motivational. Studies have shown that conscientious individuals set higher goals (Barrick, Mount, & Strauss, 1993) and report higher levels of self-efficacy for a wide variety of tasks (Colquitt & Simmering, 1998; Gellatly, 1996; Martocchio & Judge, 1997). One issue of interest to researchers has been the extent to which self-efficacy and goals mediate the relationship between conscientiousness and performance. Partial mediation was reported by Barrick et al. (1993), who found that conscientiousness affected sales performance when the effects of goals were controlled. Similarly, in a study in which grade goals were assigned to undergraduate participants in a management seminar, Colquitt and Simmering (1998) reported that conscientiousness accounted for incremental variance in learning when the effects of expectancy were controlled. Conversely, self-efficacy (and self-deception) fully mediated the conscientiousness-performance relationship in Martocchio and Judge (1997) in which the criterion involved learning a software task. Gellatly (1996), using performance on a simple calculating task as the criterion, found that the effect of conscientiousness on goals was fully mediated by expectancy.

In sum, while self-efficacy, goals, and related constructs mediate the relationship between conscientiousness and performance, there is uncertainty with respect to the extent of the mediation. A potential reason for expecting partial mediation is that some *facets* of conscientiousness may be related directly to

performance, whereas other facets affect motivational processes, which in turn impact performance. Alternatively, the relationships between the individual facets of conscientiousness and performance may themselves be partially mediated by self-efficacy and goals. For example, although conscientious individuals typically set higher goals than others (because of achievement orientation), they also have greater volitional capabilities (e.g., persistence, thoroughness) that may not be reflected in their motivational self-assessments. If either contingency is true, using a global conscientiousness measure should result in self-efficacy and goals partially mediating the conscientiousness-performance link. Based on this logic and previous research (Barrick et al., 1993; Colquitt & Simmering, 1998), the present investigation hypothesized that conscientiousness would have some effect on performance independent of goals and self-efficacy (Figure 1).

Hypothesis 6: The path between conscientiousness and performance will be partially mediated by self-efficacy and goal level.

Surprisingly, there have been no studies examining the links between the various facets of conscientiousness and motivational processes, although prediction of performance has been shown to be enhanced by measurement of conscientiousness at the facet level (Paunonen & Ashton, 2001; Paunonen & Nicol, 2001; Stewart, 1999). Because conscientiousness is posited to affect performance largely through motivational processes (Mount & Barrick, 1995), one of the objectives of this investigation was to systematically investigate the relative contributions of the facets of conscientiousness in predicting self-efficacy, goals, performance, and changes in these variables over time. In doing so, this investigation constitutes a rational, construct-oriented (Hough, 1997)

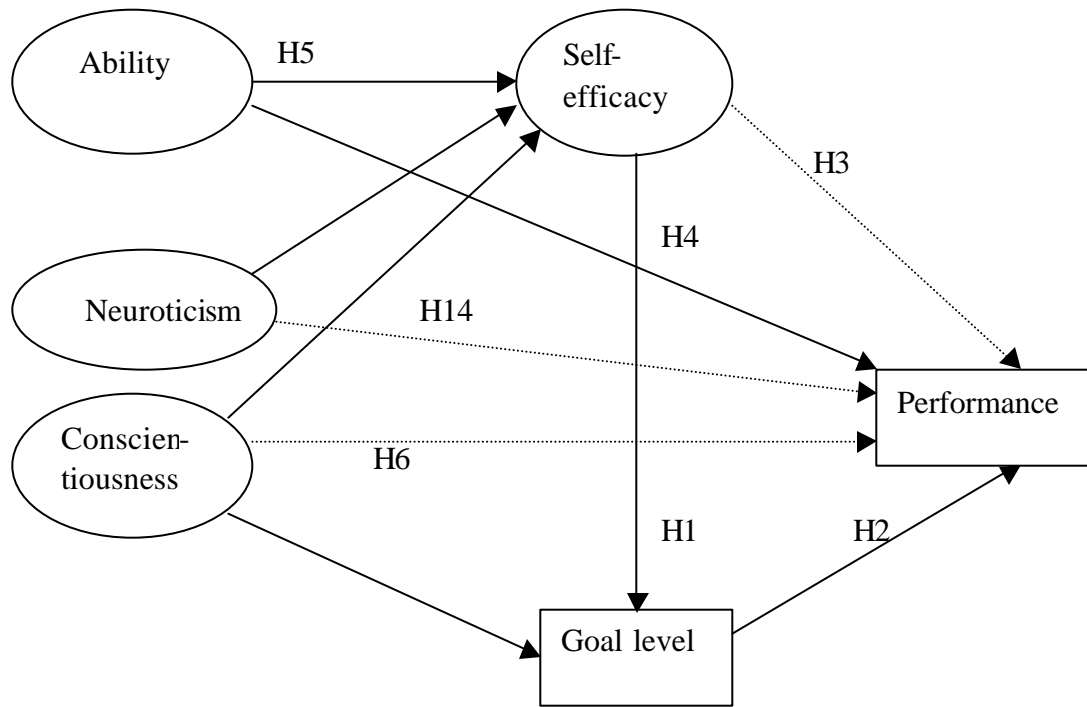


Figure 1: Hypothesized Relationships between Conscientiousness, Neuroticism, Self-Efficacy, Goal Level, Ability, and Performance. *Note:* Dotted lines indicate partial mediation. (Hypotheses 1 through 6 and 14).

extension of earlier studies which have shown that self-efficacy and goals mediate the effects of conscientiousness on performance (Barrick et al., 1993; Colquitt & Simmering, 1998; Gellatly, 1996; Martocchio & Judge, 1997).

The present study hypothesized that the facets of conscientiousness would differentially impact self-efficacy and goals to influence performance. It was proposed that five of the subtraits (i.e., *order*, *dutifulness*, *deliberation*, *competence*, and *self-discipline*) would be related to performance through individuals' self-efficacy beliefs. Specifically, because order, dutifulness, deliberation, caution, and self-discipline should be positively associated with behaviors related to academic effectiveness, it was predicted that individuals high in these qualities would also express high self-efficacy beliefs. Individuals high in *competence* and *dutifulness* are generally self-confident and responsible; it was expected that the personality-performance link for these two subtraits will be fully mediated by self-efficacy. However, because qualities related to *deliberation*, *order*, and *self-discipline* are valuable for actual task implementation (e.g., caution, thoroughness, and concentration), it was expected that self-efficacy would partially mediate the relationships between these facets on performance.

Achievement-striving, an indicator of individuals' ambition and goal directedness, was expected to affect performance chiefly through goals. High scorers on the *achievement-striving* subscale are driven to succeed (Costa & McCrae, 1992). In a study of the effects of individual differences on motivational processes, Phillips and Gully (1997) reported a significant correlation between need for achievement and goals ($r = .19, p < .01$), but a weaker relationship between need for achievement and self-efficacy ($r = .06, n.s.$). Thus, it appears likely that the *achievement-striving* facet

impacts performance predominately through goals. However, a direct link between the achievement-striving subtrait and performance was also predicted, because task performance should be positively impacted by effortful processes associated with achievement-striving but not related to goal choice. During performance, individuals high in achievement-striving were expected to exert greater effort to overcome unanticipated difficulties, and take greater care to avoid errors, than individuals lower in achievement-striving.

Hypothesis 7: The relationships between the competence and dutifulness facets and performance will be fully mediated by self-efficacy.

Hypothesis 8: The relationships between the order, deliberation, and self-discipline facets and performance will be partially mediated by self-efficacy.

Hypothesis 9: The relationship between the achievement-striving facet and performance will be partially mediated by goal level.

Conscientiousness and its subtraits were predicted to affect changes in self-efficacy and goals between performance episodes. Specifically, conscientiousness was expected to account for variance in these motivational constructs at Time 2 when the effects of self-efficacy, goals, and performance at Time 1 were controlled. It was also expected that the subtraits of conscientiousness would differentially predict changes in self-efficacy evaluations and goals. Whereas *order*, *dutifulness*, *competence*, and *deliberation* were not expected to be related to changes in self-efficacy or goal level, it was anticipated that *self-discipline* and *achievement-striving* would explain variance in changes in both when previous motivation and performance were controlled. As discussed above, *self-discipline* is associated with determination in seeing projects

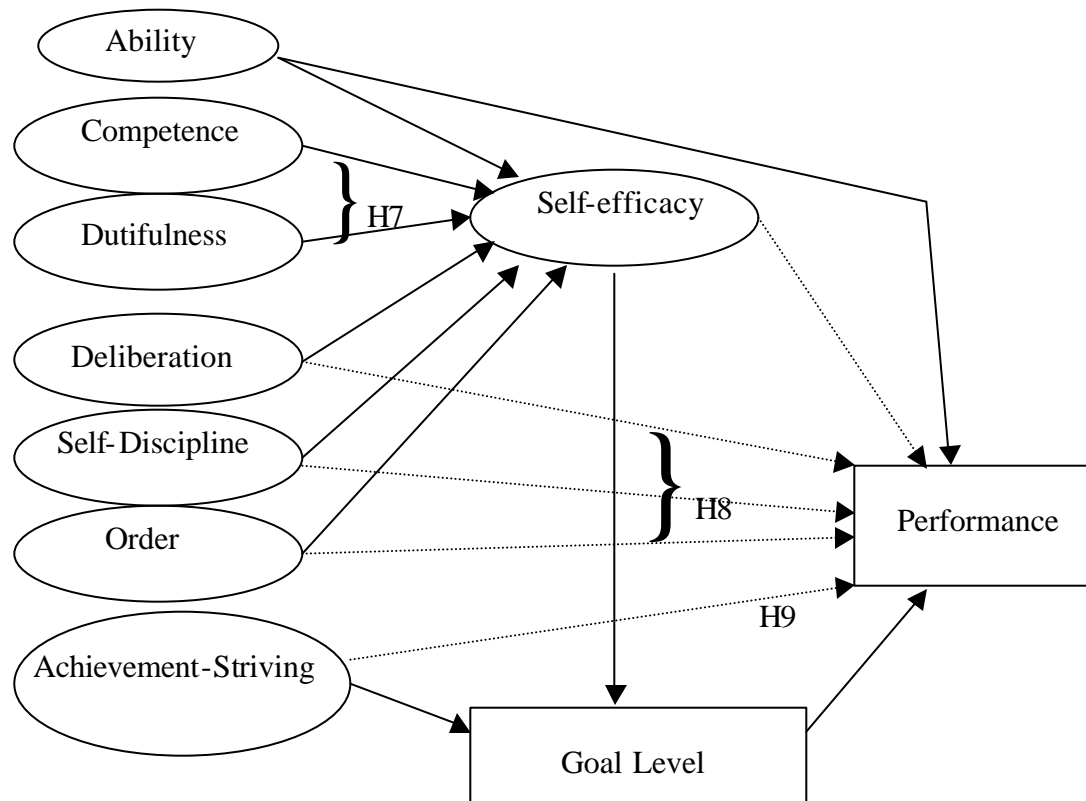


Figure 2: Hypothesized Relationships between Facets of Conscientiousness, Self-Efficacy, Goal Level, and Performance. *Note:* Dotted lines indicate partial mediation (Hypotheses 7, 8, and 9).

through to completion. Thus, self-disciplined individuals should show more resilience to negative performance feedback, such that their self-efficacy ratings and goals are less likely to decrease following sub-standard performance (i.e., when performance is lower than previous goal). Moreover, they should respond to successful performance (i.e., when performance exceeds previous goal) with correspondingly higher ratings of self-efficacy and goals. When substantial goal-performance discrepancies occur, such that performance falls below goals, these individuals are less likely to lower self-efficacy beliefs than others. They should also be more reluctant to abandon their goals when they encounter negative performance feedback. By the same token, when performance exceeds goals, individuals high in *achievement-striving* are apt to raise both self-efficacy ratings and goals for subsequent performance cycles (cf. Phillips et al., 1996). The other four subtraits predictive of self-efficacy (*order, dutifulness, competence, and deliberation*) are primarily associated with planning, self-confidence, and organization; hence, they were expected to affect the level of self-efficacy, but not necessarily changes in self-efficacy or goals. See Figures 3 and 4 for a representation of the following hypotheses.

Hypothesis 10: Conscientiousness will explain unique variance in self-efficacy at Time 2, controlling for self-efficacy and performance at Time 1.

Hypothesis 11: Conscientiousness will explain unique variance in goal level at Time 2, controlling for goal level and performance at Time 1.

Hypothesis 12: Self-discipline and achievement-striving will explain unique variance in self-efficacy at Time 2, controlling for self-efficacy and performance at Time 1.

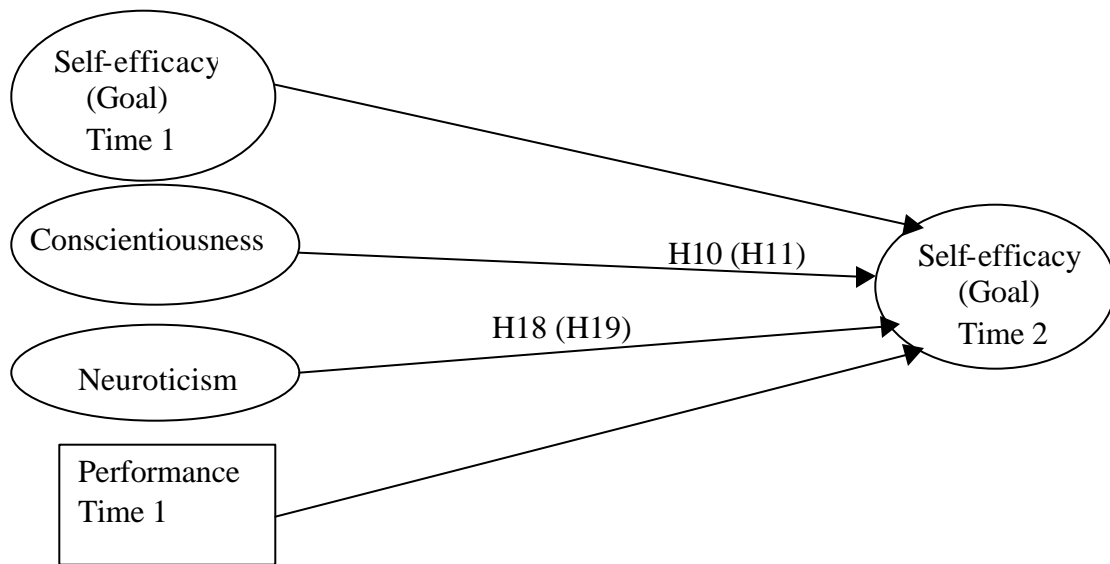


Figure 3: Hypothesized Relationships between Conscientiousness, Neuroticism, and Changes in Self-Efficacy (Goals) from Time 1 to Time 2 (Hypotheses 10, 11, 18, and 19).

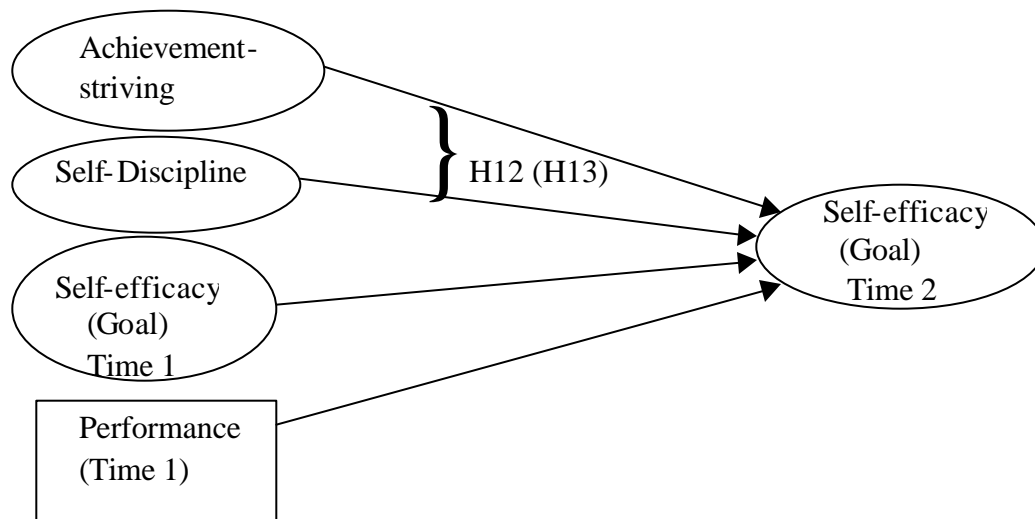


Figure 4: Hypothesized Relationships between Achievement-striving, Self-discipline, and Changes in Self-Efficacy (Goals) from Time 1 to Time 2 (Hypotheses 12 and 13).

