They're All in it Together: A Pattern Approach to Exploring Goal Orientation

Patrice L. Esson

Dissertation submitted to the faculty of the

Virginia Polytechnic Institute and State University

in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

in

Psychology

Neil M.A. Hauenstein, Ph.D. (Co-Chair)

John J. Donovan, Ph.D. (Co-Chair)

Kevin D. Carlson, Ph.D

Roseanne J. Foti, Ph.D.

.

May 11th, 2009

Blacksburg, Virginia

Keywords: Pattern Approach, Goal Orientation, Self-Efficacy, Exerted Effort

They're All in it Together: A Pattern Approach to Exploring Goal Orientation

Patrice L. Esson

Abstract

The purpose of the present study was to expand researchers' understanding of work motivation by taking a pattern approach to the examination of the dimensions of goal orientation. To explore the differential behavior of people who possess different goal orientation patterns, the present study sought to verify the existence of optimal and least optimal patterns using two important motivational outcome variables: self-efficacy and exerted effort. In addition, the role of the performance-approach goal orientation (PGO) dimension within the context of goal orientation patterns was examined. Data was collected from a sample of college students who were asked to perform a puzzle solving task and complete scales assessing their effort exerted and self-efficacy related to this task. Three hundred and seventy one participants were classified into 8 patterns. The results confirmed the existence of an optimal and a least optimal pattern of goal orientation for self efficacy and partially confirmed the existence of such patterns for exerted effort. The findings also suggested that PGO is better understood when it is examined in the context of goal orientation patterns. Specifically, PGO exhibited adaptive behaviors when paired with a strong learning goal orientation (LGO) and weak performance-avoid goal orientation (AGO), and maladaptive behaviors when paired with a strong AGO and low LGO. Taken as a whole, the results indicated that the use of goal orientation patterns produces findings that have not been previously demonstrated by traditional variable-oriented approaches. Implications of these findings and suggestions for future research are discussed.

Acknowledgements

This dissertation would not have been complete without those persons who supported, encouraged, and guided me throughout the entire process. First, I would like to thank my advisor, Dr. John Donovan for mentoring me from a far, and helping me grow into a stronger researcher and person. I would also like to thank the other members of my committee, Dr. Kevin Carlson, Dr. Roseanne Foti, and Dr. Neil Hauenstein, for helping me develop as an independent researcher through challenging my thinking, and offering guidance along the way. To Dr. Neil Hauenstein, thanks for filling in as my advisor in Dr. Donovan's absence. I am grateful to Dr. Carlson and Dr. Foti for always having open doors and for offering words of encouragement.

I am especially grateful Dr. Leifur Hafsteinsson, who so generously shared his data with me, and gave me a starting point for my final product. I also could not have completed this project without the help of three conscientious and dedicated research assistants- Rose Hylton, Candace Lohr and Artie Rothenberg. Thank you for your many hours of hard work.

To my friends who supported, encouraged and prayed for me I am eternally grateful to you. Your emails, greeting cards, text messages and words of encouragement will never be forgotten.

Finally, these acknowledgements would be complete without thanking my family, for their love and support. This accomplishment is shared by all of us. I hope that I have made you all proud. I thank my parents, Godfrey and Velma, and my sister Sharli-Ann for sharing the journey with me and always encouraging me along the way. I am forever grateful to my parents for teaching me the value of working hard, and for always believing in me. Because they have sacrificed so much and asked so little in return, I have chosen to dedicate this dissertation to them.

TABLE OF CONTENTS

List of Tables

Appendices

INTRODUCTION

Over the past two decades, goal orientation has become one of the most prominent and

frequently examined motivational constructs in applied psychology (Button, Mathieu, & Zajac,

1996; Deshon & Gillespie, 2005; Hodge & Petlichkoff, 2000; Kaplan & Maehr, 2007; Levy-

Tossman, Kaplan & Assor, 2007). Goal orientation refers to the goals implicitly pursued by an

individual in achievement settings. It is generally thought that the construct consists of multiple

dimensions (Deshon & Gillespie, 2005; Kaplan & Maehr, 2007). Although, researchers differ

with respect to the total number of dimensions believed to underlie goal orientation, the three

dimensional approach proposed by Elliot and colleagues (see: Elliot & Church, 1997; Elliot &

Harackiewicz, 1996; VandeWalle, 1997) has garnered strong support in recent research

initiatives (Levy-Tossman et al., 2007; Pintrich, Conley, & Kempler, 2003). The three

dimensions are learning goal orientation (LGO), performance-approach goal orientation (PGO),

and performance-avoid goal orientation (AGO). LGO is generally characterized by a focus on

increasing task mastery and the acquisition of knowledge (Dweck & Legget, 1988), while PGO

refers to the need to demonstrate one's competence to others (Elliot & Harackiewicz, 1996). In

contrast, AGO is generally characterized by a desire to avoid negative evaluations from others

(Elliot & Harackiewicz, 1996; VandeWalle, 1997).

Goal orientation has been shown to affect important motivational and outcome variables

such as performance (e.g., Brett & VandeWalle, 1999; Brown, 2001; Kozlowski, et al., 2001;

Payne, Youngscourt, & Beaubien, 2007; Towler & Dipboye, 2001; VandeWalle, Brown, Cron,

& Slocum, 1999), goal setting (e.g., Breland & Donovan, 2005; Payne et al., 2007; Phillips &

Gully, 1997), feedback seeking and response to feedback (e.g., Bell & Kozlowski, 2002; Mangos

& Steele-Johnson, 2001; Park, Schmidt, Scheu, & Deshon, 2007; VandeWalle, Cron, & Slocum,

2001; VandeWalle & Cumming, 1997; VandeWalle, Ganesan, Challagalla, & Brown, 2000),

task enjoyment (e.g., Smith, Balaguer, & Duda, 2006), mental focus (e.g., Lee, Sheldon, &

Turban, 2003), self efficacy (e.g., Phillips & Gully, 1997; Sins, van Joolingen, Savelsbergh, &

van Hout-Wolters, 2008), and exerted effort (e.g., Fisher & Ford, 1998; Kolić- Vehovec,

Rončević, & Bajšanski, 2008; VandeWalle et al., 1999). Despite these findings, goal orientation

research suffers from a noteworthy deficiency which prevents us from having a full

understanding of the construct and its outcomes. This deficiency is the failure to consider how

the dimensions of goal orientation may work together simultaneously to produce these

motivational outcomes.

It has been argued that individuals can, and do endorse varying levels of each goal

orientation dimension simultaneously, resulting in different goal orientation configurations,

patterns or profiles (hereafter referred to as patterns: Barron & Harackiewicz, 2001;

Harackiewicz, et al., 2000; Harwood, Cumming & Hall, 2003; Meece & Holt, 1993; Pintrich,

2000; Pintrich et al., 2003; Roedel et al., 1994). That is, a person may be high or low on all the

dimensions, or may have one of the many possible configurations of high and low across the

dimensions (Cumming, Hall, Harwood, & Gammage, 2002; Harwood et al., 2003; Roedel,

Schraw, & Plake, 1994). However, researchers who study goal orientation typically follow the

traditional individual difference or *variable-oriented* approach in their examination of this

motivational construct (Levy-Tossman, Kaplan, & Assor, 2007). The variable-oriented approach

focuses on understanding the characteristics and behavior of individual variables (Magnusson,

1997). When using this approach, researchers tend to explore and report the main effects or

individual relationships of each goal orientation dimension with outcome variables separately

(Cumming, et al., 2002; Harwood, Cumming, & Fletcher, 2004).

