Goal Orientation: A Test of Competing Models

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Abstract

This research examined the validity of the 2-factor (e.g., Button, Mathieu, and Zajac, 1996) and 3-factor (e.g., VandeWalle, 1997) models of goal orientation. These models differ in specifying the dimensionality, measurement, and nomological network for learning goal orientation and performance goal orientation constructs. This study specifically tested the factorial and nomological validity of each model of goal orientation. The factorial validity was examined through a series of nested models and evaluating model fit parameters. The nomological validity of goal orientation was examined testing theoretically-derived relationships with the self-concept traits (e.g., core self-evaluations) of self-esteem, internal locus of control, generalized self-efficacy, and emotional stability. In addition, goal orientation relationships with need for achievement, fear of negative evaluation, and social desirability were also examined.

Results of this study yielded mixed findings for the *a priori* models. Data from a student sample (N=314) and an employee sample (N=114) resulted in mixed findings across models and across samples. Although there was general support for both factor structures, several psychometric weaknesses were noted in the scales including low factor loadings, low factor variances, and low inter-item correlations. Additionally, results of the test-retest stability of goal orientation constructs were lower than desired across both models.

Results of the hypothesized relationships found consistent support for learning goal orientation relationships, while the results for performance goal orientation were mixed.

Learning goal orientation reflected positive and moderate levels of associations (i.e., r >.20) with self-esteem, internal locus of control, generalized self-efficacy, emotional stability, need for achievement and negatively related to fear of negative evaluation. Learning goal orientation also reflected positive but smaller levels of association with social desirability. Hypothesized relationships were supported for VandeWalle's (1997) performance avoid goal orientation reflecting negative relationships with the same correlates, except for a positive association with fear of negative evaluation. In general, the hypothesized relationships for Button et al.'s (1996) performance goal orientation and VandeWalle's (1997) performance prove goal orientation were not supported. These relationships resulted in near zero-correlations. Implications for future research addressing the conceptual framework, measurement and nomological relationships for goal orientation are discussed.

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Chapter 1

Introduction

Goal orientation has emerged as an important motivational construct in organizational research reflecting individual differences in work-related behaviors and task performance outcomes. The goal orientation construct reflects internal motivational processes that affect an individual's task choice, self-set goals, and effort mechanisms in learning and performance contexts (e.g., Button, Mathieu & Zajac, 1996; Fisher & Ford, 1998; Phillips & Gully, 1997; VandeWalle, 1997). Recent studies have linked goal orientation to individual differences in self-regulatory behaviors (Ford, Smith, Weissbein, Gully & Salas, 1998; VandeWalle, Brown, Cron & Slocum, 1999), feedback-seeking behavior (VandeWalle & Cummings, 1997), and motivation to learn (Colquitt & Simmering, 1998; Ford et al., 1998). Goal orientation has also been linked to individual differences in academic performance (Beaubien & Payne, 1999; Chen, Gully, Whiteman, & Kilcullen, 2000; Phillips & Gully, 1997; VandeWalle, Cron, & Slocum, 2001), training performance (Brett & VandeWalle, 1999; Brown, 2001; Kozlowski, Gully, Brown, Salas, Smith, & Nason, 2001), task performance (Steele-Johnson, Beauregard, Hoover & Schmidt, 2000, Mangos & Steele-Johnson, 2001), and sales performance (VandeWalle et al., 1999). The individual differences associated with goal orientation are characterized as learning goal orientation and performance goal orientation. Individuals with a *learning goal orientation* are concerned with increasing their competency and thus seek out opportunities that foster learning, while individuals with a *performance goal orientation* are concerned with gaining favorable judgments of their competence and have a tendency to avoid challenging situations (e.g., Dweck, 1986; Dweck & Leggett, 1988; Elliott & Dweck, 1988; Nicholls, 1984). It is these

individual differences that researchers have suggested account for variability in a variety of learning and performance contexts.

The goal orientation construct emerged from research in educational psychology examining individual differences in achievement-related behaviors. Diener & Dweck (1980) were particularly interested in why certain children engaged in adaptive behavior patterns, while other children reflected maladaptive (i.e., helplessness) behavior patterns when working on tasks. They defined adaptive behaviors as those that promote the establishment, maintenance, and attainment of personally challenging and personally valued achievement goals. The adaptive behavior patterns reflect challenge seeking, high and effective levels of persistence in the face of obstacles, and enjoyment in exerting effort in the pursuit of task mastery. In contrast, maladaptive behaviors were associated with a failure to establish reasonable, valued goals, or to maintain effective striving toward those goals that are potentially within one's reach. The maladaptive behavior pattern is characterized by challenge avoidance, low persistence in the face of difficulty, displaying negative affect (i.e. anxiety) and negative self-cognitions when confronting obstacles (e.g., Ames & Archer, 1988). Conceptually, the adaptive and maladaptive behaviors have evolved to reflect individual differences that are characterized as learning goal orientation and performance goal orientation. Furthermore, these behavior classifications are considered to be dispositional, thus reflecting stable patterns over time. Learning goal orientation is associated with adaptive behaviors that reflect a mastery-oriented approach to tasks, while performance goal orientation is associated with maladaptive behaviors and a vulnerability to a learned helplessness.

Dweck and Leggett (1988) presented one of the first conceptual frameworks for learning goal and performance goal orientation. This conceptual framework is presented in Table 1 below

and specifies the antecedents and consequences associated with learning goal and performance

goal orientation constructs.

Table 1

Dweck and Leggett's (1988) Goal Orientation Framework

Theory of Ability	Goal Orientation	Outcomes
Incremental (Ability is malleable)	Learning Goal Orientation (LGO)	Mastery-oriented Behaviors (Effective task strategy use, high initiation and persistence of effort, challenge-seeking)
Entity (Ability is fixed)	Performance Goal Orientation (PGO)	Helplessness Behaviors (Less effective task strategy use, low initiation and persistence of effort, challenge and risk avoidance)

Note. Adapted from Dweck, C. S. & Leggett, E. L. (1988). A social cognitive approach to motivation and personality. Psychological Review, 95, 256-273. Copyright © 1988 by the American Psychological Association. Adapted with permission of the author.

Dweck and Leggett's (1988) framework of goal orientation primarily focused on the behavior patterns associated with a given orientation. They suggested that these orientations may be shaped by one's belief that ability is a fixed or malleable attribute. Dweck and Leggett's (1988) conceptualization of goal orientation suggests that implicit theories and goal orientation are dispositional characteristics that result in stable and predictable patterns of behavior. As shown in Table 1, learning goal and performance goal orientation are differentially characterized by mastery-oriented and helplessness behavior patterns.

While prior research has primarily focused on goal orientation effects on young children in educational contexts, goal orientation has generated a great deal of interest among organizational researchers. It has been suggested goal orientation may account for performance variability in adult samples and in work settings (Farr, Ringenbach, & Hofmann, 1993; Zajac, 1991). However, several issues with the early research have been raised concerning the conceptualization and operationalization of the goal orientation construct. First, the conceptual framework suggests that goal orientation is a dispositional characteristic (e.g., Dweck & Leggett, 1988). However, research studies examining goal orientation have either manipulated (e.g., Butler, 1987; Elliott & Dweck, 1988; Utman, 1997) or assessed the construct (e.g., Ames & Archer, 1988; Mueller & Dweck, 1998). In studies where goal orientation was manipulated, treatment group membership was assumed to represent ones' orientation. Whether assessed or manipulated, study findings were often interpreted to suggest that goal orientation reflects an enduring behavioral characteristic (e.g., Dweck & Leggett, 1988; Mueller & Dweck, 1998). These inconsistencies in operationalizing goal orientation have raised questions concerning the nature of the construct as stable disposition.

A second issue concerns the dimensionality of the construct. While Dweck and Leggett (1988) did not explicitly address dimensionality, the operationalizations of goal orientation appear to reflect a unidimensional construct, with learning goal and performance goal representing opposite ends of a single continuum (e.g., Butler, 1987; Elliott & Dweck, 1988; Mueller & Dweck, 1998). In these studies, it was assumed that the learning goal and performance goal orientation constructs were mutually exclusive. Thus, individuals were focused on either the "learning goals" or "performance goals", but not both. Researchers have begun to question whether learning goal and performance goal orientations are truly mutually exclusive and have proposed alternative models of the construct (e.g., Button et al., 1996; VandeWalle, 1997).

An issue related to dimensionality concerns the measurement of goal orientation. Early research on goal orientation involved experimental manipulations where treatment group membership was assumed to reflect one's goal orientation. In other studies where goal orientation was assessed, measures reflecting causal attributions or locus of control were used to infer an individual's goal orientation but were not direct assessments of goal orientation. In addition, early measures of goal orientation were often forced-choice questionnaires that resulted in a single-item assessment of the construct (e.g., Elliott & Dweck, 1988; Mueller & Dweck, 1998). From these studies, the appropriateness of measures assessing goal orientation is questionable. As a result of these issues cited in prior research, alternative models of goal orientation have emerged that attempt to clarify some of the conceptual and operational ambiguities.

Alternative Models of Goal Orientation

Recent conceptualizations of the goal orientation construct have attempted to address some of the ambiguities concerning the nature, dimensionality, and measurement of the construct (e.g., Button et al., 1996; VandeWalle, 1997). Button et al. (1996) and VandeWalle (1997) have proposed two separate models of goal orientation. As shown in Table 2, these conceptualizations depart from Dweck and Leggett's (1988) framework in a number of ways. First, goal orientation is explicitly conceptualized as a stable disposition (i.e., trait characteristic). As a stable disposition, goal orientation is considered to be a motivational trait reflecting relatively stable patterns of behavior. As a trait, it is also suggested that goal orientation be assessed, not manipulated.

Table 2.

Alternative Models of Goal Orientation

Conceptualization	Dimensions	Measurement
Two-Factor Model (Button, Mathieu, & Zajac, 1996)	Learning Goal Orientation (LGO_b) Performance Goal Orientation (PGO_b)	LGO: 8 item scale PGO: 8-item scale
Three-Factor Model (VandeWalle, 1997)	Learning Goal Orientation (LGO_v) Performance Prove ($PPGO_v$) Performance Avoid ($PAGO_v$)	LGO: 5-item scale PPGO: 4-item scale PAGO: 4-item scale

Second, goal orientation is conceptualized as a multidimensional construct with two (Button et al., 1996) or three (VandeWalle, 1997) dimensions. Consistent with the earlier conceptual framework, Button et al. (1996) proposed a two-factor model of learning goal orientation and performance goal orientation. However, they assert that goal orientation dimensions are not mutually exclusive, but are distinct and unrelated constructs. Thus, individuals can have varying levels of both learning and performance goal orientations. VandeWalle (1997) proposed a three-factor model of goal orientation including learning goal orientation, performance prove goal orientation, and performance avoid goal orientation. Conceptually, he suggests that the performance goal orientation construct be dichotomized to better reflect Dweck's (1986) definition and to distinguish between the "desire to demonstrate competence" and "desire to avoid negative evaluations of competence." However, VandeWalle (1997) is less clear in specifying the expected relationships among the three goal orientation dimensions or how these dimensions reflect different patterns of behavior or outcomes. Recent research on both models has reported mixed findings in how the goal orientation dimensions are related (e.g., Dobbins, Bell, & Kozlowski, 2002). These findings reveal a positive relationship between Button et al.'s (1996) learning goal and performance goal orientations of r=.17. In addition, the relationship among VandeWalle's (1997) three dimensions are somewhat stronger, particularly for the two performance goal dimensions, with correlations ranging from r=.10 to r=.37.

A third distinction of the recent models of goal orientation involves the measurement of the construct. As a trait, goal orientation should be measured rather than manipulated. Button et al. (1996) developed and validated two separate eight-item measures for learning goal orientation and performance goal orientation. VandeWalle (1997) developed and validated a thirteen-item

measure assessing learning goal, performance prove, and performance avoid goal orientation. These measures have demonstrated acceptable internal consistency reliabilities and support for the hypothesized factor structures.

As an extension of their validation studies of goal orientation, Button et al. (1996) and VandeWalle (1997) proposed a nomological network of relationships surrounding the construct. They examined goal orientation relationships among a number of dispositional constructs. Button et al. (1996) examined the relationship between goal orientation with implicit theories of ability, self-esteem, and locus of control. VandeWalle (1997) examined goal orientation constructs with implicit theories of ability, work and family orientation, fear of negative evaluation, and feedback-seeking tendencies. While it is unclear whether these nomological relationships were theoretically derived, learning goal and performance goal constructs were hypothesized to reflect differential relationships with each of the dispositional correlates. The results of these validation studies reflect support for the hypothesized differential relationships across both conceptualizations of goal orientation. Specifically, learning goal was positively related to an incremental theory of ability, self-esteem, internal locus of control, work and family orientation dimensions of mastery and work, and feedback-seeking tendencies. In contrast, performance goal orientation was positively related to an entity theory of ability, external locus of control, work and family dimensions of competitiveness, and fear of negative evaluation. These findings suggest that individuals with a learning goal orientation reflect more positive orientations on several personal characteristics, which may also play a role in why they engage in more productive patterns of behavior compared to those with a performance goal orientation.

In summary, the recent models of goal orientation advanced by Button et al. (1996) and VandeWalle (1997) have attempted to address the conceptualization and operationalization

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issues concerning the construct. While there is a general consensus that goal orientation should be represented as a trait and a multidimensional construct, it is uncertain whether goal orientation is best conceptualized by two or three dimensions. In addition to the dimensionality, there are inconsistencies in specifying the expected relationship among the various dimensions of learning goal and performance goal constructs. Specifically, the findings are mixed on whether learning goal and performance constructs are mutually exclusive and unrelated. There are also outstanding issues concerning the theoretical support for the proposed nomological network of relationships surrounding goal orientation.

While these issues have been raised, goal orientation has continued to generate a great deal of research interest. Researchers have primarily examined goal orientation relationships with specific task-related behaviors and various performance outcomes. The behaviors associated with goal orientation are the self-regulatory actions involving how effort is expended on tasks, while the outcomes examined have varied across learning and task contexts. Researchers have found consistent support that individuals with a learning goal orientation outperform those with a performance goal orientation (e.g., Fisher & Ford, 1998; Ford et al., 1998; VandeWalle et al., 1999). While these findings are promising in identifying individual differences in performance variability, the research has been limited in examining the measurement properties of goal orientation to support these results. The lack of a consensus in conceptualizing goal orientation may potentially influence the validity of these models. The alternative models proposed by Button et al. (1996) and VandeWalle (1997) highlight the need to examine the goal orientation constructs to specifically address dimensionality and nomological validity issues.

Study Rationale

The primary purpose of the current study is to examine the validity of two competing models of goal orientation. Specifically, this study focuses on the recent trait conceptualizations advanced by Button et al. (1996) and VandeWalle (1997). This research intends to (1) examine the competing models of goal orientation to assess factorial validity and (2) examine goal orientation relationships with a theoretically derived nomological network of constructs. By examining the measurement model of goal orientation, the current study may provide evidence for the overall validity of the two competing models. The nomological network would also provide some additional insight into how goal orientation is related to other dispositional characteristics and how they interact to influence behavior.

Chapter 2 reviews the prior validation studies of the two competing models of goal orientation and subsequent research employing these frameworks. This review culminates in the development of testable hypotheses to assess the comparative validity of the two-factor and three-factor models of goal orientation. Chapter 3 describes the methodologies employed in testing these models and the hypothesized nomological relationships. A description of the procedures, study participants, measures, and analyses are also discussed. Chapter 4 presents the results of an empirical test of these two models. Chapter 5 discusses the study contributions, limitations, and future research for goal orientation.

Chapter 2

Literature Review

The trait conceptualizations of goal orientation advanced by Button et al. (1996) and

VandeWalle (1997) represent the dominant approaches in organizational research. Goal

orientation is considered to be an important motivational construct associated with behavioral

and performance variability. This chapter reviews the goal orientation body of research across

both educational and organizational disciplines. From educational research, Dweck and Leggett's

(1988) model of goal orientation is reviewed, while the review of organizational research focuses

on the two competing models of goal orientation that have emerged (e.g., Button et al., 1996;

VandeWalle, 1997). This review specifically examines the essential elements of construct

validity including the construct definition, dimensionality, measurement, and nomological

network of goal orientation. A review of these issues may further highlight the need to examine

the specific validity issues related to each of the two models under investigation.

Defining Goal Orientation

Construct definitions should identify the nature of a construct by specifying its meaning

and how the construct should differ across situations (e.g., Schwab, 1999). The definition of goal

orientation is drawn from Dweck and Leggett's (1988) classification of two types of goals that

individuals pursue in task/learning contexts. According to Dweck and Leggett (1988), learning

goals characterize individuals who seek to increase their competence, to understand or master

something new, while performance goals characterize individuals who seek to gain favorable

judgments of their competence or avoid negative evaluations of their competence (p.1040). Thus,

individuals with a learning goal orientation focus on the "development" of competence, while individuals with a performance goal orientation focus on the "judgment/evaluation" of their competence.

The recent models of goal orientation advanced by Button et al. (1996) and VandeWalle (1997) are drawn from Dweck and Leggett's (1988) framework, but explicitly conceptualize the construct as a dispositional (i.e., trait) characteristic. Button et al. (1996) defined learning goal orientation (LGO_b) and performance goal orientation (PGO_b) as relatively stable individual difference variables.[1] A learning goal orientation promotes "mastery-oriented" responses, while a performance goal orientation creates a vulnerability to maladaptive or helpless responses (p. 26). VandeWalle (1997) conceptualized goal orientation as a stable disposition toward developing or demonstrating ability in achievement situations (p. 996). He defined learning goal orientation (LGO_v) as the desire to develop the self by acquiring new skills, mastering new situations, and improving one's competence. However, he argues for clarity in the performance goal orientation construct to distinguish between "a desire to demonstrate competence" and "a desire to avoid negative evaluations of competence." Thus, he dichotomized performance goal orientation into performance prove and a performance avoid dimensions. Performance prove goal orientation ($PPGO_v$) is defined as "the desire to prove one's competence and to avoid negative judgments about it, while performance avoid goal orientation ($PAGO_v$) is defined as the desire to avoid the disproving of one's competence and to avoid negative judgments about it" (p. 1000).[2] These definitions address the temporal nature of the construct by explicitly conceptualizing goal

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[1] $LGO_{(b)}$ and $PGO_{(b)}$ represent Button et al.'s (1996) 2-factor model of learning goal orientation (LGO) and performance goal orientation (PGO).
[2] $LGO(v)$, $PPGO(v)$, $PAGO(v)$ represent VandeWalle's (1997) 3-factor model of learning goal orientation (LGO), performance prove goal orientation (PPGO), and performance avoid goal orientation (PAGO).

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orientation as a dispositional characteristic. As a general disposition, goal orientation reflects global behavioral tendencies that are relatively stable over time and across situations.

Dimensionality

The dimensionality of goal orientation has been the source of considerable debate. Button et al. (1996) proposed that goal orientation is a multidimensional construct with learning goal (LGO_b) and performance goal orientation (PGO_b) representing separate and distinct constructs. In addition, they proposed that LGO_b and PGO_b are unrelated. As separate and unrelated constructs, Button et al. (1996) argue that individuals can possess both orientations simultaneously. As an example, they describe the competitive athlete who seeks mastery of their task/content domain, but also seeks favorable evaluations of their performance/competence. Given the potential interactions between LGO_b and PGO_b, Button et al. (1996) suggested a two-factor model as opposed to the single continuum model suggested by Dweck and Leggett (1988). Similarly, VandeWalle (1997) proposed a multidimensional conceptualization of goal orientation but with three dimensions of learning goal orientation (LGO_v), performance prove goal orientation ($PPGO_v$), and performance avoid goal orientation ($PAGO_v$). Consistent with the proposed construct definition, he argues that the three dimensions are distinct. However, he does not address the expected relationships between the three goal orientation dimensions.

The two-dimension and three-dimension models proposed by Button et al. (1996) and VandeWalle (1997) reflect inconsistencies in conceptualizing the dimensionality of the goal orientation construct. While they both propose goal orientation as a multidimensional construct, there is little consensus on the number of dimensions. A review of published goal orientation research reported in Table 3 reveals very little consistency across studies in operationalizing the

construct. Researchers have employed both the two-factor and three-factor models of goal orientation, often with no supporting rationale for either model. From the review of these studies, it is unclear whether goal orientation is best represented by two or three dimensions. Only one study was found that examined these models of goal orientation simultaneously (e.g., Day, Radosevich, & Chasteen, 2003a). Day et al. (2003a) examined the Button et al. (1996) and VandeWalle (1997) models with two other models of goal orientation that have been conceptualized primarily in educational research. While their findings suggest that the 3-factor model is the best fitting model of goal orientation, several issues with this study warrant discussion. First, the analysis employed in this research combined non-equivalent conceptualizations and measurement of goal orientation. The two models examined in addition to Button et al. (1996) and VandeWalle's (1997) models are more state-like conceptualizations of the construct. Specifically, the measures employed are context-specific and assess specific behaviors in contrast to the global measures employed by Button et al. (1996) and VandeWalle (1997). Second, the models were non-equivalent in conceptualizing the dimensionality yet were fit to a common model. Thus, one purpose of the current study is to examine the validity of the trait conceptualizations of the goal orientation construct to empirically assess the factorial validity evidence for these models independently.

Both Button et al. (1996) and VandeWalle (1997) provide evidence supporting their respective models of goal orientation, yet the relationship between the various dimensions remains somewhat ambiguous. While Button et al. (1996) found that the two constructs were unrelated (r=-.08), subsequent studies have reported mixed results with correlations ranging from r=.24 (e.g., Jagacinski & Duda, 2001) to r=.52 (e.g., Kozlowski et al., 2001). Thus, it is unclear how these constructs are related and how they interact to reflect different behavior patterns.

While VandeWalle did not address the expected relationships between the three dimensions, his findings reveal that LGO_v was unrelated to $PPGO_v$ (r=.07) and negatively related to $PAGO_v$ (r=-.39). The $PPGO_v$ and $PAGO_v$ dimensions were positively related (r=.39). It is less clear whether these dimensions reflect separate and distinct constructs. Furthermore, it is unclear how the two performance goal constructs are distinct in reflecting behavior patterns or differential outcomes.

Table 3

Operationalizations of Goal Orientation in Published Research

Study	Dimensions	Measure
Sujan et al. (1994)[a]	LGO & PGO	Ames & Archer (1988)
Button et al. (1996)	LGO & PGO	Button et al. (1996)
Phillips & Gully (1997)	LGO & PGO	Button et al. (1996)
VandeWalle (1997)	LGO, PPGO, PAGO	VandeWalle (1997)
VandeWalle & Cummings (1997)	LGO, PPGO, PAGO	VandeWalle (1997)
Fisher & Ford (1998)	LGO & PGO	Button et al. (1996)
Colquitt & Simmering (1998)	LGO & PGO	Button et al. (1996)
Ford et al. (1998)	LGO & PGO	Button et al. (1996)
VandeWalle et al. (1999)[a]	LGO & PGO	Sujan et al. (1994)
Brett & VandeWalle (1999)	LGO, PPGO, PAGO	VandeWalle (1997)
Steele-Johnson et al. (2000)[b]	LGO & PGO	Revised Button et al. (1996)
Chen et al. (2000)	LGO & PGO LGO & PPGO	Button et al. (1996) VandeWalle (1997)
Mangos & Steele-Johnson (2001)[b]	LGO & PGO	Button et al. (1996)
Brown (2001)[a]	LGO & PGO	Button et al. (1996)
VandeWalle et al. (2001)	LGO, PPGO, PAGO	VandeWalle (1997)
Kozlowski et al. (2001)	LGO & PGO	Button et al. (1996)
Bell & Kozlowski (2002)	LGO & PGO	Button et al. (1996)

Note. [a]Items worded to reflect work-context/situation specific goal orientation. [b]Studies also included manipulations of goal orientation.

Measuring Goal Orientation

Measures of goal orientation have been developed to reflect Button et al.'s (1996) two-factor model and VandeWalle's (1997) three-factor model. Button et al. (1996) developed a measure to reflect a global orientation (i.e., not specific to any context or achievement activity). According to Button et al. (1996), performance goal orientation items were written to reflect a preference for nonchallenging activities, a desire to avoid mistakes, and a tendency to evaluate performance by normative standards (i.e., the performance of others). In contrast, learning goal items were written to reflect a desire to engage in challenging activities, an eagerness to improve oneself, and a tendency to use one's past performance as a standard to evaluate current performance. The items were administered on a 7-point Likert scale, with responses ranging from 1 (strongly agree) to 7 (strongly disagree). A series of confirmatory factor analyses examining the scale properties resulted in the validation of a 16-item measure of goal orientation, with eight items representing each orientation. The final measure developed by Button et al. (1996) is reported in Table 4. In addition, their findings supported the hypothesized two-factor model of goal orientation as better fit than the single model implied by Dweck and Leggett (1988). It is interesting to note that while Button et al. (1996) argue that learning goal and performance goal orientation are separate and distinct constructs, their measures reflect opposite behavioral tendencies making the assertion that individuals possess both orientations simultaneously somewhat tenuous.