Hypothesis 13: Self-discipline and achievement-striving will explain unique variance in goal level at Time 2, controlling for goal level and performance at Time 1.

Clearly, neuroticism is less “motivational” in character than conscientiousness. Accordingly, researchers have shown less inclination to include neuroticism in models investigating the relationships between personality, motivation and performance. However, certain links can be identified in the personality and motivational literatures, which are discussed below.

Recent work by Judge and his colleagues (Judge & Bono, 2001; Judge, Erez, & Bono, 1998; Judge, Locke, & Durham, 1997; Judge, Locke, Durham, & Kluger, 1998) suggests that neuroticism contributes to individuals’ core self-evaluations, which in turn affect their willingness and confidence to perform specific tasks. These core self-evaluations have implications for motivation-related decisions. For example, because neurotic individuals are more likely to view difficult tasks negatively (i.e., beyond their control to manage), they will tend to experience lower levels of motivation (Watson, 2000). Additionally, an individual with a negative self-concept (based on low self-evaluations) is less apt to increase effort to resolve discrepancies between actual performance and performance standards (Judge, Erez, & Bono, 1998). Evidence for such relationships was provided by Hemenover and Dienstbier (1996), who showed that neuroticism was negatively related to undergraduates’ perceived ability to perform successfully on an upcoming psychology exam. Specifically, neurotic participants rated their own problem-solving capacity lower, and the exam as more stressful, than non-neurotic participants. It is beyond the scope of this study to test the implications of

Judge's core self-evaluations theory for motivation. However, the model suggests that neuroticism should be negatively related to goals, self-efficacy, and performance.

Three of the facets of neuroticism (*depression, anxiety, and vulnerability*) were expected to be related to performance through motivational variables, but three were not (*angry hostility, self-consciousness, and impulsiveness*). However, *impulsiveness* was predicted to have direct effects on performance. For example, individuals high in this subtrait may experience difficulty tuning out intrusive thoughts unrelated to task performance, which may impair performance. Therefore, it was expected that self-efficacy and goals would account for only a portion of neuroticism's effect on performance.

Hypothesis 14: The effects of neuroticism on performance will be partially mediated by self-efficacy and goal level (Figure 1).

Based on the construct definitions of the subtraits of neuroticism, it is likely that some facets should be more strongly related to motivation and performance than others. This implies that aggregating the facets of neuroticism into a global trait might tend to obscure variance in motivation and performance that a facet level of analysis would reveal. As discussed above, one of the facets of neuroticism is susceptibility to depression. Ahrens, Zeiss, and Kanfer (1988) showed that depressed students set significantly lower goals for class performance. Additionally, depression is negatively related to self-esteem (Robins, Hendin, & Trzesniewski, 2001), which has been shown to be associated with higher goals (Hollenbeck & Brief, 1987) and greater effort under difficult goal conditions (Carroll & Tosi, 1970). Thus, one of the reasons depression may be negatively related to performance is because depressed individuals set lower

standards for performance than non-depressives (Locke & Latham, 1990).

Additionally, negative affect and excessive self-focus can deplete cognitive resources and undermine performance in depressive individuals (Markman & Weary, 1998).

Therefore, the present investigation predicted that the relationship between the *depression* subtrait and performance would be partially mediated by goals.

The *anxiety* and *vulnerability to stress* facets were expected to affect performance partly through self-efficacy beliefs. Because individuals high in trait anxiety tend to appraise themselves as lacking capability for dealing with demanding situations (Matthews, Derryberry, & Siegle, 2000), these subtraits should negatively impact self-efficacy evaluations. Individuals high in these subtraits tend to engage in more severe self-criticism, derived in part from negative self-beliefs (Matthews et al., 2000). However, research has also shown that individuals high in anxiety and vulnerability experience task-related performance decrements attributable to their greater difficulty in maintaining attentional focus (Matthews et al., 2000). Because such effects may not be reflected in self-efficacy evaluations, it is predicted that the relationships between the *anxiety* and *vulnerability* facets and performance will be partially mediated by self-efficacy.

One of the remaining subtraits of neuroticism, *impulsiveness*, may have implications for performance that would not be reflected in motivational processes. Because individuals high in impulsiveness experience difficulty resisting strong internal cravings, it was expected that they would be more susceptible to performance-inhibiting distractions than individuals low in this attribute. *Impulsiveness*, then, was expected to be directly related to task performance. The remaining two neuroticism facets, *self-*

consciousness and *angry hostility*, are associated primarily with difficulties in interpersonal interactions, and were not hypothesized to have any significant relationships with the motivational or performance variables in the present study. The following set of hypotheses for neuroticism facets are depicted in Figure 5.

Hypothesis 15: The relationships between the anxiety and vulnerability facets and performance will be partially mediated by self-efficacy.

Hypothesis 16: The relationship between the depression facet and performance will be partially mediated by goal level.

Hypothesis 17: The impulsiveness facet will be negatively related with performance.

Similar to conscientiousness, neuroticism and its subtraits were also expected to be related to between-episode criteria (Thomas & Mathieu, 1994), such that neuroticism would predict changes in self-efficacy and goal level independent of performance. *Anxiety*, *vulnerability*, and *depression* were expected to be independently related to changes in both self-efficacy evaluations and goals.

Individuals high in *anxiety* and *vulnerability* to stress should experience strong reactions to performance failure, which could be reflected in subsequent self-efficacy ratings. Because they are more susceptible to self-criticism (Matthews et al., 2000), anxious and vulnerable individuals might also be more apt to abandon goals when they encounter difficulties. Depressive individuals are particularly prone to internal, stable attributions for performance outcomes (Beck, 1976), making them more likely to interpret negative performance feedback as a reflection on their fundamental

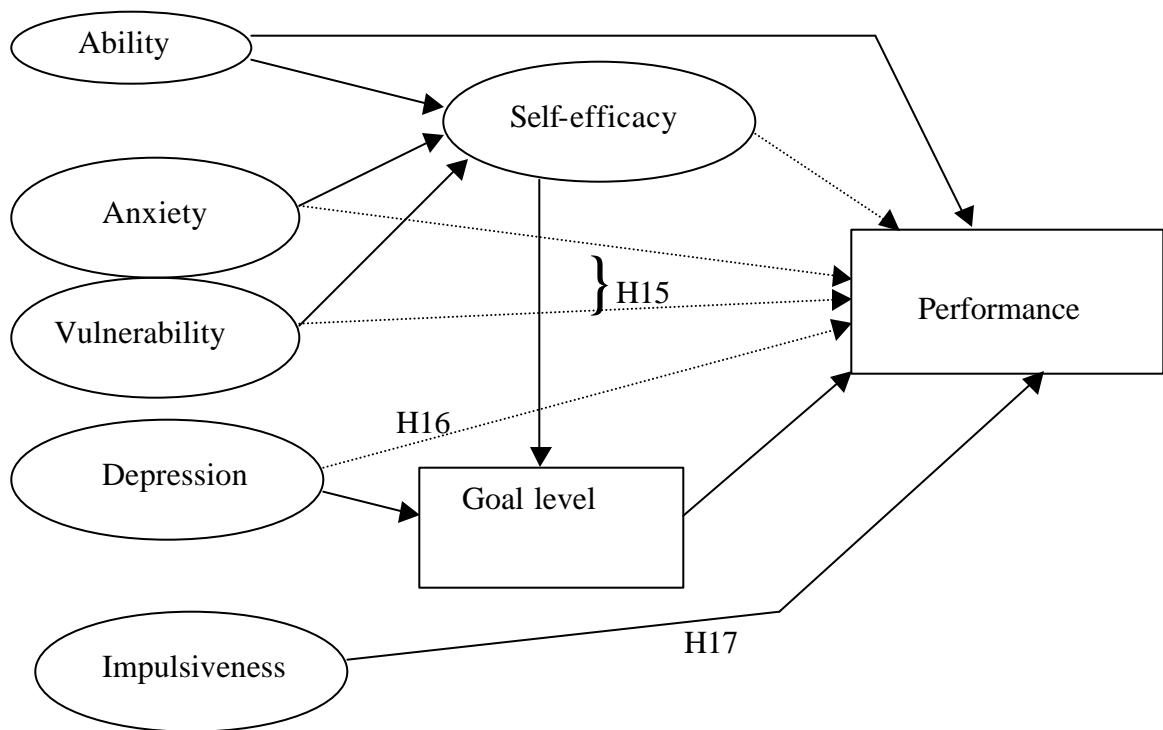


Figure 5: Hypothesized Relationships between Facets of Neuroticism, Ability, Self-Efficacy, Goal Level, and Performance. *Note:* Dotted lines indicate partial mediation (Hypotheses 15, 16, and 17).

performance capabilities. Consequently, lower performance is likely to lead to both lower self-efficacy beliefs and downward goal revision for such individuals. Therefore, it was expected that depression will have an independent relationship with changes in self-efficacy and goal level when the effects of previous performance and motivation are controlled.

Hypothesis 18: Neuroticism will explain unique variance in self-efficacy at Time 2, controlling for performance and self-efficacy at Time 1 (Figure 3).

Hypothesis 19: Neuroticism will explain unique variance in goal level at Time 2, controlling for performance and goal level at Time 1 (Figure 3).

Hypothesis 20: Anxiety, vulnerability, and depression will explain unique variance in self-efficacy at Time 2, controlling for performance and self-efficacy at Time 1 (Figure 6).

Hypothesis 21: Anxiety, vulnerability, and depression will explain unique variance in goal level at Time 2, controlling for performance and goal level at Time 1 (Figure 6).

Overview of Investigation

The models in Figures 1-6 were tested using undergraduates' coursework as the task. Participants reported self-efficacy and goals prior to the Time 1 examination. After receiving their grades on this exam, they reported self-efficacy and goals for the Time 2 exam. Coursework is an appropriate task for evaluating such motivational processes; some of the advantages include repeated performance episodes, the exact quantification of performance, the independence of individual performance, and the importance of the task to the participants (Campion & Lord, 1982). Separate testing

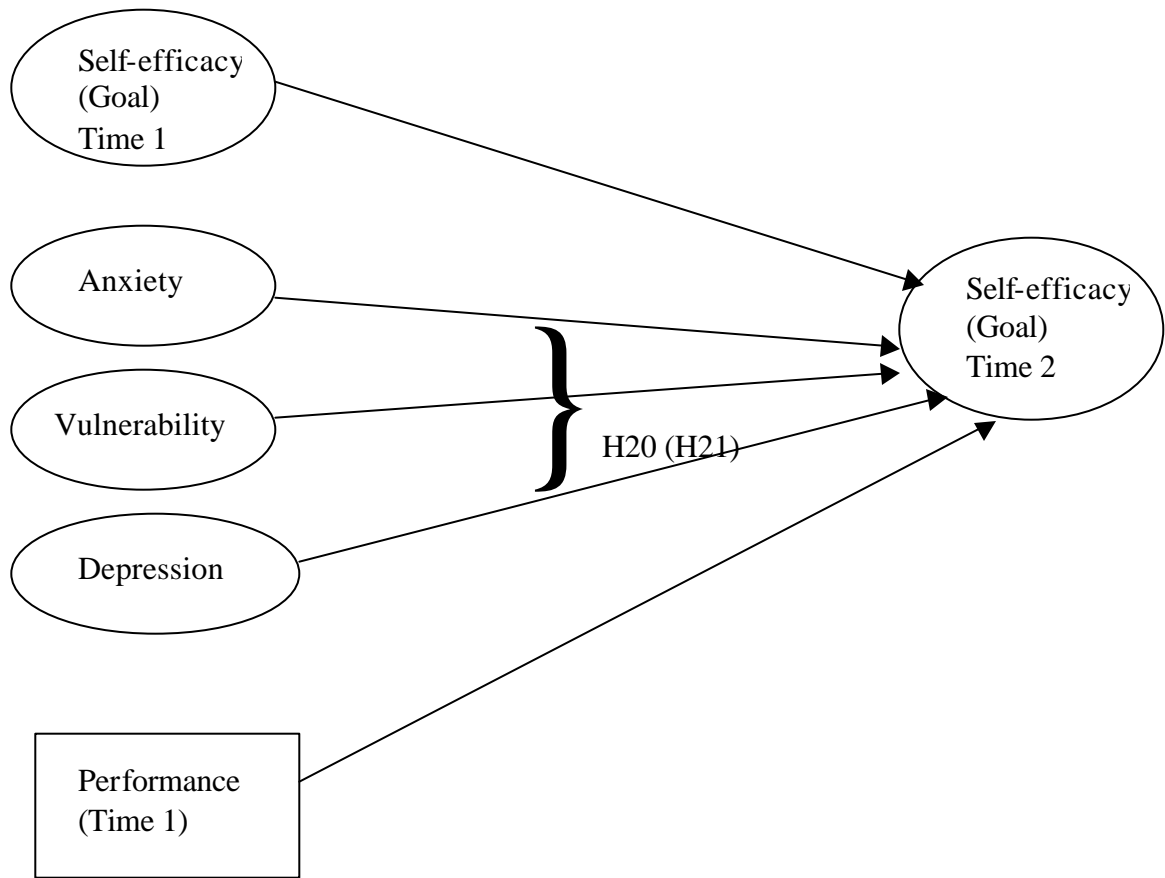


Figure 6: Hypothesized Relationships between Anxiety, Vulnerability, Depression, and Changes in Self-Efficacy (Goals) from Time 1 to Time 2 (Hypotheses 20 and 21).

sessions were held later in the semester, at which participants completed a cognitive ability test and personality inventory. Consistently significant positive relationships between conscientiousness and academic performance have been reported in recent studies. Correlations between conscientiousness and undergraduate GPA have ranged from $r = .17$ (Goff & Ackerman, 1992) to $r = .34$ (Wolfe and Johnson, 1995). Conversely, both Goff and Ackerman (1992) and Wolfe and Johnson (1995) report non-significant relationships between neuroticism and academic performance ($r = -.09$ and $r = -.02$, respectively). Possibly, stronger effects for neuroticism would have been found if the authors had used facet measures.

A repeated measures design was used in the study, to examine changes in self-efficacy and goals as a function of performance and stable personality traits. The major advantage of repeated measures designs is that they allow within-person analyses of changes in self-efficacy and goal level that are not possible with single-occasion, between-subject designs (Klein, 1991; Vancouver et al., 2001). Thus, as discussed previously, personality factors may influence the extent to which individuals revise their goals, with hard-working (conscientious) participants less inclined to revise goals downward following performance failure, and easily discouraged (neurotic) participants showing a greater tendency to do so.

METHOD

Participants.

Data were collected during the Fall 2001 semester. Data were obtained from Louisiana State University psychology undergraduates ($N = 220$), who participated in return for partial course credit. Participants were recruited from four classes, including Introduction to Psychology ($n = 30$), two Introduction to Statistics classes ($n = 85$), and Personality Psychology ($n = 105$). 175 of the participants were female, 45 were male; 185 participants described themselves as White, 19 were African American, five Hispanic, nine Asian, and two Other. The mean age of participants was 21 ($sd = 2.66$).