While the examination of main effects using variable-oriented approach has produced beneficial and meaningful results, researchers tend to report them automatically without examining the possibility of simultaneous effects of LGO, PGO and AGO (Cumming et al., 2002; Harwood et al., 2004). This practice occurs despite the theoretical arguments and psychometric evidence that suggest that the dimensions of goal orientation are likely to work together simultaneously to affect individual behavior (e.g., Button et al., 1996; Deshon & Gillespie, 2005; Duda & Nichols, 1992; Farr, Hoffman & Ringenbach 1993; Fortunato, 2006; Fortunato & Goldblatt, 2006; Harackiewicz, Barron, Tauer, & Elliot, 2002; Hodge & Petlichkoff, 2000; Nicholls, 1984, Pintrich, 2000; Pintrich et al., 2003; Roedel et al., 1994; Sit & Lindner, 2007), and despite evidence that pattern oriented approaches have the potential to provide an understanding of individual difference constructs above and beyond the findings produced by the variable-oriented approach (Bergman & Magnusson, 1997; Magnusson, 2003). More specifically, researchers have argued that pattern approaches may produce information not necessarily seen when behavior is examined at the variable level (Bergman & Magnusson, 1997; Magnusson, 1997). Further, it has been suggested that goal orientation patterns may account for more variance in outcome variables than the individual dimensions (Barron & Harackiewicz, 2001; Fortunato, 2006), and that a pattern oriented examination may clarify some of the inconsistent findings associated with specific dimensions such as PGO and AGO (Donovan, Esson, & Bakert, 2007; Donovan, Esson, & Kutcher, 2009; Harackiewicz et al., 2002).

Despite these potential benefits of utilizing a pattern approach, most researchers continue to only examine and report the unique relationships between the individual goal orientation dimensions and outcome variables. While research that takes a pattern approach to examining goal orientation does exist, there is no evidence to suggest that this approach is becoming more

common in empirical endeavors (Deshon & Gillespie, 2005). In addition, with the exception of a few (e.g., Donovan et al., 2007; 2009; Fortunato, 2006; Fortunato & Goldblatt, 2006), studies that have taken a pattern approach have typically been conducted using the two dimensional model of goal orientation, despite widespread acceptance of the three dimensional model and the strong conceptual arguments for the importance of the approach-avoid distinction within performance goal orientation.

Because of their potential to inform and expand our understanding of goal orientation, the simultaneous effects of the dimensions of goal orientation are worthy of exploration. As such, the purpose of the present study was to address this limitation in the goal orientation literature by taking a pattern approach to the examination of goal orientation and its outcomes. Given this limitation in the current goal orientation research literature and the advantages of taking a pattern approach to examining this construct, the present study sought to expand research in this area in several ways. First, the three dimensional model of goal orientation (i.e., LGO, PGO and AGO) was examined from a pattern perspective, given the strong theoretical and empirical support for its use. Second, the present study examined two important motivational outcome variables, self-efficacy and exerted effort. While limited pattern research has examined these variables, to date no pattern research has examined exerted effort using the three dimensional model of goal orientation. Third, the present study sought to present initial evidence regarding what the "optimal" and "least optimal" patterns are with respect to the outcome variables of self-efficacy and exerted effort. Finally, the present study sought to clarify inconsistencies within the traditional goal orientation research regarding the PGO dimension using the pattern approach.

The Pattern Approach

Before the focal variables of the present study are discussed, the pattern approach is defined and described. In addition, this approach will be compared and contrasted to the traditional variable-oriented approach so as to clearly demonstrate the advantages of using a pattern approach to explore goal orientation, and to proffer support for the argument that taking a pattern approach serves to complement the variable-oriented findings.

The pattern approach is a methodological aspect of a larger theoretical framework known as the person-oriented approach (Bergman & Magnusson, 1997; Magnusson, 1997). Person-oriented theorists purport that in order to fully understand human behavior one must focus on examining the simultaneous impact (as compared to the individual impact) of the components that influence the specific behavior being studied within a given context (Bergman & Magnusson, 1997; Magnusson, 1997). This approach reflects the precepts of the Gestalt philosophy which suggests that the whole is greater than the sum of the parts: In order to fully understand human functioning it is important to examine human behavior as a totality rather than solely focusing on the unique effects of individual variables on specific behaviors (Magnusson, 1997).

Researchers argue that there are six tenets that govern the person-oriented approach (Bergman & Magnusson, 1997; Bergman & Trost, 2003; von Eye & Bergman, 2003). First, the structure and dynamic of individual behavior are seen as being unique to the individual (Bergman & Magnusson, 1997; von Eye & Bergman, 2003). Second, because of the complexity of human functioning, many factors of human behavior and their interactions need to be taken into account (Bergman & Magnusson, 1997; Magnusson, 1999; von Eye & Bergman, 2003). Third, despite this complexity, there is lawfulness and structure in the human behavioral process

(Bergman & Magnusson, 1997; von Eye & Bergman, 2003). Fourth, this lawfulness is best seen in the context of patterns of behaviors (Bergman & Magnusson, 1997; Magnusson, 1997; Magnusson, 1999; von Eye & Bergman, 2003). Fifth, the interpretation and implication of behavior is best determined through the interactions of factors or components with other factors within these patterns (Bergman & Magnusson, 1997; von Eye & Bergman, 2003). Finally, some patterns may occur more frequently than other patterns as a consequence of the dynamics of the system (Bergman & Magnusson, 1997; von Eye & Bergman, 2003). These six tenets result in the overarching precept of the person-oriented approach which suggests that an interactive, holistic perspective of the individual is needed in order to fully understand human behavior (Von Eye & Bergman, 2003). The characteristic feature of the person-oriented approach is that the problem under consideration is formulated in terms of people and operationalized and studied in terms of patterns of components or variables that are relevant to the problem being considered (Magnusson, 1997). The overall goal of the person-oriented approach is to discover distinct patterns from a set of theoretically relevant components that characterize different persons and help to explain human behavior (Magnusson, 1997).

Thus, the methodological approach through which the components associated with a specific problem are measured and studied together in the context of various patterns in order to give a better understanding of that problem is known as the pattern approach (Bergman & Magnusson, 1997; Bergman & Trost, 2003; Magnusson, 1997). Because of its focus on examining a finite number of patterns that can be used to describe and explain different types of people, it can be argued that the pattern approach restores the "person" to the study of human behavior (Bergman and Magnusson, 1997). Thus, the unit of analysis in this pattern approach is the person. Researchers who use this approach believe that individuals function as a whole with

several variables, factors, or components (such as, traits, values, and goals,) working together simultaneously to impact those individuals' behavior (Bergman & Magnusson, 1997; Bergman & Trost, 2003; Magnusson, 1997). At the core of the pattern approach is the indivisibility of the components being used to define and explain the phenomenon examined (Bergman & Magnusson, 1997; Bergman & Trost, 2006). That is, the components in a pattern gather meaning from each other: They are only interpretable in relation to the other components being considered simultaneously (Bergman & Magnusson, 1997; Bergman & Trost, 2006; Magnusson, 1997).

As such, patterns are seen as integrated webs of components that are used to classify individuals who display similar trends among the focal components into groups (Magnusson, 1999; von Eye & Bergman, 2003). People are placed into homogeneous groups based on their scores across several theoretically relevant components. Once people are placed into their respective groups these groups become the focus of study. Researchers posit that the number of patterns that emerge from pattern explorations are usually small, and that the occurrence of patterns that are considered optimal is possible (Bergman, 1997; Bergman & Magnusson, 1997). The pattern approach is most suited for use when the focus of a study is on understanding how different types of people behave in a given context.

Although, the pattern approach proposes a holistic approach to examining human behavior, it is standard practice within the discipline of psychology to focus on examining the unique characteristics of, and the relationships among variables, rather than individuals (Bergman & Magnusson, 1997; Magnusson, 1997). Traditionally in research, individual behavior is conceptualized and analyzed at the variable level (Bergman & Magnusson, 1997; Magnusson, 1997). That is, problems are formulated, examined, the results of studies interpreted, and generalizations made based solely on the variables (Magnusson, 1997). This approach is known

as the variable-oriented approach. In the variable-oriented approach the belief is that the mechanisms underlying people's behavior can be revealed by examining the relationships between variables across individuals (Bergman & Trost, 2006; Magnusson, 1997). Variable-oriented research is based on the assumptions that populations are homogeneous, and that relationships among variables studied across people are valid for the relationships among the variables within individuals (Magnusson, 1997; von Eye & Bergman, 2003; von Eye & Bogat, 2006). Variables (not people) are seen as the actors for the processes being examined (Magnusson, 1997). Thus, the focus of the variable-oriented approach is on a single variable or combination of variables and their relationships with specific outcomes. It can be argued that the variable-oriented approach is best suited for research that is focused on understanding specific constructs or the relationship among multiple constructs. In general, the variable-oriented approach provides researchers with the opportunity to comprehend the functioning of specific variables by examining the general principles and characteristics of those variables (Magnusson & Törestad, 1993). Unfortunately, the results of variable-oriented research are often interpreted in terms of human functioning instead of variable functioning.