Table 4

Button, Mathieu, and Zajac's (1996) 2-Factor Model of Goal Orientation Scales

Construct	Scale Items
Learning Goal Orientation (LGO$_b$)	The opportunity to do challenging work is important to me.
	When I fail to complete a difficult task, I plan to try harder the next time I work on it.
	I prefer to work on tasks that force me to learn new things.
	The opportunity to learn new things is important to me.
	I do my best when I'm working on a fairly difficult task.
	I try hard to improve on my past performance.
	The opportunity to extend the range of my abilities is important to me.
	When I have difficulty solving a problem, I enjoy trying different approaches to see which one will work
Performance Goal Orientation (PGO$_b$)	I prefer to do things that I can do well rather than things that I do poorly
	I'm happiest at work when I perform tasks on which I know that I won't make any errors
	The things I enjoy the most are the things I do the best
	The opinions others have about how well I do certain things are important to me
	I feel smart when I do something without making any mistakes.
	I like to be fairly confident that I can successfully perform a task before I attempt it
	I like to work on tasks that I have done well on in the past.
	I feel smart when I can do something better than most other people.

Note. Reprinted from Button, S. B., Mathieu, J. E., & Zajac, D. M. (1996). Goal orientation in organizational research: A conceptual and empirical foundation. *Organizational Behavior and Human Decision Processes, 67*, 26-48. Copyright ©1996 with permission from Elsevier. Reprinted with permission of the author.

VandeWalle (1997) developed a measure to assess the three dimensions of learning goal orientation, performance prove goal orientation, and performance avoid goal orientation. He specifically operationalized the measure of goal orientation for applications in work settings. An initial pool of 50 items was written to reflect the definitions of the three goal orientation dimensions. The items were administered on a 6-point Likert scale, with responses ranging from 1 (strongly agree) to 6 (strongly disagree). The results of exploratory and confirmatory factor analyses across four diverse samples yielded a final 13-item measure. The final measure developed by VandeWalle (1997) is reported in Table 5. In addition, his findings supported the hypothesized three-factor model of goal orientation as a better fit than the single or two-factor model.

Table 5

VandeWalle's (1997) 3-Factor Model of Goal Orientation Scales

Construct	Scale Items
Learning Goal Orientation (LGO$_v$)	I am willing to select to a challenging work assignment that I can learn a lot from.
	I often look for opportunities to develop new skills and knowledge.
	I enjoy challenging and difficult tasks at work where I'll learn new skills
	For me, development of my work ability is important enough to take risks.
	I prefer to work in situations that require a high level of ability and talent.
Performance Prove Goal Orientation (PPGO$_v$)	I'm concerned with showing that I can perform better than my coworkers.
	I try to figure out what it takes to prove my ability to others at work.
	I enjoy it when others at work are aware of how well I am doing
	I prefer to work on projects where I can prove my ability to others.
Performance Avoid Goal Orientation (PAGO$_v$)	I would avoid taking on a new task if there was a chance that I would appear rather incompetent to others.
	Avoiding a show of low ability is more important to me than learning a new skill.
	I'm concerned about taking on a task at work if my performance would reveal that I had low ability.
	I prefer to avoid situations at work where I might perform poorly.

Note. VandeWalle, D. (1997). Development and validation of a work domain goal orientation instrument. *Educational and Psychological Measurement, 57(6)*, 995-1015. Copyright ©1997 Sage Publications, Inc., with permission. Reprinted with permission of the author.

Only one study was found that has examined both measures simultaneously. Dobbins, Bell and Kozlowski (2002) examined the Button et al. (1996) and VandeWalle (1997) measures to determine their relative equivalence in assessing goal orientation. These findings are reported in Table 6. As shown in Table 6, their findings reveal that both learning goal orientation scales were highly correlated (r=.77). In addition, Button et al.'s (1996) LGO_b scale was positively correlated with PGO_b (r=.17) and $PPGO_v$ (r=.10) and negatively related with $PAGO_v$ (r=-.16). VandeWalle's (1997) LGO_v was unrelated to PGO_b (r=.01), positively related to $PPGO_v$ (r=.10), and negatively related to $PAGO_v$ (r=-.27). The $PPGO_v$ and $PAGO_v$ scales were positively correlated (r=.37). Button et al.'s (1996) PGO_b scale was positively related to $PPGO_v$ (.56) and $PAGO_v$ (.37).

Table 6

Intercorrelations among Goal Orientation Dimensions

	LGO_b	PGO_b	LGO_v	$PPGO_v$	$PAGO_v$
LGO_b	-				
PGO_b	.17	-			
LGO_v	.77	.01	-		
$PPGO_v$	.10	.56	.10	-	
$PAGO_v$	-.16	.37	-.27	.37	-

Note. From "A comparison of the Button and VandeWalle goal orientation measures." Dobbins, H.W., Bell, & Kozlowski, S. W. J. 2002. Paper presented at the 17th Annual Meeting of the Society of Industrial and Organizational Psychology, April 2002. Reprinted with permission of the author.

These findings reveal that the learning goal orientation measures are highly correlated (r=.77) and thus appear to measure the same construct. However, the relationships between the three performance goal orientation dimensions are much weaker. While the performance goal orientation measures have some degree of overlap, the measures appear to be more distinct. Button et al.'s (1996) PGO scale and VandeWalle's (1997) PPGO scale share a stronger relationship (r=.56), compared to VandeWalle's (1997) PAGO scale (r=.37). From these findings, it is unclear how learning goal and performance goal constructs are related and how performance goal constructs should be conceptualized. Thus, a second purpose of the current study is to address two issues: (1) how the learning goal orientation and performance goal orientation constructs are related to each other and (2) how the performance goal orientation constructs are distinct. This examination may provide some clarity concerning how the goal orientation dimensions are expected to reflect differential patterns of behaviors, yet potentially interact.

In examining the measurement of goal orientation, it is also important to examine specific measurement properties in terms of reliability. Reliability is a necessary, although insufficient, precondition for demonstrating validity (Nunnally, 1978). In general, the reliability of measures is indicated by the level of internal consistency among the items on a given scale. Internal consistency estimates of reliability (e.g., coefficient alpha) are based on the average correlation among items within a test (Nunnally & Bernstein, 1994). At a minimum measures should reflect a fairly high level of internal consistency, with .70 regarded as one of the most widely accepted criterion (e.g., Nunnally, 1978). Additionally, Cronbach and Meehl (1955) suggest that test-retest reliabilities are critical to construct validity, particularly for traits. Test-retest reliabilities assess

the degree to which scores on the measures are stable over time and across situations. A brief review of the reliability evidence for each of the goal orientation measures is discussed.

Internal Consistency Reliability. The internal consistency estimates for each of the goal orientation measures have generally been higher than .70. Button et al.'s (1996) scale reliabilities ranged from .68 to .81 for performance goal orientation and .81 to .85 for learning goal orientation. VandeWalle's (1997) thirteen-item measure exhibited scale reliabilities of .89, .85, and .88 for learning goal, performance prove, and performance avoid goal orientations, respectively. Dobbins et al. (2002) reported similar findings with alpha reliabilities across both scales of LGO_b (.82), PGO_b (.84), LGO_v (.79), $PPGO_v$ (.84), and $PAGO_v$ (.83). These findings demonstrate that goal orientation measures generally exceed the recommended criteria of .70 for internal consistency.

Test-retest Reliability. The stability of scores on each of these measures has received less attention. While Button et al. (1996) conceptualized LGO_b and PGO_b as dispositional constructs, they did not assess the stability of scores over time to support this assertion. Only one study was found that examined the stability of Button et al.'s (1996) goal orientation measures (e.g., Fisher, Delbridge, & DeShon, 1997). Fisher et al. (1997) reported test-retest reliabilities ranging from .60 to .65 for learning goal orientation and .70 to .74 for performance goal orientation over a period of 30 to 60 days. VandeWalle (1997) reported test-retest reliabilities of .66, .60, and .57 over a period of 90 days for measures of learning goal, performance prove, and performance avoid goal orientations, respectively. Overall, these findings suggest moderate levels of stability compared to the Big Five personality traits, which range from .69 to .76 over 78 to 158 days (e.g., Viswesvaran & Ones, 2000). While prior research suggests that goal orientation scores are

relatively stable over time, this research has been limited. The current study extends prior research by examining test-retest reliabilities of both goal orientation measures simultaneously.

In summary, the recent conceptualizations of goal orientation highlight several areas for additional research. First, while goal orientation has been conceptualized as a stable disposition, research supporting the stability of scale scores has been limited. No study was found that examined both the internal consistency and test-retest properties of these scales simultaneously. Second, while there is a general consensus that goal orientation is multidimensional construct, it is uncertain whether two or three dimensions are appropriate. In addition, it is unclear how the goal orientation dimensions are related as well as the possible interaction effects. These ambiguities concerning the construct may potentially limit the utility of goal orientation in explaining work-related behaviors and performance outcomes. Thus, the primary purpose of the current study is to examine the validity of the two competing models of goal orientation. Specifically, this study intends to examine empirically the *a priori* models presented by Button et al. (1996) and VandeWalle (1997) to evaluate overall model fit. A factor analytic assessment of these measures is expected to provide some clarity in the dimensionality of the construct as well as the observed relationship between the dimensions (i.e., factors).

Nomological Network

A nomological network examines the relationship between a construct under measurement consideration and other constructs (Schwab, 1999). The nomological network of relationships is also essential in demonstrating construct validity. Pedhazur and Schmelkin (1991) suggest that construct validation processes should examine theoretical propositions concerning the relationship between the construct under investigation and other constructs. These

relationships should specify the antecedents, correlates, and consequences associated with a construct and assess the extent that the relationships operate as suggested by theory. The nomological network for goal orientation is reviewed based on Dweck and Leggett's (1988) framework and the recent models advanced by Button et al. (1996) and VandeWalle (1997).

Antecedents. From Table 1, Dweck and Leggett (1988) assert that goal orientation is shaped by one's implicit beliefs about the nature of ability as a fixed or malleable attribute. An entity theorist holds that belief that ability is fixed attribute that cannot be enhanced through learning or effort. Entity theorists are more likely to adopt a performance goal orientation and focus their efforts on demonstrating competence rather than developing competence. In contrast, incremental theorists hold the belief that ability is malleable characteristic that can be enhanced through learning or effort. Incremental theorists adopt a learning goal orientation and their behavior is directed toward developing competence through learning.

Prior research has reported consistent findings for the hypothesized relationships between learning goal and performance goal orientation and implicit theories of ability. Button et al. (1996) found that learning goal orientation was moderately related to an incremental theory of ability (r=.46), while performance goal orientation was related to an entity theory of ability (r=.17). VandeWalle (1997) found that learning goal orientation was negatively related to an entity theory of ability (r=-.14), while performance prove and performance avoid goal orientations were positively related to entity theories with correlations of .18 and .28, respectively. These findings provide support for the hypothesized goal orientation relationships with implicit theories of ability. However, measures of implicit theories of ability are embedded within goal orientation measures, thus these relationships are not surprising. For example, Button et al.'s (1996) learning goal orientation measure include items such as "The opportunity to

extend my range of abilities is important to me", which implies ability is malleable. Similarly, VandeWalle's (1997) measure includes items such as "For me, development of my ability is important enough to take risks", which suggest ability can be developed. Thus, while the relationships with implicit theories of ability were supported in both of these validity studies, it is clear that there are some measurement confounds.

Correlates. Conceptually, Dweck and Leggett (1988) argue that goal orientation is embedded in the self-concept. Specifically, they suggest that a learning goal orientation reflects a positive self-concept, while a performance goal orientation reflects a negative self-concept. The "self-concept" reflects the diverse attributes and capacities that are manifested by ones' internal beliefs and feelings (Coopersmith, 1967). It is characterized by one's self-awareness, self-image, and self-evaluation (Gecas, 1982). These characteristics have also been associated with general behavioral tendencies. Thus, individuals with a positive self-concept are more likely to engage in adaptive behavior patterns that are characterized by a learning goal orientation. In contrast, individuals with a negative self-concept are more susceptible to engaging in maladaptive or learned helplessness behaviors that are characterized by a performance goal orientation.

Dweck and Leggett (1988) suggest that goal orientation may interact with other dispositional characteristics in shaping a positive or negative self-concept. The self-concept is shaped, in part, by a number of psychological traits including self-esteem, locus of control, and personality. Learning goal and performance goal orientations constructs are expected to be differentially related to self-esteem, locus of control, and personality in that they are consistent with one's self-concept (i.e., positive or negative). Dweck and Leggett (1988) assert that individuals with a learning goal orientation generally reflect higher levels of self-esteem and an internal locus of control. As a result, these individuals generally report higher overall evaluations

of self and a belief in the control over their own outcomes. In contrast, individuals with a performance goal orientation reflect lower levels of self-esteem and an external locus of control. As a result, they also report lower overall evaluations of self and a belief in the control over their own outcomes. Although Dweck and Leggett (1988) acknowledge that learning goal and performance goal orientation are related to self-esteem, locus of control and personality, they also argue that they are distinct constructs and suggest that goal orientation may provide incremental value in understanding human behavior.

The self-concept is receiving renewed interest in organizational behavior and organizational psychology research. Recent research examining the self-concept in organizational research has suggested that in addition to self-esteem and locus of control, several personality attributes - emotional stability and generalized self-efficacy – are important in shaping a positive or negative self-concept (Judge, Locke, & Durham, 1997). Judge et al. (1997) assert that four key traits – self-esteem, locus of control, generalized self-efficacy, and emotional stability (i.e., neuroticism) – represent a higher order construct reflecting the evaluative component of self-concept. They suggest that high and low agreement on these personality attributes reflects positive and negative self-concepts. A positive self-concept is characterized by an internal locus of control and high levels of self-esteem, generalized self-efficacy, and emotional stability. In contrast, a negative self-concept is characterized by an external locus of control and low levels of self-esteem, generalized self-efficacy and emotional stability. These trait characteristics associated with the self-concept are also considered to be important determinants of task-related behaviors and outcomes including job performance and job satisfaction (e.g., Judge et al., 1997).

While Dweck and Leggett's (1988) conceptual framework links goal orientation to the self-concept, no research has systematically examined learning goal and performance goal orientations with the traits associated with self-concept as identified by Judge et al. (1997). However, Button et al. (1996) examined goal orientation relationships with several of these correlates. They examined learning goal and performance goal orientation with self-esteem and locus of control. They found support for hypothesized relationships with learning goal orientation positively related to self-esteem (r=.48) and an internal locus of control (r=.90). The findings for performance goal orientation were mixed. While performance goal orientation was unrelated to self-esteem (r=-.06), it was positively related to an internal locus of control (r=.28). Thus, while learning goal orientation relationships were consistent with theoretic conceptualizations, the performance goal orientation relationships were mixed and inconsistent with theory. In addition, the moderate to strong correlations of learning goal orientation with self-esteem and locus of control have raised questions concerning the distinctiveness of these constructs. No studies were found examining VandeWalle's three factors with self-esteem or locus of control. A review of the research examining goal orientation with the four traits comprising self-concept is presented in the following section.

Self-Esteem. Self-esteem (SE) is a trait that reflects an individual's overall evaluation of their self-worth (Rosenberg, 1965). In essence, it reflects the extent to which individuals have pride in themselves and their capabilities. According to Rosenberg (1965), a high self-esteem characterizes individuals who respect themselves and reflect a high degree worthiness, while a low self-esteem reflects self-rejection and self-dissatisfaction. Dweck and Leggett (1988) suggest that individuals with a learning goal orientation would reflect a high level of self-esteem, while those with a performance goal orientation would reflect a low self-esteem. Button et al. (1996)

report a positive correlation between self-esteem and learning goal orientation (LGO_v) of r=.48, but self-esteem was unrelated to performance goal orientation (PGO_b) r=-.06. No studies were found examining self-esteem with VandeWalle's (1997) three dimensions of goal orientation. Based on the conceptual framework and the limited empirical research, it is expected that self-esteem will be positively related to both learning goal constructs (LGO_b and LGO_v) and negatively related to the performance goal constructs (PGO_b, $PPGO_v$, $PAGO_v$).

Hypothesis 1: Self-esteem is positively related to learning goal orientation (LGO_b and LGO_v), and negatively related to performance goal orientation (PGO_b, $PPGO_v$, $PAGO_v$).

Locus of Control. Locus of control (LOC) reflects the degree to which individuals believe they have control over events in their lives (e.g., internal) or whether they believe outside forces control the events in their lives (external; Rotter, 1966). In general, locus of control reflects an individual's belief in their ability to control their own performance outcomes. Dweck and Leggett's (1988) goal orientation framework suggests that individuals with a learning goal orientation would reflect a high level of internal locus of control, while those with a performance goal orientation would reflect a low level of internal or even an external locus of control. Button et al. (1996) found that locus of control was positively related to both learning goal orientation (r=.90) and performance goal orientation (r=.28). These findings suggest that both learning goal orientation and performance goal orientation are related to an internal locus of control. No studies were found examining locus of control and VandeWalle's (1997) three dimensions of goal orientation. While the findings of Button et al. (1996) are contrary to the theoretical propositions suggested by Dweck and Leggett (1988) for performance goal orientation, the measure of locus of control used in their study was modified for use in work settings. It is unknown whether these scale modifications may have accounted for the unexpected finding with

performance goal orientation. In the current study, it is expected that learning goal orientation will be positively related to internal locus of control, while performance goal orientation will be negatively related to internal locus of control.

Hypothesis 2: Learning goal orientation (LGO_b and LGO_v) is positively related to internal locus of control while performance goal orientation (PGO_b, $PPGO_v$, $PAGO_v$) is negatively related to an internal locus of control.

Generalized Self-Efficacy. Generalized self-efficacy (GSE) is considered to be a trait-like generality of task self-efficacy (Eden, 1988; 1996). According to Eden (1996), generalized self-efficacy is defined as "one's belief in their overall competence to effect requisite performances across a wide variety of achievement situations." Judge, Locke, Durham, & Kluger (1998) also defined GSE as "an individual's perception of their ability to perform across a variety of different situations." Generalized self-efficacy has shown positive associations with learning goal orientation LGO_b (r=.58) and LGO_v (r=.57; Chen, Gully & Eden, 2001). The findings were mixed findings for performance goal orientation with correlations of PGO_b (r=.12) and $PPGO_v$ (r=-.08). Thus, it is unclear how generalized self-efficacy is related to performance goal constructs. Prior research has suggested that self-efficacy constructs would be differentially related to positive and negative self-concepts (Gecas, 1982). While Dweck and Leggett (1988), nor Button et al. (1996) and VandeWalle (1997) specifically addressed self-efficacy constructs, it is expected that generalized self-efficacy will be positively related to learning goal orientation and negatively related to performance goal orientation.

Hypothesis 3: Generalized self-efficacy is positively related to learning goal orientation (LGO_b and LGO_v) and negatively related to performance goal orientation (PGO_b, $PPGO_v$, and $PAGO_v$).

Emotional Stability/Neuroticism. Emotional stability (ES) is a personality trait drawn

from the Big 5 personality taxonomy (McCrae & Costa, 1992). It is a personality trait that

reflects an individual's tendency to experience negative emotional states or emotional stress

tolerance. In general, individuals with high levels of emotional stability or emotional stress

tolerance view themselves more positively and are characterized as calm, less likely to be

stressed, or experience anxiety. In contrast, individuals with low levels of emotional stability or

emotional stress tolerance view themselves and the world around them negatively and are

characterized as nervous, easily stressed, and anxious. Dweck and Leggett (1988) did not

specifically address the role of emotional stability with goal orientation constructs, however,

recent research examined the relationship of personality constructs in the goal orientation

nomological network (e.g., Chan & Tesluk, 2000; Day et al., 2003a). Prior research has shown

that individuals with a learning goal orientation report higher levels of emotional stress tolerance

with correlations of LGO_v (r=-.39; Chan & Tesluk, 2000) and LGO_b (r=-.24; McKinney, 2001).

In contrast, individuals with a performance goal orientation reflect lower levels of emotional

stress tolerance with correlations of PGO_b (r=.45; McKinney, 2001), PPGO (r=.09), and PAGO

(r=.39; Chan & Tesluk, 2000). From these findings, it is expected that emotional stability will be

positively related to learning goal orientation and negatively related to performance goal

orientation.

Hypothesis 4: Emotional stability is positively related to learning goal orientation (LGO_b

and LGO_v) and negatively related to performance goal orientation (PGO_b, $PPGO_v$, and $PAGO_v$).

In addition to the four self-concept traits, recent research has demonstrated that other

traits have emerged as correlates of goal orientation. Several researchers have expanded the

nomological network to include need for achievement (e.g., Jagacinski & Duda, 2001), fear of

negative evaluation (VandeWalle, 1997), and social desirability (Button et al., 1996). Specifically, given the definition of goal orientation reflecting either achievement-striving or evaluative behavior patterns, need for achievement and fear of negative evaluation have been suggested as important correlates of goal orientation. Thus, in addition to the self-concept traits, need for achievement, fear of negative evaluation, and social desirability are examined in the goal orientation nomological network.

Need for Achievement (nAch). Need for achievement is considered to be an important internal motive that drives behavior (McClelland, 1961). It is generally defined as a need to seek out challenges with some standard of excellence (McClelland, Atkinson, Clark & Lowell, 1976). This achievement motive has been suggested as an important determinant of behavior by distinguishing between individuals who operate with the "hope of success" versus the "fear of failure." The achievement-related behaviors and outcomes associated with need for achievement have been suggested as important linkages with goal orientation (Phillips & Gully, 1997). Recent research has shown that need for achievement was positively related to learning goal orientation, while negatively related to performance goal orientation (e.g., Jagacinski & Duda, 2001; Phillips & Gully; 1997). Phillips & Gully (1997) found that need for achievement was positively related to learning goal orientation with a correlation of r=.35, while unrelated to performance goal orientation (r=.03). Jagacinski and Duda (2001) reported similar relationships with correlations of r=.52 and r=-.13 for learning goal and performance goal orientations, respectively. No research was found examining VandeWalle's model of goal orientation with need for achievement.

Drawing on the assertions of McClelland et al. (1976) and Dweck and Leggett's (1988) framework for goal orientation, it would expected that individuals with a learning goal

orientation exhibit behaviors with the "hope of success", while those with a performance goal orientation may operate more from the "fear of failure." Thus, it is expected that need for achievement will be differentially related to learning goal and performance goal orientation constructs.

Hypothesis 5: Need for achievement is positively related to learning goal orientation (LBO$_b$ and LGO$_v$) and negatively related to performance goal orientation (PGO$_b$, PPGO$_v$, and PAGO$_v$).

Fear of Negative Evaluation (FNE). Fear of negative evaluation is considered to an important determinant of behavior characterized by the tendency of individuals to focus on others' evaluations of them (Leary, 1983). VandeWalle (1997) suggested that fear of negative evaluation is an important correlate in the nomological network for goal orientation. Conceptually, he argued that fear of negative evaluation may be more salient for individuals with performance goal orientations and thus reflect strong, positive correlations. In contrast, individuals with a learning goal orientation would reflect weak or negative relationships with fear of negative evaluation. His findings were as expected which reveal that fear of negative of evaluation was negatively related to learning goal orientation (r=-.13) and positively related to performance prove and performance avoid goal orientations with correlations of r=.30 and r=.37, respectively.

Hypothesis 6: Fear of negative evaluation is negatively related to learning goal orientation (LGO$_b$ and LGO$_v$) and positively related to performance goal orientation (PGO$_b$, PPGO$_v$, and PAGO$_v$).

Social Desirability (Soc. D). Socially desirable responding has long been cited as a potential source of variance in personality measures where individuals may engage in impression

management tactics that inflate scores (Paulhus, 1984). One issue that has been addressed within psychological research is the need to address and control for socially desirable responses to the various personality assessments (Zerbe &Paulhus, 1987). Although limited, prior research has shown moderate levels of association between goal orientation constructs and social desirability. Button et al. (1996) examined the relationship of social desirability with goal orientation and found that social desirability was positively related to learning goal orientation (r=.27) and negatively related to performance goal orientation (r=-.32). Furthermore, Button et al. (1996) suggest that future research needs to examine the relationship between social desirability and goal orientation.

Hypothesis 7: Social desirability is positively related to learning goal orientation (LBO_b and LGO_v) and negatively related to performance goal orientation (PGO_b, $PPGO_v$, and $PAGO_v$).