Measures

Conscientiousness and neuroticism. Conscientiousness, neuroticism, and their facets were assessed with the NEO-PI-R Form S (self-report; Costa & McCrae, 1992). The NEO-PI-R was the first questionnaire-type instrument designed specifically to test the five-factor model, and remains the most widely used facet-based FFM personality questionnaire (Widiger & Trull, 1997). It contains 240 self-report items, and usually requires 30-40 minutes to complete.

Conscientiousness and neuroticism are computed as weighted averages of six first-order facets. Each facet is assessed with eight items, which are formulated as self-descriptive statements. For example, an item for the *achievement striving* scale of conscientiousness reads, "I have a clear set of goals and work toward them in an orderly fashion." Responses are given in a 5-point Likert scale, from Strongly Disagree to Strongly Agree. Table 1 shows the global factors, their first-order facets, and the reliabilities reported for each in the manual (Costa & McCrae, 1992).

Table 1

Reliabilities (Coefficient Alpha) for Global Factors and Facets, Form S of the NEO-PI-R (Costa & McCrae, 1992).

Scale	α
Conscientiousness	.90
C1: Competence	.67
C2: Order	.66
C3: Dutifulness	.62
C4: Achievement Striving	.67
C5: Self-Discipline	.75
C6: Deliberation	.71
Neuroticism	.92
N1: Anxiety	.78
N2: Angry Hostility	.75
N3: Depression	.81
N4: Self-Consciousness	.68
N5: Impulsiveness	.70
N6: Vulnerability	.77

Note: Each facet scale contains 8 items.

The NEO-PI-R has been extensively validated with other personality measures, including the Personality Research Form (PRF; Jackson, 1984), Gough's (1983) Adjective Check List, and Goldberg's (1992) Big Five Markers inventory. It has also been used frequently in organizational settings (Costa, 1996).

Goals. Participants indicated their test goals by reporting the minimal grade (in percentage points) that would satisfy them (Appendix 1). Locke and Bryan (1968) showed that such goals were more highly correlated with academic performance than "hope for" or "will try for" operationalizations.

Self-efficacy. A scale developed by Wood and Locke (1987) was employed. Self-efficacy was measured with seven items, including class concentration, memorization, exam concentration, understanding, explaining concepts, discriminating concepts, and note-taking. Although Wood and Locke (1987) asked participants to respond in a yes/no format on two separate dimensions (Can Do and Confidence), Maurer and Pierce (1998) showed that a 5-point Likert format along a single dimension offered similar reliabilities and validity for academic performance. The scale performed moderately well as a predictor of performance in Wood and Locke (1987), with validities ranging from $r = .10$ (explaining concepts) to $r = .26$ (class concentration). Maurer and Pierce (1998) report an overall validity coefficient of $r = .25$ for final course grades.

Cognitive ability. Ability was assessed with the Wonderlic Personnel Inventory, a 12-minute test of general mental ability. This instrument has 50 multiple choice and short answer questions; examinees are instructed to answer as many items as possible in 12 minutes. The test measures three basic areas of intelligence: Verbal Ability

(synonyms and antonyms), Math Ability (word and complex arithmetic problems) and Logical Reasoning (syllogisms and sentence completion). The test begins with relatively simple questions, but the degree of difficulty rises quickly, and very few respondents are able to answer all 50 items in the 12 minute period. The WPT comes in a simple, three-page format. The examinee writes answers in boxes in the margins of the test form itself.

Test-retest reliabilities of the WPT range from .82 to .94 (Murphy, 1984). Internal consistency estimates (KR-20) are generally around .90. The WPT correlates highly with other, more extensive mental ability tests, including the Wechsler Adult Intelligence Scale-Revised (WAIS-R), with $r = .89$ to $.96$ reported in various studies, and the General Aptitude Test Battery (GATB), with $r = .56$ to $.80$. A score of 20 correct responses on the WPT corresponds approximately to a WAIS-R IQ score of 100 (Wonderlic Inc., 1992).

Procedure

During the last class meeting prior to their first examination, participants in three of the classes (Personality and both Statistics sections) reported their goals and self-efficacy for performance on the exam. During the first class meeting after receiving their exam scores on the first test, participants reported their goals and self-efficacy for the second exam. One point of extra credit was granted to participants for each occasion. Additionally, participants were given the opportunity to register for separate 90-minute testing sessions, in which they completed a cognitive ability test and a personality inventory. These sessions were held later in the semester. Three extra credit points were granted for these sessions. Students in the Introduction to

Psychology class were asked to report their goals and self-efficacy for the second examination of the semester. During the separate testing sessions they reported goals and self-efficacy for their next exam.

Responses to all measures were coded and subsequently matched at the end of the semester to help ensure confidentiality. To further guarantee anonymity, all identifying information was removed from questionnaire materials after all data were matched. Instructors did not see students' responses on any of the questionnaires during the semester.

Analytic Strategy

All hypothesized models were tested using structural equation modeling (SEM) with LISREL 8.3 (Joreskog & Sorbom, 1993). Based on the analysis of covariance structures, SEM has distinct advantages over other statistical techniques. For example, unlike regression or ANOVA, SEM permits the researcher to simultaneously estimate relationships between observed and latent constructs and between different latent constructs. Additionally, SEM automatically accounts for measurement error by modelling latent constructs separately from observed variables and error terms.

The two-step approach. In testing the hypothesized models, the present investigation uses the two step model-building approach recommended by Anderson and Gerbing (1988). With this method, the researcher begins by specifying a measurement model, in which the relationships between observed variables and latent constructs are analyzed. This confirmatory factor analysis phase examines whether the items or item indicators are valid measures of the hypothesized latent constructs. Satisfactory specification of a measurement model is a necessary prerequisite for testing

substantive hypotheses. Step two involves a hypothesis-driven examination of the structural relationships between the latent constructs themselves, in which the goal is to find the most meaningful and parsimonious model for the observed data. Various criteria (i.e., fit indices) are used to evaluate the adequacy of measurement and structural models.

If the initial theoretical model does not fit observed data, alternative structural models can be examined. Anderson and Gerbing (1988) outline a systematic procedure for fitting alternative structural models to observed covariance matrices by applying and relaxing constraints (i.e., dropping or adding paths) between latent constructs. These modifications to the structural model should be theory-driven, rather than empirically driven. Models that only differ in the number of constraints applied are said to be nested. The chi-square difference test is used to compare the fit of nested models, with the goal of identifying the most appropriate (i.e., best-fitting) model.

Item parcelling. As mentioned above, in the confirmatory factor analysis phase of SEM the researcher must provide evidence that the observed study variables are related strongly to their hypothesized latent constructs, and not to unrelated constructs. At its most basic level, this issue can be examined by testing whether individual scale items load on the appropriate latent construct. Using item-level indicators is essential when developing a new measure. However, investigators frequently use an item parcelling strategy (combining items from the same scale into common indicators) when using an established measure with many items and multiple constructs. There are two advantages to this strategy. First, item parcels commonly exhibit higher reliability than individual items (West, Finch, & Curran, 1995). Second, using parcels reduces the

number of estimated parameters in the measurement model; because model fit estimates are more stable when the respondent-to-parameter ratio is high, it is frequently preferable to combine indicators into parcels (Hall, Snell, & Foust, 1999). For these reasons, and because the measures used in this study have been previously validated, item parcels were used in the present investigation. For models testing facet-level hypotheses, three item parcels were formed for each personality facet scale (8 items each) and both self-efficacy scales (7 items each) (Bollen, 1989). For models testing global-level hypotheses, each personality facet scale mean was used as a separate indicator; as before, three item parcels were used for the self-efficacy scales. This procedure was used by Judge, Bono, and Locke (2000) in a similar study in which both higher-order and lower-order traits were modeled in separate analyses.

Single indicator variables. Three of the variables in the study (cognitive ability, goal level, and performance) were represented by single scores; these were defined by single indicators. Because it cannot be assumed that such measures are perfectly reliable, a procedure described by Joreskog and Sorbom (1982) was used to estimate error variances (theta-delta or theta-epsilon) and factor loadings (lambda) for these single indicator variables. Error variances were fixed at one minus the reliability (estimated at .88 for the Wonderlic Personnel Test, and at .90 for the goal level and performance items; Phillips & Gully, 1997) multiplied by the observed score variances. Factor loadings for these items were fixed as a function of one minus the square root of their reliabilities (Anderson & Gerbing, 1988).

Evaluation of model fit. Structural equation modeling software packages give the researcher a variety of means for evaluating the fit of observed data to theoretical

models. The most conventional indicator of model fit is the chi-square (χ^2) statistic, which represents the size of the discrepancy between the sample and model-implied covariance matrices, with a non-significant χ^2 value indicating good fit. Because the χ^2 test is sensitive to large sample sizes, it has become standard practice to supplement this analysis with other measures of model fit.

The remaining commonly reported fit indices evaluate other aspects of the observed data relative to the hypothesized model. The Root-Mean-Square-Error-of-Approximation (RMSEA) compares the sample covariance matrix with a hypothetical population covariance matrix, fitted per degree of freedom. Good model fit is reflected by RMSEA values of .08 or less (Vandenberg and Lance, 2000). A second fit index, the Standardized Root Mean Squared Residual (SRMR) represents the average standardized residual obtained when the sample variance-covariance matrix is fitted to the hypothesized model; good models yield values of .10 or less (Vandenberg & Lance, 2000).

The Goodness of Fit Index (GFI) indicates the amount of variance in the observed data explained by the hypothesized model; the GFI is an absolute measure of fit corresponding approximately to the R^2 statistic (Byrne, 1998). The Comparative Fit Index (CFI) is an incremental fit index, measuring the observed data against a fully restricted baseline model (Hu & Bentler, 1995). Also reported in the present study is the Non-Normed Fit Index (NNFI; also called the Tucker-Lewis Index), another incremental fit index comparing the observed data to a null model. GFI, CFI, and NNFI values of .90 or higher indicate adequate model fit (Vandenberg & Lance, 2000).

The final fit statistic to be reported in the present investigation is the test for difference in χ^2 between nested models. This is the preferred method for comparing the hypothesized structural model to both the measurement model and to more or less constrained structural models. Where changes in χ^2 are significant ($p < .05$), less constrained models are progressively tested, as recommended by Anderson and Gerbing (1988) in the procedures described above. After adequate measurement and structural models have been established, significance levels of individual path coefficients are inspected to test specific hypotheses.

RESULTS

Descriptive Statistics

Means, standard deviations, intercorrelations, and reliabilities are reported in Tables 2 and 3. Most of the reliabilities (coefficient alpha) were in acceptable ranges, although the reliabilities of competence ($\alpha = .61$), dutifulness, ($\alpha = .63$) and impulsivity ($\alpha = .66$) were below the commonly accepted cutoff of .70 (Nunnally & Bernstein, 1994). The correlations reported in Table 2 provide initial support for the relationships posited by social cognitive theory. Specifically, Time 1 self-efficacy was significantly correlated both with Time 1 goals ($r = .23, p < .01$) and with performance ($r = .20, p < .01$). The relationship between Time 1 goal level and performance was also significant in the expected direction ($r = .32, p < .01$).

Correlations between global conscientiousness, the facets of conscientiousness, the motivational constructs, and performance are reported in Table 2. Global conscientiousness was positively related to self-efficacy at both Time 1 ($r = .17, p < .05$) and at Time 2 ($r = .23, p < .01$). However, conscientiousness was not related to goal level at either Time 1 or Time 2 ($r = .04, n.s.,$ and $r = .05, n.s.,$ respectively), but was marginally related to performance ($r = .13, p = .06$). Three of the conscientiousness facets were correlated with self-efficacy at both Time 1 and Time 2, including competence ($r = .21, p < .01$ and $r = .25, p < .01$, respectively) dutifulness ($r = .18, p < .01$ and $r = .24, p < .01$) and achievement-striving ($r = .19, p < .01$ and $r = .29, p < .01$). Order was related to self-efficacy only at Time 2 ($r = .14, p < .05$). The only significant relationship between the conscientiousness facets and goal level was for achievement-striving at Time 1 ($r = .14, p < .05$). However, two of the facets,

Table 2
Descriptive Statistics, Reliability Coefficients, and Correlation Coefficients: Conscientiousness and Facets

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Conscientiousness	2.37	.47	(.86)												
2. Competence	2.60	.48	.78**	(.61)											
3. Order	.22	.65	.74**	.49**	(.74)										
4. Dutifulness	2.64	.55	.77**	.55**	.42**	(.63)									
5. Achievement	2.34	.65	.79**	.57**	.52**	.52**	(.81)								
6. Self-Discipline	2.27	.77	.86**	.61**	.55**	.60**	.70**	(.85)							
7. Deliberation	2.09	.65	.69**	.49**	.42**	.50**	.33**	.44**	(.78)						
8. Wonderlic	24.16	4.33	.01	.08	.00	.03	.03	-.03	-.01	(.90) _a					
9. Self-efficacy t1	3.82	.58	.17*	.21**	.01	.18**	.19**	.10	.05	.12	(.81)				
10. Self-efficacy t2	3.75	.62	.23**	.25**	.14*	.24**	.29**	.13	.06	.02	.61**	(.83)			
11. Goal t1	85.13	6.03	.04	.11	-.02	.12	.14*	-.01	-.12	.23**	.33**	.26**	(.90) _a		
12. Goal t2	85.95	6.75	.05	.10	.01	.09	.11	.00	-.04	.26**	.25**	.26**	.52**	(.90) _a	
13. Test Score	77.33	12.61	.13	.04	-.05	.23**	.22**	.10	.05	.20**	.21**	.29**	.32**	.33**	(.90) _a

Note: *N* = 220. Cronbach's alphas are reported in parentheses on the diagonal.

p* < .05 *p* < .01

_a Estimates (Anderson & Gerbing, 1988)

dutifulness and achievement-striving, were significantly related to test performance ($r = .23, p < .01$ and $r = .22, p < .01$, respectively). Thus, there appears to be initial support for some of the hypothesized relationships between conscientiousness, its facets, and the motivational and performance constructs.

Correlations between neuroticism, its facets, and the motivational and performance variables are reported in Table 3. Global neuroticism was significantly correlated with self-efficacy at Time 1 ($r = -.13, p = .05$) but not at Time 2 ($r = -.07$, n.s.); neuroticism was uncorrelated with goal level on both occasions ($r = -.04$, n.s., and $r = .00$, n.s., respectively) and with performance ($r = .06$, n.s.). Among the neuroticism facets, depression was significantly related to self-efficacy at both Time 1 ($r = -.16, p < .05$) and Time 2 ($r = -.14, p < .05$). Vulnerability was related to self-efficacy at Time 1 ($r = -.17, p < .05$), but not at Time 2 ($r = -.10$, n.s.). None of the neuroticism facets were related to goal level. The relationship between anxiety and test performance was significant, but in the positive direction ($r = .15, p < .05$). Thus, initial inspection of the relationships between neuroticism, its facets, and the motivation and performance constructs provides only limited support for the hypotheses.

Collinearity diagnostics. One of the concerns of the present investigation is the potential for multicollinearity, which can occur when predictor variables are highly correlated among themselves (Cohen & Cohen, 1983). Because the primary facets of the personality scales are designed to load on common second order factors (conscientiousness and neuroticism), high intercorrelations among these scales could be expected.