Thus, while this approach offers a simple, easily understood method of examining individual differences, it presents models that result in the conceptualization of people through the summation of variables and ignores important interactions among these variables (Magnusson, 2000; Magnusson, & Törestad, 1993). In addition, because the information provided by the variable-oriented approach focuses on the description of variables, it is often difficult to translate outcomes of research using this approach into properties that allow for the accurate characterization of individuals (Bergman, Magnusson, & El-Khouri, 2003; Bergman & Magnusson, 1997; Magnusson, 1997). The ability to create an understanding of complex

behavior is central to the pattern approach (Bergman & Magnusson, 1997). Researchers suggest that this characteristic of the pattern approach makes it a feasible compliment to the use of the variable approach. The pattern approach's capacity to address other limitations associated with the variable approach also speaks to this methodology's ability to compliment the use of the variable-oriented approach.

Because of its holistic approach to exploring human behavior, the pattern approach produces findings above and beyond those found at the variable level. Researchers have argued that the pattern approach can (and does) produce results regarding certain variables that are not found when the variable-oriented approach is used (e.g., Magnusson, 1997; Dilchert, 2007; Foti & Hauenstein, 2007; Smith & Foti, 1998; von Eye, Bogat, & Rhodes, 2006). To illustrate, Foti and Hauenstein (2007) noted that variable-oriented findings seem to suggest that separate individual difference variables predict leadership effectiveness versus leadership emergence. The researchers noted that whereas personality variables had the strongest relationships with leadership effectiveness, cognitive ability was most strongly correlated with leadership emergence. However, when a pattern approach was used to examine both leadership outcomes the results suggested that the pattern that characterized by high levels of intelligence, dominance, general self-efficacy and self-monitoring consistently predicted both effectiveness and emergence. This example demonstrates that while the variable-oriented approach does produce meaningful outcomes, the use of the pattern approach can produce additional information regarding human behavior above and beyond those variable-oriented findings.

Researchers have also noted that in certain settings the pattern approach can and does account for more variance in predicting outcomes than the variable-oriented approach (e.g., Asendorpf & Denissen, 2006; Dilchert, 2007; Fortunato, 2006; Foti & Hauenstein, 2007;

Magnusson, 1997). For example, in a study examining the differential behaviors of goal orientation patterns with regards to job attitudes, Fortunato (2006) found that goal orientation patterns explained more variance in outcome variables than the variance explained by variable-oriented findings. Specifically, Fortunato (2006) found that variance explained by goal orientation patterns ranged from 5 to 10% while the variance explained by the use of the variable-oriented approach never exceeded 2%. These findings support theoretical assertions by Magnusson (1997, 1999) and colleagues (Bergman & Magnusson, 1997) that the use of the pattern approach can account for variance in prediction above and beyond the variance produced using the variable-oriented approach.

Beyond the issue of enhancing predictive validity, it is frequently argued that the pattern approach may help to clarify some of the perplexing findings that result from variable-oriented research. Specifically, the pattern approach allows for the examination of non linear interactions among components and suggests that conclusions should be based on a holistic interpretation of the data rather than on the interpretation of specific variable-based outcomes (Bergman & Magnusson, 1997). That is, the meaning ascribed to a variable within the context of a pattern is based on the other variables with which it is paired (Magnusson, 1997). As such, inconsistent findings at the variable level may actually indicate failure to consider the levels of other variables that may be working concurrently to produce some outcome. For example, Bergman and El-Khouri (2001) note that one of the assumptions of the variable-oriented approach is that behavior occurs in a linear fashion. When human behavior does not meet this assumption, the results of statistical analyses such as correlations present a distorted picture of the phenomenon and may result in inconsistent findings (Bergman & El-Khouri, 2001). The use of the pattern approach allows for the examination and explanation of such dynamic non-linear relationships

that can produce meaningful and understandable information regarding human behavior (Bergman & El-Khouri, 2001). As such, the use of the pattern approach may assist in clarifying some of the inconsistencies found in the outcomes of variable-oriented findings.

In addition, researchers have argued that because the variable-oriented approach does not examine behavior at the level of the individual, generalizing the results of variable-oriented research to the individual level may prove substantially more challenging than generalizing the results of pattern-oriented research (Bergman & Magnusson, 1997). It should be noted that when used appropriately (to generalize at the variable level), variable-oriented findings generalize as well as pattern-oriented findings. However, in attempting to generalize from the variable level to the person level, variable-oriented results lose both predictability and the ability to generalize effectively. Thus, another advantage of the person–oriented approach is that the empirical results are generalizable to people not variables (Magnusson, 1997).

In general, the major difference between the pattern approach and the variable-oriented approach is in the view and interpretation of the number that is used to indicate a person's position on some trait (Magnusson, 1997). In the variable-oriented approach a single point of datum derives its meaning from its position relative to other persons' locations on that same dimension (Magnusson, 1997). On the other hand, in the pattern approach each single point of datum derives its meaning from its place in a pattern of data for one particular individual (Magnusson, 1997). Although an argument is made here for the use of the pattern approach in the present study, the use of a variable-oriented approach should not be discounted. In fact, neither of these two research methodologies is considered inherently superior (Magnusson & Törestad, 1993). Instead, it should be noted that the pattern approach and the variable-oriented approach can and do complement each other (e.g., Bergman & Magnusson, 1997; Bergman &

Trost, 2003; Magnusson, 1997; Magnusson & Törestad, 1993). Variables play a critical role in pattern-oriented research: Findings of variable-oriented research are often used to identify contributors to the particular pattern being studied. Thus, the variable–oriented approach often serves as the first step in the identification and explanation of variables for the pattern analysis (Magnusson, 1995).To arrive at interpretations and provide us with a clear understanding of complex human behavior the pattern approach often builds on the foundation laid by the results of the variable-oriented approach (Magnusson, 1997). Thus, in order to fully understand human behavior, both the variable-oriented studies and pattern oriented studies are needed (Magnusson & Törestad, 1993).

The Pattern Approach versus the Variable-Oriented Approach: An Example

While in theory the pattern and variable-oriented approaches are distinct methodological approaches that complement each other, it is sometimes difficult to distinguish which approach is best suited for a given research scenario. The use of one method over the other should be informed by the inherent nature of the issue being examined. The following example serves to demonstrate the differences between the two methods by identifying situations in which each method would be best suited for use. Both the theoretical and empirical characteristics of the two approaches are discussed below.

A school is recruiting several students to participate in an accelerated academic program. The developers of the program have determined that they would ideally like to have students who feel confident in their ability to succeed (measured by self-efficacy) and who regularly exert a great deal of effort. The program developers have decided to use goal orientation theory to help them in their process. Whether they use the variable –oriented approach or the pattern approach will depend on several factors.

One important theoretical question is what question they are trying to answer? If they are concerned about understanding how each dimension of goal orientation relates to self-efficacy and exerted effort then the variable-oriented approach should be adopted. This is so because the question focuses on the relationship between one variable (a specific dimension of goal orientation) and another variable (self-efficacy or exerted effort). Thus, the unit of analysis would be the variable. However, if their concern is "What combination of the three dimensions do the students who exert the most effort display?", then a pattern-oriented approach would be most suited to answer this question. This is so because the root question being examined is "what type of student is likely to exert the most effort?". In this situation the focus would be on the different subgroups that could be used to categorize students based on their standings on the dimensions of goal orientation. Thus, the question being explored can play a role in determining which approach is best suited to be used.