Consequences of Goal Orientation. Conceptually, Dweck and Leggett (1988) suggest that goal orientation reflects an "approach" to tasks with an emphasis on task mastery or demonstrating competence. The consequences associated with goal orientation are reflected in three outcomes including cognition, affect, and behavior. Cognitive outcomes are characterized by an individual's causal attributions for success or failure on a task. These causal attributions are drawn from attribution theory and refer to the extent to which performance success or failure is due to ability or effort (Dweck & Leggett, 1988). The affective consequences of goal orientation refer to the tendency to experience anxiety or depressed affect when performing tasks. Lastly, the behavioral consequences refer to the initiation and persistence of effort on the task. Thus, individuals with a learning goal orientation are considered to attribute performance successes or failures to effort, experience low levels of anxiety, and exhibit high levels of persistence/effort on tasks. In contrast, individuals with a performance goal orientation attribute

performance successes or failures to ability, experience higher levels of anxiety, and exhibit lower levels of persistence/effort on tasks. It is these differences that Dweck and Leggett (1988) assert to account for the performance variability between individuals.

Few studies have examined goal orientation with affective and cognitive outcomes. Only two studies were found that examined goal orientation with affect (e.g., Chan & Tesluk, 2000; Dobbins et al., 2002). Dobbins et al. (2002) examined both models of goal orientation to assess comparative validities with negative affectivity. Their findings reveal that both learning goal constructs were negatively related and performance goal constructs positively related to negative affect. No study was found that examined these models of goal orientation with the cognitive outcomes reflecting causal attributions.

The majority of goal orientation research in organizational contexts has primarily focused on the consequences including a variety of task-related behaviors and task/academic performance outcomes. Goal orientation is considered to have direct effect on task-related behaviors and a more indirect effect on performance outcomes. The task-related behaviors include self-regulation (VandeWalle et al., 1999), learning strategies (Ford et al., 1998), effort (Fisher & Ford, 1998), and goal-setting (Phillips & Gully, 1997). These studies have shown consistent positive associations with learning goal orientation, while results for performance goal orientation have been mixed with findings of small positive, negative, or no relationships with these behaviors. Other studies have examined goal orientation relationships with a variety of performance outcomes including learning (Colquitt & Simmering, 1998; Fisher & Ford, 1998), training performance (Brown, 2001; Ford et al., 1998; Kozlowski et al., 2001), task performance (Bell & Kozlowski, 2002; Mangos & Steele-Johnson, 2001; Steele—Johnson et al., 2000), and academic performance (Chen et al., 2000; Phillips & Gully, 1997; VandeWalle et al., 2001).

Overall, these findings reflect positive associations with learning goal orientation, while resulting in negative or unrelated associations to performance goal orientation.

A recent meta-analysis of goal orientation relationships with performance outcomes supports these individual study findings. Beaubien and Payne (1999) examined studies employing the two-factor model of goal orientation with overall task performance. Their findings reveal that while learning goal orientation was positively related to overall task performance (r=.20), performance goal orientation was virtually unrelated to task performance (r=-.004). A review of VandeWalle's three-factor model revealed that learning goal orientation was positively related to task performance (r=.113), performance prove goal orientation was unrelated (r=.005), and performance avoid goal orientation was negatively related (r=-.139; McKinney & Carlson, 2002). While learning goal orientation appears to have predictive validity with certain task behaviors and performance outcomes, performance goal orientation relationships have been inconsistent with theory and of lower validity. Thus, learning goal orientation appears to reflect more consistent and positive relationships with important task-related outcomes. The relationships for performance goal orientation with task-related behaviors and performance are inconsistent and of a weaker magnitude.

While these findings of the nomological relationships are promising in identifying important individual differences associated with goal orientation, it is less clear how well these differences have been captured. Based on the recent models advanced by Button et al. (1996) and VandeWalle (1997), the individual differences associated with goal orientation may vary on two or three dimensions. The validity evidence for goal orientation may be confounded by this lack of consensus in conceptualizing and operationalizing the construct. Thus, the current study

examines specific validity evidence of the two competing models of goal orientation by empirically evaluating the factorial and nomological validity of these constructs.

Summary

This chapter reviewed goal orientation research including the initial conceptualization advanced by Dweck and Leggett (1988) and the more recent conceptualizations advanced by Button et al. (1996) and VandeWalle (1997). This review primarily focused on the competing models of goal orientation that are dominant in organizational research (Button et al., 1996; VandeWalle, 1997). From this review, several conceptual and operational issues associated with recent models of goal orientation have emerged. First, there is little consensus on the dimensionality of the construct. Second, it is uncertain how the goal orientation dimensions are related and distinct in reflecting behavior patterns. Third, research has been limited in examining a nomological network associated with both models. Thus, the purpose of the current study is to address these issues with an empirical examination of the measurement properties of the goal orientation measures and relationships with a theoretically derived nomological network. A summary of the hypotheses tested in the current study are shown in Table 5.

Table 7

Summary of Study Hypotheses

Variables	LGO_b	PGO_b	LGO_v	$PPGO_v$	$PAGO_v$
Self-Esteem (SE)	+	-	+	-	-
Locus of Control (LOC)	+	-	+	-	-
Generalized Self-Efficacy (GSE)	+	-	+	-	-
Emotional Stability (ES)	+	-	+	-	-
Need for Achievement (nAch)	+	-	+	-	-
Fear of Negative Evaluation (FNE)	-	+	-	+	+
Social Desirability (Soc. D)	+	-	+	-	-

Chapter 3

Method

Overview

The purpose of the current study was to assess the comparative validity of two competing models of goal orientation. This study assessed specific validity issues associated with the two-factor and three-factor models of goal orientation advanced by Button et al. (1996) and VandeWalle (1997). This validation process examined the internal consistency and test-retest reliabilities of the goal orientation measures. In addition, a factor analytic assessment of the two goal orientation measures was conducted to assess the best overall model fit to support the dimensionality of the construct. Finally, a nomological network of goal orientation relationships was examined with measures of self-esteem, generalized self-efficacy, locus of control, emotional stability, need for achievement, fear of negative evaluation, and social desirability.

Sample

Two samples (e.g., student and employee) were drawn to assess the goal orientation measurement models and nomological network. Participation in the study was voluntary and participants received either extra course credit or were entered in a random drawing for cash prizes. Sample 1 was a student sample comprised of 314 students in various undergraduate management courses at Virginia Tech. The sample demographics were 51% female, 77% white, and ranged in age from 18 to 25. Sample 2 was an employee sample comprised of 116 university employees in Student Services at Virginia Tech. The sample demographics were 56% female and 82% white. Thirty-six percent of the participants ranged in age from 26 to 39, while 55% were

age 40 or older. Fifty percent of the participants were employed with the university from 1 to 9 years, while 22% were employed 10 or more years. In addition, 52% held the same position for 1 to 10 years and 18% held the same position for 10 or more years.

An adequate sample size is an important component of model analysis. The minimum recommended sample size for confirmatory factor analysis is at least 200 (Hatcher, 1994; Hoelter, 1983; Hu & Bentler, 1999). In addition, recommendations for sample size for adequate scale evaluation range from 1:4 (e.g., Rummel, 1970) to at least 1:10 respondents per item (e.g., Schwab, 1980). Based on these recommendations and a total of 13 and 16 items on each respective scale, a minimum sample size of 64 to 160 is necessary for factor analysis of these models. While the employee sample (N=116) was somewhat lower than desired 200, it does meet the minimum recommendation of 4 respondents per item. In addition, the sample size suggested for power of .80 and expected effect size of r=.20 is N=250 (e.g., Cohen, 1988). The student sample of N=314 exceeds this recommendation.

Measures

This study required the measurement of seven trait variables including goal orientation, self-esteem, locus of control, generalized self-efficacy, emotional stability, need for achievement, and fear of negative evaluation. Each of these measures were assessed on a 6-point Likert scale, with responses of 1 (strongly disagree), 2 (disagree), 3 (slightly disagree), 4 (slightly agree), 5 (agree), and 6 (strongly agree). A consistent scale format was selected for ease of administration. A 6-point Likert scale was selected based on prior research suggesting coefficient alpha reliabilities level off between 5 and 6 point scaling (Hinkin, 1995). In addition to these traits, social desirability was also measured. Social desirability was assessed using the

true/false format as suggested by Marlowe & Crowne (1960). Response to the social desirability statements were summed to generate a score based on true and/or false responses to specific items.

Internal consistency reliabilities were assessed for each of the measures. In addition, test-retest reliabilities were assessed for the goal orientation measures to examine the stability in the scores over time. All measures used in this study are reported in Appendices.

Goal Orientation. Goal orientation was assessed with the two measures developed and validated by Button et al. (1996) and VandeWalle (1997). The first scale is a 16-item measure developed by Button et al. (1996), which includes 8 items assessing learning goal orientation and 8 items assessing performance goal orientation. Sample learning goal orientation items include: "The opportunity to do challenging work is important to me" and "I prefer to work on tasks that force me to learn new things." Sample performance goal orientation items include: "I prefer to do things that I can do well rather than things that I do poorly" and "The opinions others have about how well I do certain things are important to me." Prior reliabilities have been reported of .84 and .82 for the learning goal orientation and performance goal orientation, respectively (Button et al., 1996).

The second scale is a 13-item measure developed by VandeWalle (1997), with 5 items assessing learning goal orientation, 4 items assessing performance prove goal orientation, and 4 items assessing performance avoid goal orientation. Sample learning goal orientation items include: "I often look for opportunities to develop my new skills and knowledge" and "I prefer to work on situations that require a high level of ability and talent." Sample performance prove goal orientation items include: "I'm concerned with showing that I can perform better than my coworkers" and "I prefer to work on projects where I can prove my ability to others" and sample

performance avoid goal orientation items include: "I'm concerned about taking on a task if my performance would reveal that I had low ability" and "I prefer to avoid situations where I might perform poorly." Prior reliabilities of .89, .95, and .88 have been reported for learning goal orientation, performance prove goal orientation, and performance avoid goal orientation, respectively (VandeWalle, 1997).

Self-Esteem. Self-esteem was assessed with the 10-item scale developed by Rosenberg (1965). Stronger agreement reflects a high self-esteem, while disagreement reflects a low self-esteem. Sample items from the scale include: "On the whole, I am satisfied with myself" and "I feel I do not have much to be proud of." Prior scale reliabilities have reported ranging from .72 to .90 (Judge, et al., 1998).

Locus of Control. Locus of control was assessed with 10-items from the internality, powerful others, and chance scale developed and validated by Levenson (1981). The internality scale reflects more global locus of control beliefs and assesses the "strength" of an internal locus of control. This measure is an indicator of internal locus of control strength rather than internal/external belief tendencies. Strong agreement indicates a high internal locus of control while disagreement reflects low internal locus of control. Sample items from this scale include: "My life is determined by own actions" and "When I get what I want, it's usually because I have worked hard for it." Prior reliabilities have been reported of .87 (Judge, et al., 1998).

The internality scale developed by Levenson (1981) was selected over the more widely used scale developed by Rotter (1966) for several reasons. First, Rotter's scale is a forced choice format that examines whether an individual reflects more internal versus external beliefs about personal control over life events. The current study examines locus of control in the context of the self-concept, which emphasizes more the strength of one's beliefs over their personal control.

For this reason, the internality scale was deemed more appropriate in this study. Second, Rotter's (1965) scale assesses beliefs about personal control in the larger society and contains items that reflect the influences of others and the environment in making loci of control evaluations. For example, sample items of the Rotter (1966) scale include: "In the case of the unprepared student, there is rarely if ever such a thing as an unfair test" versus "Many times exam questions tend to be so unrelated to course work that studying is really useless", and "The average citizen can have an influence in government decisions" versus "This world is run by the few people in power, and there is not much the little guy can do about it." These items appear to reflect aspects beyond personal control and may be somewhat confounded by the external sources of influence in specific situations. For these reasons, the Internality scale was selected as a measure of locus of control beliefs as they directly relate to shaping a positive or negative self-concept.

Generalized Self-efficacy. Generalized self-efficacy was assessed with the 8-item scale developed by Chen et al. (2001). High agreement reflects a strong belief in one's capabilities to successfully perform across a variety of tasks, while low agreement reflects a weak belief in one's capabilities to perform. Sample items from the scale include: "I will be able to achieve most of the goals I have set for myself" and "I am confident that I can perform effectively on many different tasks." Previous reliabilities for the scale were reported of .86 (Chen et al., 2001).

Emotional Stability/Neuroticism. Emotional stability was assessed with Goldberg's (1999) International Personality Item Pool (IPIP). The IPIP is a scale assessing the Big 5 personality dimensions of openness, conscientiousness, extraversion, agreeableness, and emotional stability. The emotional stability factor is measured with 6 subscales of 10 items assessing each of the following: anxiety, anger, depression, vulnerability, self-consciousness and immoderation. For the current study, emotional stability was assessed with 10 items from the

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anxiety subscale and 5 items from the vulnerability subscale. These scales were selected because they reflect the aspects of emotional stress tolerance and the ability to make adjustments to situational pressures more likely to be encountered in task contexts. High agreement reflects a greater degree of emotional stress tolerance, while low agreement reflects a lesser degree of emotional stress tolerance. Each of these items required participants to indicate their level of agreement with statements that reflect their general behavioral tendencies. Sample items from anxiety subscale include: "stress out easily" and "worry about things." Sample items from the vulnerability subscale include: "remain calm under pressure" and "can handle complex problems." Prior reliabilities have been reported of .83 and .82 for the anxiety and vulnerability subscales, respectively (Goldberg, 1999).

Need for Achievement. Need for achievement was assessed with 16-item scale from the Personality Research Form (Jackson, 1974). Stronger agreement reflects high achievement motivation, while low agreement reflects lower levels of achievement motivation. Sample items from this scale include: "I often set goals that are very difficult to reach", and "I try to work just hard enough to get by." Prior reliabilities have been reported of .72 (Phillips & Gully, 1997).

Fear of Negative Evaluation. Fear of negative evaluation was assessed with the 12-item scale developed by Leary (1983). The instrument assesses the degree to which individuals are concerned with how they are perceived or evaluated by others. Sample items include: "I am afraid people with find fault with me" and "other people's opinions of me do not bother me." Prior reliabilities have been reported ranging from .91 (VandeWalle, 1997) to. 94 (Leary, 1991).

Social Desirability. Social desirability was assessed with 22 items from the Crowne and Marlowe (1964) scale. This scale attempts to identify individuals who describe themselves in favorable terms. Participants responded either "True" or "False" to 22 statements assessing

social desirability. The scale was scored by adding True and False responses to specific items. Sample items include: "Before I vote, I thoroughly investigate the qualifications of all of the candidates" and "If I could get into a movie without paying and be sure I was not seen, I would probably do it." Prior reliabilities have been reported of .78 (Button et al., 1996).

Survey Administration

Study questionnaires were administered at three different points in time. The first administration assessed the study variables in the student sample. The second administration assessed the test-retest stability of goal orientation to a small subset of participants in the student sample. The final survey administration was assessed to participants in the employee sample. All participants were assured that the responses will remain confidential. Study questionnaires were administered employing both an online and paper-and-pencil format. For all assessments, participants completed the informed consent prior to survey administrations. The survey administration timeline is outlined in Table 8.

The survey for the student sample included 110 items assessing goal orientation, self-esteem, locus of control, generalized self-efficacy, emotional stability, need for achievement, fear of negative evaluation, and social desirability. Of the 314 participants in the student sample, 206 participants completed the online format, while 108 participants completed the paper-and-pencil format. The online format took approximately 20 to 35 minutes to complete. The paper-and-pencil format was administered during the normal class time for student participants and took approximately 25 to 35 minutes to complete. For the test-retest assessment, 65 participants of the student sample were administered the goal orientation measures in paper-and-pencil format 60 days after the initial assessment. The 60 day retest timeframe exceeds the

recommended 30 day retest timeframe when assessing "true change", test-retest should be administered no sooner than 2 weeks to 30 days (Nunnally & Bernstein, 1994).

The employee sample was administered an 84-item survey in paper-and-pencil format including assessments of goal orientation, self-esteem, locus of control, generalized self-efficacy, emotional stability, and fear of negative evaluation. Two measures were excluded from the employee survey – need for achievement and social desirability. There were several reasons for excluding these measures from the survey administration. First, the researcher was limited to a survey of approximately 80 items. This request by management was to minimize the time away from work yet allow participation in the research project. Second, the decision to exclude need for achievement and social desirability measures was based on the limited theoretical support and empirical research in work settings for these variables compared other study variables. The survey administration was completed in approximately 30 to 40 minutes.

Table 8

Survey assessments timeline across student and employee samples

Administration	Sample	N	Format	Assessments
Time 1	Student	206	Online	Goal orientation
		108	Paper & Pencil	Self-esteem
				Locus of control
				Generalized self-efficacy
				Emotional stability
				need for achievement
				Fear of negative evaluation
				Social desirability
Time 2	Student	65	Paper & Pencil	Test-retest of goal orientation
Time 3	Employee	116	Paper & Pencil	Goal orientation
				Self-esteem
				Locus of control
				Generalized self-efficacy
				Emotional stability
				Fear of negative evaluation

Analytic Strategy

To examine the two alternative models goal orientation, a series of analyses were conducted to assess the factor structure of the goal orientation scales and to examine the nomological relationships with the hypothesized correlates. The first set of analyses examined the respective measurement models of the two-factor and three-factor models of goal orientation. These relationships were examined using LISREL 8.0 (Joreskog & Sorbom, 1993). The second set of analyses examined the nomological validity of goal orientation relationships with the hypothesized correlates. These relationships were examined using SPSS 11.0. A brief review of these analytic procedures are discussed below.

Measurement Model

The measurement model defines the relationship between observed and unobserved variables (Byrne, 1998). The measurement models representing the two-factor and three-factor models of goal orientation are shown in Figures 1 and 2. As shown in these figures, the two-factor model of goal orientation is represented by 16 items reflecting learning goal and performance goal orientations, while the three-factor model is represented by 13 items reflecting learning goal, performance prove and performance avoid goal orientations. The measurement properties for each model of goal orientation were examined using confirmatory factor analysis (CFA). Factor analysis allows us to examine the relationship between a set of observed variables (indicators/items) and the underlying constructs (Byrne, 1998). A confirmatory factor analysis examines the amount the variance and covariance among a set of observed variables and assesses how well the *a priori* model fits the sample data. In the confirmatory factor analysis, several parameters were estimated including the factor loadings, factor variances, error variances, and

covariances. These parameter estimates were based on the number of indicators (i.e., items) for each underlying construct (i.e., factor). In general, a confirmatory factor analysis is used to examine the factor structure against a null model with zero covariances between items (Bentler & Bonnett, 1980) and a baseline model of a single factor. Given the relative distinctiveness (i.e., non-equivalence) among the indicators across the two measurement models of goal orientation, a series of nested models were tested to examine model fit. A *within-model* analysis was conducted for 2-factor and 3-factor models, respectively. Across both models, the *a priori* models were examined against several competing models including a null model and a baseline model reflecting a single factor. Additionally, the *a priori* three-factor model was assessed as a two-factor model with LGO_v and the two performance goal dimensions - $PPGO_v$ and $PAGO_v$ - loading on a single factor. These models were evaluated with several fit indices to assess overall model fit.

Multiple fit indices were used to assess the best fitting model for the two-factor and three-factor models of goal orientation, respectively. Model fit was assessed with the following indices: (1) chi-square (χ^2) statistic, which was evaluated with a χ^2 difference test across each of the models for significance and overall fit. In addition, a chi-square (χ^2) divided by degrees of freedom, a more informal test of model fit, was evaluated against a recommended level of 2.0 for adequate fit (Hatcher, 1994); (2) the root mean square error of approximation (RMSEA) which is a measure of average standardized residuals per degree of freedom; a value of .08 indicates a relatively good fit, while values close to .10 are considered fair (Browne & Cudeck, 1993); (3) standardized root mean square residual (SRMR) provides information about the total average deviation in the variance/covariance matrix; a value of .05 is considered a good fit, while values up to .08 are considered fair (Hu & Bentler, 1999); (4) the goodness of fit index (GFI) is an

index of the relative amount of observed variances and covariances among the variables accounted for by the measurement model; (5) the non-normed fit index (NNFI) and the comparative fit index (CFI) are comparative indices that contrast a hypothesized model against an absolute null model that proposes that all indicators are uncorrelated. Values for the GFI, NNFI, and CFI were evaluated based on recommendations that these values exceed .90 to indicate relatively good fit (Hatcher, 1994). These fit indices were examined to assess the comparative best overall model fit supporting the dimensionality of goal orientation.

Nomological Network

The specific hypotheses for goal orientation nomological relationships with several correlates including generalized self-efficacy, locus of control, emotional stability, and self-esteem, need for achievement, fear of negative evaluation, and social desirability were examined with a bivariate correlation analysis using SPSS 11.0.