Table 3
Descriptive Statistics, Reliability Coefficients, and Correlation Coefficients: Neuroticism and Facets

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Neuroticism	2.08	.49	(.89)												
2. Anxiety	2.45	.72	.81**	(.81)											
3. Hostility	1.80	.68	.68**	.42**	(.79)										
4. Depression	2.07	.76	.83**	.63**	.43**	(.83)									
5. Self-conscious	2.12	.85	.77**	.48**	.33**	.63**	(.72)								
6. Impulsivity	2.34	.59	.49**	.62**	.34**	.63**	.18**	(.66)							
7. Vulnerability	1.72	.61	.81**	.61**	.44**	.65**	.59**	.30**	(.78)						
8. Wonderlic	24.16	4.33	-.09	-.11	-.08	-.10	-.04	-.04	-.07	(.88) _a					
9. Self-efficacy t1	3.82	.58	-.13*	-.03	-.10	-.16*	-.13	.00	-.17*	.12	(.81)				
10. Self-efficacy t2	3.75	.62	-.07	.04	.03	-.14*	-.08	-.04	-.10	.02	.61**	(.83)			
11. Goal t1	85.13	6.03	-.04	-.01	-.06	-.05	-.01	.06	-.12	.23**	.33**	.25**	(.90) _a		
12. Goal t2	85.75	6.75	.00	.08	-.07	-.01	.02	.03	-.05	.26**	.26**	.26**	.52**	(.90) _a	
13. Test score	77.33	12.61	.06	.15*	-.10	.01	.07	.05	.01	.20**	.21**	.29**	.32**	.33**	(.90) _a

Note: *N* = 220. Cronbach's alphas are reported in parentheses on the diagonal.

p* < .05 *p* < .01

_a Estimated (Anderson & Gerbing, 1988)

Multicollinearity can cause large swings in regression coefficients, excessively wide confidence intervals, or even regression coefficients with signs in the opposite direction of the bivariate relationships (Neter, Kutner, Nachtsheim, & Wasserman, 1996). Initial inspection of the correlations among the facets of conscientiousness (Mean $r = .51$) and neuroticism (Mean $r = .49$) showed that multicollinearity was a potential concern; therefore, diagnostics for this condition were conducted using procedures outlined in the SPSS Base 10 Applications Guide (SPSS, 1999).

The first collinearity analyses examined the facets of conscientiousness and neuroticism for tolerance, defined as $1 - R^2_i$, where R^2_i represents the squared multiple correlation of a variable with the other predictors. Tolerance values range from 0 to 1; levels approaching zero indicate potential multicollinearity (SPSS, 1999). The lowest tolerance for the conscientiousness facets was .39 (self-discipline); the rest were greater than .45. The lowest tolerance among the neuroticism facets was .44 (depression). Thus, multicollinearity was not indicated by analyses of tolerances among either the conscientiousness or the neuroticism facets.

A second method of evaluating independent variables for multicollinearity is through inspection of condition indices, which represent the ratios of the greatest eigenvalues (standardized linear relationships among independent variables) to successive eigenvalues. A condition index larger than 15 may be indicative of multicollinearity, whereas values exceeding 30 indicate serious problems (SPSS, 1999). The condition index for the combined conscientiousness facets was 23.67, indicating potential concern; the condition index for the neuroticism facets was 16.48, suggesting that multicollinearity may be a lesser concern for neuroticism. The discovery of

possible multicollinearity effects among the personality facets impacted the model-fitting strategy, as discussed below.

Tests of Hypotheses

In the introductory section of this paper, the hypotheses for conscientiousness and its facets were presented first for Time 1 and Time 2, followed by the hypotheses for neuroticism at Time 1 and Time 2. However, because of differences in the analytic strategies used for Time 1 and Time 2 analyses, the results section will be structured slightly differently. After reviewing results for the hypothesis tests related to social cognitive theory (Hypotheses 1 through 5) all Time 1 analyses, for both conscientiousness and neuroticism, will be presented, followed by all Time 2 analyses. Thus, in order to make the presentation of results clear and precise, some of the Time 2 hypotheses will be tested out of sequence from their original presentation in the introduction. A summary of all hypothesis tests is presented in Table 6 (p. 75-76).

Tests of Social Cognitive Theory Predictions. Hypotheses 1 through 5 delineated expected relationships between ability, self-efficacy, goal level, and performance, based on social cognitive theory (SCT). Because these core relationships are common to all the Time 1 models (Figure 1), the first step was to determine whether the hypothesized relationships according to SCT were supported. Structural equation modeling was employed to test these hypotheses; results of these analyses are presented in Table 4. The measurement model (Model 1) fit the data quite well ($\chi^2(6) = 5.78$; RMSEA = .00; SRMR = .03; GFI = .99; CFI = 1.00; NNFI = 1.00). The hypothesized model (Model 2), however, showed a significant decrement in fit relative to Model 1 ($\Delta\chi^2(1) = 8.39, p < .01$). Because the positive relationship between ability and goal level has been

Table 4

Fit Indices for Covariance Structural Analysis: Social Cognitive Theory Constructs

Model number and type	χ^2	<i>df</i>	RMSEA	SRMR	GFI	CFI	NNFI	$\Delta\chi^2$
1. Measurement model	5.78	6	0.00	.03	.99	1.00	1.00	
2. Hypothesized model	14.17	7	.042	.07	.96	.97	.97	8.39**
3. Alternate model (a)	5.76	6	0.00	.03	.99	1.00	1.00	

Note: $n = 220$. RMSEA = root mean square error of approximation; SRMR = Standardized Root Mean Residual; GFI = Goodness of Fit Index; CFI = Comparative Fit Index; NNFI = Non-Normed Fit Index.

a: Add ability → goal path.

demonstrated in previous research (Barrick, Mount, & Strauss, 1996; Hollenbeck & Brief, 1987; Thomas & Mathieu, 1994), an alternate model was tested (Model 3) in which a path was estimated between these variables. Because all paths were estimated in this model (i.e., the model was saturated), the fit statistics were equivalent to the measurement model. Ability accounted for 2% of the variance in self-efficacy; ability and self-efficacy explained 18% of the variance in goals; and ability, self-efficacy and goals explained 14% of the variance in performance. This model is presented in Figure 7.

Hypothesis 1, which predicted a positive relationship between self-efficacy and goals, was supported ($\beta = .36, p < .01$). Additionally, goal level was positively related to performance, as predicted by Hypothesis 2 ($\beta = .25, p < .01$). Hypothesis 3 predicted that the relationship between self-efficacy and performance would be partially mediated by goals; the path coefficient from self-efficacy to performance was marginally significant when goal level was controlled ($\beta = .13, p = .07$). Because the significant bivariate self-efficacy/performance relationship ($r = .20, p < .05$) provided evidence of a direct path between these constructs, Hypothesis 3 was marginally supported. Hypothesis 4 predicted that ability would positively impact performance; this hypothesis was supported ($\beta = .13, p < .05$). The ability-self-efficacy relationship was also significant ($\beta = .14, p = .05$); thus, Hypothesis 5 was also supported. Although not originally hypothesized, there was a significant relationship between ability and goal level ($\beta = .19, p < .01$).

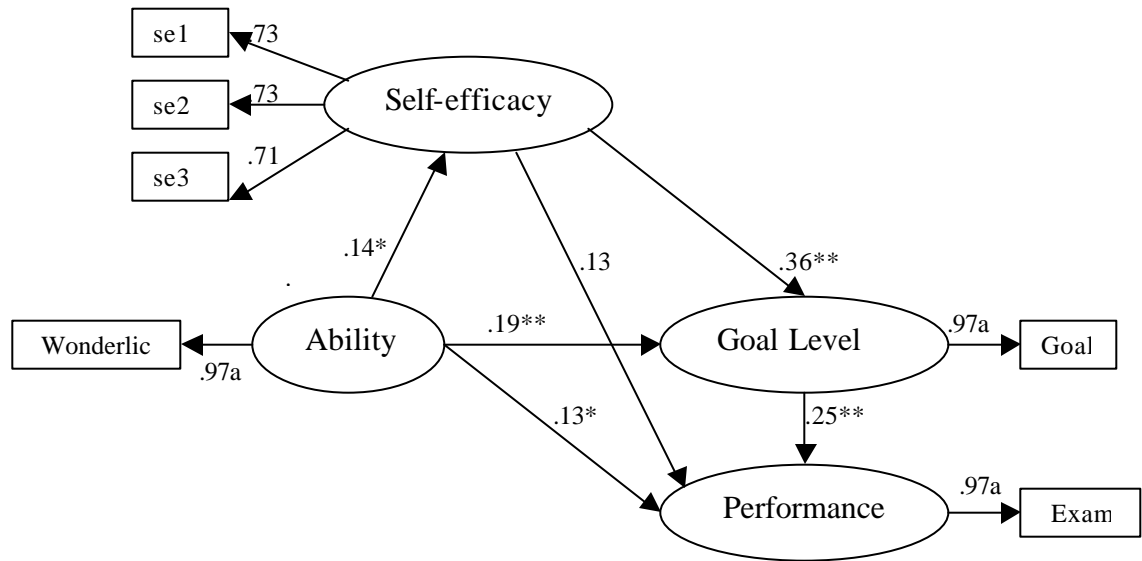


Figure 7. Standardized Path model for Ability, Self-Efficacy, Goal, and Performance.
 a. Estimated (Anderson & Gerbing, 1989)
 * $p < .05$ ** $p < .01$

In short, the relationships between ability, the motivational constructs, and performance were consistent with social cognitive theory (Bandura, 1997; Locke & Latham, 1990). These core relationships were not modified in subsequent model testing. The relationships between self-efficacy, goals, and performance were relatively unchanged across the various model tests. However, the role of ability as a predictor of motivation and performance was affected to a greater extent with the introduction of personality factors, as noted below.

Tests of Time 1 Models

Global conscientiousness. Hypothesis 6 predicted that the relationship between conscientiousness and performance would be partially mediated by self-efficacy and goals (see Figure 1). The measurement model fit the data well ($\chi^2(47) = 106.84$; RMSEA = .072; SRMR = .05; GFI = .93; CFI = .93; NNFI = .90). Examination of the hypothesized structural model also indicated good overall fit ($\chi^2(49) = 106.87$; RMSEA = .070; SRMR = .06; GFI = .93; CFI = .93; NNFI = .90), and was not significantly worse than the measurement model ($\Delta\chi^2(2) = .03$, n.s.). The structural model is presented in Figure 8. The path between conscientiousness and self-efficacy was significant ($\beta = .23$, $p < .01$), whereas conscientiousness and goals were unrelated ($\beta = .06$, n.s.). However, conscientiousness had a modest independent effect on performance ($\beta = .11$, $p = .06$). Ability and conscientiousness accounted for 7% of the variance in self-efficacy. Conscientiousness, ability, and self-efficacy accounted for 19% of the variance in goal level. Finally, conscientiousness, ability, self-efficacy, and goals accounted for 15% of the variance in performance. In sum, conscientiousness

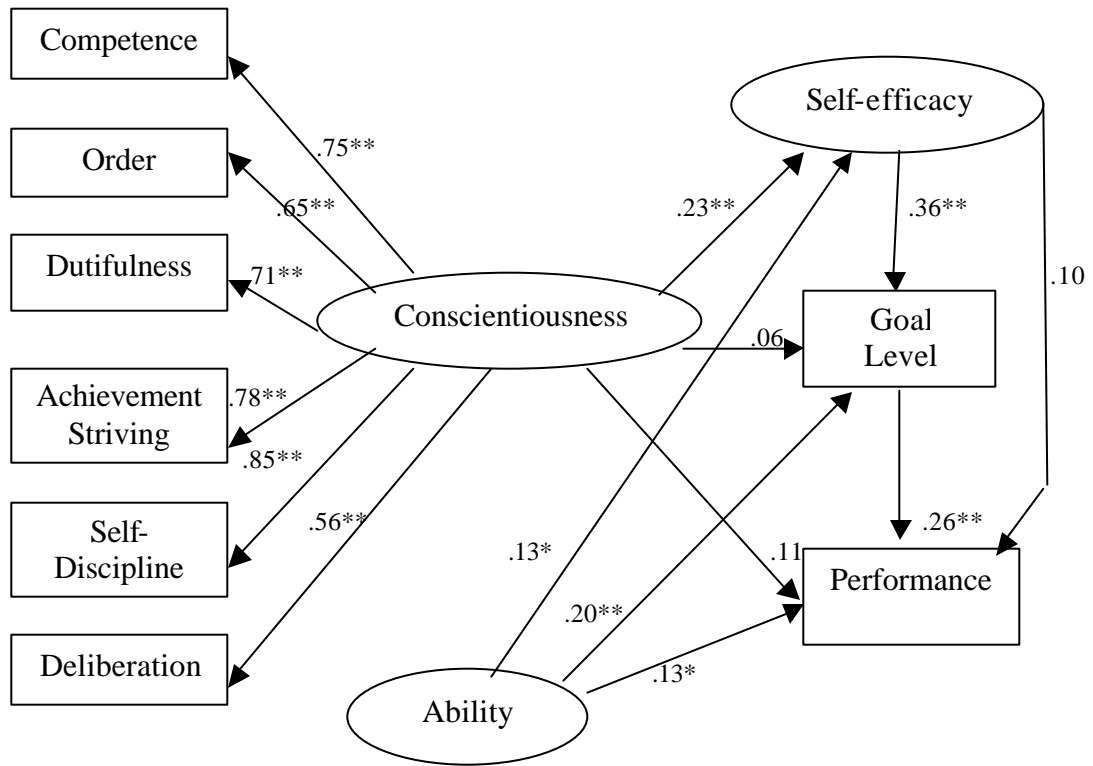


Figure 8. Standardized Path Model for Global Conscientiousness, Ability, Self-Efficacy, Goal, and Performance (Model 2; Time 1).

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

was significantly related to self-efficacy, marginally related to performance, and unrelated to goals. Thus, Hypothesis 6 received partial support.

Conscientiousness facet models. Hypotheses 7, 8, and 9 predicted various relationships between the facets of conscientiousness and self-efficacy, goals, and performance (see Figure 2). Hypothesis 7 predicted that the relationships between the competence and dutifulness facets and performance would be fully mediated by self-efficacy. Hypothesis 8 predicted that the relationships between the order, deliberation, and self-discipline facets would be partially mediated by self-efficacy. Finally, Hypothesis 9 predicted that the relationship between achievement-striving and performance would be partially mediated by goals. Results of the analyses are shown in Table 5. The measurement model (Model 1) fit the data fairly well ($\chi^2(210) = 293.68$; RMSEA = .041; SRMR = .05; GFI = .90; CFI = .96; NNFI = .94). A single structural model (Model 2) was examined to test Hypotheses 7, 8, and 9. This model showed a significant decrement in fit with respect to the measurement model ($\Delta\chi^2(15) = 33.80, p < .01$). Based on an examination of the regression coefficients and modification indices of this model, an alternate model (Model 3) was tested, in which all paths for order, achievement, and self-discipline were constrained to zero, and paths were added from dutifulness and deliberation to goal, and from competence to performance. Fit statistics for this model were satisfactory ($\chi^2(229) = 320.99$; RMSEA = .042; SRMR = .05; GFI = .89; CFI = .95; NNFI = .94); additionally, this model did not result in a significant chi-square change compared to the measurement model ($\Delta\chi^2(19) = 27.31, n.s.$). In Model 3, ability and competence accounted for 8% of the variance in self-efficacy; however, none of the path coefficients from ability to the dependent variables

Table 5

Fit Indices for Covariance Structural Analysis: Conscientiousness Facet Models (Time

1)

Model number and type	χ^2	<i>df</i>	RMSEA	SRMR	GFI	CFI	NNFI	$\Delta\chi^2$
1. Measurement model	293.68	210	.041	.05	.90	.96	.94	
2. Hypothesized model	326.48	225	.043	.05	.89	.94	.93	34**
3. Alternate (a)	320.99	229	.041	.05	.89	.95	.94	27 ns
4. Alternate (b)	268.16	229	.027	.05	.91	.98	.97	

Note: $n = 220$. RMSEA = root mean square error of approximation; SRMR = Standardized Root Mean Residual; GFI = Goodness of Fit Index; CFI = Comparative Fit Index; NNFI = Non-Normed Fit Index.

a. Drop order, dutifulness, self-discipline, deliberation → self-efficacy. Drop achievement-striving → goal. Drop order, achievement-striving, self-discipline, deliberation → performance. Add dutifulness, deliberation → goal. Add competence, dutifulness → performance.

b. Ridge model: Constant ($c = 0.05$) added to diagonal of variance/covariance matrix of predictor variables of Model 3.