Outside of the question being examined, the characteristics associated with each approach may also play a role in determining which method is most suitable for use in a given scenario. Suppose the developer is told that research results indicate that LGO is positively correlated with self-efficacy at the variable level. This would bring two issues to the forefront that would highlight the idiosyncrasies of each of these approaches. One is the proper interpretation of this finding. Frequently findings at the variable level are mistakenly generalized to the person level. Thus, the developer might automatically conclude that applicants who score high on the LGO dimension will all exhibit high levels of self-efficacy. However, such an interpretation ignores the applicant's standing on the other dimensions of goal orientation and inadvertently results in the grouping of applicants by their standing on only one of three potentially inter-related dimensions. That is, an applicant would be considered either a high LGO, or a high AGO or a

high PGO person even though he/ she may have scored highly on all dimensions. This highlights the second issue: While being high in LGO (an adaptive dimension) is seen as a positive trait being high on AGO (a maladaptive dimension) is seen as a negative trait. As such, a student who is high on both traits may not be seen as a good potential candidate. The variable approach will allow the developers to look at the interaction between two dimensions quite easily. However, the addition of the third dimension (PGO) would make the interpretation of results at the variable level challenging as the role of each variable in a three way interaction is difficult to interpret. In addition, the dimensions may function differently as a result of existing simultaneously. The effects on self-efficacy and exerted effort of the simultaneous exhibition of various levels of the dimensions of goal orientation would be difficult to observe using the variable-oriented approach. Because the pattern approach argues that the dimensions within a pattern gather meaning from each other the pattern approach would be better suited for examining the simultaneous effects of the three dimensions. The use of the pattern approach would allow the developers of the program to take into account applicants' scores on all three dimensions in a manner that would allow them to describe types of applicants. Thus the use of the pattern approach would allow the developers to examine and interpret complex interactions among the dimensions of goal orientation.

Outside of the theoretical distinction between the two approaches, empirical factors also play a role in determining which approach is most suitable for use in a given scenario. The concept of homogeneity plays an important role in empirically distinguishing between the two approaches. The variable approach is based on the assumption of homogeneity of individuals. That is, all things being equal, the developers of the program would assume that students who were high on any one dimension would exert the same amount of effort and exhibit the similar

amounts of efficacy. The pattern approach argues that an applicant who exhibits a particular combination of goal orientation dimensions should be placed in a group with other applicants who exhibit the same combination of dimensions. Thus the homogeneity in the pattern approach exists within each pattern. That is, the pattern approach suggests that students who score high on LGO, low on PGO and high on AGO should all be placed in the same group. This concept of homogeneity can be used to assist the developer of the program in deciding which method is most appropriate for helping him select from the pool of applicants. To do this the developer would have to examine two types of variance the between group variance and the within group variance. High between groups variability suggest that the difference between patterns is substantial while low between group variability indicates that the difference between patterns is minimal. High within group variability suggests that there are differences in the characteristics among the members of a group while low within group variability suggest that the persons within a pattern exhibit similar characteristics. If all moderators are accounted for or no moderators are present, the combination of a high between group variability and a low within group variability may suggests that the pattern approach would be best suited to describe the data. The combination of a low between group variability and high within group variability suggests that the variable-oriented approach may be more appropriate for use: The groups are not substantially different from each other and variability exists within the groups suggesting that individual variables may play distinct roles in people's behavior instead of a combination of variables. The developer may use the variability statistics to help him/ her to determine whether the patterns created are comprised of applicants who are truly similar to each other and if the patterns themselves are distinct from each other. If the applicants within a given pattern are dissimilar the within groups variability will be high which would suggest that homogeneity does

not exist within the group. If the groups themselves are quite similar the between groups variance would be small would suggest homogeneity among the members of the groups. See Appendix A for an empirical demonstration of this concept.

Another important empirical factor that may help the program developers decide which approach is best suited for their needs is the predictive validity. The argument here is simple. If the variable approach is most suitable for use then variable oriented findings should account for the substantial proportion of variance in predicting a specific outcome variable. If the pattern approach is more suitable for use the patterns should either account for more variance in predicting an outcome variable or add incremental validity to the prediction of that outcome variable. This would suggest that the developers of the program would need to run a regression analysis and examine the proportion of variance explained by the variables as well as the proportion of variance explained by the patterns.

The pattern approach and the variable approach both explain and educate researchers about various phenomena. Although researchers often default to using the variable-oriented approach, the above described example demonstrates that the thought process that goes into the choice of methodology is important and should not be ignored. While a given research scenario may not permit or necessitate an exploration of each of the issues described above it is still important that researchers make every effort to choose the appropriate method. The present study was focused on understanding the amount of self-efficacy and exerted-effort produced by persons with different goal orientation patterns. As such, the pattern approach was deemed the appropriate methodology for this examination.

The Goal Orientation Construct

Goal orientation was independently conceived by different psychologists during the mid to late 1970s through the 1980s (e.g., Ames, 1984; Dweck, 1975, 1986, 1989; Maehr, 1983; 1984; Nicholls, 1975). Researchers Nicholls and Dweck proposed conceptualizations of achievement goals that have been particularly influential in the development of achievement goal and goal orientation theories (Elliot, 2005). Nicholls (1984) purported that people defined success in two ways, *task involvement* and *ego involvement*. Task involvement is hypothesized as being a self referent, intrinsically motivated goal that resulted in a focus on task mastery. In contrast, ego involvement is external referent; the primary goal of people high in ego involvement is to demonstrate competence when compared to others. Independent of Nicholls (1975), Dweck (1975, 1986, 1989) and her colleagues (Dweck & Elliott, 1983; Dweck & Leggett, 1988) were concurrently examining achievement motivation. From their research, two distinct classes of goals were identified: *performance goals* and *learning goals*. Performance goal oriented individuals' behavior was characterized by the need to receive favorable judgments from others regarding their competence and by the need to avoid failure. Learning goal oriented individuals' behaviors were characterized as being concerned with developing their competence and task mastery. Although differences exist between Nicholls' (1975, 1984) and Dweck's (1975, 1986, 1989) frameworks, Elliot (2005) suggests that the similarities between the two (e.g., the focus on mastery and competence) outweigh their differences. Given these similarities, Ames and Archer (1987, 1988) proposed an integrative achievement goals approach. Over time the constructs in this integrated approach collectively became known as *goal orientation* by researchers, especially by those in the field of work motivation (e.g., Farr et al., 1993).

Dimensions of Goal Orientation

Along with the integration of conceptualizations came a proliferation of research examining potential outcomes of goal orientation. For example, LGO was found to be associated with many positive outcomes such as increased self-efficacy (e.g., Phillips & Gully, 1998), high levels of task interest (e.g., Harackiewicz, Barron, Tauer, Carter, & Elliot, 2000) and task knowledge (e.g., Fisher & Ford, 1998). However, as noted by Payne et al. (2007) in their review of the goal orientation literature, the outcomes associated with performance goal orientation were less conclusive. For example, when examining the relationship between performance goal orientation and self-efficacy, some researchers found a negative relationship between the two variables (e.g., Ford, Smith, Weissbein, Gully, & Salas, 1998; Phillips & Gully, 1997), while others found a positive relationship (e.g., Brown, 2001) or found no relationship between the two variables (e.g., Bell & Kozlowski, 2002; Chen, Gully, Whiteman, & Kilcullen, 2000; Donovan & Hafsteinsson, 2006).

Elliot (1994; 2005) suggested that these inconsistencies were due to the confounding of the avoid and approach aspects of performance goals. He proposed that performance goal orientation be separated into two dimensions: performance-approach orientation (PGO) and performance-avoid orientation (AGO), while learning goal orientation (LGO) remained as it was originally conceptualized. In this new three dimensional framework, LGO was focused on the attainment of task mastery, PGO was characterized by the attainment of normative competence, and AGO was characterized by the avoidance of normative incompetence (Elliot, 1994; Elliot & Church, 1997). Research results have indicated that the three dimensional model produces more robust outcomes than alternative two and four dimensional frameworks (Elliot, 2005). The characteristics of each of the dimensions are summarized below.