Figure 1. Measurement Model - 2-Factor Model (Button, Mathieu & Zajac, 1996)
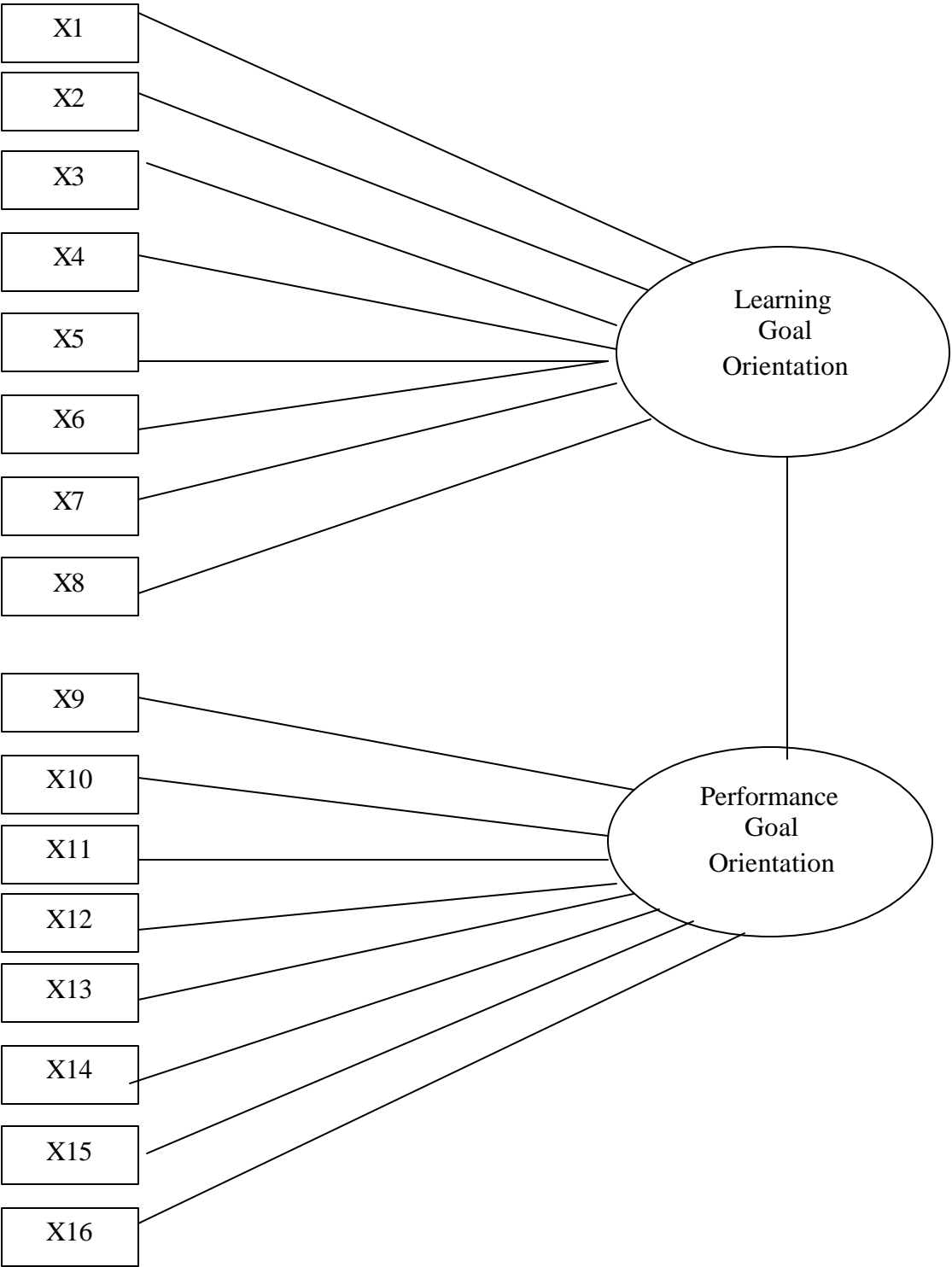
Figure 2. Measurement Model – 3-Factor Model (VandeWalle, 1997)
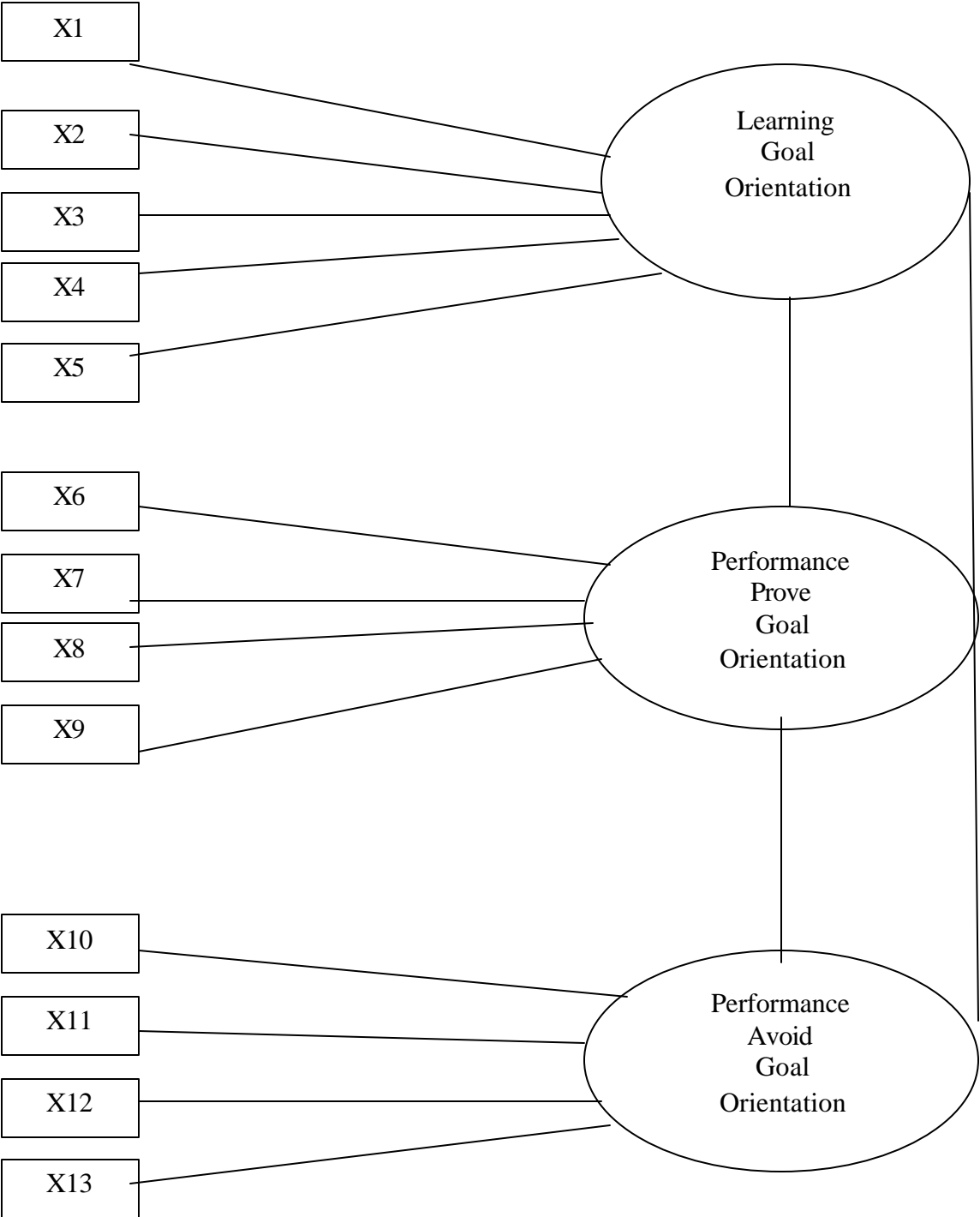
Chapter 4

Results

The primary purpose of this study was to examine two alternative models of goal orientation. Each of the models was examined across student and employee samples. Given that two samples were drawn to conduct the measurement model analyses, the results are presented as follows: 2-factor model student sample, 2-factor model employee sample, 3-factor model student sample, and 3-factor model employee sample. In addition, test-retest stabilities of the goal orientation scales are discussed. Finally, the results of hypothesis testing of the nomological relationships across both models are discussed.

Measurement Model Analyses

2-Factor Model - Student Sample

The descriptive statistics and correlations among goal orientation indicators and composite variables are reported in Table 9. As shown in the table, both LGO_b and PGO_b scales reflect above average scores with means of 38.77 and 38.62 out of 48, respectively. These findings suggest that range restriction exists with scores restricted to the high end of LGO_b and PGO_b scales. In addition, both scales reflect a negative skewness among the individual items and composite scales. The correlation between LGO_b and PGO_b is r=.08, reflecting a relatively weak correlation among the dimensions of goal orientation. When examining individual scale items, none of the items exceed a .20 correlation with the opposing scale (e.g., LGO_b items with PGO_b items).

Table 9

Descriptive statistics and correlations of goal orientation variables – 2-Factor Model, Student Sample

Variable	N	M^a	SD	Skewness	Kurtosis	Correlation with LGO_b	Correlation with PGO_b
LGO1	314	4.78	.87	-1.194	2.836	.76	.01
LGO2	314	5.09	.83	-1.08	1.92	.69	.16
LGO3	314	4.55	.82	-.38	.245	.64	-.05
LGO4	314	5.14	.72	-.470	-.099	.67	.03
LGO5	314	4.55	.90	-.382	.026	.64	-.01
LGO6	314	5.12	.80	-.895	1.264	.71	.18
LGO7	314	5.18	.77	-.876	1.199	.70	.11
LGO8	314	4.36	1.02	-.493	.297	.64	.02
PGO1	314	5.11	.95	-.991	.596	-.01	.64
PGO2	314	4.64	1.06	-.535	.000	-.15	.71
PGO3	313	4.79	.99	-.673	.214	-.02	.61
PGO4	314	4.59	1.08	-.850	.759	.17	.56
PGO5	314	5.12	.91	-1.716	6.018	.16	.61
PGO6	314	4.51	.93	-.610	.505	.02	.60
PGO7	314	4.76	.79	-.258	-.091	.07	.72
PGO8	314	5.09	.83	-.739	.463	.17	.53
LGO	314	38.77	4.56	-.819	1.421	-	.08
PGO	313	38.62	4.69	-.280	-.124	.08	-

Note. LGO=learning goal orientation; PGO=performance goal orientation; N=sample size; M=mean; SD=standard deviation ^{a}Min/Max scores for indicator variables range from 1 to 6, while scores for the composite scales range from 8 to 48.

The results of the measurement model analysis are reported in Table 10. The goodness-of-fit indices support the 2-uncorrelated factors model as the best fitting model (χ^2=319.78; df=104) compared to the null (χ^2=2466.62; df=120) and the single factor model (χ^2=750.12; df=104). The χ^2 difference test exceeds the critical value of 1.96 to reject both the null and single factor models and accept the 2-factor model as the best fitting model. Support for the uncorrelated factors model is further evidenced by the relatively weak correlation (r=.08) between and LGO_b and PGO_b factors. The CFI, GFI, and NNFI fit indices reveal a better fit for the 2-uncorrelated factors model with values of .91, .89, and .88, respectively. With the exception of the NNFI, each of these values exceeds the recommended .90 level. The RMSEA and SRMR values of .09 further supports the 2-factor model as the best fit to the data. The final measurement model is presented in Figure 3.

Table 10

Goodness of Fit Tests for 2-Factor Model – Student Sample

Model	χ^2	df	χ^2/df	RMSEA	SRMR	CFI	NNFI	GFI
Null Model	2466.62	120	20.55					
Model 1: Single Factor Model	750.12	104	7.2	.18	.15	.72	.68	.69
Model 2: 2-Factor Model	319.78	104	3.07	.09	.09	.91	.89	.88
Null vs. Model 1	1716.50							
Null vs. Model 2	2146.84							
Model 1 vs. Model 2	430.34							

Note. χ^2=chi-square; df=degrees of freedom; RMSEA=root mean square error of approximation; SRMR=standardized root mean square residual; CFI=comparative fit index; NNFI=non-normed fit index; GFI=goodness of fit index.

Figure 3. Measurement Model for the 2-Factor Model, Student Sample
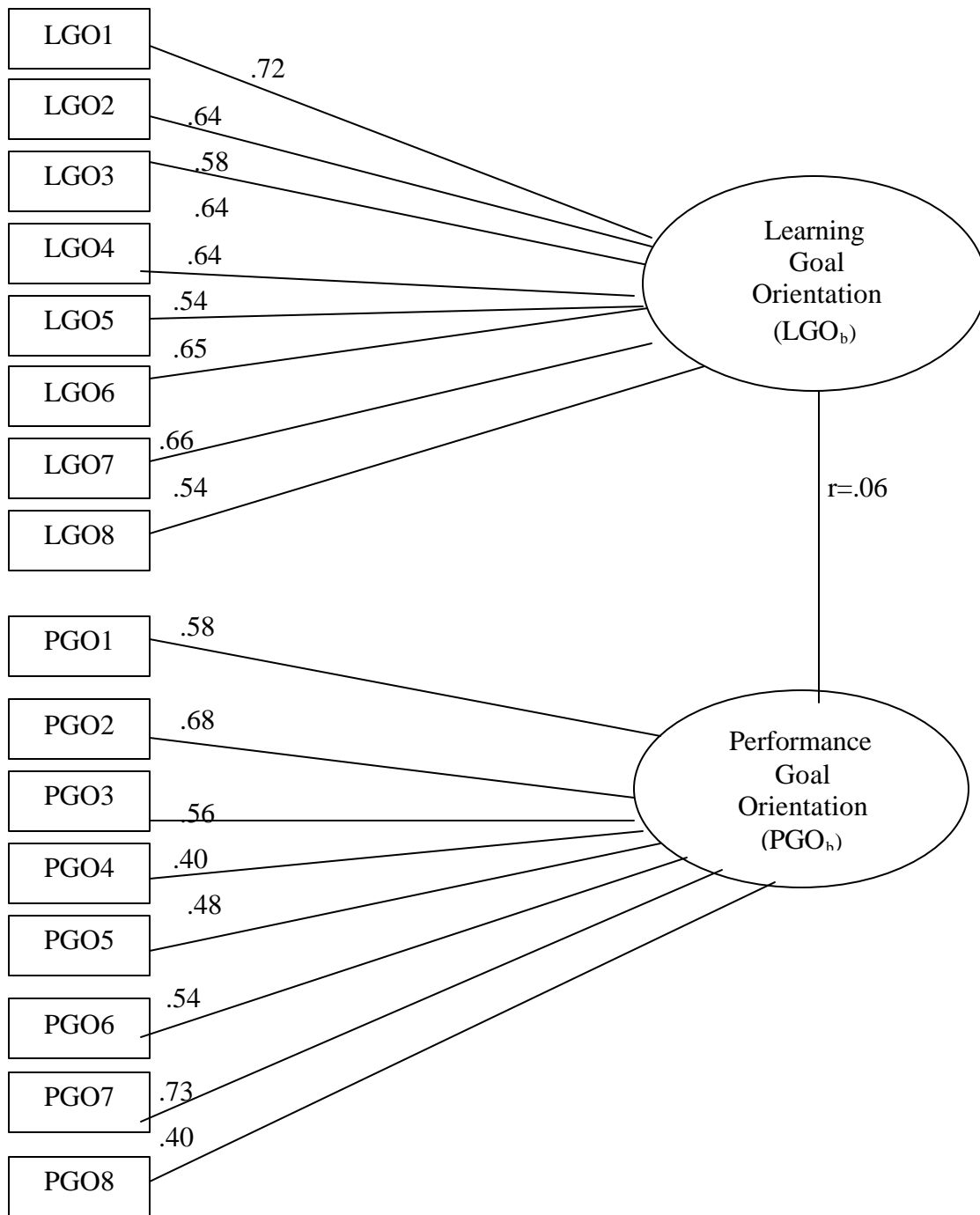
A more detailed analysis of the measurement model including standardized factor loadings, indicator and composite reliabilities, error variances and factor variances are reported in Table 11. The standardized factor loadings for the LGO_b factor exceed the recommended .60 level (Hatcher, 1994), with the exception of items 3, 5, and 8, which fall slightly below .60. The standardized loadings for the PGO_b reveal that six of the eight loadings falling below the .60 level. The factor loadings for items 4, 5, and 8 are markedly lower with values less than .50, indicating weaker representations of the underlying latent factor. The variance extracted for each factor is .39 and .31 for LGO_b and PGO_b, respectively. These values fall below the recommended .50 level (e.g., Fornell & Larcker, 1981; Streiner, 1994), which suggests that a larger amount of variance is attributed to measurement error rather than the latent constructs. Thus, while the 2-factor model results in adequate fit to the data, a closer examination of the measurement properties reveal some weaknesses in several of the items assessing PGO_b.

The measurement issues associated with the goal orientation scales are further highlighted in the inter-item correlations among LGO_b and PGO_b indicator variables that are reported in Table 12. The inter-item correlations for LGO_b indicators range from .25 to .58, with the weakest relationships reflected in LGO8. The inter-item correlations among the PGO_b items range from .12 to .50, with the weakest relationships found for items PGO4, PGO5, and PGO8. Specifically, these items include "The opinions others have about how well I do certain things are important to me", "I feel smart when I do something without making any mistakes", and "I feel smart when I can do something better than most other people" for PGO4, PGO5, and PGO8, respectively. These items appear to tap more affective feelings and referent others compared to the other items on the scale. Among these items, several correlations are below .20 revealing a relatively weak inter-correlation among items assessing the same construct. In summary, while

support was found for the *a priori* 2-factor model, these findings highlight several measurement

issues including items with low inter-correlations and factor loadings.

Table 11

Measurement Properties of the 2-Factor Measurement Model – Student Sample

Construct/Indicator	Standardized Loading	t-value	Composite[a]/Indicator Reliability[b]	Error Variance[c]	Variance Extracted[d]
LGO_b			.83[a]		.39
V1	.72	13.57	.52	.48	
V2	.64	11.80	.41	.59	
V3	.58	10.33	.34	.66	
V4	.64	11.68	.41	.59	
V5	.54	9.53	.29	.71	
V6	.65	12.02	.42	.58	
V7	.66	12.27	.44	.56	
V8	.54	9.45	.29	.71	
PGO_b			.77[a]		.31
V1	.58	10.17	.34	.66	
V2	.68	12.36	.46	.54	
V3	.56	9.69	.31	.79	
V4	.40	6.61	.16	.84	
V5	.48	8.11	.23	.77	
V6	.54	9.28	.29	.71	
V7	.73	13.45	.53	.47	
V8	.40	6.57	.16	.84	

Note. [a]Composite reliability is the alpha reliability for the scale. [b]Indicator reliability equals the square the standardized factor loading. [c]Error variance is 1 minus the indicator reliability. [d]Variance extracted is the amount of variance captured by the underlying factor in relation to the amount of variance due to measurement error (Fornell & Larcker, 1981; Streiner, 1994).

Table 12

Inter-item correlations of goal orientation indicators – 2-Factor model, Student Sample

Variable	M	SD	LG1	LG2	LG3	LG4	LG5	LG6	LG7	LG8	PG1	PG2	PG3	PG4	PG5	PG6	PG7	PG8
LG1	4.78	.87	-															
LG2	5.09	.83	.50	-														
LG3	4.55	.82	.45	.30	-													
LG4	5.14	.72	.40	.32	.49	-												
LG5	4.55	.90	.47	.36	.37	.31	-											
LG6	5.12	.80	.45	.57	.30	.37	.31	-										
LG7	5.18	.77	.41	.38	.36	.58	.30	.44	-									
LG8	4.35	1.02	.42	.32	.27	.31	.25	.36	.41	-								
PG1	5.12	.96	-.04	.04	-.10	.01	-.04	.09	.04	-.05	-							
PG2	4.64	1.06	-.17	.02	-.22	-.14	-.14	.02	-.10	-.08	.44	-						
PG3	4.79	.99	-.06	.02	-.04	-.11	.001	.10	-.04	-.008	.39	.44	-					
PG4	4.59	1.08	.13	.19	.14	.11	.06	.13	.12	.07	.22	.24	.12	-				
PG5	5.12	.91	.10	.21	-.001	.16	.04	.17	.18	.03	.22	.28	.22	.34	-			
PG6	4.51	.93	-.02	.05	-.002	.014	-.08	.03	.08	.05	.30	.42	.22	.28	.20	-		
PG7	4.76	.78	.03	.14	-.05	.05	.02	.16	.11	-.04	.40	.50	.42	.26	.36	.42	-	
PG8	5.09	.83	.11	.15	.02	.07	.10	.20	.20	.12	.22	.13	.22	.26	.44	.18	.31	-

Note. LG=learning goal orientation; PG=performance goal orientation; M=mean; SD=standard deviation.

2-Factor Model - Employee Sample

The descriptive statistics and correlations among goal orientation indicator and composite variables for the employee sample are reported in Table 13. As shown in the table, both LGO_b and PGO_b items and composite scales reflect scores that are restricted to the high end of the scales with mean values of 42.00 and 37.81 out of 48 for LGO_b and PGO_b, respectively. The distributional properties reflecting a negative skewness suggest that participants reflect higher agreement with both LGO_b and PGO_b dimensions. An examination of the correlations between indicators and the LGO_b and PGO_b scales reveal that several items have moderate correlations (i.e., $>.20$) with the opposing scale. In addition, the LGO_b and PGO_b factors reflect a moderate relationship ($r=.24$). This finding is in contrast to the findings of the student sample where LGO_b and PGO_b were unrelated. However, this finding must be interpreted with caution given the relatively low sample size in the employee sample ($N=116$). While most researchers suggest a minimum sample size of at least 200 for analysis of measurement models (e.g. Hatcher, 1994; Hoelter, 1983), this sample falls below the recommended level.

Table 13

Descriptive statistics and correlations among goal orientation variables – 2-Factor Model,
Employee Sample

Variable	N	M[a]	SD	Skewness	Kurtosis	Correlation with LGO	Correlation with PGO
LGO1	116	5.16	.96	-2.38	9.255	.71	.07
LGO2	116	5.29	.86	-2.136	7.397	.77	.19
LGO3	116	5.11	.85	-1.504	4.730	.79	.16
LGO4	116	5.47	.84	-2.975	12.839	.84	.31
LGO5	116	4.98	.98	-2.066	7.368	.74	.14
LGO6	116	5.33	.98	-3.043	12.680	.78	.21
LGO7	116	5.43	.88	-1.990	6.474	.81	.28
LGO8	116	5.22	.89	-1.987	6.104	.65	.14
PGO1	116	4.69	1.44	-1.216	.917	-.01	.66
PGO2	116	4.47	1.54	-.967	.119	.00	.67
PGO3	116	4.97	1.24	-1.425	1.706	.22	.69
PGO4	116	4.86	1.27	-1.210	1.131	.37	.55
PGO5	116	4.84	1.21	-1.240	1.519	.23	.65
PGO6	116	4.78	1.17	-1.061	.877	.28	.69
PGO7	116	4.88	1.05	-1.092	1.388	.17	.75
PGO8	116	4.31	1.47	-.670	-.555	.12	.67
LGO	116	42.00	5.49	-2.994	14.151	-	.24
PGO	116	37.81	6.89	-1.272	2.886	.24	-

Note. LGO=learning goal orientation; PGO=performance goal orientation; N=sample size;
M=mean; SD=standard deviation. [a]Min/Max scores for indicator variables range from 1 to 6,
while scores for the composite scales range from 8 to 48.

The results of the measurement model analysis for the employee sample are reported in Table 14. The goodness-of-fit indices support the 2-factor model as the best fitting model (χ^2=212.13, *df*=103) compared to the null model (χ^2=1557.94, *df*=120) and the single factor model (χ^2=392.90, *df*=104). The 2-factor model is a correlated factors model reflecting a moderate relationship (r=.24) between the LGO_b and PGO_b. The CFI, GFI, and NNFI values of .91, .91, and .83 respectively provide support for the 2-factor model as the most adequate fit to the data. Additionally, the RMSEA of .08 and SRMR of .09 further support the 2-factor model as an adequate fit to the data. While the goodness-of-fit indices support the 2-factor model as the best fitting model, it is contrary to the *a priori* model and the results of the student sample analysis supporting LGO_b and PGO_b as unrelated constructs. However, these contradictory findings have been found in prior research where varying levels of LGO_b and PGO_b have been reported ranging from .24 to .52 (e.g., Jagacinski & Duda, 1992; Kozlowski et al., 2001). The final measurement model for the employee sample is reported in Figure 4.

Table 14

Goodness of Fit Tests for 2-Factor Model, Employee Sample

Model	χ^2	df	χ^2/df	RMSEA	SRMR	CFI	NNFI	GFI
Null model	1557.94	120	12.98					
Model 1								
Single factor model	392.90	104	3.78	.19	.16	.80	.77	.64
Model 2b:								
2-Factor Model	212.13	103	2.06	.08	.09	.92	.91	.83
Null vs. Model 1	1165.04							
Null vs. Model 2	1345.81							
Model 1 vs. Model 2	180.77							

Note. χ^2=chi-square; df=degrees of freedom; RMSEA=root mean square error of approximation; SRMR=standardized root mean square residual; CFI=comparative fit index; NNFI=non-normed fit index; GFI=goodness of fit index.

Figure 4. Measurement Model for the 2-Factor, Employee Sample
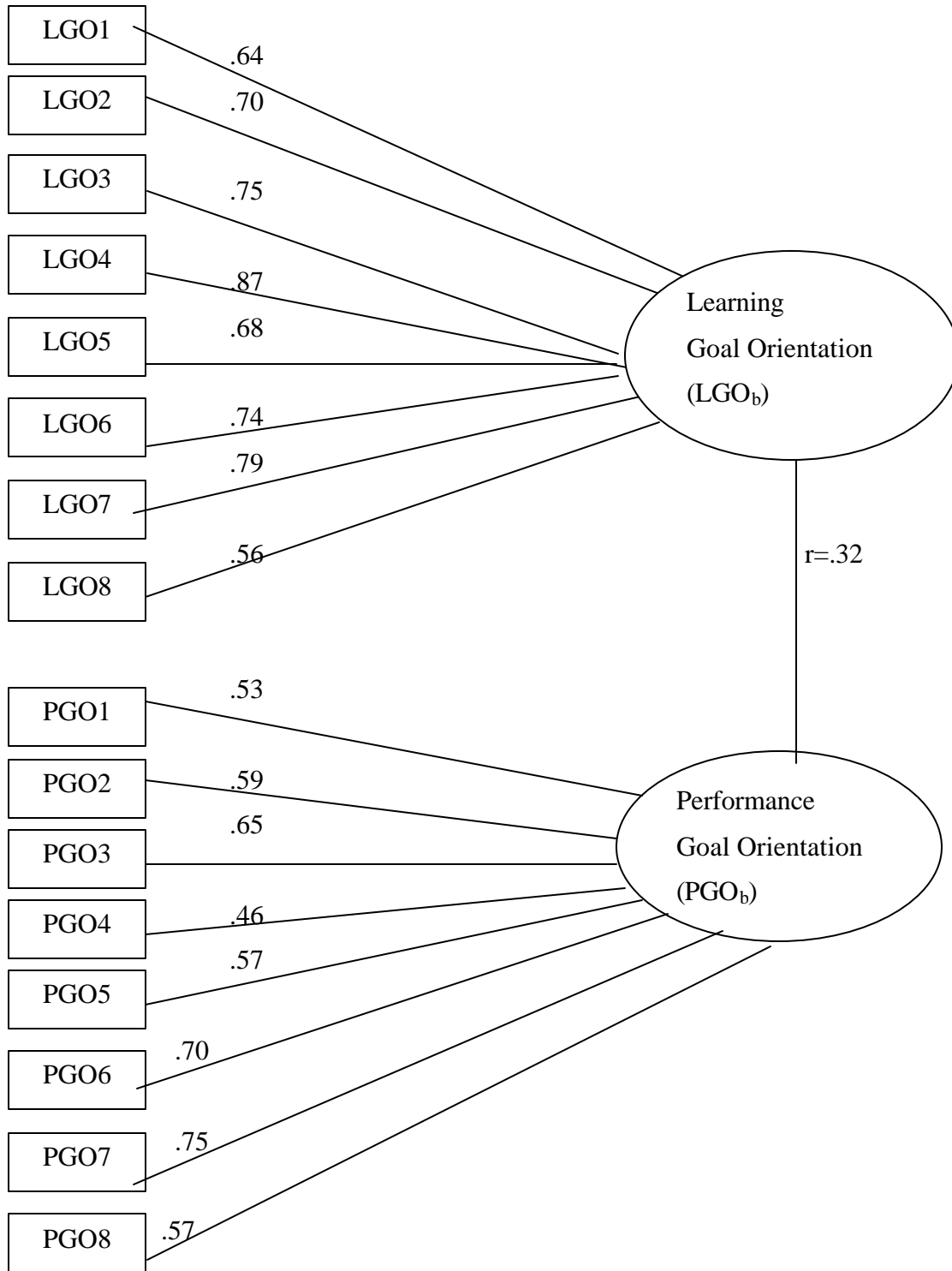
A closer examination of the measurement properties of the 2-factor model including standardized factor loadings, indicator and composite reliabilities, error variances, and factor variances are reported in Table 15. The standardized factor loadings for the LGO_b scale reveal that all but one of the factor loadings (LGO8) exceeds the .60 recommended level. The findings for PGO_b reveal that five of the loadings are below the recommended .60 level (e.g., PGO1, PGO2, PGO4, PGO5, and PGO8), although some of the indicators fall only slightly below this level. The factor variances are .52 and .37 for LGO_b and PGO_b, respectively. While LGO_b exceeds the recommended .50, the PGO_b factor variance of .37 indicates that the variance attributed to measurement error is greater than the variance attributed to the underlying latent construct. These findings further highlight the potential measurement weaknesses for the PGO_b scale.