** $p < .01$

was significant, suggesting that some of the variance in ability's effects on motivation and performance overlapped that of the facets. Ability, dutifulness, deliberation, and self-efficacy accounted for 21% of the variance in goals. Ability, competence, dutifulness, self-efficacy, and goals explained 35% of the variance in performance.

Model 3 is presented in Figure 9.

It can be seen in Figure 9 that the signs of some of the relationships between the facets and the dependent variables do not reflect either the findings of previous research or the bivariate correlations (Table 2). Specifically, regression coefficients were negative between competence and performance ($\beta = -.61$) and deliberation and goals ($\beta = -.37$), whereas the pairwise correlations between the same constructs were nonsignificant ($r = .04$, n.s., and $r = -.12$, n.s.) These results suggested that multicollinearity among the facets may have destabilized the regression coefficients. As discussed previously, tests for the presence of multicollinearity in the facets of conscientiousness were not conclusive; however, because unstable (i.e., reverse-signed) regression coefficients can be indicative of multicollinearity (Neter et al., 1996) a ridge regression option in LISREL was conducted on the data in Model 3.

Ridge regression is a procedure for reducing the effects of multicollinearity by systematically adding positive values to the main diagonal of the variance/covariance matrix of the predictor variables (Bobko, 1990). The technique entails accepting a small amount of bias in the regression coefficients in return for reducing the sampling variance in the predictor variance/covariance matrix, on the rationale that ordinary least squares regression coefficients are inflated (in absolute values) when multicollinearity is present (Pagel & Lunneborg, 1985).

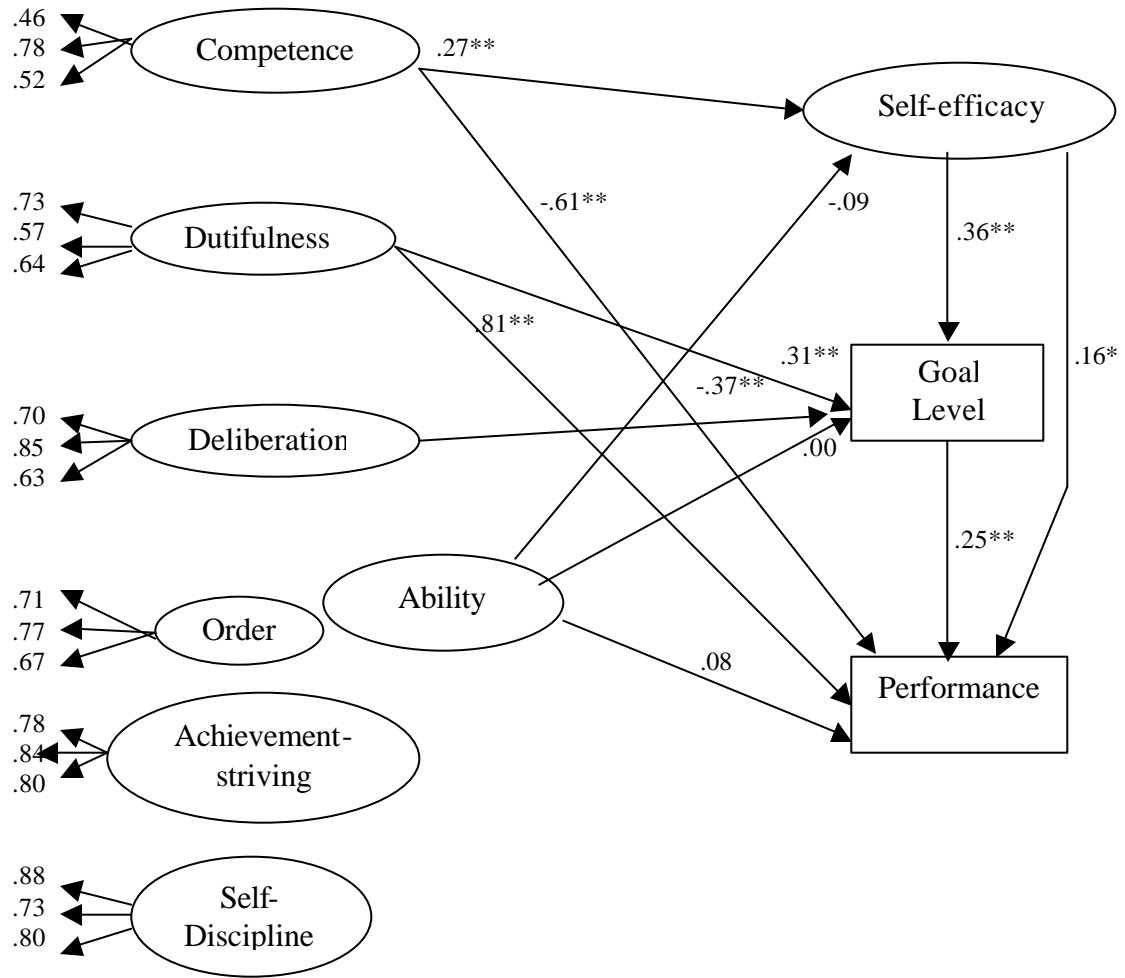


Figure 9. Standardized Path Model for Facets of Conscientiousness, Ability, Self-Efficacy, Goal, and Performance (Time 1).

** $p < .01$

Unlike some statistical programs (e.g., SAS), LISREL 8.3 (Joreskog & Sorbom, 1996) does not compute a ridge trace automatically; therefore, the analyst must manually enter the biasing constants. In the present analyses values were entered progressively starting with a ridge value of 0.01, the default starting value in LISREL, and proceeded in .01 increments. At each step the regression coefficients, explained variances in the dependent variables, and overall model fit were inspected. The desired outcome of these analyses was a model in which the beta values were positive (i.e., consistent with the bivariate relationships), with minimal sacrifices in terms of explained variance. Because sampling variance was reduced at each iteration, the fit statistics improved as the biasing constant was increased.

With the ridge constant set at 0.01, there was no change in the direction of the regression coefficients, and little change in explained variance or model fit. With the ridge constant set at 0.05 (Model 4) the fit statistics were satisfactory ($\chi^2(229) = 268.16$; RMSEA = .027; SRMR = .05; GFI = .91; CFI = .98; NNFI = .97), but there was less explained variance compared to the unbiased model both for goals (9% vs. 20%) and performance (26% vs. 35%). Both models explained the same amount of variance in self-efficacy (8%). More importantly, there was no evidence of changing signs in the regression coefficients in the structural model. In fact, the relationship between competence and performance increased in the negative direction ($\beta = -.75$ vs. $\beta = -.61$), whereas the dutifulness/goal relationship remained unchanged ($\beta = -.37$). Increasing the biasing constant to higher levels did not change these fundamental relationships. Thus, ridge regression was not an effective remedy for the opposite-signed regression coefficients in the structural models. A similar finding was reported

by Pagel and Lunneborg (1985) who showed that ridge regression outperforms ordinary least squares methods only when sample sizes are small and R^2 values are less than .10. Bobko (1990) also notes that ridge regression procedures are only effective where multicollinearity is present. Therefore, although the collinearity diagnostics for the facets of conscientiousness (discussed above) were inconclusive, results of the ridge analyses suggest that the unexpected pattern of regression coefficients in the conscientiousness facet models was probably not attributable to multicollinearity.

A second possible explanation for the negatively signed regression coefficients in the conscientiousness facet models is suppression. Suppression exists when the predictive validity of an independent variable is increased when additional independent variables are added to a regression equation (Smith, Ager, & Williams, 1992). As with multicollinearity, the effect of suppression can be a reversal of sign in predictor-criterion relationships (Cohen & Cohen, 1993). Thus, suppression is a reasonable explanation for both the opposite-signed beta weight in the competence-performance relationship and the inflated negative beta weight in the deliberation-goal relationship. The suppression explanation will be returned to in the Discussion.

Global neuroticism models. Hypothesis 14 predicted that the relationship between global neuroticism and performance would be partially mediated by self-efficacy and goal level (see Figure 1). The measurement model fit the data very well ($\chi^2 (47) = 62.51$; RMSEA = .036; SRMR = .05; GFI = .96; CFI = .98; NNFI = .97). The hypothesized structural model also exhibited satisfactory overall fit ($\chi^2 (48) = 64.48$; RMSEA = .037; SRMR = .05; GFI = .95; CFI = .98; NNFI = .97), and was not significantly different from the measurement model ($\Delta\chi^2 (1) = 1.97$, n.s.). Neuroticism

was significantly related to self-efficacy ($\beta = -.18, p < .01$), but unrelated to both goals and performance ($\beta = .02, n.s.$ and $\beta = .09, n.s.$, respectively). Thus Hypothesis 14 was not supported. Neuroticism and ability accounted for 5% of the variance in self-efficacy. Neuroticism, ability, and self-efficacy accounted for 19% of the variance in goals. Finally, neuroticism, ability, self-efficacy, and goals accounted for 15% of the variance in performance. The structural model is shown in Figure 10.

Neuroticism facet models. Hypotheses were developed for only four of the facets of neuroticism. Hypothesis 15 predicted that the relationships between anxiety and vulnerability would be partially mediated by self-efficacy. Hypothesis 16 predicted that the depression / performance relationship would be partially mediated by goals, and Hypothesis 17 predicted that impulsiveness would directly impact performance. The measurement model fit the data well ($\chi^2 (110) = 145.32$; RMSEA = .033; SRMR = .04; GFI = .94; CFI = .97; NNFI = .96). The hypothesized structural model also provided satisfactory fit ($\chi^2 (119) = 154.17$; RMSEA = .033; SRMR = .04; GFI = .94; CFI = .97; NNFI = .96), and was not significantly worse than the measurement model ($\Delta\chi^2 (9) = 8.85, n.s.$).

The structural model is shown in Figure 11. Anxiety was significantly related to both self-efficacy ($\beta = .34, p < .01$) and performance ($\beta = .54, p < .01$). Vulnerability was related to self-efficacy ($\beta = -.50, p < .01$), but not to performance ($\beta = -.19, n.s.$). Thus Hypothesis 15 received moderate support. Depression was not significantly related to goals ($\beta = -.06, n.s.$) but had a unique impact on performance ($\beta = -.31, p < .01$); impulsivity had no direct relationship with performance ($\beta = -.04, n.s.$); thus, Hypotheses 16 and 17 were unsupported. Ability, anxiety, and vulnerability accounted

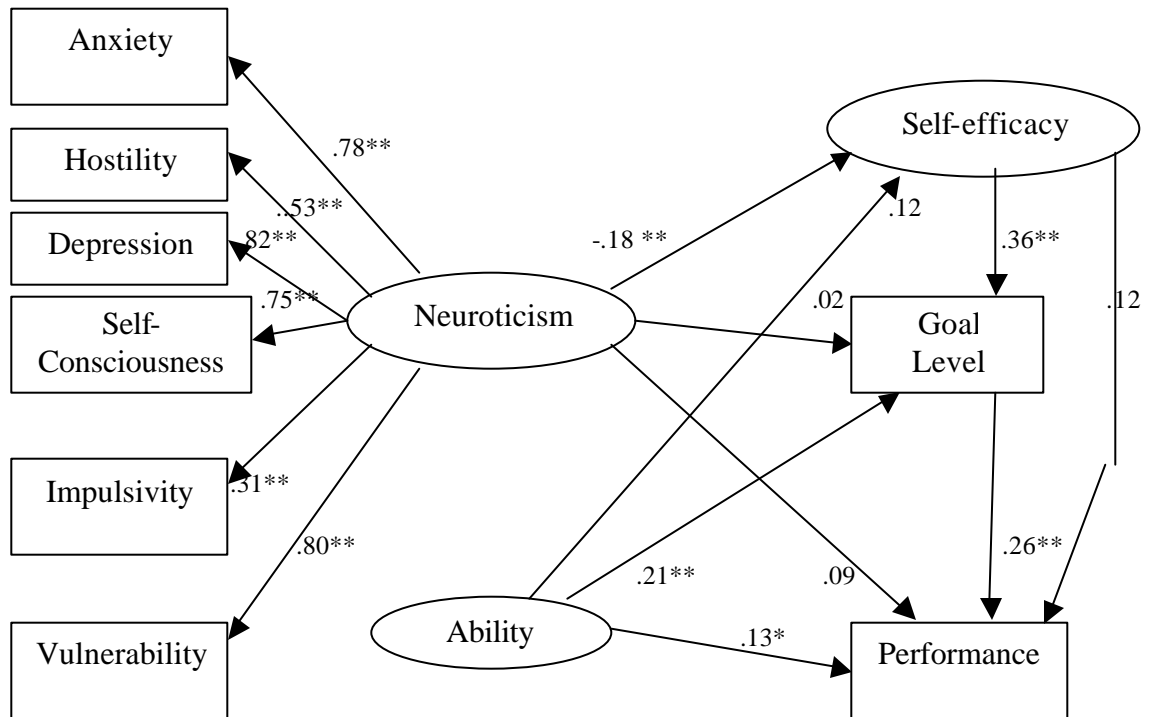


Figure 10. Standardized Path Model for Global Neuroticism, Ability, Self-Efficacy, Goal, and Performance (Time 1).

** $p < .01$

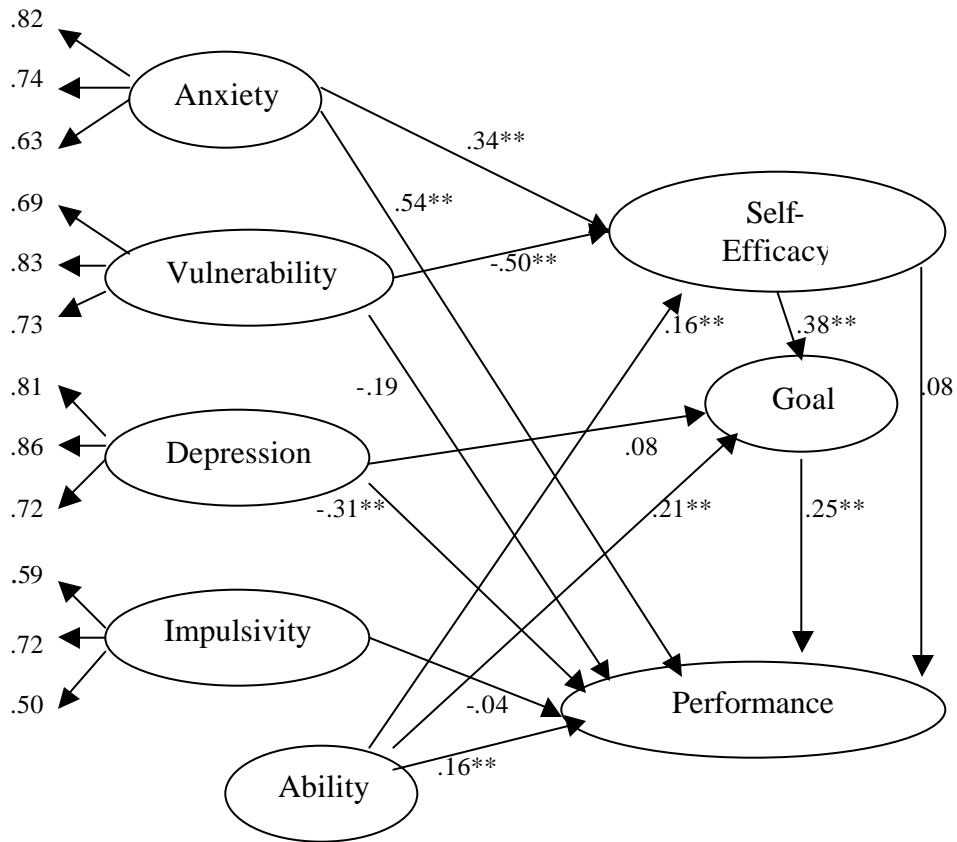


Figure 11: Standardized Path Model for Facets of Neuroticism, Ability, Self-Efficacy, Goal, and Performance (Time 1).
 ** $p < .01$

for 14% of the variance in self-efficacy. Ability, depression and self-efficacy accounted for 21% of the variance in goals. Ability, anxiety, vulnerability, depression, impulsivity, self-efficacy, and goals explained 24% of the variance in performance.