Learning goal orientation (LGO). Persons who possess high levels of LGO are concerned with improving their understanding and mastery of tasks (Dweck, 1986; Dweck & Leggett, 1988; Farr, et al., 1993). These individuals are not focused on appearing competent in front of others and as a result, view challenging achievement situations as learning opportunities. These persons display affect, behaviors, and cognitions that encourage and support goal attainment. Researchers have noted that regardless of their levels of ability, individuals high in LGO view failure as an opportunity to receive valuable feedback that will assist them in attaining task mastery, ultimately leading to personal growth (Dweck, 1989). As such, individuals high in LGO are more likely than those low in LGO to seek out challenges. In addition, persons high in LGO view the exertion of effort as a tool to help them master a particular task. The high levels of exerted effort by those persons with high levels of LGO have been linked to persistence towards goals (Dweck, 1989).

Given these propositions about the outcomes associated with high levels of LGO, it is not surprising that research at the variable level has suggested that a positive relationship exists between LGO and several motivational and performance variables such as mental focus, task interest and engagement, persistence, effort, and self-efficacy (e.g., Elliot & Church, 1997; Elliot & Harackiewicz, 1996; Elliot & McGregor, 1999; Harackiewicz, Barron, Carter, Lehto, & Elliot, 1997; Heintz & Steele-Johnson, 2004; Hole, & Crozier, 2007; Lee et al., 2003; Middleton & Midgley, 1997; Phillips & Gully, 1997; VandeWalle et al., 2001; Wolters & Rosenthal, 2000). In a recent meta-analysis summarizing this large body of research, Payne et al. (2007) reported positive correlations between LGO and several proximal and distal consequences including feedback seeking ($r = .20$), and general and specific self-efficacy ($r = .56$ and $r = .31$). Taken as

a whole, the research suggests that LGO has a positive influence on many motivational processes and outcome variables.

Performance approach orientation (PGO). The motives of persons with high levels of PGO are centered around high competence expectancy and achievement motivation. The primary goal of these individuals is to receive favorable judgments from others with respect to their competence (Elliot & Church, 1997; VandeWalle, 1997). Such persons attempt to achieve this goal by trying to look better than others when demonstrating their competence at a particular task (Elliot & Church, 1997; Farr et al., 1993; VandeWalle, 1997). Because individuals with high levels of PGO focus much of their attention on the demonstration of competence, their behavior is often affected by fear of failure (Elliot & Church, 1997). When faced with the possibility of failure, someone with high levels of PGO might abandon his/ her pursuit of achievement.

Research findings related to PGO have highlighted the complexity of this dimension. Results of research regarding PGO are especially confusing, as high levels of PGO have been linked to both positive outcomes such as high levels of persistence and intrinsic motivation (e.g., Elliot & Church, 1997; Elliot & McGregor, 1999), and negative outcomes such as depression, anxiety, shallow processing of information, and unwillingness to seek help (e.g., Elliot, McGregor, & Gable, 1999; Middleton & Midgley, 1997). These results reflect the combination of adaptive and maladaptive motives implicit in PGO.

These uncorrelated findings with respect to PGO could imply that PGO may not be related to these outcome variables or that the opposing motives may at times cancel each other out, thereby resulting in the small or non-significant correlations often found by researchers. However, a third explanation for these findings is that researchers have failed to consider participants levels of LGO and AGO when examining PGO. That is, PGO may not operate as

independently as proposed by the variable-oriented researchers. Instead, the effects of PGO may depend on the levels of LGO and AGO held by an individual. Since the two motives associated with PGO are often associated with contradictory motivational states (fear of failure and achievement motivation), it may be argued that these two aspects of PGO may be exhibited more or less by an individual based upon the level of LGO and AGO that one holds. This explanation supports Elliot and Moller's (2003) argument that PGO is neither all bad, nor all good. Instead, it suggests that PGO's effect may best be seen in conjunction with LGO and AGO.

Performance avoid orientation (AGO). Unlike PGO, AGO is viewed as a completely maladaptive dimension of goal orientation. AGO is characterized by the fear of failure and low competence expectancies (Elliot & Church 1997). For individuals who have a high AGO, challenging situations represent an opportunity for judgments regarding one's competence. (Elliot & Church, 1997). As such, individuals high in AGO tend to avoid challenging situations, such as achievement settings which include learning, as this may be accompanied by errors and others' perceptions that they are incompetent (Elliot & Church, 1997; VandeWalle, 1997). As a result, this form of self-regulation often elicits threat appraisals, defensive behavior, anxiety about negative possibilities, and a great deal of attention to failure-relevant information which may distract these individuals from concentrating on the task at hand (Button et al., 1996; Elliot, 1994; Elliot & McGregor, 1999; Higgins, 1995).

Research findings at the variable level provide evidence in support of many of these theoretical assumptions regarding AGO. For example, Middleton and Midgley (1997) found that AGO was positively correlated with test anxiety ($r = .41$) and avoiding seeking help ($r = .40$), and negatively correlated with self-efficacy ($r = -.11$). VandeWalle et al. (2001) found that after receiving feedback, AGO was negatively correlated to self-efficacy ($r = -.31$), goal setting ($r = -$

.30), and performance on an exam (r = -.23). Porath and Bateman (2006) also found that the levels of AGO displayed by sales persons was negatively correlated to proactive behavior (r = -.29) and performance (r = -.29). In addition to these findings, meta-analytic research results have suggested that AGO is related to both proximal and distal motivational consequences such as increased state anxiety (r = .31), lower levels of feedback seeking behavior (r = -.22), lower levels of self esteem (r = -.31), and lower levels of general and specific self-efficacy (r = -.47 and -.26; Payne et al., 2007). As a whole, research results at the variable level support the assertion that the fear of failure and low competence expectancies associated with AGO makes this dimension maladaptive.

Overview of Outcome Variables

The present study sought to enhance our knowledge of the goal orientation construct by examining the effects of goal orientation patterns on two outcome variables: self-efficacy, and exerted effort. Past research has suggested that these two outcome variables play important roles in the producing more distal motivational outcomes such as goal setting and performance (e.g., Diefendorff, 2004; Ford et al., 1998; Phillips & Gully, 1997; VandeWalle et al., 2001). This examination of these two important motivational outcomes will provide us with a more informative glimpse into how the simultaneous display of different levels of each of the goal orientation dimensions influences motivational processes. In order to lay the foundation for the hypotheses tested in this study, these outcome variables are briefly discussed below.

Self-Efficacy. One the most important constructs within the context of motivational research is self efficacy. Self-efficacy refers to one's judgments regarding his/ her capabilities to successfully perform a task, and is seen by many as a critical variable in the realm of work motivation (e.g., Bandura, 1986;1997; Mangos & Steele-Johnson, 2001; Phillips & Gully, 1997;

Schmidt &Ford 2003; VandeWalle et al., 2001). Specifically, researchers have suggested that self-efficacy is likely to predict several motivational variables including goal setting, performance, and information searching behavior (e.g., Breland & Donovan, 2005; Diefendorff, 2004; Ford et al., 1998; Phillips & Gully, 1997; Potosky & Ramakrishna, 2002; Seijts, Latham, Tasa, & Latham, 2004; VandeWalle et al., 2001). In addition, self-efficacy has been found to be positively correlated with other motivational outcome variables such as effort, locus of control, and task interest (e.g., Harackiewicz et al., 1997; Phillips & Gully, 1997; VandeWalle et al., 2001; Wolters & Rosenthal, 2000).