The inter-item correlations among goal orientation indicator variables are reported in Table 16. The inter-item correlations for LGO_b indicators range from .35 to .61, while the inter-item correlations between PGO_b indicators range from .18 to .56. Several of the inter-correlations for PGO4, PGO5, and PGO8 are below .25. These findings are consistent with same level of relationships found in the student sample. While the employee sample yields different results than the student sample, these findings must be interpreted with caution given the low sample size in the employee sample (N=116). Generally a sample size of N=200 is recommended for confirmatory factor analysis (Hatcher, 1994; Hu & Bentler, 1999). It may be that the smaller than desired sample was insufficient to adequately assess the model.

Table 15

Factor Loadings and Standard Errors for the 2-Factor Model, Employee Sample

Construct/Indicator	Standardized Loading	t-value	Composite[a]/Indicator Reliability[b]	Error Variance[c]	Variance Extracted[d]
LGO$_b$			.89[a]		.52
V1	.64	7.36	.41	.59	
V2	.70	8.23	.49	.51	
V3	.75	9.13	.56	.44	
V4	.87	11.31	.76	.24	
V5	.68	7.92	.46	.54	
V6	.74	8.91	.55	.45	
V7	.79	9.81	.62	.38	
V8	.56	6.20	.31	.69	
PGO$_b$			.81[a]		.37
V1	.53	5.60	.28	.72	
V2	.59	6.38	.35	.65	
V3	.65	7.23	.42	.58	
V4	.46	4.82	.21	.79	
V5	.57	6.14	.32	.68	
V6	.70	7.95	.49	.51	
V7	.75	8.70	.56	.44	
V8	.57	6.08	.32	.68	

Note. [a]Composite reliability is the alpha reliability for the scale. [b]Indicator reliability equals the square the standardized factor loading. [c]Error variance is 1 minus the indicator reliability. [d]Variance extracted is the amount of variance captured by the underlying factor in relation to the amount of variance due to measurement error (Fornell & Larcker, 1981; Streiner, 1994).

Table 16

Inter-item correlations for 2 Factor model of Goal Orientation – Employee Sample

Variable	M	SD	LG1	LG2	LG3	LG4	LG5	LG6	LG7	LG8	PG1	PG2	PG3	PG4	PG5	PG6	PG7	PG8
LG1	5.16	.96	-															
LG2	5.29	.86	.45	-														
LG3	5.11	.85	.54	.53	-													
LG4	5.47	.84	.53	.56	.70	-												
LG5	4.98	.98	.38	.58	.48	.58	-											
LG6	5.33	.98	.50	.54	.58	.61	.53	-										
LG7	5.43	.88	.54	.50	.60	.74	.51	.59	-									
LG8	5.22	.89	.35	.52	.42	.42	.41	.38	.48	-								
PG1	4.69	1.44	.04	-.02	-.08	.07	-.13	-.04	.03	.08	-							
PG2	4.47	1.54	-.05	.04	-.03	.04	.005	-.03	-.03	.06	.45	-						
PG3	4.97	1.24	.08	.16	.18	.31	.14	.17	.24	.05	.46	.41	-					
PG4	4.86	1.27	.13	.33	.32	.29	.29	.32	.35	.21	.19	.23	.18	-				
PG5	4.84	1.21	.07	.17	.24	.29	.13	.16	.25	.12	.21	.20	.26	.48	-			
PG6	4.78	1.17	.08	.17	.15	.31	.20	.29	.31	.19	.24	.45	.53	.36	.43	-		
PG7	4.88	1.05	.03	.12	.07	.20	.14	.19	.19	.10	.39	.52	.45	.31	.40	.56	-	
PG8	4.31	1.47	.03	.07	.06	.18	.07	.12	.21	-.03	.44	.22	.40	.25	.55	.24	.44	-

Note. LG=learning goal orientation; PG=performance goal orientation; M=mean; SD=standard deviation

The 2-factor model of goal orientation across student and employee samples resulted in mixed findings. Across both samples, LGO_b and PGO_b scales reflect higher mean scores, are negatively skewed, and represent an adequate model fit to the data. The factor loadings for LGO_b factors are generally within an acceptable level, while PGO_b reflects lower than recommended factor loadings. However, inconsistencies exist concerning the relationship between learning goal and performance goal factors, ranging from r=.08 to r=.24. The findings were also mixed concerning the amount of variance explained by the factors but are consistently low for PGO_b. The low level of inter-correlations among PGO_b scale items and low factor loadings suggest that some items in the PGO_b scale may not be appropriately capturing the latent construct.

3-Factor Model - Student Sample

The descriptive statistics and correlations among goal orientation indicator and composite variables are reported in Table 17. As shown in the table, both LGO_v and $PPGO_v$ scales reflect above average scores, means of 23.06 out of 30 and 16.71 out of 24, respectively. Participants report weaker associations for performance avoid goal orientation ($PAGO_v$), with a mean score of 13.68 out of 24. These findings are also reflected in the negative skewness of LGO_v and $PPGO_v$ scales, and to a lesser extent $PAGO_v$. An examination of the individual scale items reveals that LGO_v items are unrelated to $PPGO_v$ and negatively related to $PAGO_v$ items. The $PPGO_v$ and $PAGO_v$ items reflect moderate correlations ranging from .24 to .34. The overall scales reflect similar relationships with LGO_v positively related to $PPGO_v$ (r=.11) and negatively related to $PAGO_v$ (r=-.33), while $PPGO_v$ and $PAGO_v$ are positively related (r=.37). These relationships are similar to prior research reflecting correlated dimensions within the 3-factor model (Dobbins et al., 2002; VandeWalle, 1997).

Table 17

Descriptive statistics and correlations among the 3-factor Model, Student sample

Variable	N	M	SD	Skewness	Kurtosis	Correlation with LGO_v	Correlation with $PPGO_v$	Correlation with $PAGO_v$
LGO1	314	4.68	.77	-.195	.346	.76	.01	-.27
LGO2	314	4.69	.83	-.360	-.026	.78	.10	-.24
LGO3	314	4.65	.74	-.240	.103	.80	.06	-.27
LGO4	314	4.53	.79	-.056	-.005	.75	.04	-.30
LGO5	314	4.62	.84	-.436	.428	.73	.19	-.19
PPGO1	314	4.04	1.23	-.407	-.274	.13	.78	.25
PPGO2	314	3.86	1.19	-.287	-.305	.07	.83	.34
PPGO3	314	4.51	1.09	-.814	1.086	.03	.76	.26
PPGO4	314	4.31	1.09	-.541	.118	.11	.83	.34
PAGO1	314	3.53	1.09	-.03	.463	-.21	.34	.78
PAGO2	314	2.95	1.06	.492	-.360	-.34	.30	.79
PAGO3	314	3.49	1.13	-.043	-.468	-.23	.29	.85
PAGO4	314	3.71	1.09	-.249	-.407	-.28	.23	.79
LGO	314	23.06	3.03	-.146	.137	-		
PPGO	314	16.71	3.68	-.392	.000	.11	-	
PAGO	314	13.68	3.50	.220	-.392	-.33	.37	-

Note. LGO=learning goal orientation; PPGO=performance prove goal orientation; PAGO=performance avoid goal orientation; N=sample size; M=mean; SD=standard deviation. [a]Min/Max scores for indicator variables range from 1 to 6, while scores for the composite scales range from LGO, 5-30; PPGO, 4-24, and PAGO, 4-24.

The results of the measurement model analyses are reported in Table 18. The goodness-of-fit indices support the 3-correlated factors model as the best fitting model (χ^2=177.48; *df*=62) compared the null model (χ^2=2394.0; *df*=78) and the single factor model (χ^2=901.78; *df*=65). The χ^2 difference test exceeds the critical value of 1.96 to reject the null model and accept the 3-factor model as the best fitting model. The 3-factor model also reveals a better fit than a 2-factor model (χ^2=483.05; *df*=64). Support for the 3-factor model as correlated factors is further evidenced by the level of inter-correlations of LGO_v with $PPGO_v$ and $PAGO_v$ of .11 and -.33, respectively. The $PPGO_v$ and $PAGO_v$ scales correlate .37. The goodness-of-fit indices further support the 3-factor model with CFI, GFI, and NNFI values of .95, .94, and .92, respectively. Each of these values exceed the .90 level indicative of adequate model fit to the data. The RMSEA and SRMR values of .08 and .05, respectively, also reveal an adequate fit of the model with the data. The final measurement model for the 3-factor model is presented in Figure 5.

Table 18

CFA and Goodness of Fit Results for the 3-Factor Model – Student Sample

Models/Comparisons	χ^2	df	χ^2/df	RMSEA	SRMR	CFI	NNFI	GFI
Null model	2394.0	78	30.69					
Model 1: single factor	901.78	65	13.87	.25	.19	.64	.57	.60
Model 2: 2-Factor Model	483.05	64	7.55	.17	.13	.82	.78	.77
Model 3: 3-Factor Model	177.48	62	2.86	.08	.05	.95	.94	.92
Null vs. Model 1	1492.22							
Null vs. Model 2	1910.95							
Null vs. Model 3	2216.52							
Model 1 vs. Model 2	418.73							
Model 2 vs. Model 3	305.59							

Note. χ^2=chi-square; *df*=degrees of freedom; χ^2 difference test; RMSEA=root mean square error of approximation; SRMR= CFI=comparative fit index; NNFI=non-normed fit index; GFI=goodness of fit index.

Figure 5. Measurement Model results for the 3-Factor Model – Student Sample
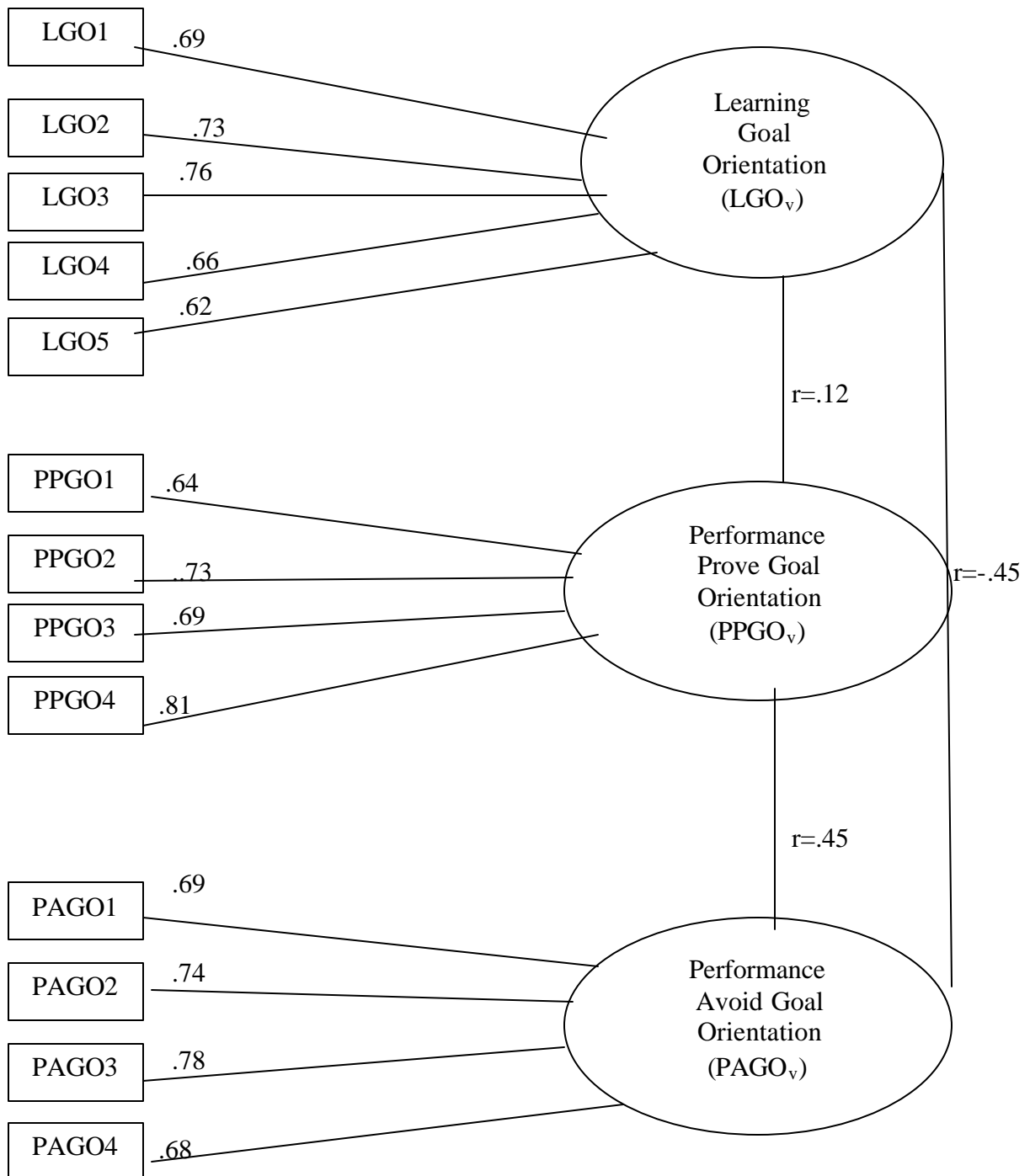
The measurement properties of the 3-factor model of goal orientation including standardized factor loadings, indicator and composite reliabilities, error variances and factor variances are reported in Table 19. The standardized factor loadings for all factors exceed the .60 recommended level. The variance extracted for each factor of .48, .52 and .53 for LGO_v, $PPGO_v$, and $PAGO_v$, respectively. With the exception of LGO_v, all factor variances exceed .50 (e.g., Fornell & Larcker, 1981) with LGO_v falling only slightly below this level with a variance of .48. The finding of relatively strong factor variances indicate that a significant amount of variance in the goal orientation scales may be attributed to the latent construct.

The inter-item correlations among LGO_v and $PPGO_v$ and $PAGO_v$ indicator variables are reported in Table 20. The inter-item correlations for LGO_v indicators range from .39 to .58, $PPGO_v$ correlations range from .36 to .66, and $PAGO_v$ correlations range from .43 to .61. These relationships reflect moderate to strong correlations among indicators variables expected to tap the latent construct and further support the measurement model.

Table 19

Factor Loadings, Reliabilities and Errors for the 3-Factor Model, Student Sample

Construct/Indicator	Standardized Loading	t-value	Composite[a]/Indicator Reliability[b]	Error Variance[c]	Variance Extracted[dc]
LGO$_v$			.82[a]		.48
V1	.69	12.93	.48	.52	
V2	.73	13.71	.53	.47	
V3	.76	14.64	.58	.42	
V4	.66	12.08	.44	.56	
V5	.62	11.14	.38	.62	
PPGO$_v$			.81[a]		.52
V1	.64	11.63	.41	.59	
V2	.73	13.66	.53	.47	
V3	.69	12.80	.48	.52	
V4	.81	15.82	.66	.34	
PAGO$_v$			.81[a]		.53
V1	.69	12.75	.48	.52	
V2	.74	14.12	.55	.45	
V3	.78	15.17	.61	.39	
V4	.68	12.59	.46	.54	

Note. [a]Composite reliability is the alpha reliability for the scale. [b]Indicator reliability equals the square the standardized factor loading. [c]Error variance is 1 minus the indicator reliability. [d]Variance extracted is the amount of variance captured by the underlying factor in relation to the amount of variance due to measurement error (Fornell & Larcker, 1981; Streiner, 1994).

Table 20

Inter-item correlations among indicator variables, 3-Factor model – Student Sample

Variable	M	SD	LGO1	LGO2	LGO3	LGO4	LGO5	PPGO1	PPGO2	PPGO3	PPGO4	PAGO1	PAGO2	PAGO3	PAGO4
LGO1	4.58	.77	-												
LGO2	4.69	.83	.53	-											
LGO3	4.65	.74	.54	.58	-										
LGO4	4.53	.79	.44	.44	.48	-									
LGO5	4.62	.84	.39	.40	.46	.51	-								
PPGO1	4.04	1.23	.02	.08	.08	.05	.27	-							
PPGO2	3.86	1.19	.01	.09	.07	.003	.09	.63	-						
PPGO3	4.51	1.09	-.02	.05	-.02	.007	.10	.36	.43	-					
PPGO4	4.31	1.09	.02	.12	.05	.05	.16	.46	.55	.66	-				
PAGO1	3.53	1.09	-.16	-.14	-.19	-.20	-.10	.24	.31	.27	.36	-			
PAGO2	2.95	1.06	-.28	-.25	-.26	-.27	-.24	.19	.32	.21	.26	.51	-		
PAGO3	3.49	.13	-.17	-.17	-.18	-.22	-.15	.20	.26	.21	.27	.50	.61	-	
PAGO4	3.71	1.09	-.25	-.21	-.23	-.26	-.13	.17	.19	.17	.21	.50	.43	.58	-

Note. LGO=learning goal orientation; PPGO=performance prove goal orientation; PAGO=performance avoid goal orientation; M=mean; SD=standard deviation.

3-Factor Model - Employee Sample

The descriptive statistics and correlations among goal orientation indicator and composite variables are reported in Table 21. As shown in the table, both LGO_v and $PPGO_v$ scales reflect above average scores with means of 24.66 out of 30 and 16.44 out of 24, respectively. These findings are similar to those found in the student sample. Participants report a lesser association with a performance avoid goal orientation ($PAGO_v$) with a mean score of 11.73 out of 24. The LGO_v and $PPGO_v$ are negatively skewed, while $PAGO_v$ is positively skewed. An examination of the indicator variables (i.e., individual scale items) reveals somewhat stronger correlations of LGO_v with $PPGO_v$ items ranging from .14 to .27, while reflecting negative correlations with $PAGO_v$ items. The $PPGO_v$ and $PAGO_v$ items are positively related with correlations ranging from .19 to .40. The inter-correlations among scales reveal that LGO_v is positively correlated with $PPGO_v$ (r=.27) and unrelated to PAGO (r=-.04). The correlation between $PPGO_v$ and $PAGO_v$ is r=.33. The pattern of relationships is similar to those in previous research and in the student sample in this study, however, the LGO_v and $PAGO_v$ are virtually unrelated with near zero correlations.

Table 21

Descriptive statistics and correlations among the 3-factor goal orientation variables – Employee sample

Variable	N	M[a]	SD	Skewness	Kurtosis	Correlation with LGO	Correlation with PPGO	Correlation with PAGO
LGO1	116	5.16	1.04	-2.280	7.706	.80	.16	-.08
LGO2	116	5.18	.86	-1.526	4.260	.79	.14	-.17
LGO3	116	5.08	.91	-1.728	5.648	.84	.20	-.14
LGO4	116	4.67	1.19	-1.090	.726	.73	.27	.12
LGO5	115	4.57	1.08	-1.096	1.519	.62	.22	.07
PPGO1	116	3.61	1.46	-.132	-1.097	.08	.80	.28
PPGO2	116	4.15	1.43	-.591	-.364	.30	.86	.29
PPGO3	116	4.41	1.33	-.827	.044	.29	.84	.22
PPGO4	116	4.28	1.42	-.427	-1.046	.24	.87	.31
PAGO1	116	3.12	1.44	.052	-.966	.07	.40	.73
PAGO2	116	2.63	1.38	.675	-.349	-.06	.22	.82
PAGO3	116	2.93	1.43	.399	-.760	.03	.24	.85
PAGO4	116	3.05	1.45	.274	-.810	-.15	.19	.79
LGO$_v$	115	24.66	3.82	-1.469	3.990	-		
PPGO$_v$	116	16.44	4.78	-.541	-.655	.27	-	
PAGO$_v$	116	11.73	4.53	.177	-.677	-.04	.33	-

Note. LGO=learning goal orientation; PPGO=performance prove goal orientation; PAGO=performance avoid goal orientation; N=sample size; M=mean; SD=standard deviation.
[a]Min/Max scores for indicator variables range from 1 to 6, while scores for the composite scales range from LGO$_v$, 5-30; PPGO$_v$, 4-24, and PAGO$_v$, 4-24.

The results of the measurement model analyses are reported in Table 22. The goodness-of-fit indices support the 3-factor model as the best fitting model (χ^2=105.70; df=62) compared the null model (χ^2=948.60; df=78) and the single factor model (χ^2=460.77; df=65). The χ^2 difference test exceeds the critical value of 1.96 to reject the null model and accept the 3-factor model as the best fitting model. The goodness-of-fit indices further support the 3-factor model with values for CFI, GFI, and NNFI reveal .95, .94, and .88, respectively. The RMSEA and SRMR values of .07 and .09, respectively, reveal an adequate fit of the data with the model. These findings are similar to those with the student sample resulting in the 3-factor model as the best fitting model. The final measurement model is presented in Figure 6.

Table 22

CFA and Goodness of Fit Results for the 3-Factor Model – Employee Sample

Models/Comparisons	χ^2	df	χ^2/df	RMSEA	SRMR	CFI	NNFI	GFI
Null model	948.60	78	12.16					
Model 1 – single factor	460.77	65	7.08	.28	.23	.55	.45	.54
Model 2: 2-Factor model	232.09	64	3.63	.17	.15	.81	.76	.74
Model 3: 3-Factor model	105.70	62	1.70	.07	.09	.95	.94	.88
Null vs. Model 1	487.83							
Null vs. Model 2	716.51							
Null vs. Model 3	842.90							
Model 1 vs. Model 2	228.68							
Model 1 vs. Model 3	355.07							
Model 2 vs. Model 3	126.39							

Note. N=114; χ^2=chi-square; *df*=degrees of freedom; χ^2 difference test; CFI=comparative fit index; NNFI=non-normed fit index; GFI=goodness of fit index; RMSEA=root mean square error of approximation; SRMR= standardized root means square residual.