Interestingly, examination of the correlation matrix (Table 3) shows that the bivariate correlation between anxiety and performance was positive ($r = .15, p < .05$), while the correlation between anxiety and self-efficacy, although negative, was non-significant ($r = -.03, n.s.$). Thus, the unusual positive relationships between anxiety and self-efficacy and performance do not appear to be an effect of unstable regression coefficients associated with multicollinearity, although it appears that suppression may have occurred, as with the conscientiousness facet models. However, these results are not consistent with previous research (Matthews, Derryberry, & Siegle, 2000) or theory (Ahrens, Zeiss, & Kanfer, 1988) and should be investigated in future research. It is possible that high-anxiety individuals experienced more energized affect (Carver & Scheier, 1998), causing them to adopt an approach orientation to the task. This may have resulted in greater preparation and more effortful studying for the exam.

Tests of Time 2 Models

Analyses. Because all paths are estimated in the covariance structural analyses for Time 2 hypotheses (i.e., the models were just identified; see Figures 4, 5, and 6), no chi-square changes occur between the measurement models and the structural models in these analyses. Therefore only the fit statistics for the measurement models and path coefficients for the structural models are reported. In other words, all Time 2

hypotheses were tested by inspection of path coefficients in the structural models after establishing the adequacy of the measurement models.

Global Conscientiousness. Hypothesis 10 predicted that global conscientiousness would explain unique variance in Time 2 self-efficacy, after controlling for the effects of Time 1 self-efficacy and performance. Indices of fit for the global conscientiousness measurement model were satisfactory ($\chi^2(60) = 122.87$; RMSEA = .068; SRMR = .06; GFI = .92; CFI = .95; NNFI = .93). The structural model accounted for 60% of the variance in Time 2 self-efficacy. The path coefficient between conscientiousness and Time 2 self-efficacy was marginally significant ($\beta = .10$, $p = .07$); thus, Hypothesis 10 was weakly supported, such that global conscientiousness explained 1% of the variance in Time 2 self-efficacy when Time 1 self-efficacy and performance were controlled.

Hypothesis 11 predicted that global conscientiousness would explain unique variance in goal level at Time 2, when the effects of Time 1 goals and performance were controlled. The measurement model fit the data adequately ($\chi^2(24) = 76.87$; RMSEA = .09; SRMR = .06; GFI = .93; CFI = .92; NNFI = .89). The regression coefficient from conscientiousness to Time 2 goal level was non-significant ($\beta = .01$, n.s.); thus, Hypothesis 11 was unsupported. The structural model for both self-efficacy and goals is shown in Figure 12, with the path coefficients for goals shown in brackets.

Conscientiousness Facets. Hypothesis 12 predicted that two facets of conscientiousness (achievement-striving and self-discipline) would predict Time 2 self-efficacy when the effects of Time 1 self-efficacy and performance were controlled. The measurement model fit the data well ($\chi^2(56) = 69.45$; RMSEA = .03; SRMR = .04; GFI

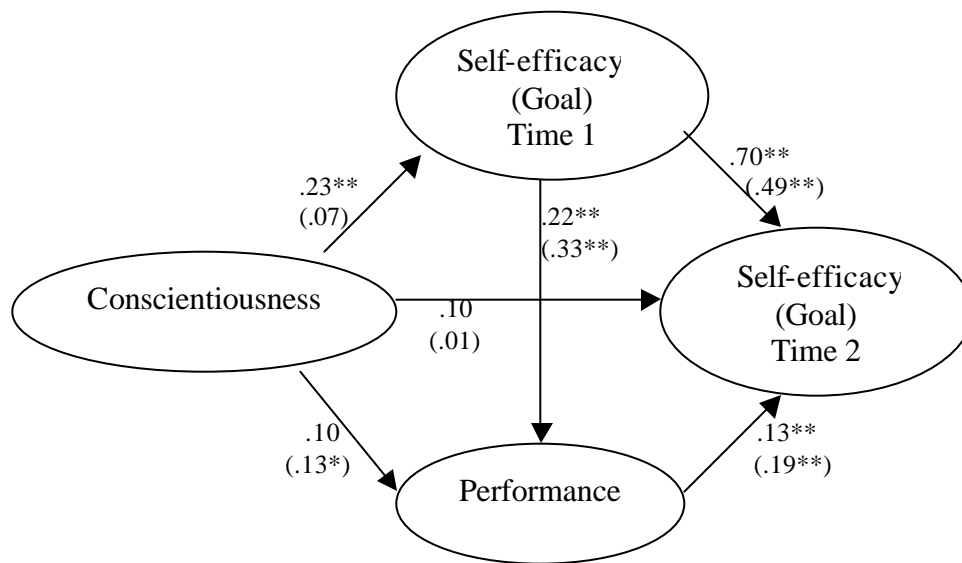


Figure 12: Standardized Path Model for Global Conscientiousness, Time 1 Self-Efficacy, Time 1 Goals, Performance, Time 2 Self-efficacy, and Time 2 Goals. (Note: Path coefficients for goals are in parentheses).

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

= .96; CFI = .99; NNFI = .99). Achievement-striving was significantly related to Time 2 self-efficacy ($\beta = .36, p < .01$). Self-discipline and Time 2 self-efficacy were also significantly related ($\beta = -.25, p < .05$). The negative-signed regression coefficient for self-discipline was not consistent with the bivariate relationship between self-discipline and Time 2 self-efficacy ($r = .13, n.s.$; see Table 2). A ridge regression was conducted on the model, using procedures described above, with no effect on the sign. Therefore it is likely that suppression contributed to this effect. The model accounted for 64% of the variance in Time 2 self-efficacy, of which 5% was attributable to personality. Thus, Hypothesis 12 was supported. The model is presented in Figure 13.

Hypothesis 13 predicted that achievement-striving and self-discipline would account for unique variance in Time 2 goals, controlling for Time 1 goals and performance. The measurement model exhibited excellent fit ($\chi^2(20) = 17.19$; RMSEA = 0.0; SRMR = .02; GFI = .98; CFI = 1.00; NNFI = 1.00). However, neither achievement-striving ($\beta = .04, n.s.$) nor self-discipline ($\beta = -.05, n.s.$) was significantly related to Time 2 goals, when the effects of Time 1 goals and performance were controlled. Thus, Hypothesis 13 was unsupported. Figure 14 shows the structural model tested.

Global Neuroticism. Hypothesis 18 predicted that global neuroticism would explain unique variance in Time 2 self-efficacy when initial self-efficacy levels and performance were controlled. The measurement model provided satisfactory fit to the data ($\chi^2(60) = 93.13$; RMSEA = .05; SRMR = .05; GFI = .94; CFI = .97; NNFI = .96). Neuroticism was not significantly related to Time 2 self-efficacy ($\beta = .03, n.s.$). Thus Hypothesis 18 was not supported.

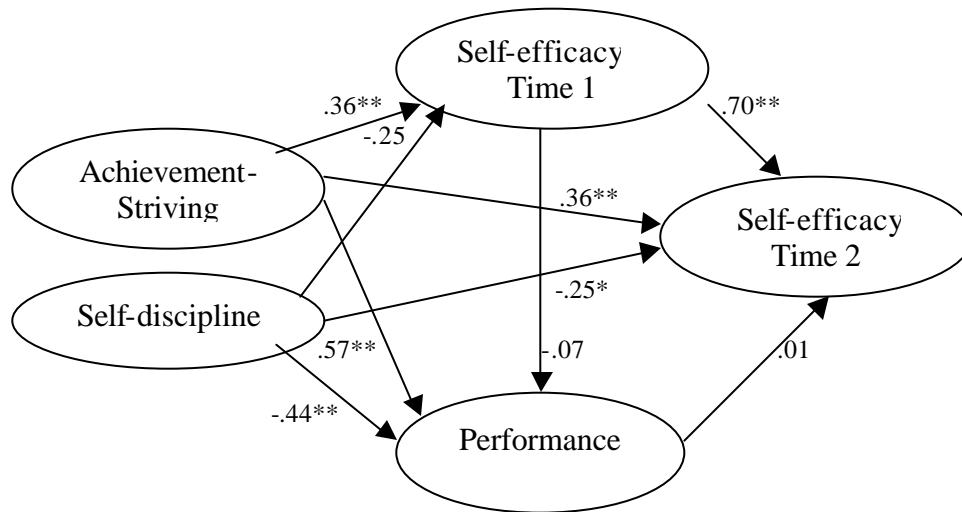


Figure 13: Standardized Path Model for Achievement-striving, Self-discipline, Time 1 Self-Efficacy, Performance, and Time 2 Self-Efficacy.

** p < .01

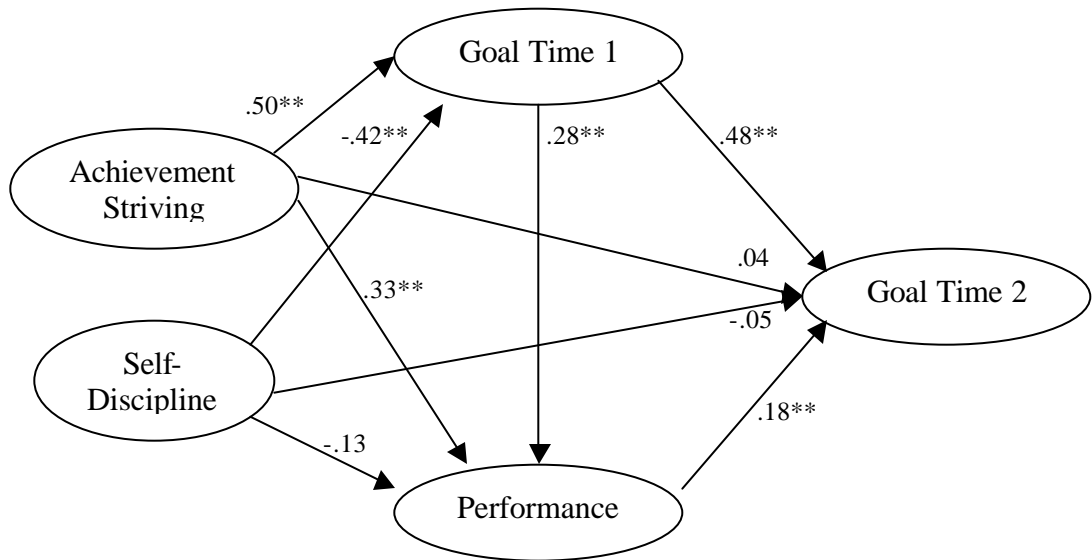


Figure 14: Standardized Path model for Achievement-striving, Self-discipline, Time 1 Goal, Performance, and Time 2 Goal.

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

Hypothesis 19 predicted that neuroticism would account for variance in goal level at Time 2 when the effects of Time 1 goals and performance were controlled. The measurement model was acceptable ($\chi^2(24) = 38.77$; RMSEA = .05; SRMR = .05; GFI = .96; CFI = .98; NNFI = .96). The regression coefficient from neuroticism to Time 2 goal was non-significant ($\beta = .02$, n.s.); thus, Hypothesis 19 was unsupported. The structural models for neuroticism, Time 2 self-efficacy, and Time 2 goals are shown in Figure 15, with regression coefficients for the goal model appearing in brackets.

Neuroticism Facets. Hypothesis 20 predicted that three facets of neuroticism (anxiety, depression, and vulnerability) would affect Time 2 self-efficacy independently of the effects of Time 1 self-efficacy and previous performance. The measurement model fit the data well ($\chi^2(90) = 108.72$; RMSEA = .03; SRMR = .04; GFI = .94; CFI = .99; NNFI = .98). Neither anxiety ($\beta = .10$, n.s.), depression ($\beta = -.07$, n.s.) nor vulnerability ($\beta = .02$, n.s.) contributed independently to Time 2 self-efficacy; therefore, Hypothesis 20 was also unsupported. The structural model is presented in Figure 16.

Hypothesis 21 predicted that three facets of neuroticism (anxiety, depression, and vulnerability) would be related to Time 2 goals independently of Time 1 goals and performance. The measurement model fit the data well ($\chi^2(42) = 38.77$; RMSEA = .03; SRMR = .04; GFI = .96; CFI = .99; NNFI = .98). Neither anxiety ($\beta = .20$, n.s.), depression ($\beta = -.10$, n.s.) nor vulnerability ($\beta = -.13$, n.s.) was significantly related to Time 2 goal level; thus, Hypothesis 21 was unsupported. The structural model is shown in Figure 17.

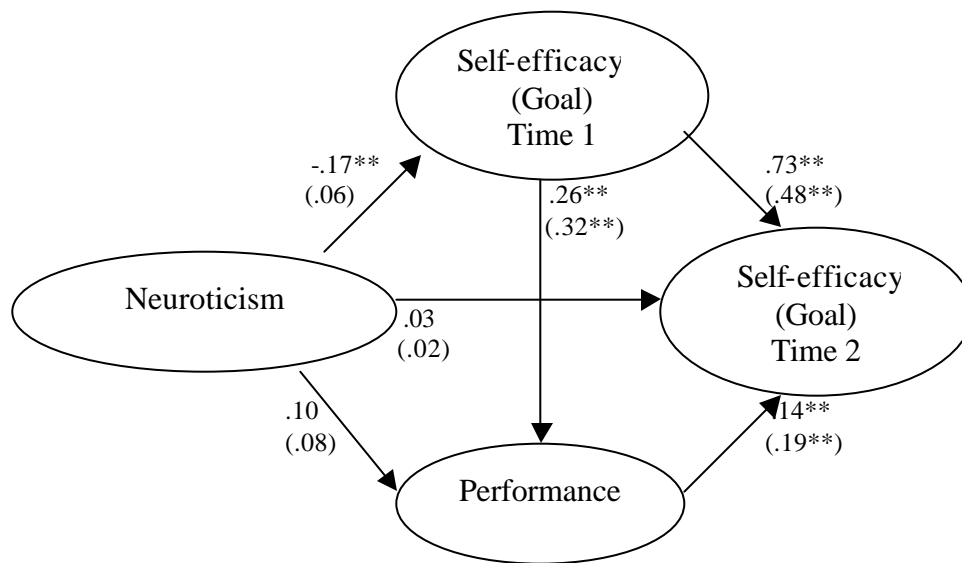


Figure 15: Standardized Path Model for Global Neuroticism, Time 1 Self-Efficacy, Time 1 Goals, Performance, Time 2 Self-Efficacy, and Time 2 Goals. (Note: Path coefficients for goals are in parentheses).