Self-efficacy is seen as an important motivational outcome of goal orientation because the motives that underlie the dimensions of goal orientation are presumed to impact perceptions of competence among individuals (e.g., Phillips & Gully, 1997; VandeWalle et al., 2001). Researchers generally argue that goal orientation predicts self-efficacy, which in turn predicts more distal outcomes such as goal setting (e.g., Phillips & Gully, 1997). As such, it is believed that self-efficacy mediates the relationship between goal orientation and several important outcome variables such as goal setting and performance (Phillips & Gully, 1997). Past research has consistently produced moderate to high positive correlations between LGO and self efficacy (e.g., Bell & Kozlowski, 2002; Breland, 2004; Diefendorff, 2004; Kozlowski et al., 2001; Phillips & Gully, 1997; Schmidt & Ford, 2003; VandeWalle et al., 2001). A recent meta-analysis reported positive correlations for both the relationship between LGO and specific self-efficacy (r = .31) and for the relationship between LGO and general self-efficacy (r = .56; Payne et al., 2007). These findings are not surprising given that the premise of a LGO is rooted in task mastery and the development of competence. It seems only logical that LGO would be positively

related to feelings of competence. Thus, the general consensus is that LGO exerts a robust and positive effect on self-efficacy across performance settings and tasks.

Unlike the relationship between LGO and self-efficacy, the relationship between PGO and self-efficacy has been somewhat unclear. As noted previously, PGO is characterized by two contrasting motives (striving for achievement and the fear of failure), which may be partially responsible for the inconsistent correlations observed between PGO and self-efficacy. While some researchers have found positive correlations for the relationship between PGO and self-efficacy (e.g., Bong, 2008; Coutinho & Neuman, 2008; Hseih, Sullivan, & Geurra, 2007), others have found that PGO is unrelated to self-efficacy (e.g., Schmidt & Ford, 2003; VandeWalle et al., 2001). Meta-analytic findings support the latter, suggesting that PGO is unrelated to both general and specific-self efficacy (r = -.06 and .03; Payne et al., 2007). However, before dismissing the existence of a relationship between PGO and self-efficacy, one should consider the possibility that these inconsistent results are a function of the complexity of the PGO construct (i.e., a result of the presence of the two contradictory motives described above). The present study proposed that effects of a strong PGO may depend upon the level of AGO and LGO held by individuals, and that our understanding of PGO would be greatly expanded by using a pattern approach. For example, the presence of high levels of LGO may make the striving for achievement aspect of a high PGO salient if AGO is low, while high levels of AGO may put focus on the fear of failure component of a high PGO if LGO is low. As a result of this, it has been argued that a strong PGO considered in isolation will not necessarily produce a positive or negative correlation with self-efficacy. Instead, PGO may demonstrate more consistent relationships when examined simultaneously with LGO and AGO.

Research has suggested that AGO has a more stable and consistent relationship with self-efficacy than PGO. AGO is characterized by the desire to avoid appearing incompetent to others. Researchers have argued that persons with strong AGO often experience paralyzing anxiety and hopelessness, and that this negative motivational state can be so powerful that it undermines self-efficacy (VandeWalle et al., 2001). Research findings have provided evidence in support of this assertion by producing negative correlations between AGO and self-efficacy (e.g., Middleton & Midgley, 2002; VandeWalle et al., 2001). Specifically, Middleton and Midgley (2002) found a negative correlation for the relationship between AGO and self-efficacy in school children ($r = -.25$), while VandeWalle et al. (2001) also reported a negative correlation for the relationship between AGO and self-efficacy in college students ($r = -.31$). Meta-analytic findings also support the assertion that the relationship between AGO and self-efficacy is negative. Payne et al. (2007) reported negative correlations for the relationships between AGO and general self-efficacy ($r = -.47$), and AGO and specific self-efficacy ($r = -.21$). These findings provide evidence that seem to suggest that the negative motivational states associated with AGO are so powerful that people experience feelings of incompetence. That is, persons high in AGO worry so much about appearing incompetent that they actually begin to feel incompetent. In addition, the anxiety associated with the fear of failure is so great that they may thwart attempts to develop competence, which may ultimately magnify feelings of incompetence.

Exerted Effort. In addition to self-efficacy, researchers have suggested that motivation affects performance through influencing the amount of effort allocated to tasks (Kanfer, 1990). It is believed that high levels of effort can lead to successful performance, assuming the individual has the required skills and abilities to perform the task. As such, it is important that we examine the role goal orientation plays in the exertion of effort in achievement settings. Unfortunately,

research examining the relationship between goal orientation and exerted effort has been limited, with researchers typically examining effort related variables such as the intent to exert effort (e.g., Stevens & Gist, 1997; VandeWalle et al., 1999), and the desire to work hard (VandeWalle, 1997). Nevertheless, the few studies that have examined the exertion of effort have suggested that exerted effort mediates the relationship between goal orientation and distal motivational variables such as performance (e.g., VandeWalle et al., 2001). This implies that effort exertion is an important variable in the relationship between goal orientation and more distal outcomes.

Researchers note that because persons high in LGO focus their attention on task mastery and the positive value of the task itself, they are likely to exhibit achievement oriented behaviors such as the exertion of effort (Elliot, 1999; Pekrun et al., 2006). Further, persons with a strong LGO believe that the exertion of effort is necessary for successful task mastery (VandeWalle et al., 2001). Research findings provide evidence in support of these theoretical assertions by producing positive correlations between exerted effort and LGO. For example in studies examining the effects of goal orientation in the classroom, Ames and Archer (1988), Elliot & McGregor (1999) and VandeWalle et al. (2001) reported positive correlations between LGO and self reported exertion of effort ($r = .37$, $r = .28$ and $r = .41$). Similarly, Brookhart, Walsh, and Zientarski (2006) found positive correlations ranging from $r = .34$ to $r = .50$ for the relationship between LGO and exerted effort. Thus, the research conducted to date suggests that LGO is positively related to exerted effort (e.g., Sideridis, 2005; VandeWalle et al., 2001).

In contrast, the relationship between PGO and effort is neither as strong, nor as easily understood. The behavioral pattern associated with PGO is focused on demonstrating competence. Theoretically, it has been argued that persons with high levels of PGO believe that ability is static and that successful performance at any task would depend on one's innate ability

(VandeWalle et al., 1999; 2001). As such, the need to exert effort would suggest a lack of ability and would not reflect someone who is truly competent (VandeWalle et al., 1999; 2001). Thus, researchers originally argued that individuals with high amounts of PGO would be unlikely to exert effort, and that there would be either a null or negative correlation between high levels of PGO and effort exertion (VandeWalle et al., 2001). However, research studies that have examined the relationship between PGO and exerted effort tend to find small, but significant positive correlations between the two variables. Ames and Archer (1988) reported a positive correlation between PGO and the belief that effort results in success ($r = .14$). Positive correlations were also found by Elliot & McGregor (1999), and VandeWalle et al. (2001) for the relationship between PGO and exerted effort ($r = .19$, and $r = .36$, respectively). While these findings contradict original theoretical assumptions regarding PGO, they do suggest that the desire to appear competent is so strong that individuals high in PGO are willing to do whatever they can to achieve this goal so long as they believe the goal is attainable. This proposition is supported by the fact that Hafsteinsson (2004) found that the correlation between PGO and exerted effort was substantially smaller when the task was difficult ($r = .18$) than when the task was simple ($r = .38$). These findings suggest that when the task is simple PGO will have a stronger correlation with effort as the likelihood of successfully displaying competence is higher as compared to difficult tasks. Overall, these findings do suggest that strong PGO is positively related to the exertion of effort.

Unlike PGO, research findings seem to suggest that there is no correlation between AGO and exerted effort (e.g., Elliot & McGregor, 1999; VandeWalle et al., 2001). However, it must be noted that very few studies have examined the relationship between AGO this motivational variable, and therefore it is difficult to draw firm conclusions regarding this relationship.