Figure 6. Measurement Model results for the 3-Factor Model – Employee Sample
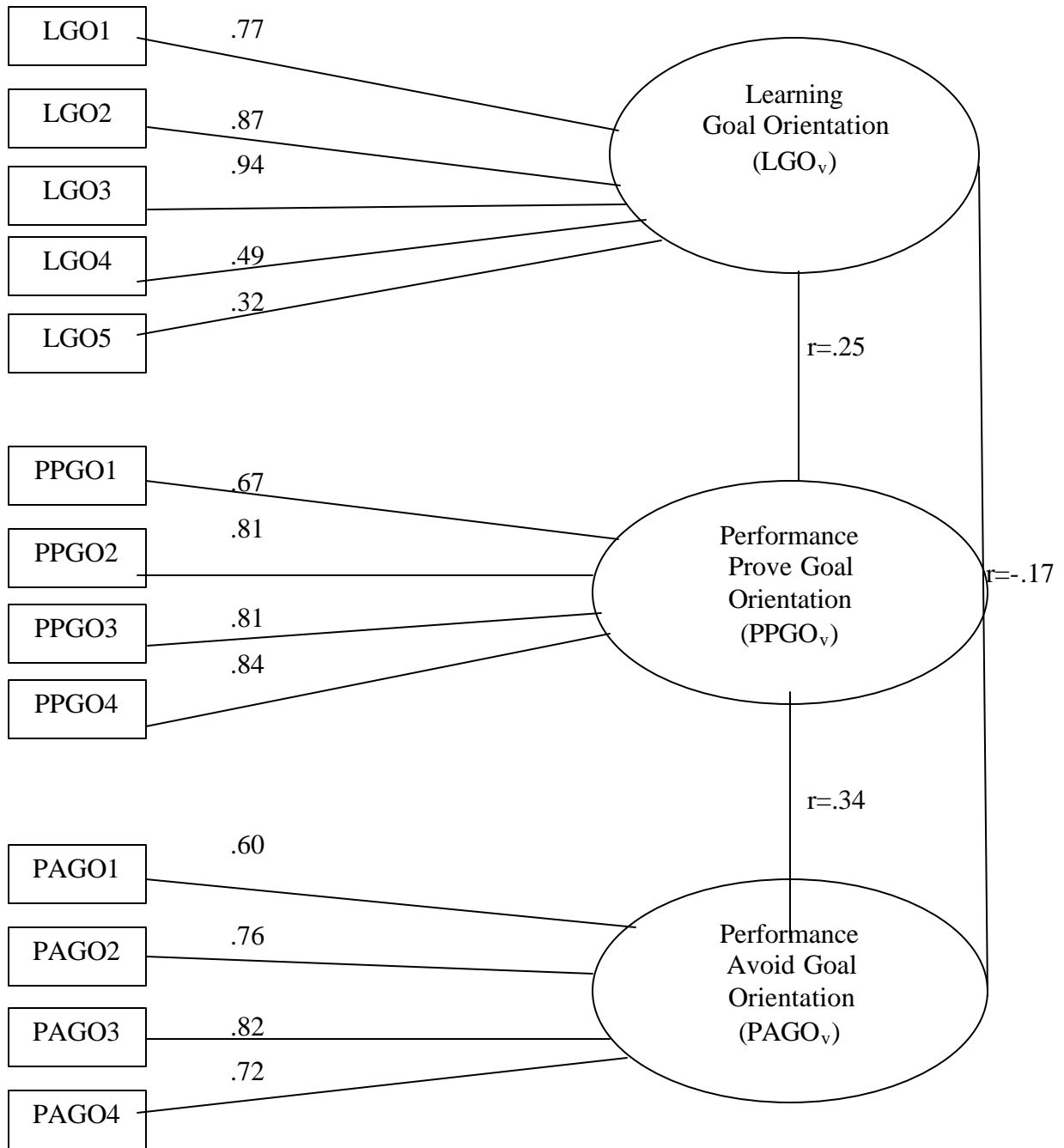
The measurement properties of the 3-factor model of goal orientation including standardized factor loadings, indicator and composite reliabilities, error variances and factor variances are reported in Table 23. The standardized factor loadings for all factors exceed the .60 recommended level, with the exception of LGO5 with a variance of .32. The LGO5 item assesses agreement with the statement, "I prefer to work in situations that require a high level of ability and talent." It is unclear why this item reflects a weaker assessment of LGO in the employee sample. It may reflect the specific tendencies of the participants in this sample who were primarily blue collar workers. The variance extracted for each factor of .51, .62, and .62 for LGO, PPGO, and PAGO, respectively. Each of the factor variances exceed .50 (e.g., Fornell & Larcker, 1981) and indicate moderate to strong representations of the latent construct. While the 3-factor model resulted in the best fit, these findings should be interpreted with caution given the low sample size (N=116) in evaluating the model. A sample size of 200 is considered the minimum level for model testing (Hatcher, 1994; Hoelter, 1983; Hu & Bentler, 1999).

The inter-item correlations among LGO_v and $PPGO_v$ and $PAGO_v$ indicator variables are reported in Table 24. The inter-item correlations for LGO_v indicators range from .28 to .71, with the weakest levels for LGO5. This finding appears consistent with the lower factor loading of .32 for this item. The $PPGO_b$ correlations range from .52 to .68, and PAGO correlations range from .35 to .61. Overall, these relationships reflect moderate to strong correlations among indicators variables expected to tap the latent construct.

Table 23

Factor Loadings, and Errors for the 3-factor Model, Employee sample

Construct/Indicator	Standardized Loading	t-value	Composite[a]/Indicator Reliability[b]	Error Variance[c]	Variance Extracted[d]
LGO$_v$			.80[a]		.51
V1	.77	9.47	.59	.41	
V2	.87	11.35	.76	.24	
V3	.94	12.60	.88	.18	
V4	.49	5.31	.24	.76	
V5	.32	3.39	.10	.90	
PPGO$_v$			.87[a]		.62
V1	.67	7.65	.45	.55	
V2	.81	9.96	.66	.34	
V3	.81	9.83	.66	.34	
V4	.84	10.47	.71	.29	
PAGO$_v$			.81[a]		.62
V1	.60	6.41	.36	.64	
V2	.76	8.67	.58	.42	
V3	.82	9.58	.67	.33	
V4	.72	8.18	.52	.48	

Note. LGO=learning goal orientation; PPGO=performance prove goal orientation; PAGO=performance avoid goal orientation. [a]Composite reliability is the alpha reliability for the scale. [b]Indicator reliability equals the square the standardized factor loading. [c]Error variance is 1 minus the indicator reliability. [d]Variance extracted is the amount of variance captured by the underlying factor in relation to the amount of variance due to measurement error (Fornell & Larcker, 1981; Streiner, 1994).

Table 24

Inter-item correlations among indicator variables – 3-Factor Model, Employee sample

Variable	M	SD	LGO1	LGO2	LGO3	LGO4	LGO5	PPGO1	PPGO2	PPGO3	PPGO4	PAGO1	PAGO2	PAGO3	PAGO4
LGO1	5.16	1.04	-												
LGO2	5.18	.86	.69	-											
LGO3	5.08	.91	.71	.82	-										
LGO4	4.67	1.19	.39	.36	.47	-									
LGO5	4.57	1.08	.29	.25	.28	.44	-								
PPGO1	3.61	1.46	-.05	-.04	.02	.14	.19	-							
PPGO2	4.15	1.43	.21	.22	.21	.25	.22	.55	-						
PPGO3	4.41	1.33	.22	.19	.27	.32	.08	.52	.66	-					
PPGO4	4.28	1.42	.16	.11	.16	.20	.26	.59	.67	.68	-				
PAGO1	3.12	1.44	.03	-.03	.03	.12	.08	.33	.32	.33	.36	-			
PAGO2	2.63	1.38	-.06	-.19	-.11	.08	-.008	.22	.19	.10	.21	.45	-		
PAGO3	2.93	1.43	-.01	-.10	-.11	.14	.13	.14	.22	.20	.24	.51	.61	-	
PAGO4	3.05	1.45	-.22	-.20	-.26	.04	.02	.20	.18	.08	.16	.35	.57	.60	-

Note. LGO=learning goal orientation; PPGO=performance prove goal orientation; PAGO=performance avoid goal orientation; M=mean; SD=standard deviation.

Model Comparisons

A comparison of the *a priori* 2-factor and 3-factor models was examined to assess the extent to which the factors are expected to tap the same latent construct. While the measures of goal orientation associated with both models are not equivalent, they are similar. The level of association between LGO_b and LGO_v (r>.70) suggest that they are equivalent measures of the same latent construct. However, an examination of the PGO_b, $PPGO_v$, and $PAGO_v$ scales reflect moderate relationships but weaker than the learning goal orientation scales. The inter-factor correlations between the scales assessing goal orientation for these two models are reported in Tables 25 and 26. As shown in these tables, the learning goal orientation scales (LGO_b and LGO_v) were highly correlated in both the student and employee samples with positive correlations of r=.71 and r=.73 (p<.01), respectively. The correlation with the performance goal orientation scales (PGO_b, $PPGO_v$, and $PAGO_v$) reveal a mixed pattern of relationships. The PGO_b factor was positively related with $PPGO_v$ and $PAGO_v$ with correlations of r=.35 and r=.41 (p<.01) in the student sample and correlations of r=.46 and r=.40 (p<.01) in the employee sample. These weaker levels of association among the performance goal orientation factors suggests that they are not assessing equivalent constructs.

A comparison of the measurement properties of the 2-factor and 3-factor models is reported in Table 27. Across both samples, LGO_b, PGO_b, LGO_v, and $PPGO_v$ reflect higher mean scores and negative skewness, while participants reported lower agreement with $PAGO_v$. The scales also yield acceptable alpha reliabilities ranging from .77 to .89, reflecting high internal consistency among scale items. Overall factor variances are weakest for the 2-factor model and particularly for PGO_b. Across both samples, the PGO_b factor variances are well below the .50 recommended level with variances of .31 and .37 for student and employee samples,

respectively. These findings suggest that for PGO_b, acceptable alpha reliabilities and model fit statistics can obscure poor measurement properties discussed earlier.

A summary of the model parameters are reported in Table 28. As shown in the table, the 3-factor model of goal orientation results in slightly better overall model fit with higher values for CFI, GFI, and NNFI. In addition, RMSEA and SRMR values are slightly better for the 3-factor model. While the 3-factor model appears to have slightly better fit, the lack of equivalence in these models precludes one from drawing conclusions regarding the superiority of either model. The 3-factor model also has fewer degrees of freedom and thus lower likelihood of disconfirming this model compared to the 2-factor model. These empirical comparisons across these models are useful to examine the summary evidence for *within-model* fit and comparative levels of goodness of fit indices.

Table 25

Inter-factor correlations among 2-Factor and 3-Factor Models - Student Sample

	LGO_b	PGO_b	LGO_v	$PPGO_v$	$PAGO_v$
LGO_b	(.83)				
PGO_b	.08	(.77)			
LGO_v	.71**	-.09	(.82)		
$PPGO_v$	.09	.35**	.11	(.81)	
$PAGO_v$	-.26**	.41**	.33**	.38**	(.81)
M	38.76	38.62	23.06	16.73	13.67
SD	4.57	4.69	3.03	3.68	3.50

Note. N=313. LGO_b=Button et al. learning goal orientation scale; PGO_b=Button et al. performance goal orientation scale; LGO_v=VandeWalle learning goal orientation scale; $PPGO_v$=VandeWalle performance prove goal orientation scale; $PAGO_v$=VandeWalle performance avoid goal orientation scale; M=mean scale scores; SD=standard deviation of scale scores. Reliabilities are reported on the diagonal. **denotes a correlation that is significant at the .01 level.

Table 26

Inter-factor correlations among 2-Factor and 3-Factor Models – Employee Sample

	LGO$_b$	PGO$_b$	LGO$_v$	PPGO$_v$	PAGO$_v$
LGO$_b$	(.89)				
PGO$_b$	.24**	(.81)			
LGO$_v$	.73**	.25**	(.80)		
PPGO$_v$	.08	.46**	.26**	(.87)	
PAGO$_v$	-.12	.40**	-.05	.32**	(.81)
M	41.96	37.75	24.62	16.47	11.68
SD	5.50	6.94	3.82	4.71	4.53

Note. N=114. LGO$_b$=Button et al. learning goal orientation scale; PGO$_b$=Button et al. performance goal orientation scale; LGO$_v$=VandeWalle learning goal orientation scale; PPGO$_v$=VandeWalle performance prove goal orientation scale; PAGO$_v$=VandeWalle performance avoid goal orientation scale; M=mean scale scores; SD=standard deviation of scale scores. Reliabilities are reported on the diagonal. **denotes a correlation that is significant at the .01 level.

Table 27

Descriptive Statistics, Reliabilities, and Factor Variances – 2-Factor Model and 3-Factor Models of Goal Orientation

Student Sample

Construct	N	M	SD	Min/Max	Skewness	Kurtosis	Alpha	Variance
LGO$_b$	314	38.77	4.56	8-48	-.819	1.421	.83	.39
PGO$_b$	313	38.62	4.69	8-48	-.280	-.124	.77	.31
LGO$_v$	314	23.06	3.03	5-30	-.146	.137	.82	.48
PPGO$_v$	314	16.71	3.68	4-24	-.392	.000	.81	.52
PAGO$_v$	314	13.68	3.50	4-24	.220	-.392	.81	.53

Employee Sample

Construct	N	M	SD	Min/Max	Skewness	Kurtosis	Alpha	Variance
LGO$_b$	116	42.00	5.49	8-48	-2.994	-1.272	.89	.52
PGO$_b$	116	37.81	6.89	8-48	-1.272	2.886	.81	.37
LGO$_v$	115	24.66	3.82	5-30	-1.469	3.990	.80	.51
PPGO$_v$	116	16.44	4.78	4-24	-.541	-.655	.87	.62
PAGO$_v$	116	11.73	4.53	4-24	.177	-.677	.81	.53

Note. N=sample size; M=mean; SD=standard deviation; Min/Max=scale range.

Table 28

Model Comparisons - Goodness of Fit –Within Model Comparisons/Across Samples

Fit Statistic	2-Factor Model Uncorrelated (Student sample)	2-Factor Model Correlated (Employee sample)	3-Factor Model Correlated (Student Sample	3-Factor Model Correlated (Employee sample)
N	314	116	314	116
χ^2	319.78	212.13	177.48	105.70
df	104	103	62	62
χ^2/df	3.07	2.06	2.86	1.70
CFI	.91	.92	.95	.95
GFI	.88	.83	.92	.88
NNFI	.89	.91	.94	.94
RMSEA	.09	.08	.08	.07
SRMR	.09	.09	.05	09

Note. χ^2=chi-square; df=degrees of freedom; χ^2 difference test; CFI=comparative fit index; NNFI=non-normed fit index; GFI=goodness of fit index; RMSEA=root mean square error of approximation; SRMR= standardized root means square residual.

Test-Retest Stability

Given the limited research examining the stability of goal orientation scores over time, a test-retest assessment was conducted for goal orientation scales over a 60-day timeframe. Results of the test-retest analysis reveal the following stability coefficients: LGO_b (.55), PGO_b (.66), LGO_v (.56), $PPGO_v$ (.49), and $PAGO_v$ (.75). With the exception of $PAGO_v$, these stability coefficients are somewhat lower than reported in prior goal orientation research (Fisher et al., 1997; VandeWalle, 1997). Performance avoid goal orientation ($PAGO_v$) appeared to be the more stable of the goal orientation constructs. Given that participants in this study reported lower agreement with $PAGO_v$, the finding that their associations with performance avoidance tendencies were low and stable over time was not surprising. However, there was considerable variability in Time 1 and Time 2 assessments of the remaining goal orientation constructs. These findings neither support nor reject the assertion of goal orientation as a stable trait, but suggest that other factors may have influenced the stability of scores over a 60-day timeframe.

Nomological Network – Tests of Hypotheses

The hypotheses tested were drawn from the theoretical framework of goal orientation suggesting differential relationships for learning goal and performance goal orientations with other traits. The hypotheses tested differential relationships for goal orientations and self-esteem, locus of control, generalized self-efficacy, emotional stability, need for achievement, fear of negative evaluation, and social desirability. The results of the hypotheses tested in both student and employee samples are reported in Table 29 and Table 30, respectively.

Hypotheses 1. Support was found for hypothesis 1 that learning goal orientation (LGO_b and LGO_v) was positively related to self-esteem, while the performance goal orientation (PGO_b,

$PPGO_v$, and $PAGO_v$) findings were mixed. As shown in Table 29, LGO_b and LGO_v were positively related with correlations of r=.33 and r=.26 (p<.01), respectively. As expected, PGO_b, $PPGO_v$, and $PAGO_v$ were negatively correlated but only $PAGO_v$ relationship was of significant magnitude with a correlation of r=-.31(p<.01). Both PGO_b and $PPGO_v$ were unrelated to self-esteem with correlations of r=-.03, r=-.04, respectively. Thus, while individuals endorsing a learning goal orientation report higher levels of self-esteem, there is no relationship between self-esteem and two dimensions of performance goal orientation (e.g., PGO_b, and $PPGO_v$).

Tests of the same relationships in the employee sample are reported in Table 30. As shown in the table, support for the hypothesized relationships was mixed. Learning goal orientation was positively related to self-esteem with correlations of r=.24 (p<.01) and r=.18 for LGO_b and LGO_v, respectively. However, the findings were mixed for performance goal orientation relationships with support for the hypothesized negative relationship with $PAGO_v$ with a correlation of r=-.13. The hypothesized relationship with PGO_b and $PPGO_v$ was not supported with correlations of r=.07 and r=.02, respectively.

Hypothesis 2. Support was mixed for goal orientation relationships with internal locus of control. As shown in Table 29, support was found for LGO_b and LGO_v being positively related to internal locus of control with correlations of r=.43 and r=.41 (p<.01), respectively. Support was mixed with the performance goal orientation relationships. In support of hypothesis 2, $PAGO_v$ was negatively related to internal locus of control with a correlation of r=-.31 (p<.01), however, PGO_b, and $PPGO_v$ unrelated with correlations of r=.02 and r=.04, respectively.

A test of the same hypothesis in the employee sample was supported. As shown in Table 30, learning goal orientation was positively related to internal locus of control with correlations of r=.36 and r=.30 (p<.01) for LGO_b and LGO_v, respectively. Support was also found for $PPGO_v$,

and PAGO$_v$ and internal locus of control with negative relationships of r=-.10, and r=-.30, respectively. However, the hypothesized relationship with PGO$_b$ (r=-.007) was not supported.

Hypothesis 3. Support was mixed for goal orientation relationships with generalized self-efficacy. As shown in Table 29, LGO$_b$ and LGO$_v$ were positively related with correlations of r=.49 and r=.50 (p<.01), respectively. However results were mixed for performance goal orientation relationships. Support was found for the hypothesized relationship of generalized self-efficacy and PAGO$_v$ with a negative correlation of r=-.26 (p<.01), but unrelated to PGO$_b$ and PPGO$_v$ with correlations of r=.01 and r=.06, respectively.

Similar results were found in the employee sample with mixed support for hypothesis 3. Support was found for LGO$_b$ and LGO$_v$ with correlations of r=.49 and r=.53 (p<.01), respectively. Both PGO$_b$ and PPGO$_v$ were positively related with correlations of r=.16 and r=.15, respectively. However, PAGO$_v$ was unrelated to generalized self-efficacy with a negative correlation of r=-.05.

Hypothesis 4. Support was found for hypothesis 4 with differential goal orientation relationships with emotional stability. As expected, LGO$_b$ and LGO$_v$ were positively related with correlations of r=.25 and r=.20 (p<.01), respectively. In addition, PGO$_b$, PPGO$_v$, and PAGO$_v$ were negatively related to emotional stability with correlations of r=-.25, r=-.20, and r=-.40 (p<.01), respectively. Thus, individuals endorsing a learning goal orientation report higher levels of emotional stress tolerance compared to those with a performance goal.

In the employee sample, support was mixed for goal orientation relationships with emotional stability. Support was somewhat mixed for LGO$_b$ and LGO$_v$ with positive correlations of r=.19 (p<.05) and r=.05, respectively. The near zero correlation with LGO$_v$ (r=.05) was weaker than expected. Results were mixed for performance goal orientation relationships with

emotional stability. Both PGO_b and $PAGO_v$ were negatively related with a correlation of r=-.18 with PGO_b and a correlation of r=-.22 (p<.05) with $PAGO_v$. The hypothesis for $PPGO_v$ was not supported, which reflected a positive relationship with emotional stability of r=.22 (p<.05). It is not clear why PPGO had a positive relationship with emotional stability of the same magnitude as PGO_b and $PAGO_v$.

Hypothesis 5. Support was mixed for goal orientation and need for achievement. As expected, LGO_b and LGO_v were positively related with correlations of r=.50 and r=.52 (p<.01), respectively. These findings suggest that individuals endorsing a learning goal orientation also report higher achievement orientations. This finding is consistent with prior research (Phillips & Gully, 1997). Support was also found for $PAGO_v$ with a negative correlation r=-.22 (p<.01), but the relationship with $PPGO_v$ was contrary to the hypothesis with a positive correlation of r=.14 (p<.05). PGO_b was unrelated to need for achievement with a correlation of r=-.06. This hypothesis was not tested in the employee sample, thus no results are reported.

Hypothesis 6. Support was found for differential relationships between goal orientation and fear of negative evaluation. Both LGO_b and LGO_v were negatively related with correlations of r=-.19 and r=-.22 (p<.01), respectively. These findings suggest that individuals with a learning goal orientation are not concerned about others' evaluations of them. Support was also found that PGO_b, $PPGO_v$, and $PAGO_v$ were positively related with correlations of r=.33, r=.31, and r=.50 (p<.01), respectively.

Support was mixed in the employee sample for goal orientation relationships with fear of negative evaluation. The hypothesized negative relationship with learning goal orientations was not supported. In contrast, LGO_b and LGO_v were unrelated to fear of negative evaluation with correlations of r=.03 and r=.07, respectively. These findings suggest the individuals endorsing a

learning goal orientation do not reflect these evaluative concerns. As expected, PGO_b, $PPGO_v$, and $PAGO_v$ were positively related with correlations of r=.25, r=.27, and r=.26 (p<.01), respectively.

Hypothesis 7. Support was mixed for the hypothesized goal orientation relationships with social desirability. As expected, LGO_b and LGO_v were positively related to social desirability with correlations of r=.13 (p<.01) and r=.08, respectively. These findings suggest that while there may be some level of social desirable responses (e.g., impression management or self-deception), the relationships were relatively weak. Support was mixed for performance goal orientations and social desirability. As expected, $PPGO_v$ and $PAGO_v$ were negatively related with correlations of r=-.16 (p<.01) and r=-.11 (p<.05), respectively. However, PGO_b was unrelated to social desirability (r=.00). This hypothesis was not tested in the employee sample, thus no results are reported. Overall, the magnitude of the relationships with social desirability were small, reflecting relatively weak relationships.

In summary, the goal orientation relationships with several correlates provide an interesting story for understanding goal orientation constructs. In general, all learning goal orientation hypothesized relationships (LGO_b and LGO_v) were supported, with the exception of fear of negative evaluation in the employee sample that reflected no relationship. The level of social desirability among learning goal orientation constructs is relatively small. Thus, learning goal orientation is positively associated with other self-concept constructs of self-esteem, internal locus of control, generalized self-efficacy, emotional stability, and need for achievement. These findings would suggest that learning goal orientation is related to a positive self-concept, which may be reflected in higher levels of motivation and effort expended in achievement and other task contexts.

The findings for performance goal orientation relationships are surprisingly mixed. There is consistent support for $PAGO_v$ being negatively related to the self-concept traits of self-esteem, internal locus of control, generalized self-efficacy, emotional stability, and need for achievement, yet positively related to fear of negative evaluation. These findings would suggest that those individuals reflecting high levels of performance avoidance tendencies are more likely to reflect a negative self-concept and likely to experience lower levels of motivation and effort expenditures in achievement and task contexts. Thus, $PAGO_v$ would reflect opposing behavioral tendencies of individuals with higher levels of learning goal orientation. The more striking relationships are found when examining PGO_b and $PPGO_v$ results. It appears that PGO_b and $PPGO_v$ are unrelated to self-esteem, internal locus of control, and generalized self-efficacy and weak associations with need for achievement. However, these findings are consistent with prior research that supports differential relationships for learning and performance goal orientations, yet fail to highlight the relative number of near zero relationships that exist for performance goal orientation constructs .

Table 29

Correlations among study variables – Student Sample

	LGO_b	PGO_b	LGO_v	PPGO_v	PAGO_v	SE	LOC	GSE	ES	NAch	FNE	Soc. D
LGO_b	(.83)											
PGO_b	.06	(.77)										
LGO_v	.72**	-.09	(.82)									
PPGO_v	.10	.34**	.11*	(.81)								
PAGO_v	-.26**	.40**	-.33**	.36**	(.81)							
SE	.33**	-.03	.26**	-.04	-.31**	(.87)						
LOC	.43**	.02	.41**	.04	-.31**	.47**	(.76)					
GSE	.49**	.01	.50**	.06	-.26**	.53**	.47**	(.88)				
ES	.25**	-.25**	.31**	-.20**	-.40**	.55**	.27**	.46**	(.91)			
nAch	.50**	-.06	.52**	.14*	-.22**	.32**	.48**	.47**	.21**	(.79)		
FNE	-.18**	.33**	-.22**	.31**	.50**	-.47**	-.20**	-.28**	-.58**	-.18**	(.92)	
SD	.13**	.00	.08	-.16**	-.11*	.09	.04	.10*	.10*	.07*	-.04	(.86)
M	38.80	38.66	23.06	16.70	13.61	46.22	45.56	38.21	59.62	64.42	43.56	9.91
SD	4.54	4.63	3.05	3.69	3.48	7.70	5.69	5.15	11.84	9.20	10.21	4.81

Note. N=306-314. LGO_b=Button et al. learning goal orientation scale; PGO_b=Button et al. performance goal orientation scale; LGO_v=VandeWalle learning goal orientation scale; PPGO_v=VandeWalle performance prove goal orientation scale; PAGO_v =VandeWalle performance avoid goal orientation scale; GSE=generalized self-efficacy; SE=self-esteem; LOC=locus of control; ES=emotional stability; nAch=need for achievement; FNE=fear of negative evaluation; Soc. D=social desirability; M=mean scale scores; SD=standard deviation of scale scores. Reliabilities are reported on the diagonal. *denotes a correlation that is significant at the .05 level. **denotes a correlation that is significant at the .01 level.