****** $p < .01$

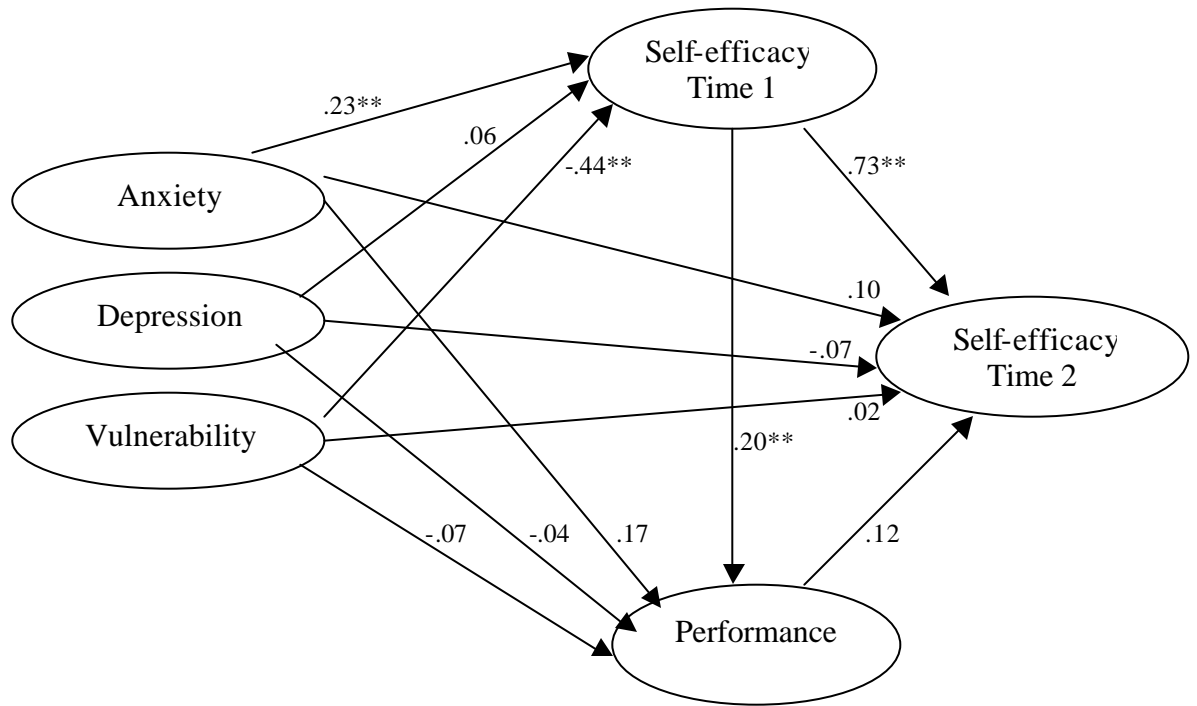


Figure 16: Standardized Path Model for Anxiety, Depression, Vulnerability, Time 1 Self-Efficacy, Performance, and Time 2 Self-Efficacy.
 ** $p < .01$

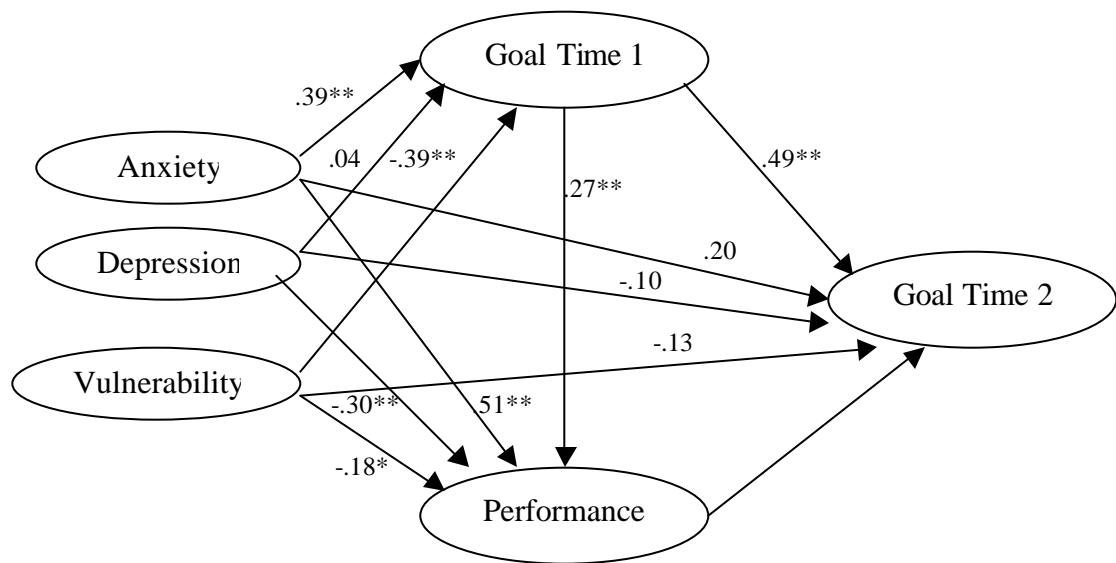


Figure 17: Standardized Path Model for Anxiety, Depression, Vulnerability, Time 1 Goal, Performance, and Time 2 Goal.
 * $p < .05$ ** $p < .01$

DISCUSSION

Summary of Findings

This investigation has had three broad objectives. The first objective was to extend previous research examining the roles of personality and motivation in predicting performance. A second aim was to determine whether operationalizing conscientiousness and neuroticism at facet levels would explain more variance in motivation and performance than global-level operationalizations. The third objective was to explore the role of personality factors in changes in motivation over time. Hypotheses related to these objectives were tested using structural equation modeling. A summary of the hypothesis tests is presented in Table 6.

Social cognitive theory model. Hypotheses 1 through 5 concerned the relationships between cognitive ability, self-efficacy, goals, and performance. Predictions that ability would impact self-efficacy and performance were supported; additionally, there was a significant, positive relationship between ability and goal level. Consistent with models advanced by Bandura (1997) and Locke and Latham (1990), both self-efficacy and goals were predictive of higher levels of performance, with goals partially mediating the effects of self-efficacy on performance.

Conscientiousness. There was partial support for Hypothesis 6, which predicted that global conscientiousness would account for unique variance in self-efficacy, goals, and performance. Specifically, global conscientiousness predicted self-efficacy and performance, but was unrelated to self-set goals (see Figure 8). A similar result was reported by Gellatly (1996), where conscientiousness was more strongly related to individuals' beliefs in their chances of attaining high levels of performance

Table 6

Summary of results by hypothesis

Hypothesis	Result
1. There will be a positive relationship between self-efficacy and goal level.	Supported
2. There will be a positive relationship between goal level and performance.	Supported
3. Goal level will partially mediate the relationship between self-efficacy and performance	Supported
4. There will be a positive relationship between ability and performance.	Supported
5. There will be a positive relationship between ability and self-efficacy.	Supported
6. The path between conscientiousness and performance will be partially mediated by self-efficacy and goals.	Supported for self-efficacy. Not supported for goals.
7. The paths between the competence and dutifulness facets and performance will be fully mediated by self-efficacy.	Not supported.
8. The relationships between the order, deliberation, and self-discipline facets will be partially mediated by self-efficacy.	Not supported.
9. The relationship between achievement-striving and performance will be partially mediated by goal level.	Not supported.
10. Conscientiousness will explain unique variance in Time 2 self-efficacy, controlling for s/e and performance at Time 1.	Not supported
11. Conscientiousness will explain unique variance in Time 2 goals, controlling for goals and performance at Time 1.	Not supported
12. Self-discipline and achievement-striving will explain unique variance in Time 2 self-efficacy, controlling for self-efficacy and performance at Time 1.	Supported for achievement-striving. Not supported for self-discipline.

Table 6 (cont'd)

Hypothesis	Result
13. Self-discipline and achievement-striving will explain unique variance in Time 2 goals, controlling for goals and performance at Time 1.	Not supported.
14. The path between neuroticism and performance will be partially mediated by self-efficacy and goals.	Not supported.
15. The relationships between the anxiety and vulnerability facets and performance will be partially mediated by self-efficacy.	Not supported
16. The relationship between depression and performance will be partially mediated by goal level.	Not supported.
17. The impulsiveness facet will be negatively related to performance.	Not supported.
18. Neuroticism will explain unique variance in Time 2 self-efficacy, controlling for self-efficacy and performance at Time 1.	Not supported.
19. Neuroticism will explain unique variance in Time 2 goals, controlling for goals and performance at Time 1.	Not supported.
20. Anxiety, vulnerability, and depression will explain unique variance in Time 2 self-efficacy, controlling for self-efficacy and performance at Time 1.	Not supported.
21. Anxiety, vulnerability, and depression will explain unique variance in Time 2 goals, controlling for goals and performance at Time 1.	Not supported

than in setting actual goals. Hypotheses 7, 8, and 9 stated that particular facets of conscientiousness would explain unique variance in self-efficacy, goals, and performance. Although the bivariate relationships were supportive of some of these hypotheses (e.g., achievement-striving was related to self-efficacy, goals, and performance), the only facets with significant unique effects in the structural models were competence, dutifulness, and deliberation. Hypothesis 7, which predicted that self-efficacy would fully mediate the relationships between competence, dutifulness, and performance, was unsupported. Although competence was related to self-efficacy, there was also an independent competence/performance link, suggesting partial mediation. Dutifulness was related to goals rather than to self-efficacy, and also had a unique impact on performance, ruling out a mediating effect for self-efficacy. The direct link between dutifulness and performance may be a function of the type of performance investigated. That is, test performance is affected by sustained effort and diligence in studying and attending class over a period of time, which may relate to a person's dispositional dutifulness.

Hypothesis 8 predicted that self-efficacy would partially mediate the effects of order, self-discipline, and deliberation on performance. This hypothesis was not supported, as none of these facets were related to self-efficacy or performance. These facets appear to share a common quality of meticulousness and orderliness that may be more highly correlated with long-term outcome variables than for a single test occasion. Finally, Hypothesis 9, which predicted that achievement-striving would impact performance through goals, was not supported, although achievement had significant zero-order correlations with both goals and performance ($r = .14, p < .05$ and $r = .22,$

$p < .01$, respectively). Together these findings suggest that the relationships of achievement-striving with the dependent variables overlapped with the relationships between the rest of the conscientiousness facets and the dependent variables, resulting in non-significant paths in the structural model. It is possible that achievement-striving represents a central, defining aspect of conscientiousness that is shared with the other facets.

Some of the relationships between conscientiousness facets and the dependent variables in the structural paths were in the opposite direction of theoretical predictions and the bivariate relationships between these constructs reported in Table 2. However, the lack of any changes in the paths when the ridge option was employed suggested that multicollinearity was not the cause of such findings. Thus, suppression is left as an explanation for both the opposite-signed and inflated same-sign regression coefficients in the structural model. Evidence for suppression can be found by comparing the bivariate correlation between competence and performance ($r = .04$, n.s.) with the direct link between these constructs in the structural model ($\beta = -.61$, $p < .01$). This strong negative relationship can be interpreted from two perspectives. First, there may have been unique aspects of competence that were negatively related to test performance; for example, it is possible that competent students were overconfident (which may be reflected by the positive relationship between competence and self-efficacy in the path model: $\beta = .27$, $p < .01$); consequently, these students may have been deficient in their test preparations. The second perspective suggests that after most of the variance in test performance was accounted for by the other predictors (i.e., the remaining conscientiousness facets, motivational processes, and ability), the remaining portion of

the criterion was negatively related to performance. It is difficult to judge how to interpret such effects. However, additional theoretical development and replication may shed light on these findings.

Regardless of the specific interpretation of path coefficients, results for conscientiousness models provided some evidence that measurement at the facet level increases criterion-related validity compared to global conscientiousness. Although the increase in explained variance in self-efficacy for the facet model compared to the global model was minimal (8% vs. 7%), the difference between operationalizations was greater for goals (21% vs. 18%) and performance (35% vs. 16%). The greater predictive validity exhibited by facets of conscientiousness on performance measures is consistent with previous research (Paunonen & Ashton, 2001; Paunonen & Nicol, 2001; Stewart, 1999). The present study is the first to provide similar evidence for the increased criterion-related validity for conscientiousness facets as predictors of motivational processes.

One reason that aggregating primary level facets into composite factors may compromise predictive validity is that some of the facets may be unrelated to the criterion. In the present study, for example, three of the conscientiousness facets (order, self-discipline, and deliberation) had weak bivariate relationships with most of the dependent variables. These facets appear to fall into the “dependability” axis of conscientiousness (Hough, 1997). Although such qualities are undoubtedly important determinants of job performance over time (Stewart, 1999), they appear to have been weakly related to motivation or performance on a single occasion (i.e., test

performance). Inclusion of these facets in the global conscientiousness scale may have undermined this scale's criterion-related validity.

Generally, there was little evidence for the unique effects of conscientiousness on changes in self-efficacy and goal revision. Hypothesis 10 stated that changes in self-efficacy would be predicted by global conscientiousness. This was weakly supported, as conscientiousness was marginally significant ($\beta = .10, p = .07$) but accounted for only 1% of the variance in Time 2 self-efficacy after controlling for Time 1 self-efficacy and performance. Hypothesis 11, which predicted that global conscientiousness would predict goal revision, was unsupported. Hypothesis 12 stated that two of the facets of conscientiousness, achievement-striving and self-discipline, would explain unique variance in Time 2 self-efficacy. This hypothesis received stronger support, as the two facets explained 5% of the variance in the changes in self-efficacy. The prediction that the same two facets would capture unique variance in Time 2 goals (Hypothesis 13) was not supported. In general, the Time 2 results reflected the Time 1 findings for conscientiousness, showing (a) stronger relationships with self-efficacy than goals; and (b) increased criterion-related validity associated with facet-level measurement compared to the global operationalization. Models depicting these findings are presented in Figures 12, 13, and 14.

Neuroticism. Hypothesis 14, which predicted that neuroticism would impact performance through self-efficacy, was weakly supported. Neuroticism negatively predicted self-efficacy, but was unrelated to goals and performance (see Figure 10). Results for the neuroticism facets are presented in Figure 11. Hypothesis 15 stated that self-efficacy would partially mediate the effects of anxiety and vulnerability on

performance. This hypothesis was supported, as both facets were related to self-efficacy and to performance. Surprisingly, however, the bivariate relationship between anxiety and performance (Table 3) was positive ($r = .15, p < .05$). It is possible that the generalized anxiety construct tapped by this scale (e.g., “I am easily frightened”) reflected overall attitudes about life for many participants, but was not applicable to test performance, especially since examinations are familiar experiences to undergraduates. Further research is needed to better understand this relationship. In addition, the zero-order correlation between vulnerability and self-efficacy was negative ($r = -.17, p < .05$), as was the path coefficient between these constructs in the structural model ($\beta = -.50, p < .01$). Weaker coping skills associated with vulnerability to stress may have caused these participants to report lower self-efficacy beliefs.

Hypothesis 16 predicted that depression would uniquely predict goals and performance. The relationship with goals was not significant, but depression was negatively related to performance. As with other reported findings, this result was probably an effect of suppression, as the bivariate correlation between depression and performance was not significant ($r = .01$). In other words, the structural path between depression and performance ($\beta = -.31, p < .01$) was made stronger than the bivariate relationship when the other three neuroticism facets were simultaneously examined in the structural models. This finding suggests that some aspect of depression that may not be shared by other facets of neuroticism (e.g., hopelessness) was uniquely related to some aspect of test performance (e.g., not being discouraged when answers do not come easily). Depression was also negatively related to self-efficacy, as shown in Table 3 ($r = -.16, p < .05$). Although not hypothesized, this finding is consistent with the tendency

of depressed individuals to perceive themselves in terms of skill deficits (Bandura, 1997, p. 343). Finally, Hypothesis 17, which predicted a direct relationship between impulsiveness and performance, was unsupported.

Overall, results provided some evidence that neuroticism predicts both motivation and performance, and that criterion-related validities are enhanced by facet-level operationalizations. Global neuroticism explained unique variance in self-efficacy compared to a model in which ability was the only predictor (5% vs. 2%). However, neuroticism accounted for minimal variance in goals (19% vs. 18%) and performance (15% vs. 14%) compared with models in which personality was not included. The facet-level operationalization for neuroticism accounted for more variance than the global model in self-efficacy (14% vs. 5%) and performance (24% vs. 15%), but not in goals (19% for both models). Three of the facets (anxiety, vulnerability, and depression) accounted for unique variance in performance.

Global neuroticism did not account for changes in self-efficacy (Hypothesis 18) or goals (Hypothesis 19). Furthermore, predictions that facets of neuroticism would independently predict changes in self-efficacy and goals (Hypotheses 20 and 21) were unsupported. The structural models are shown in Figures 15, 16, and 17. Thus, the general prediction that neurotic individuals would be more likely to revise self-efficacy and goals downward following performance feedback was not supported.