Theoretically, the anxiety associated with high levels of AGO could be so paralyzing that it should inhibit the exertion of effort. This suggests that AGO may be negatively correlated with exerted effort, and that persons with high levels of AGO should exert less effort than persons with low levels of AGO. In addition, the conceptual foundations of the AGO dimension suggests that individuals with high levels of AGO may view the exertion of effort as an indicator of incompetence (i.e., if you are competent, you shouldn't have to work hard at a task). The inability of researchers to support this theoretical assertion may indicate that these propositions are invalid, or may suggest that AGO's impact on effort exertion could be attenuated by the simultaneous presence of high levels of LGO and PGO. That is, the positive relationship between LGO and PGO and the exertion effort may weaken the anxiety based impact of AGO on exerted effort, thereby resulting in findings of no relationship between AGO and exerted effort. Unfortunately, no published research to date has examined this possibility. The present study sought shed light on the role of AGO on effort by examining the dimension in context of goal orientation patterns.

Summary. This body of research indicates that in many cases goal orientation is linked to the motivational outcomes of self-efficacy and exerted effort (e.g., Breland, 2004; Lee et al., 2003; Sideridis, 2005; VandeWalle et al., 2001). These variables are vital to our understanding of motivation in achievement settings. The variable-oriented research summarized above indicates that LGO is positively related to both outcome variables. However, the results related to AGO and PGO are not as clear. While AGO was found to be negatively correlated with self-efficacy, the dimension did not produce any significant relationships with exerted effort. PGO produced positive relationships with exerted effort, but produced inconsistent or null findings with self-efficacy.

Goal Orientation Patterns

As noted previously, the variable-oriented approach has provided us with a general understanding of the behavioral characteristics associated with each of the goal orientation dimensions of goal orientation, and has helped to establish basic relationships between each of the dimensions and the two outcome variables examined in this study. However, this approach fails to explain how these relationships would look if people simultaneously possessed varying levels of each dimension. The present study argues that goal orientation is an appropriate context for the use of the pattern approach because people do possess varying combinations of these three dimensions (e.g., Fortunato & Goldblatt, 2006) and the behavioral characteristics of such patterns have not been sufficiently examined in the literature. For example, previous studies have failed to examine the existence of optimal and least optimal patterns for predicting motivational outcomes. As such, an examination of the simultaneous effects of the dimensions of goal orientation would expand our understanding of the construct above and beyond the results of the variable-oriented findings.

The use of a pattern approach has several implications for the growth of goal orientation research. First, the pattern approach allows for the examination of complex and dynamic relationships among the dimensions that have not been sufficiently explored in goal orientation literature. Second, the pattern approach offers the potential to explain more variance in outcome variables than the traditional variable-oriented approach thereby highlighting the potential for more accurate predictions of outcomes using patterns (e.g., Fortunato, 2006; Foti & Hauenstein, 2007). Third, specific combinations of LGO, PGO and AGO could have unique relationships to outcome variables that are not evident when each dimension is examined independently (Harackiewicz et al, 2002). Fourth, the use of the pattern approach may assist reseachers in

explaining the uncorrelated and inconsistent findings that are observed with outcome variables when the variable-oriented approach is used, especially with regards to PGO and AGO. In sum, pattern based research extends the conceptualization of goal orientation past the traditional individual difference variables into a realm that offers the potential for greater understanding of the construct, more reliable predictions of outcomes, and clarification regarding inconsistent and null findings, thereby expanding our knowledge of the construct and its correlates.

Despite repeated calls for goal orientation pattern research (e.g., Button et al., 1996; Colquitt & Simmering, 1998; Deshon & Gillespie, 2005; Harackiewicz et al., 2000; Hoffman & Strickland 1995; Kaplan & Midgley, 1997; Kristof-Brown & Stephens, 2001; Pintrich, 2000; Pintrich et al., 2003; Roedel et al., 1994), and the noted advantages of taking such an approach, the number of pattern studies in the domain of goal orientation has been very small, especially when compared to the number of studies that have examined the independent effects of the dimensions of goal orientation (Deshon & Gillespie, 2005). Nevertheless, some researchers have attempted to examine the effects of simultaneous goal orientations on motivational processes and outcome related variables such as performance (e.g., Harackiewicz et al., 1997; Hoffman & Strickland, 1995; Meece & Holt, 1988), goal setting (e.g., Donovan et al., 2009; Harwood et al., 2004), imagery (e.g., Cumming et al., 2002; Harwood et al., 2003), self-regulatory behaviors (e.g., Kolić- Vehovec, 2008), coping strategies (e.g., Brdar et al., 2006; Etnier, Sidman, & Hancock, 2004), job attitudes (Fortunato, 2006), interest (e.g., Harackiewicz et al., 1997), enjoyment (e.g., Stephens, 1998),effort (e.g., Cury, Biddle, Sarrazin,& Famose, 1997), and self efficacy (e.g., Donovan et al., 2007; Fortunato & Goldblatt, 2006; Hodge & Petlichkoff, 2000). The findings of studies that have taken a pattern approach to examining goal orientation overwhelmingly suggest that different goal orientation patterns produce different processes and

outcomes related to motivation. Before these studies are summarized, it must be noted that two major limitations exist within this body of research. Specifically, researchers who have examined goal orientation using a pattern approach tend to use the two dimensional model when forming patterns, and many researchers include extraneous variables in their formation of patterns. These limitations are briefly discussed below.

Despite arguments that the three dimensional model is more appropriate than the two dimensional model for explorations regarding the construct, most of the studies conducted to date have created patterns using the two dimensional framework of goal orientation (e.g., Cumming & Hall, 2004; Etnier et al., 2004; Fox et al., 1994; Hoffman & Strickland, 1995). Specifically, researchers tend to use the traditional LGO (mastery/ task-involvement) and performance goal orientation (ego-involvement) dimensions in their formation of patterns. This approach to pattern formation ignores the approach-avoid distinction of performance goal orientation proposed by Elliot and colleagues (Elliot, 1999; Elliot & Church, 1997). The practice of using of the two dimensional model in the formation of goal orientation patterns has continued for over a decade, despite evidence and arguments that the three dimensional framework is theoretically and statistically a more comprehensive model, and thus, is better suited for examinations that include goal orientation (Attenweiler & Moore, 2006; Elliot, 2005). To date, only four published studies (Bembenutty, 1999; Fortunato, 2006; Fortunato & Goldblatt, 2006; Levy-Tossman et al., 2007), and two unpublished studies (Donovan et al., 2007;2009) have examined goal orientation patterns using the current conceptualization of the three dimensional model (i.e., LGO, PGO and AGO). Given the many arguments in support of this three dimensional model and the statistical evidence that suggests it is better suited for these types of analyses than the two dimensional model, the present study will employ Elliot's three

dimensional framework in the formation of goal orientation patterns. In doing so, it will be adding to our relatively limited knowledge of how the patterns formed using these three dimensions predict important motivational outcomes.

Along with the challenges associated with deciding which dimensional framework to use in pattern studies, the actual composition or configuration of goal orientation patterns has also proven somewhat problematic. In creating these patterns, some researchers have included non-goal orientation variables as a part of those patterns. For example, in addition to task and ego orientations, Wang, Chatzisarantis, Spray, and Biddle (2002) included perceived competence in their formation of goal orientation patterns, Hodge et al. (2008) included affiliation, recognition and status, and Wang and Biddle (2001) included implicit beliefs, relative autonomy, amotivation, and perceived sport competence. Work-avoidance has also been included as the third variable in pattern formation in several studies (e.g., Brdar et al., 2006; Kolić- Vehovec, 2008; Meece & Holt, 1993; Veermans & Tapola, 2004). While these extraneous variables were added to explorations in the true spirit of pattern oriented research, their presence in goal orientation patterns makes it difficult for researchers to gain a complete and clear understanding of how the dimensions of goal orientation function together. In addition, the presence of such variables makes it difficult for us to decipher the true nature of the goal orientation and its patterns. Magnusson (1997) noted that taking a pattern approach does not imply that an entire system can or should be examined in each research endeavor. Instead, he encourages the examination of specific problems within the system, and argues that pattern studies that are focused on understanding specific subsystems are also extremely useful in helping us understand the overall system (Magnusson, 1997). Thus, in an attempt to gain a better understanding of how

the dimensions of goal orientation work together, only LGO, PGO, and AGO will be used in the creation of goal orientation patterns in the present study.