Table 30

Correlations among study variables – Employee Sample

	LGO$_b$	PGO$_b$	LGO$_v$	PPGO$_v$	PAGO$_v$	SE	LOC	GSE	ES	FNE
LGO$_b$	(.89)									
PGO$_b$	.24**	(.81)								
LGO$_v$	.73**	.25**	(.80)							
PPGO$_v$	.08	.46**	.26**	(.87)						
PAGO$_v$	-.12	.40**	-.05	.32**	(.81)					
SE	.24**	-.07	.18	.02	-.13	(.82)				
LOC	.36**	-.007	.30**	-.10	-.30**	.59**	(.64)			
GSE	.49**	.16	.53**	.15	-.05	.49**	.52**	(.88)		
ES	.19*	-.18	.05	.22**	-.22*	.52**	.41**	.39**	(.91)	
FNE	.03	.25**	.07	.27**	.26**	-.23*	-.32**	-.12	-.34**	(.83)
M	41.96	37.75	24.62	16.47	11.68	44.76	43.52	38.64	56.28	41.73
SD	5.50	6.94	3.82	4.71	4.53	8.19	6.26	5.18	13.21	10.74

Note. N=114-116. LGO$_b$=Button et al. learning goal orientation scale; PGO$_b$=Button et al. performance goal orientation scale; LGO$_v$=VandeWalle learning goal orientation scale; PPGO$_v$ =VandeWalle performance prove goal orientation scale; PAGO$_v$=VandeWalle performance avoid goal orientation scale; GSE=generalized self-efficacy; SE=self-esteem; LOC=locus of control; ES=emotional stability; FNE=fear of negative evaluation; M=mean scale scores; SD=standard deviation of scale scores. Reliabilities are reported on the diagonal. *denotes a correlation that is significant at the .05 level. **denotes a correlation that is significant at the .01 level.

Chapter 5

Discussion

This study examined two competing models of goal orientation to assess the factorial and nomological validity. Overall, support was found for both models of goal orientation resulting in an adequate fit with the data. However, the findings also highlight some conceptual and measurement issues associated with these models. The two-factor (Button et al., 1996) and three-factor (VandeWalle, 1997) models of goal orientation are first discussed followed by a conceptual comparison across models. The results of hypothesis testing of the nomological network for goal orientation yielded mixed findings across both models and across student and employee samples. This chapter discusses the implications and limitations of these findings and directions for future research.

Measurement Models

The two-factor model conceptualizes goal orientation as two unrelated dimensions of learning goal orientation and performance goal orientation. While most psychometric properties were similar across student and employee samples, results for model fit were mixed. In both samples, participant scores on both goal orientation scales (LGO_b and PGO_b) were restricted to the high end of the scale. This finding is consistent with prior research that indicates range restriction exists for the respective LGO_b and PGO_b scales (Breland, Hafsteinson, & Donovan, 2003; Hafsteinson , Breland & Donovan, 2003). The high level of agreement across both scales is particularly problematic given that the learning goal orientation and performance goal orientation are considered to reflect opposing behavioral tendencies. While Button et al. (1996)

argue that individuals may have varying levels of agreement with learning goal orientation and performance goal orientation simultaneously, it is difficult to reconcile these patterns in terms of the expected behaviors. Although this issue has been noted in prior research, there has been relatively no research addressing this issue.

The relationship between learning goal and performance goal orientation dimensions produced mixed results across student and employee samples. While Button et al. (1996) suggest that learning goal orientation and performance goal orientation are unrelated, the correlations between these dimensions in the current study ranged from .06 to .24. This relationship was strongest in the employee sample, which suggests that learning goal and performance goal orientations may operate in a somewhat different manner in work settings. Prior research has primarily examined goal orientation in academic settings utilizing student samples. However, even with student samples, the relationships between goal orientation dimensions have yielded stronger associations. Recent studies have reported correlations ranging from .24 (Jagacinski & Duda, 2001) to .52 (Kozlowski et al., 2001). Thus, the relationship between LGO_b and PGO_b appears inconsistent across studies that may not be unique to the student or employee samples in the current study. It is not clear what factors may be influencing these varying levels of association between learning goal orientation and performance goal orientation.

Results of the measurement model analysis revealed acceptable fit indices, however, a closer examination of the psychometric properties highlights several issues with this model of goal orientation. The most significant findings were found in the performance goal orientation factor. First, three of the eight items assessing performance goal orientation reflect relatively weak factor loadings. In the current study, the loadings for these factors ranged from .40 to .48, somewhat lower than desired levels for good indicators of the underlying construct. A more

stringent test of factor analytic models suggest that factor loadings less than .60 may be weak indicators of the construct (e.g., Hatcher, 1994). A second issue concerns the factor variance associated with the performance goal orientation factor (PGO_b). The factor variances of .39 and .37 across student and employee samples, respectively, reveal lower than desired levels of .50 (Hatcher, 1994) for variance attributed to the underlying factor. Finally, the three items reflecting low loadings also reveal low inter-item correlations among the remaining five items on the scale with associations less than .30. Thus, while the overall scale has acceptable internal consistency reliabilities of .77 and .81 across student and employee samples, respectively, these findings suggest that the measure of performance goal orientation could be improved by addressing potential weaknesses in the PGO_b scale.

Although the learning goal orientation factor revealed stronger psychometric properties there were also weaknesses noted in the scale. In general, the factor loadings and variances were acceptable compared to the PGO_b factor. However, the LGO_b factor yielded somewhat weaker loadings for three of the indicators ranging from .54 to .58, though, these values are only slightly below the .60 recommended level (Hatcher, 1994). The factor variance for the LGO_b ranged from .39 to .52 for student and employee samples, respectively. The variance of .39 in the student sample indicates that a greater percentage of variance is attributed to measurement error rather than the underlying construct. Overall, the 2-factor model of goal orientation resulted in adequate fit, yet these findings highlight several measurement issues associated with each scale that may impact the overall validity and utility of the goal orientation construct.

The 3-factor model of goal orientation yielded similar results for the three dimensions of learning goal, performance prove, and performance avoid goal orientations. Across both samples, participant scores were restricted to the high end of the LGO_v and $PPGO_v$ scales.

Overall, there was lesser agreement with performance avoid goal orientation tendencies. Interestingly, the agreement was weaker in the employee sample where evaluative concerns may be considered more salient because of work settings. In the 3-factor model, the goal orientation dimensions are moderately correlated ranging from r=.12 to r=.45. These findings are consistent with VandeWalle's (1997) findings, though, conceptually it is difficult to reconcile these relationships with the expected patterns of behavior. It is not clear what behavior would be displayed for an individual with high scores of LGO_v, $PPGO_v$, and $PAGO_v$ simultaneously. The issue is further complicated when examining the performance goal orientation factor and distinguishing between performance prove goal orientation ($PPGO_v$) and performance avoid goal orientation ($PAGO_v$). While VandeWalle (1997) argued for two dimensions of performance goal orientation, it is not clear whether or how they reflect different behavior patterns. Thus, there are some conceptual ambiguities concerning VandeWalle's (1997) dimensions of goal orientation.

Results of the measurement model analysis for the 3-factor model of goal orientation revealed acceptable fit across both student and employee samples. Specifically, the 3-factor model yielded acceptable factor loadings and factor variances across these samples, exceeding .60 and .50 respectively. While $PPGO_v$ and $PAGO_v$ values were within recommended levels, some measurement weaknesses were noted for the LGO_v factor. In the student sample, the factor variance of .48 was somewhat lower than the desired level of .50 for variance attributed to the underlying factor; though, all factor loadings exceeded .60. However, in the employee sample, two of the indicators reflect lower than desired factor loadings of .32 and .49. It is not clear whether these issues are specific to the samples examined but they do suggest some measurement weaknesses may exist in LGO_v. Overall, the 3-factor model resulted in an adequate fit of the data to the model with fairly strong psychometric properties.

The two models of goal orientation are distinct in terms of dimensionality, relationship among dimensions, and measurement. A comparison of the measures suggests that the learning goal orientation scales (LGO_b and LGO_v) are more equivalent and appear to tap the same construct. Across both samples, the correlation between the two measures exceeds .70. These findings are consistent with previous research with correlations ranging from .77 to .81 (Day, et al., 2003a; Dobbins et al., 2002). From these findings, it does appear that learning goal orientation (LGO_b and LGO_v) is represented as the same construct across both models.

The two models diverge when conceptualizing the performance goal orientation construct. Conceptually, it is not clear how these dimensions are distinct in representing behavior. In the current study, the relationship among the three performance goal orientation dimensions (PGO_b, $PPGO_v$, and $PAGO_v$) reflect moderate correlations ranging from .32 to .46, markedly lower in comparison to the learning goal orientation measures. These findings are consistent with prior research, which suggests that these measures are tapping different constructs (Dobbins, et al., 2002). However, it is difficult to reconcile these findings given that these constructs emerge from the same conceptual framework. The rationale for VandeWalle's (1997) departure from earlier frameworks and dichotomizing performance goal orientation into performance prove and performance avoid dimensions is less well specified in terms of behavior. The specific issues concerning the dimensionality of performance goal orientation and the relationship between these dimensions cannot be addressed with the results of this study. However, they do highlight the need to examine the conceptual framework of goal orientation to specifically address meaningful individual differences associated with the performance goal orientation construct.

While the current study does not resolve the dimensionality issue with the performance goal orientation construct, there are several issues that emerge when examining the performance goal orientation construct across both models. First, the low factor loadings, low inter-item correlations, and low factor variances in the Button et al. (1996) PGO_b factor were consistent across both student and employee samples. These findings suggest that several items assessing PGO_b appear to be weak indicators of the underlying construct. A recent item-response theory (IRT) analysis of this scale revealed that measurement varied substantially across these scales with the lowest level found for PGO_b (Hafsteinsson, Breland & Donovan, 2003). This finding along with the results of the current study suggests that some measurement weaknesses exist in Button et al.'s (1996) measures of goal orientation.

A second issue concerns the utility of VandeWalle's (1996) $PPGO_v$ and $PAGO_v$ dichotomies. It is not clear from VandeWalle's conceptual framework how these constructs result in different behaviors or outcomes. While the current study revealed stronger psychometric properties for these measures of goal orientation, a recent IRT analysis of this scale reveal that the items result in low levels of measurement precision (Breland, Hafsteinsson, & Donovan, 2003). Breland et al. (2003) suggest that measurement may be improved by adding more items and better discriminating items. The measurement issues of $PPGO_v$ and $PAGO_v$ may be directly linked to conceptual ambiguities between these dimensions.

Finally, it is not clear what the relationship should be among learning goal and performance goal orientation dimensions. The findings were mixed in this study and in prior research where learning goal orientation reflects small, moderate, or no relationship with performance goal orientation constructs. The mixed findings are more prevalent among the 2-factor model of goal orientation. Conceptually, both Button et al. (1996) and VandeWalle (1997)

argue that learning goal and performance goal constructs reflect differential behaviors patterns, yet inconsistencies exist in the level of association between these constructs. This issues further highlights the need to reexamine the conceptual framework.

In testing the competing models of goal orientation, this research also sought to examine the stability of goal orientation as a trait. This issue is particularly important given limited research on the stability of goal orientation and the departure of these models from earlier operationalizations of the construct as an experimental manipulation or a context-specific measure. The assessments of goal orientation over a 60 day timeframe resulted in relatively low stability coefficients ranging from .49 to .75 with the most stable scores found for $PAGO_v$. These findings reflect weaker stability reliabilities compared to other personality attributes ranging from .69 to .76 over 78 to 158 days (Visweswaran & Ones, 2000). However, the 60-day timeframe in the current study is of shorter duration than prior studies and it may be that the timeframe was too short to assess stability. It is also possible that these findings may be the result of contextual influences that participants were exposed to in the classroom environment. At a minimum, these findings suggest the need for additional research examining the stability of goal orientation over time. Furthermore, there is considerable debate among goal orientation researchers whether goal orientation is best conceptualized as a trait, state, or both (Carr & DeShon, 2001). Researchers have begun examining the utility of trait and state conceptualizations of goal orientation (Donovan & Breland, 2003; Fisher, 1998). Thus, the issue of stability is important to provide a better understanding of the conceptualization and measurement of goal orientation.

Nomological Relationships

The nomological network for hypothesized relationships among the goal orientation dimensions are expected to reflect opposing patterns of behavioral tendencies and thus differential relationships for learning goal orientation (LGO_b and LGO_v) and performance goal orientation (PGO_b, $PPGO_v$, and $PAGO_v$) with other variables. In the current study, the relationships with learning goal orientation (LGO_b and LGO_v) were as expected reflecting positive associations with the self-concept traits of self-esteem, locus of control, generalized self-efficacy, and emotional stability. In addition, learning goal orientation was positively related to need for achievement and social desirability but negatively related to fear of negative evaluation. These findings were consistent across student and employee samples. Overall, these findings support the theoretical assertions suggested by Dweck and Leggett (1988) that learning goal orientation may be an important component of the self-concept. These findings were also consistent with prior research reflecting positive relationships between learning goal orientation and other traits including self-esteem and locus of control (Beaubien & Payne, 1999). It is these positive relationships that are expected to account for the behavioral tendencies and desirable performance outcomes associated with learning goal orientation.

The performance goal orientation relationships resulted in mixed findings with the same study variables. In the current study, only the hypothesized relationships for performance avoid goal orientation ($PAGO_v$) were supported for all study variables. The hypothesized negative relationships for $PAGO_v$ were supported for the self-concept traits of self-esteem, locus of control, generalized self-efficacy, and emotional stability. In addition, $PAGO_v$ was negatively related to need for achievement and social desirability. As expected, performance avoid goal orientation ($PAGO_v$) was positively related to fear of negative evaluation. These findings were

consistent across both student and employee samples, although the employee sample reflected a weaker magnitude of these relationships.

The results were mixed when examining PGO_b and $PPGO_v$ hypothesized relationships. In the current study, PGO_b and $PPGO_v$ were positively related to fear of negative evaluation and negatively related to emotional stability. However, the hypothesized relationships were not supported for self-esteem and locus of control. These findings were consistent with prior research suggesting no relationship between performance goal orientation (PGO_b and $PPGO_v$) and these traits (e.g., Beaubien & Payne, 1999; McKinney & Carlson, 2003). Additionally, PGO_b was unrelated to need for achievement and social desirability in the student sample, while $PPGO_v$ reflected relatively weak relationships with these variables. The results for PGO_b and $PPGO_v$ with emotional stability were mixed across student and employee samples. In the student sample, PGO_b and $PPGO_v$ were unrelated to emotional stability while the relationships in the employee sample reflected a small, positive relationship. The mixed support for the hypothesized PGO_b and $PPGO_v$ relationships may be a reflection of some of the measurement weaknesses noted concerning PGO_b, although the $PPGO_v$ factor did not suffer from the same measurement issues. These findings further highlight the need for conceptual clarity within the goal orientation framework.

In summarizing the findings of the current study, several issues have been noted. First, it is not clear how goal orientation should be conceptualized as a multidimensional construct in explaining behavioral variability. In the current study, the learning goal orientation constructs (LGO_b and LGO_v) were related but resulted in mixed relationships with the performance goal orientation constructs (PGO_b, $PPGO_v$, $PAGO_v$). Thus, it is not clear how the dimensions of goal orientation are expected to explain behavioral variability. If they are unrelated constructs that

reflect opposing behavior patterns, the level of association found in this study and prior research obscures our understanding of the construct. A second issue concerns the measurement weaknesses noted *within* the two-factor model and with LGO_v in the three-factor model. These measurement weaknesses were marked by lower than desired factor loadings, factor variances, and inter-item correlations in the PGO_b factor that were consistent across samples. A third issue concerns the overall conceptual distinctions among the performance goal orientation dimensions. The three dimensions of PGO_b, $PPGO_v$, and $PAGO_v$ reflect identical hypothesized relationships yet are considered distinct constructs. This issue is further complicated by the lack of support for most of the hypothesized relationships with PGO_b and $PPGO_v$. It is not clear how performance goal orientation should be conceptualized and the expected relationships within the nomological network of trait-like individual differences that reflect behavioral tendencies.

These issues with goal orientation are particularly important to address given the recent impetus of research examining the predictive validity of these constructs (e.g., Breland & Donovan, 2003; Brown, 2001; Chen et al., 2000; Day et al., 2003a; Day, Yeo, & Radesevich, 2003b; Ford et al., 1998; Steele-Johnson et al., 2000; VandeWalle, et al., 1999). The results of these studies suggest that learning goal orientation is an advantageous trait and may warrant consideration in selection contexts (e.g., VandeWalle et al., 1999). However, the conceptual and measurement issues surrounding goal orientation may severely limit the validity and utility of the construct. While the conceptual ambiguities have been noted in prior research (Beaubien & Payne, 1999; Carr & DeShon, 2001; Day et al., 2003a), there has been little research focused on addressing these issues. In summary, the findings of the current study and prior research highlight the need for a better understanding of the conceptual framework and associated measurement of the goal orientation construct.

Limitations

While the current study contributes to prior research by examining the 2-factor and 3-factor models of goal orientation simultaneously, several methodological limitations in the current study require discussion. First, the current study is based solely on self-report data. Self-report data are considered to be a fallible source of data for a number of reasons including (1) reliance on retrospective reporting, (2) context-dependent assessments, and (3) the tendency for socially desirable responses (Schwarz, 1999). Prior research in decision-making has shown that respondents do not do a good job of capturing their own behavior (Stevenson, Busemeyer, & Naylor, 1990), resulting in potentially inaccurate representations of behavioral tendencies. Additionally, the context-dependent issues have been well cited in personality research which suggests that responses to the survey questionnaires are highly dependent on the context within which one is responding (Schwarz, 1999). A final issue with self-reports concerns the likelihood of socially desirable responses to survey questions. Social desirability has resulted in small to moderate correlations with personality constructs (Visweswaran & Ones, 2000), yet the results of the current study reveal weaker associations with goal orientation. The reliance on self-report data may be problematic but given that goal orientation and other trait-like tendencies are often difficult to observe, it is an issue that is likely to persist in psychological research.

A second limitation of this study concerns the survey presentation format and length. The survey was administered in mixed format across student and employee samples. Student participants completed either an online or paper-and-pencil formats, while employees completed only paper-and-pencil assessments. It is not known what the implications are for these presentation formats; however, an issue to be addressed concerns the survey length. In the current study students completed online and paper-and-pencil surveys consisting of 110 items

with completion times ranging from 25 to 45 minutes, while employees completed paper-and-pencil surveys of 84 items with an average completion time of 20 to 25 minutes. Recent research has demonstrated that longer surveys may negatively impact response validity (DeVellis, 1991). Longer survey assessments have resulted in lower validity when responding to the latter half of the survey (Walker, Burke, McCarthy, Fuller & Moffett, 2003). It not clear what the optimal survey length may be or at what point response quality begins to deteriorate. In the Walker et al. (2003) study, they examined surveys with 44 items and 363 items and found that the respondents spent significantly less time per item on the longer scale. Their findings revealed that response validity was lower in later responses on a long scale. While it is not clear whether survey length impacted response validity in the current study, prior research certainly suggests that these effects be examined.

A third limitation concerns the employee sample. One issue is the low sample size of 114 to 116 respondents. The minimum recommended sample size for confirmatory factor analysis is 200 or at least 4 respondents per item (Hatcher, 1994). While a sample of 116 falls short of the recommended 200, it does meet the recommended 4 respondents per item. Although a sample less than 200 does not preclude an examination of the measurement models, it does suggest that the results be interpreted with caution. Sample sizes less than 250 have resulted in unstable parameter estimates (Hu & Bentler, 1999), thus a replication of this study with larger samples is warranted. A second issue with the employee sample concerns the literacy level of respondents. Of the 140 surveys completed, only 116 usable surveys were obtained. Upon visual inspection, the unusable surveys were the result of random responses not consistent with the number of response in the survey. Given the anonymity of respondents in this sample, the researcher was unable to address this issue and thus the surveys were excluded from the analysis. While literacy

levels were not assessed within the sample, the scale was qualified to the sixth grade reading level in an attempt to address potential issues with the participant's ability to adequately respond to the questionnaire items. Given that similar response levels were apparent across student and employee samples, it not clear whether literacy played a role in the current study.

Finally, a potential limitation concerns the test-retest timeframe. At a minimum, the test-retest timeframe should not occur sooner than 14 to 30 days (Nunnally & Bernstein, 1994). The 60 day test-retest timeframe in the current study resulted in somewhat lower than desired reliabilities compared to other personality measures. It may be that the timeframe was too short to assess stability or that other contextual factors may have influenced the reliabilities. The test-retest assessment was conducted in a classroom setting which may have predisposed students to contextual influences over the course of survey administrations. It may also be that goal orientation is less stable than expected in reflecting true trait-like behaviors. The stability of goal orientation is an issue that warrants additional research.

Future Research

The findings of this study highlight several areas for future research in examining the validity and utility of the goal orientation construct. These areas include addressing conceptual issues, measurement issues, and the nomological framework for goal orientation. The first area for future research concerns the conceptualization of the goal orientation construct. The models advanced by Button et al. (1996) and VandeWalle (1997) are a departure from Dweck and Leggett's (1988) conceptual framework in a number of ways. While both models build on Dweck's (1986) definition, these models reconceptualize goal orientation by specifying the dimensionality, measurement, and nomological network in a trait framework. Dweck and

Leggett's (1988) conceptualization of learning and performance goals attempted to explain effort-related behaviors; however the conceptual meaning of goal orientation in the recent models proposed by Button et al. (1996) and VandeWalle (1997) are less well specified in explaining specific behaviors. While Button et al. (1996) suggest that learning goal orientation and performance goal orientation are not mutually exclusive and thus potentially interact, they are less clear in explaining what behaviors are defined (i.e., effort-related). Button et al. (1996) defined learning goal orientation as reflecting mastery-oriented behaviors, while performance goal orientation reflects maladaptive behaviors or learned helplessness. Thus, goal orientation is an individual difference reflecting contrasting behavior patterns. However, they argue that individuals can engage in mastery-oriented and helplessness behaviors simultaneously. Furthermore, they do not clearly specific how these behaviors are manifest. Do you persist on the task or withdraw depending of varying levels of learning goal and performance goal orientations?

Similarly, VandeWalle (1997) defined learning goal orientation as the desire for mastery or improve competence. He defined performance prove goal orientation as the desire to demonstrate competence and performance avoid goal orientation as the desire to avoid negative evaluation of competence. While one can make inferences concerning effort-related behaviors associated with learning goal orientation and performance prove goal orientation in trying to develop or demonstrate competence, the performance avoid goal orientation dimension is a bit more problematic. To avoid negative evaluations of competence, do you work harder or withdraw from the task? Furthermore, it is not clear what behaviors are associated with performance prove goal orientation and how they are distinct from learning goal orientation. If the goal is improve competence (LGO_v) or demonstrate competence ($PPGO_v$), do these construct

represent different behaviors? It is these ambiguities in both models that highlight a need for conceptual clarity in these constructs.

The models of goal orientation advanced by Button et al. (1996) and VandeWalle (1997) highlight the need for a detailed review of the conceptual framework of goal orientation to address the theoretical linkages of these models. This review may provide a better insight into several of the issues highlighted in this study including the (1) conceptualization of goal orientation as trait, state, or contextual effect, (2) dimensionality to explain meaningful differences in behavior, and (3) expected relationship among the dimensions of goal orientation. These issues remain unresolved in the current body of goal orientation research but are fundamental to the validity and utility of the construct in organizational research.

A second area of future research concerns the measurement of the construct. The current study and prior research highlights several issues with the measurement of the goal orientation construct, particularly performance goal orientation across both models. These issues have primarily focused on scale quality and the adequacy of items to effectively discriminate one's relative standing on goal orientation. Some insight into the measurement issues may be gained by a more robust examination of the content validity of existing measures. Measures of goal orientation developed by Button et al. (1996) and VandeWalle (1997) appear to have confounded measures of implicit theories of ability and goal orientation. While Dweck and Leggett (1988) suggest that implicit theories of ability and perceptions of one's ability may be antecedents or even correlates of goal orientation, these measures are embedded within VandeWalle's (1997) measure. For example, one learning goal orientation (LGO_v) item asks "For me, development of my ability is important enough to take risks." In this item, development of ability is considered to an indicator of learning goal orientation rather than an antecedent or correlate. Furthermore, it is

not whether this item was intended to assess beliefs about the development of ability or risk-taking propensity. Similarly a performance avoid goal orientation (PAGO$_v$) items asks, "Avoiding a show of low ability is more important to me than learning a new skill." It is not clear what is being asked with this item but it appears to assume that these are contradictory preferences.