To summarize, the analyses provided relatively weak support for the specific hypotheses tested, such that few of the specific relationships between personality factors, motivation, and performance conformed exactly to the hypothesized models. For instance, whereas some of the personality facets (e.g., competence) were expected

to impact performance through self-efficacy, results indicated this facet had a direct link with performance. Although few specific hypotheses were supported, this research provided evidence that facet-level measurement of personality accounts for greater criterion-related validity in motivation and performance than global operationalizations.

The Role of Personality in the Motivation / Performance Link

Social cognitive theory states that the effects of stable personality factors on task performance are fully mediated by motivational processes (Bandura, 1997; Locke & Latham, 1990). This investigation has addressed arguments advanced by Bandura (1999) and Locke (2000) that stable individual differences are not important antecedents of task performance when the effects of motivational constructs (self-efficacy and goals) are controlled. These authors argue that such social cognitive processes are the causal mechanisms through which personality impacts behavior. For example, Bandura (1999) points out that conscientiousness is usually measured with items asking the respondent to report the frequency with which he or she performs conscientious behaviors. As such, it is a behavioral descriptor that becomes “reified” as a cause of behavior (p. 166), with no explanation for *how* conscientiousness might actually cause behavior. Thus, the trait or dispositional approach to personality tends to be descriptive rather than theoretical, a criticism of trait psychology recognized by many Five-Factor Model theorists (e.g., Saucier & Goldberg, 1996). Conversely, Bandura (1997) argues that self-efficacy and related sociocognitive processes focus on the person as the agentic cause of behavior, emphasizing the role of forethought to explain the means by which individuals govern their actions.

However, there is evidence showing that personality constitutes more than patterns of responding to self-report inventories. For example, different streams of research have underlined the biological component of personality traits measured using the Five-Factor taxonomy. One such program has used twin-study research methodology to show that there is a hereditary component to personality at both global and facet trait levels (Jang, McCrae, Angleitner, Riemann, & Livesly, 1998). Similarly, other researchers have identified physiological “markers” (e.g., separate behavioral approach and inhibition systems) associated with extraversion and neuroticism (Pickering & Gray, 1999). These research findings suggest that aspects of personality operate at a fundamental organismic level, and should not be construed superficially as act-frequencies or cross-situational tendencies to behave consistently in various contexts (cf. Mischel, 1968). It is more informative to regard personality as a dispositional genotypic construct that influences the most basic tendencies of individuals (McCrae & Costa, 1996; 1999).

Findings reported in the present study do not support SCT’s prediction that self-efficacy and goals completely explain the effects of personality on performance. Both conscientiousness and neuroticism, when measured at the facet level, accounted for unique variance in performance when the effects of self-efficacy and goal level were controlled. Therefore, this investigation supports previous research (Barrick, Mount, & Strauss, 1996; Colquitt & Simmering, 1998) showing that motivational processes do not account for all the effects of personality on performance.

The direct links from personality to performance found in the present study suggest that there may be other midlevel processes through which personality impacts

test performance. Consistent with McCrae and Costa's (1996) model, the mechanisms through which personality affects behavior are multifaceted, including not only motivational processes, but also affective and neuropsychological processes, skills, habits, interpersonal relationships, personal preferences, cultural factors, and more. It is possible that conscientiousness-related constructs impact performance through non-motivational midlevel processes such as emotional or physiological control. For example, conscientious individuals may have greater stress-management skills during performance episodes than non-conscientious persons. These skills may enable them to maintain greater task focus, and less susceptibility to distraction or rumination (Kuhl, 2000). In a related vein, the conscientiousness / performance relationship may be partly mediated by what Heckhausen (1991) refers to as volitional processes. Volition, or will, refers to processes occurring during goal pursuit (e.g., initiation and maintenance of actions), as opposed to goal choice (Locke & Latham, 1990). Examples include task persistence and determination in the face of obstacles (Heckhausen, 1991). Achievement-striving may affect performance partly through such volitional processes, as suggested by Stewart (1999).

Results of the present study also suggest that neuroticism impacts performance through mechanisms other than motivation. It should be noted that another label for this dimension is emotional stability, suggesting that the relationship between neuroticism and performance might be mediated by affective states. The cognitive and affective domains are not orthogonal (Carver & Scheier, 1998); thus, depressive individuals, for example, may have had more difficulty recalling information due to interference from negative emotional states. Additionally, they may have had lower

volitional energy available for task performance. Neurotic persons may also be susceptible to performance decrements caused by excessive emotional self-focus, or disengagement (Matthews, Schwan, Campbell, Saklofske, & Mohamed, 2000). Future personality research should examine such non-motivational midlevel construct as mediators of the personality/performance relationship.

Global vs. Facet Prediction of Motivation and Performance

This study has addressed the controversy concerning which level of analysis is most appropriate for personality measurement, when the criterion is task performance (Hough & Schneider, 1996; Ones & Viswesvaran, 1996). Although researchers have repeatedly called for exploration of the incremental validity of personality facets over global factors (Hough, 1997), little actual research in this area has been published (Hurtz & Donovan, 2000). The present investigation has substantiated earlier research findings (Paunonen & Ashton, 2001; Stewart, 1999) showing greater predictive validity in motivation and performance associated with facet-level measurement. For both conscientiousness and neuroticism, facet models explained more than twice the variance in both self-efficacy and performance compared with global models.

Such information can be useful to organizations that use personality testing in their personnel functions; for example, traits related to motivation and performance can be retained as part of selection systems, whereas weakly related traits need not be measured. In this way the personality testing component of selection systems does not necessarily need to become more cumbersome through the implementation of facet-level measurement.

Personality and Changes in Self-Efficacy and Goals

Measurement of changes in self-efficacy and goals as a function of personality factors was operationalized as follows. First, the relationships between Time 1 and Time 2 self-efficacy and goals represented the stability of these constructs. Thus, partialling out Time 1 from Time 2 left only the changes in self-efficacy and goals. Links between performance and Time 2 levels represented the extent to which individuals changed their self-efficacy beliefs and goals based on their Time 1 performance. The question explored in the present study was whether personality factors would predict changes in self-efficacy and goals beyond the effects of performance.

As discussed above, predictions that personality factors would be uniquely related to changes in self-efficacy were supported for conscientiousness and its facets, but not for neuroticism. Achievement striving was more strongly related to Time 2 self-efficacy than any other personality factor, suggesting that this trait may have strong links with individuals' perceptions of personal control. In other words, students high in achievement-striving had greater belief in their abilities to master key aspects of coursework (e.g., concentrating during class, taking good notes; see Appendix 1) irrespective of performance feedback. This suggests the possibility that there may be a link between achievement striving and mastery goal orientation (Dweck, 1986), such that individuals high in these qualities believe that their abilities are mutable through personal effort.

Neither conscientiousness, neuroticism, nor their facets accounted for unique variance in goal revision. Moreover, with the exception of achievement-striving, no

personality factor was significantly related to goals at either Time 1 or Time 2. This was not consistent with earlier research showing relationships between conscientiousness and goal level (e.g., Barrick, Mount, & Strauss, 1993; Phillips & Gully, 1997). It is possible that the null results in the present study were a function of range restriction in goals: 60% of the participants set a goal of 90 or greater for the next exam.

Limitations and Directions for Future Research

A limitation of the present investigation concerns its generalizability to work contexts. However, the advantages of using undergraduate participants and exam performance as the criterion in part mitigate such concerns. Specifically, in this type of study, performance is exactly quantifiable and a function of individual effort (Campion & Lord, 1982). This makes it possible to identify predictor/criterion relationships with less risk of criterion contamination than would be typical in most jobs. Additionally, the basic processes studied here should transfer well to work contexts; abundant research has demonstrated the relevance of personality and motivational states to job performance (Barrick & Mount, 1991; Stajkovic & Luthans, 1998; Tubbs, 1986). However, an important next step will be to replicate study findings in organizational settings.

A secondary limitation is the lack of experimental control in the study design. The correlational nature of most of the hypotheses prohibits causal inferences. However, owing to the temporal stability of personality (Costa & McCrae, 1997) relative to situationally specific self-efficacy and goals, it is likely that personality may impact motivational processes, and not vice versa.

A review of the results (Table 6) shows that many hypotheses were not supported. This might lead the reader to conclude that the overall findings of this investigation were negative. However, it should be noted that several of these hypotheses were exploratory in nature, lacking much previous empirical or theoretical support; for example, there has been virtually no published research on the differential predictive validity of the facets of neuroticism. At this stage in personality and motivation research, the investigator must often be guided more by conceptual factors than by empirical data. Additionally, in the present study, whereas personality was examined at two levels of analysis (facet and global), the criterion variable, task performance, was only operationalized at a single level. As discussed above, the criterion-related validities tended to be higher for the facets than for the global constructs. However, if the criterion were operationalized at a higher level of generality (e.g., as an overall performance construct including attendance, punctuality, course grade, and grades in other classes), it is possible that the relationships would have been stronger for the global than the facet measures. By the same token, the predictive validities for the facet measures may have been enhanced if the criterion were parsed into more molecular tasks (e.g., homework scores, class participation, individual test items, or weekly quizzes). In other words, the finding that facets outpredicted global measures may have been attributable to a greater match in bandwidth or specificity between these predictors and the criterion (Cronbach & Gleser, 1957).

Further research is needed to advance several of the findings reported in the present investigation. First, the effects of the remaining Big Five factors (extraversion, agreeableness, and openness to experience) and their facets on motivation and

performance remain to be explored. Although previous research indicates that these are less reliably related to performance than conscientiousness and neuroticism (Barrick & Mount, 1991), very little research has been conducted concerning the facets of these constructs. For example, some of the openness facets (e.g., ideas) might be related to task performance whereas others (e.g., fantasy) might tend to be unrelated to performance. Combining these facets into a global personality dimension may mask the criterion-related validity of the factor construct.

A second avenue for future research concerns interactions among personality traits at both global and facet levels. For instance, Witt, Burke, Barrick, and Mount (2002) recently showed that conscientiousness and agreeableness interacted to predict job performance ratings, such that workers high in both received higher ratings than workers high in conscientiousness alone. In view of the fact that anxiety was positively related to performance in the present study, it would be interesting to determine whether anxiety moderates the relationship between achievement-striving and performance, such that individuals high on both outperform individuals high on one or the other.

Finally, the results of the present study need to be replicated using different samples and measures. One natural candidate for the latter would be the Hogan Personality Inventory (HPI; Hogan & Hogan, 1995), a personality questionnaire that has seen extensive testing in industrial settings. It would also be useful to determine the extent to which the present findings generalize to actual work populations. The most practical avenue for this research would be through concurrent validation research with extant workforces.

The importance of this line of research to organizations should be mentioned. Because personality testing is increasingly used by organizations as part of their selection processes (Hough, 2001) it is important for researchers to get a better understanding of which personality variables are best predictors of performance. Knowing, for example, that achievement-striving is a stronger predictor than deliberation of performance can cue personnel managers to weight applicants' scores on achievement more highly than on deliberation. There are also implications for performance management: Understanding the different sensitivity to self-efficacy beliefs and goals associated with different personality types might be useful to managers seeking to enhance productivity through performance appraisal or training.

Conclusion

Results of this investigation shed new light on the relationships between personality, motivation, and performance. Theoretical propositions tested with structural equation modeling suggested that personality factors not only predict important motivational processes (i.e., self-efficacy), but also account for unique variance in performance when the effects of such processes are controlled. Additionally, this study has supplemented earlier research work demonstrating the added criterion-related validity associated with facet-level personality measurement for both motivational processes and performance. Generally, the criterion-related validities were higher for conscientiousness and its facets than for neuroticism and its facets. Finally, changes in self-efficacy were shown to be marginally related to conscientiousness-related personality factors, and unrelated to neuroticism-related factors.

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APPENDIX A: GOAL AND SELF-EFFICACY QUESTIONNAIRE

Name _____

ID# _____

What is the *minimum* (the least you would be satisfied with) percentage grade goal **for the next test** (on a scale of 0% to 100%)? _____

Please **circle the number** that corresponds to your level of agreement.

I am confident in my ability to concentrate and stay fully focused on the materials being presented throughout each class period.

Strongly Disagree 1 2 3 4 5 Strongly Agree

I am confident in my ability to memorize and recall on demand the facts and concepts covered in this course.

Strongly Disagree 1 2 3 4 5 Strongly Agree

I am confident in my ability to focus exclusively on understanding and answering questions and avoiding breaks in my concentration during exams.

Strongly Disagree 1 2 3 4 5 Strongly Agree

I understand the facts, concepts and arguments covered in the course as they are presented in lectures and the textbook.

Strongly Disagree 1 2 3 4 5 Strongly Agree

I am confident in my ability to explain the facts, concepts, and arguments covered in the course clearly to others in my own words.

Strongly Disagree 1 2 3 4 5 Strongly Agree

I am able to discriminate between the more important and less important facts, concepts, and arguments covered in the course.

Strongly Disagree 1 2 3 4 5 Strongly Agree

I am able to make understandable course notes which emphasize, clarify, and relate key facts, concepts, and arguments as they are presented in lectures and the text.

Strongly Disagree 1 2 3 4 5 Strongly Agree

APPENDIX B: CONSENT FORM

Participation in the Goal-Setting Investigation

- 1.) Overview: Participants in this study will be asked to set goals and rate their own ability on several dimensions of academically-related behaviors (e.g., ability to concentrate in class). Additionally, they will complete a personality inventory and a cognitive ability test. The purpose of the study is to improve our understanding of the role individual differences play in determining motivational behaviors and performance.
- 2.) Goal questionnaires will be administered on two occasions. The first administration will occur the class meeting before Exam 1 (Sept 19). The second administration will occur two class meetings after Exam 1 (Sept 26).
- 3.) Separate 1-hour sessions will be held for the administration of the other two questionnaires. These will occur at various times (TBA) during the semester.
- 4.) **You must complete all the above questionnaires and take both Exams 1 and 2 to receive any credit for this study.** You will receive a total of **6 extra credit points** (out of 16 maximum) for participating in this study.
- 5.) The extra credit points you accumulate for participating in this study can only be applied toward your grade **in this class**.
- 6.) In order to match your responses on the goal-setting questionnaires to personality and cognitive ability questionnaires, I need to be able to identify you individually. For this purpose, you must place your **Student ID Number** on the first page of each goal-setting, personality, and cognitive ability questionnaire. To guarantee your anonymity and the confidentiality of your responses, this identifying information will be removed from the questionnaires after all the data have been collected. Furthermore, at no time during the semester will the data be examined or analyzed; your responses will **only** be entered into a data file for future analysis. Thus, you can feel confident that I will in no way know how you responded to any of the questionnaires, so you should feel comfortable answering them openly and honestly.
- 7.) Because this is a goal-setting study, it is important to know how individuals actually perform. Therefore, the relationship between your exam scores and your responses on the goal-setting, personality, and cognitive ability questionnaires will be examined. However, this will not be done until after the semester is over. At that time, they will be matched by ID numbers. Once all data are accounted for, and extra credit points assigned, all identifying information for the questionnaires will be discarded.
- 8.) Finally, you are free to withdraw from the study at any point during the semester without penalty. You have the option of participating in other research being offered by the Psychology Department, or of completing the written assignments for extra credit. If at any point in the semester you wish to discuss the nature of the study with me, feel free to contact me.

I have read the above information and agree to participate in the Goal-Setting Research Study.

Signature of participant

ID #

Date

VITA

James H. Martin received his bachelor of arts degree in 1997 from the University of North Carolina at Chapel Hill. He received a master of arts degree in industrial/organizational psychology in 1999 from Louisiana State University. He is a student affiliate of the American Psychological Association, the Society for Industrial and Organizational Psychology, the Academy of Management, and the Society for Personality and Social Psychology. His primary research interests are workplace applications of personality and motivation.