There are also content issues evident in Button et al.'s (1996) performance goal orientation items which tend to reflect an individuals' evaluative concerns with items assessing, "The opinions others have about how well I do certain things are important to me" and "I feel smart when I can do something better than most other people." While these items do reflect linkages to Dweck and Leggett's (1988) framework, they also reflect a referent other perspective that one could argue is an outcome rather than an indicator of performance goal orientation. These measures suggest that some item content issues may exist. Additional support for examining the validity of existing measures can be linked to a recent IRT analysis of these scales that suggest existing items may be insufficient to adequately discriminate in assessing goal orientation (e.g., Breland et al., 2003; Hafsteinsson et al., 2003). In summary, these measurement issues highlight the need for additional research examining the properties of goal orientation scales.

A final area for future research concerns the nomological network of goal orientation. In the current study, goal orientation relationships were examined with other theoretically-derived traits which produced mixed results for performance goal orientation constructs. These findings suggest a need for future research to examine the full complement of nomological relationships including antecedents, correlates, and outcomes. Goal orientation research has primarily focused on performance outcomes and to a lesser extent self-regulatory behaviors. The findings of these

studies have been similar with learning goal orientation resulting in small to moderate positive relationships with behavioral and performance outcomes, while performance goal orientation relationships have been of low magnitude and inconsistent results with these outcomes. Recent meta-analytic studies examining goal orientation with specific self-regulatory behaviors (Day et al., 2003b) and performance outcomes (Beaubien & Payne, 1999; McKinney & Carlson, 2003) also report stronger associations for learning goal orientation and performance outcomes. However, these findings are somewhat tenuous for two reasons: (1) the measurement issues cited in this study among the goal orientation scales and (2) lack of consistency in conceptualizations and measures of goal orientation used to cumulate study findings. A detailed review of these studies reveals that the criteria for inclusion were based on consistencies in the factor structure of goal orientation without controlling for the competing trait and state conceptualizations of the construct. For example, trait and state conceptualizations of goal orientation were included in the same analyses assessing overall predictive validity. It is difficult to disentangle trait versus state effects of goal orientation which result in different interpretations of validity. Thus, the cumulative knowledge of goal orientation effects reported in these studies is questionable.

A related issue concerns the predictive validity of goal orientation for distal and proximal outcomes. It is argued that traits tend to be weaker predictors of distal outcomes such as academic and/or job performance outcomes (Kanfer, 1990). Dweck and Leggett's (1988) conceptual framework suggests that goal orientation is predictive of effort-related behaviors and thus a more appropriate focus for the predictive validity would be self-regulatory behaviors. The debate concerning the appropriateness of utilizing traits to predict distal versus proximal outcomes has been the focus of research in work motivation body of research (Kanfer, 1990) within which goal orientation is embedded (Chen et al., 2000). The majority of goal orientation

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research has focused on predicting various performance outcomes resulting in relatively weak relationships (r<.20). These results may reflect the inappropriate focus on the predictive validity of distal rather than proximal outcomes. Thus, future research should examine the predictive validity of goal orientation with proximal behaviors as suggested by Dweck and Leggett's (1988) framework.

Conclusion

Goal orientation has generated a great deal of research attention in recent years. In organizational research, goal orientation is considered to be an important motivational trait explaining performance variability. The importance of goal orientation may provide incremental value beyond the more widely studied personality attributes in explaining human behavior. The consistent and positive associations of learning goal orientation have resulted in its inclusion in recent models of motivational traits (Kanfer & Heggestaad, 2000). While the performance goal orientation has yielded less consistent results, future research examining the conceptual and measurement issues associated with this construct may improve its validity and utility in organizational research. The results of this study suggest that goal orientation may be an important component of the self-concept which has received a renewed interest in organizational research that has shown positive results in explaining performance variability in academic and work settings. Future research examining the conceptual framework of goal orientation is likely to provide a finer-grained explanation of behavior and with the promise of enhancing the utility of this construct in organizational research.

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Appendices

Appendix A - Survey Questionnaires – Student Version

Your responses to all questionnaires in this research will be remain confidential, and will only be seen by the primary researcher. Your instructor (professor and/or teaching assistants) will not see any of your responses to any of the questionnaires used in this research.

Virginia Tech Student ID #: _____

Please use this scale to answer the following items. Select the response option that best represents **your o**pinion or beliefs on these items.

1------------------2----------------3----------------------4------------------5-----------------6

| Strongly | Disagree | Slightly | Slightly | Agree | Strongly |
| Disagree | | Disagree | Agree | | Agree |

1. The opportunity to do challenging work is important to me.
2. When I fail to complete a difficult task, I plan to try harder the next time I work on it.
3. I prefer to work on tasks that force me to learn new things.
4. The opportunity to learn new things is important to me.
5. I do my best when I'm working on a fairly difficult task.
6. I try hard to improve on my past performance.
7. The opportunity to extend the range of my abilities is important to me.
8. When I have difficulty solving a problem, I enjoy trying different approaches to see which one will work.
9. I prefer to do things that I can do well rather than things that I do poorly.
10. I'm happiest at work when I perform tasks on which I know that I won't make any errors.
11. The things I enjoy the most are the things I do the best.
12. The opinions others have about how well I do certain things are important to me.
13. I feel smart when I do something without making any mistakes.
14. I like to be fairly confident that I can successfully perform a task before I attempt it.
15. I like to work on tasks that I have done well on in the past.

16. I feel smart when I can do something better than most other people.

17. I am willing to select to a challenging work assignment that I can learn a lot from.

18. I often look for opportunities to develop new skills and knowledge.

19. I enjoy challenging and difficult tasks at work where I'll learn new skills.

20. For me, development of my work ability is important enough to take risks.

21. I prefer to work in situations that require a high level of ability and talent.

22. I'm concerned with showing that I can perform better than my coworkers.

23. I try to figure out what it takes to prove my ability to others at work.

24. I enjoy it when others at work are aware of how well I am doing.

25. I prefer to work on projects where I can prove my ability to others.

26. I would avoid taking on a new task if there was a chance that I would appear rather incompetent to others.

27. Avoiding a show of low ability is more important to me than learning a new skill.

28. I'm concerned about taking on a task at work if my performance would reveal that I had low ability.

29. I prefer to avoid situations at work where I might perform poorly.

30. I will be able to achieve most of the goals I set for myself.

31. When facing difficult tasks, I am certain that I will accomplish them

32. In general, I think I can obtain outcomes that are important to me

33. I believe I can succeed at most any endeavor to which I set my mind.

34. I will be able to successfully overcome many challenges.

35. I am confident that I can perform effectively on many different tasks.

36. Compared to other people, I can do most tasks very well.

37. Even when things are tough, I can perform quite well.

38. On the whole, I am satisfied with myself.

39. At times, I think I am no good at all.

40. I feel that I have a number of good qualities.

41. I am able to do things as well as most other people

42. I feel I do not have much to be proud of.

43. I certainly feel useless at times.

44. I feel that I am a person of worth, at least on an equal plane with others

45. I wish I could have more respect for myself.

46. All in all, I am inclined to feel that I am a failure.

47. I take a positive attitude toward myself.

48. When I get what I want, it's usually because I worked hard for it

49. My life is determined by my own actions

50. I am usually able to protect my personal interests

51. When I make plans, I am almost certain to make them work

52. I can pretty much determine what will happen in my life

53. To a great extent, my life is controlled by accidental happenings

54. When I get what I want, it's usually because I'm lucky

55. It's not always wise for me to plan too far ahead because many things turn out to be a matter of good or bad fortune

56. It's chiefly a matter of fate whether or not I have a few friends or many friends

57. Whether or not I get to be a leader depends mostly on my ability

The following are phrases that describe people's behaviors.

Describe yourself as generally are now, not as you wish to be in the future. I generally…….

58. Worry about things

59. Fear for the worst

60. Am afraid of many things

61. Get stressed out easily

62. Get caught up in my problems

63. Am not easily bothered by things

64. Am relaxed most of the time

65. Am not easily disturbed by events

66. Don't worry about things that have already happened

67. Adapt easily to new situations

68. Remain calm under pressure

69. Can handle complex problems

70. Know how to cope

71. Am calm even in tense situations

72. Readily overcome setbacks

73. I worry about what people will think of me even when I know it doesn't make any difference.

74. I am unconcerned even if I know people are forming an unfavorable impression of me.

75. I am frequently afraid of other people noting my shortcomings.

76. I rarely worry about what kind of impression I am making on someone.

77. I am afraid that others will not approve of me.

78. I am afraid that people will find fault with me.

79. Other people's opinions of me do not bother me.

80. When I am talking to someone, I worry about what they may be thinking about me.

81. I am usually worried about what kind of impression I make.

82. If I know someone is judging me, it has little effect on me.

83. Sometimes I think that I am too concerned with what other people think of me.

84. I often worry that I will say or do the wrong things

85. People should be more involved with their work.

86. I enjoy difficult work.

87. I will not be satisfied until I am the best in my field of work.

88. I would work just as hard whether or not I had to earn a living.

Use the following scale to respond to the following statements. Select the response that best represents **your** beliefs/opinions/actions on these statements.

1 – True of me

2 – Not true of me

89. Before I vote, I thoroughly investigate the qualifications of all of the candidates.

90. I never hesitate to go out of my way to help someone in trouble.

91. I have never intensely disliked anyone.

92. I sometimes feel resentful when I don't get my way.

93. I am always careful about my manner of dress.

94. My table manners at home are as good as when I eat out in a restaurant.

95. If I could get into a movie without paying and be sure I was not seen, I would probably do it.

96. I like to gossip at times.

97. There have been times when I felt like rebelling against people in authority even though I knew they were right.

98. No matter who I'm talking to, I'm always a good listener.

99. I can remember "playing sick" to get out of something.

100. There have been occasions when I took advantage of someone.

101. I'm always willing to admit when I make a mistake.

102. I always try to practice what I preach.

103. I don't find it particularly difficult to get along with loudmouthed, obnoxious people.

104. I am always courteous, even to people who are disagreeable.

105. I never make a long trip without checking the safety of my car.

106. I have never deliberately said something that hurt someone's feelings.

107. I sometimes try to get even rather than forgive and forget.

108. I never resent being asked to return a favor.

109. When I don't know something, I don't mind admitting it.

110. It is sometimes hard for me to go on with my work if I am not encouraged.

The following information is voluntary and will only be used to provide demographic information about the sample participating in this study.

111.   Age

1) 18 – 22   2) 23 – 25   3) 26 – 29   4) 30 – 34   5) 35+

112.   Gender

1) Male   2) Female

113.   Race

| 1) White, not of Hispanic origin | 2) Black/African-American | 3) Hispanic/Latin American | 4) Asian/Pacific Islander | 5) American Indian |

6) Other

please specify

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1------------------2----------------3---------------------4-----------------5-----------------6
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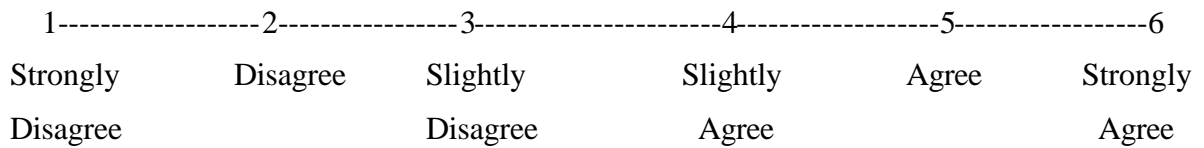| Strongly Disagree | Disagree | Slightly Disagree | Slightly Agree | Agree | Strongly Agree |

Appendix B - Goal Orientation (Button, Mathieu & Zajac, 1996)

1. The opportunity to do challenging work is important to me.
2. When I fail to complete a difficult task, I plan to try harder the next time I work on it.
3. I prefer to work on tasks that force me to learn new things.
4. The opportunity to learn new things is important to me.
5. I do my best when I'm working on a fairly difficult task.
6. I try hard to improve on my past performance.
7. The opportunity to extend the range of my abilities is important to me.
8. When I have difficulty solving a problem, I enjoy trying different approaches to see which one will work.
9. I prefer to do things that I can do well rather than things that I do poorly.
10. I'm happiest at work when I perform tasks on which I know that I won't make any errors.
11. The things I enjoy the most are the things I do the best.
12. The opinions others have about how well I do certain things are important to me.
13. I feel smart when I do something without making any mistakes.
14. I like to be fairly confident that I can successfully perform a task before I attempt it.
15. I like to work on tasks that I have done well on in the past.
16. I feel smart when I can do something better than most other people.

```
1------------------2----------------3---------------------4-----------------5----------------6
Strongly         Disagree         Slightly             Slightly           Agree          Strongly
Disagree                          Disagree             Agree                              Agree
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Appendix C - Goal Orientation (VandeWalle, 1997)

1. I am willing to select to a challenging work assignment that I can learn a lot from.
2. I often look for opportunities to develop new skills and knowledge.
3. I enjoy challenging and difficult tasks at work where I'll learn new skills.
4. For me, development of my ability is important enough to take risks.
5. I prefer to work in situations that require a high level of ability and talent.
6. I'm concerned with showing that I can perform better than my coworkers.
7. I try to figure out what it takes to prove my ability to others at work.
8. I enjoy it when others at work are aware of how well I am doing.
9. I prefer to work on projects where I can prove my ability to others.
10. I would avoid taking on a new task if there was a chance that I would appear rather incompetent to others.
11. Avoiding a show of low ability is more important to me than learning a new skill.
12. I'm concerned about taking on a task at work if my performance would reveal that I had low ability.
13. I prefer to avoid situations at work where I might perform poorly.

1------------------2----------------3--------------------4-----------------5----------------6

| Strongly | Disagree | Slightly | Slightly | Agree | Strongly |
| Disagree | | Disagree | Agree | | Agree |

Appendix D - Generalized Self-Efficacy (Chen, Gully & Eden, 2001)

1. I will be able to achieve most of the goals I set for myself.
2. When facing difficult tasks, I am certain that I will accomplish them
3. In general, I think I can obtain outcomes that are important to me
4. I believe I can succeed at most any endeavor to which I set my mind.
5. I will be able to successfully overcome many challenges.
6. I am confident that I can perform effectively on many different tasks.
7. Compared to other people, I can do most tasks very well.
8. Even when things are tough, I can perform quite well.

1------------------2----------------3---------------------4-----------------5----------------6

| Strongly | Disagree | Slightly | Slightly | Agree | Strongly |
| Disagree | | Disagree | Agree | | Agree |

Appendix E - Self-Esteem (Rosenberg, 1965)

1. On the whole, I am satisfied with myself.
2. At times, I think I am no good at all.
3. I feel that I have a number of good qualities.
4. I am able to do things as well as most other people
5. I feel I do not have much to be proud of.
6. I certainly feel useless at times.
7. I feel that I am a person of worth, at least on an equal plane with others
8. I wish I could have more respect for myself.
9. All in all, I am inclined to feel that I am a failure.
10. I take a positive attitude toward myself.

1------------------2----------------3--------------------4-----------------5----------------6

| Strongly | Disagree | Slightly | Slightly | Agree | Strongly |
| Disagree | | Disagree | Agree | | Agree |

Appendix F - Locus of Control (Levenson, 1981)

1. When I get what I want, it's usually because I worked hard for it
2. My life is determined by my own actions
3. I am usually able to protect my personal interests
4. When I make plans, I am almost certain to make them work
5. I can pretty much determine what will happen in my life
6. To a great extent, my life is controlled by accidental happenings
7. When I get what I want, it's usually because I'm lucky
8. It's not always wise for me to plan too far ahead because many things turn out to be a matter of good or bad fortune
9. It's chiefly a matter of fate whether or not I have a few friends or many friends
10. Whether or not I get to be a leader depends mostly on my ability

1------------------2----------------3--------------------4-----------------5----------------6

| Strongly | Disagree | Slightly | Slightly | Agree | Strongly |
| Disagree | | Disagree | Agree | | Agree |

Appendix G - Emotional Stability (Goldberg, 1999)

Describe yourself as generally are now, not as you wish to be in the future. I generally…….

1. Worry about things
2. Fear for the worst
3. Am afraid of many things
4. Get stressed out easily
5. Get caught up in my problems
6. Am not easily bothered by things
7. Am relaxed most of the time
8. Am not easily disturbed by events
9. Don't worry about things that have already happened
10. Adapt easily to new situations
11. Remain calm under pressure
12. Can handle complex problems
13. Know how to cope
14. Am calm even in tense situations
15. Readily overcome setbacks

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1------------------2----------------3---------------------4-----------------5----------------6
```

| Strongly | Disagree | Slightly | Slightly | Agree | Strongly |
| Disagree | | Disagree | Agree | | Agree |

Appendix H - Need for Achievement (Jackson Personality Research Form, 1974)

1. People should be more involved with their work.
2. I enjoy difficult work.
3. I will not be satisfied until I am the best in my field of work.
4. I would work just as hard whether or not I had to earn a living.
5. My goal is to do at least a little bit more than anyone else has done before.
6. I often set goals that are very difficult to reach.
7. As a child I worked a long time for some of the things I earned.
8. I don't mind working while other people are having fun.
9. I seldom set standards which are difficult for me to reach. (R)
10. I have rarely done extra studying in connection with my work. (R)
11. I try to work just hard enough to get by. (R)
12. I do not let my work get in the way of what I really want to do. (R)
13. In my work I seldom do more than is necessary. (R)
14. People seldom think of me as a hard worker. (R)
15. It doesn't really matter to me whether or not I become one of the best in my field of work. (R)
16. I am not really certain what I want to do or how to go about doing it. (R)

1------------------2----------------3--------------------4-----------------5----------------6

| Strongly | Disagree | Slightly | Slightly | Agree | Strongly |
| Disagree | | Disagree | Agree | | Agree |

Appendix I - Fear of Negative Evaluation (Leary, 1983)

1. I worry about what people will think of me even when I know it doesn't make any difference.
2. I am unconcerned even if I know people are forming an unfavorable impression of me. (R)
3. I am frequently afraid of other people noting my shortcomings.
4. I rarely worry about what kind of impression I am making on someone. (R)
5. I am afraid that others will not approve of me.
6. I am afraid that people will find fault with me.
7. Other people's opinions of me do not bother me. (R)
8. When I am talking to someone, I worry about what they may be thinking about me.
9. I am usually worried about what kind of impression I make.
10. If I know someone is judging me, it has little effect on me. (R)
11. Sometimes I think that I am too concerned with what other people think of me.
12. I often worry that I will say or do the wrong things

Appendix J - Social Desirability (Crowne and Marlowe, 1964)

1 – True of me

2 – Not true of me

1. Before I vote, I thoroughly investigate the qualifications of all of the candidates.

2. I never hesitate to go out of my way to help someone in trouble.

3. I have never intensely disliked anyone.

4. I sometimes feel resentful when I don't get my way.

5. I am always careful about my manner of dress.

6. My table manners at home are as good as when I eat out in a restaurant.

7. If I could get into a movie without paying and be sure I was not seen, I would probably do it.

8. On a few occasions, I have given up doing something because I thought too little of my ability.

9. I like to gossip at times.

10. There have been times when I felt like rebelling against people in authority even though I knew they were right.

11. No matter who I'm talking to, I'm always a good listener.

12. I can remember "playing sick" to get out of something.

13. There have been occasions when I took advantage of someone.

14. I'm always willing to admit it when I make a mistake.

15. I always try to practice what I preach.

16. I don't find it particularly difficult to get along with loudmouthed, obnoxious people.

17. I sometimes try to get even rather than forgive and forget.

18. When I don't know something, I don't mind admitting it.

19. I am always courteous, even to people who are disagreeable.

20. I never resent being asked to return a favor.

21. I never make a long trip without checking the safety of my car.

22. I have never deliberately said something that hurt someone's feelings

ARLISE P. MCKINNEY

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EDUCATION

Ph.D.	Virginia Polytechnic Institute and State University, December 2003 Department of Management Major: Organizational Behavior/Human Resources Minor: Industrial & Organizational Psychology **Dissertation Title**: Goal Orientation: A Test of Competing Models Chairs: Dr. T. W. Bonham and Dr. K. S. Singh
M.B.A.	The University of North Carolina at Greensboro M.B.A., May 1996
B.S.	The University of North Carolina at Greensboro B.S., Accounting, May 1989

PUBLICATIONS:

McKinney, A. P., Carlson, K. D., Mecham, R. L., D'Angelo, N., & Connerley, M. L. "Recruiters' Use of GPA in Initial Screening Decisions: Higher GPAs Don't Always Make the Cut." In press at Personnel Psychology.

CONFERENCE PRESENTATIONS

Hollander, E. R., Watt, A., & **McKinney, A. P.** "NBADS Format: Further support to its advantages over other formats." Presented at the Society of Industrial and Organizational Psychology Annual Meeting, Orlando, FL, April 2003.

CONFERENCE PRESENTATIONS (Continued)

Donovan, J. J., **McKinney, A. P.** & Quintela, Y (Chairs). "Work motivation: Theoretical approaches to understanding contextual performance behaviors." Panel discussion presented at the Society of Industrial and Organizational Psychology, Annual Meeting, Orlando, FL, April 2003.

McKinney, A. P., & Carlson, K. D. "The Incremental Contribution of Trait Goal Orientation in Explaining Performance Variability." Presented at the Society of Industrial and Organizational Psychology Annual Meeting, Toronto, CA, April 2002.

McKinney, A. P., Mecham, R. L., D'Angelo, N., Carlson, K. D., & Connerley, M. L. "GPA and the Likelihood of Adverse Impact in Screening Decisions." Presented at the Society of Industrial and Organizational Psychology Annual Meeting, San Diego, CA, April 2001.

RESEARCH IN PROGRESS

Working Papers:

McKinney, A. P., & Carlson, K. D. "Trait conceptualizations of goal orientation: A meta-analytic examination of criterion-related validity." Targeted at Personnel Psychology.

McKinney, A. P. "The interactive effects of self-efficacy and trait goal orientation in explaining performance variability." Targeted at Human Performance.

McKinney, A. P. "The predictive validity of personnel selection assessments and the likelihood of adverse impact: A case for integrity tests." Targeted at the Journal of Applied Psychology.

RESEARCH INTERESTS

Primary Research Interests:

Work Motivation and Job Performance – extending research in work motivation with a focus on identifying motivational traits and self-regulatory behaviors to examine these relationships with job performance.

Individual Differences – examining the construct validity evidence for trait (e.g., personality, goal orientation) and state (e.g., self-efficacy, affectivity) constructs in organizational research focusing on the conceptual development of these constructs and the psychometric properties of associated measures.

Job Performance – extending research that explores the nature of the job performance criterion to examine the unique influence of task and contextual performance behaviors on supervisory ratings of job performance.

TEACHING EXPERIENCE:

August 2003 – Present   **Assistant Professor** – Department of Business Administration
The University of North Carolina at Greensboro
- Industrial and Organizational Psychology
- Managing Diversity
- Understanding Work Team Effectiveness

June 2000 – July 2003   **Instructor** – Department of Management
Virginia Polytechnic Institute and State University
- Organizational Behavior
- Human Resource Management
- Principles of Management

ACADEMIC PROFESSIONAL ACTIVITIES

Academy of Management (AOM)
Southern Management Association (SMA)
Society of Industrial and Organizational Psychology (SIOP)
Center for Advanced Research Methods (CARMA)
KPMG Management Doctoral Students Association, PhD. Project
National Black MBA Association

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Wachovia Corporation, Winston-Salem, NC

1997 – 1999   <u>**Consumer Sales and Service**</u>
Project Manager, Training & Development
Responsible for planning, development and implementation of consumer sales and service training for 5-state territory with project leadership on the mergers & acquisitions team and business process reengineering efforts

1996 – 1997   **Senior Training Specialist**
Responsible for design, development and delivery of consumer management training program for 5-state territory

1994 – 1996   **Consumer Credit Analyst**
Responsible for ensuring compliance of consumer lending practices for Piedmont Triad Regional Operations

1989 – 1996   **Consumer Branch Manager**
Responsible for the management of consumer branch network to include budgeting, personnel administration, and sales and service

ACADEMIC HONORS & RECOGNITION

April 2003   Recipient, Outstanding Graduate Student Award
                                    Virginia Polytechnic Institute and State University

August 2002   Academy of Management OB/OMT Doctoral Consortium
                                    Representative for Department of Management,
                                    Virginia Polytechnic Institute and State University

August 1999 – May 2002   Recipient, State Dean's Fellowship Award
                                    Virginia Polytechnic Institute and State University