Hypotheses

Although only a few studies have taken a pattern approach to examining goal orientation using self-efficacy and effort as outcome variables, relevant studies that have taken this approach will be summarized and arguments made for the hypotheses proposed. The findings of these pattern studies have been used in conjunction with the foundation laid by variable-oriented findings and the theoretical assumptions regarding the dimensions of goal orientation in the development of the hypotheses presented below.

It should be noted that each pattern examined in this study is described in terms of persons being high or low on each dimension. The order in which the dimensions are presented is the same for each pattern. That is, LGO is presented first then PGO and finally AGO. The letter "H" has been used to depict the "high" descriptor, while the letter "L" is used to depict the "low" descriptor. This means that someone who is high on LGO, high on PGO and low on AGO would be described by a HHL pattern. These abbreviated descriptors will be used in all subsequent sections.

Determination of the Optimal Pattern

When using a pattern approach it is important to consider which patterns are likely to exhibit the optimal levels of outcome variables (e.g., Smith & Foti, 1998). The determination of this optimal pattern is of great importance to motivational researchers as the knowledge of this pattern would have great implications for application and prediction of motivational outcome variables. To this end, the present study sought to examine what the optimal goal orientation pattern may be using self-efficacy and exerted effort as motivational outcomes. To date, no study

has examined the occurrence of such a pattern within the context of goal orientation research. As such, the present study sought to fill this important gap in the literature by undertaking the examination of the optimal pattern produced by the simultaneous effects of the three goal orientation dimensions.

Theoretical assumptions about the three dimensions of goal orientation at the variable level suggest that LGO is the most adaptive dimension, AGO is the most maladaptive dimension and PGO displays both adaptive and maladaptive characteristics. Empirical findings at the variable level have suggested that high levels of LGO are positively related to both self-efficacy and exerted effort (e.g., Bell & Kozlowski, 2002; Elliot & McGregor, 1999; Payne et al., 2007; Phillips & Gully, 1997; VandeWalle et al., 2001), while high levels of AGO are negatively correlated with self-efficacy, but uncorrelated with exerted effort (e.g., Elliot & McGregor, 1999; Middleton & Midgley, 2002; Payne et al., 2007; VandeWalle et al., 2001). Research results have also suggested that PGO is positively correlated with exerted effort but uncorrelated with self-efficacy (e.g., Elliot & McGregor, 1999; Payne et al., 2007; Schmidt & Ford, 2003; VandeWalle et al., 2001). Given these findings, the optimal pattern with regards to goal orientation would be one in which adaptive characteristics and behaviors such as a mastery focus, achievement striving, and persistence at difficult tasks are present, and maladaptive characteristics and behaviors such as the fear of failure are dormant. This would suggest that the pattern containing high levels of LGO, combined with high levels of PGO and low levels of AGO (i.e., HHL) would exhibit the highest amount of self-efficacy and exerted effort compared to other patterns, thereby establishing it as the optimal pattern for these particular outcome variables. In this pattern, task mastery and achievement motivation would be salient while the fear of failure would presumably be absent due to the low levels of AGO present. Thus, this pattern allows

individuals to focus on displaying and developing their competence, and feeling free to exert effort without the concern of being seen as incompetent if they do not succeed.

No prior research has examined the existence of an optimal pattern of goal orientation. However, the findings of previous research provide tentative support for this assertion. Specifically, Donovan et al. (2007) found that the pattern that contained high levels of LGO and PGO paired with a low level of AGO exhibited the highest level of self-efficacy of all the eight patterns examined in their study. While not perfectly in support of these arguments, Fortunato and Goldblatt (2006) found that persons who displayed a high LGO, moderate PGO and low AGO pattern exhibited higher levels of self-efficacy than the other three patterns produced in their study. It must be noted that Fortunato and Goldblatt's cluster analysis did not produce a pattern that was high in both LGO and PGO and simultaneously low on AGO. As such, the high LGO, moderate PGO, low AGO pattern produced was the closest match to a high LGO, high PGO and low AGO pattern. Taken together, the theoretical assumptions and research findings seem to provide support for the argument that the HHL pattern can be considered the optimal pattern in terms of self-efficacy.

Regarding exerted effort, past research has suggested that both LGO and PGO are positively related to exerted effort (e.g., Elliot & McGregor, 1999; VandeWalle et al., 2001). This suggests that high levels of both of these variables should result in exhibition of adaptive achievement striving behaviors, and thus greater exhibition of effort. In contrast, past research has suggested that AGO is unrelated to exerted effort (e.g., Elliot & McGregor, 1999; VandeWalle et al., 2001). However, theoretically, a strong AGO is characterized by negative motivational states which should distract people high in AGO while performing the task, thus preventing them from exerting high levels of effort. Given that the variable-oriented research has

considered AGO independently of the effects of the other two dimensions, the possibility exists that the negative characteristics of this dimension may be abated by the simultaneous display of adaptive characteristics associated with the other two dimensions. Such an occurrence would only be evident in the context of goal orientation patterns. As such, when working to establish the optimal pattern for the exertion of effort it is important to examine a pattern in which the probability of exhibiting positive adaptive behaviors that would promote the exertion of effort is high, and the probability of negative motivational states that may inhibit a person's exertion of effort is low. Taken together, these assumptions suggest that the greatest amount of effort will be exhibited by the proposed optimal pattern (i.e., HHL). In this particular pattern, the possible distracting effects of AGO are minimal, allowing the achievement striving characteristics associated with high levels of LGO and PGO to dominate the pattern resulting in greater exertion of effort than other patterns.

To establish that the proposed optimal pattern is indeed the pattern that produces the highest levels of outcome variables, past researchers have suggested that this pattern be compared with other patterns that differ in just one dimension (e.g., O'Shea, 2002; Smith & Foti, 1998). By comparing the optimal pattern to patterns that differ in just one variable, researchers can provide support for the assertion that the unique combination of variables in the optimal pattern is indeed vital to its functioning as the optimal pattern. As such, the present study sought to compare the proposed optimal pattern to three other patterns that differed in only one of the three goal orientation dimensions (Hypothesis 1-3).

For the first hypothesis, the HHL pattern was compared to the HHH pattern. The HHH is characterized by both adaptive and maladaptive motivational states. Specifically, someone displaying this pattern should be concerned about mastering a task and gaining positive

feedback, while at the same time showing a high level of concern for avoiding negative evaluations. Thus, although individuals with this pattern have a high level of LGO present, the simultaneous presence of a high AGO is likely to deplete some of the positive effects associated with this high LGO (and perhaps the high PGO). As such, the proposed optimal pattern in which the positive effects of LGO and PGO are salient and negative effects of AGO are dormant should display higher levels of the motivational outcome variables than the HHH pattern.

> *Hypothesis 1: The pattern that is characterized by a high LGO, high PGO and low AGO will exhibit higher levels of self-efficacy and exerted effort than the pattern characterized by a high LGO, high PGO and high AGO.*

Hypothesis 2 compared the proposed optimal pattern (the HHL pattern) to the LHL pattern. At the variable-oriented level, a high LGO is associated with more adaptive behaviors and higher levels of self-efficacy and exerted effort than a low LGO (e.g., VandeWalle et al., 2001). Because LGO is low in the LHL pattern, the mastery focused motives associated with high levels of LGO are absent. As such, any potential positive impact of a high PGO in the LHL pattern will not be as great as the combined impact of both a high PGO and a high LGO, even when the negative effects of AGO are absent. Thus, a person who exhibits the LHL pattern will demonstrate lower levels of perceived competence and place less value on the exertion of effort than a person who exhibits a HHL pattern.

> *Hypothesis 2: The pattern that is characterized by a high LGO, high PGO and low AGO will exhibit higher levels of self-efficacy and exerted effort than the pattern characterized by a low LGO, high PGO and low AGO.*

Hypothesis 3 compared the HHL pattern to the HLL pattern. Specifically, this hypothesis argues that the HLL pattern will display some positive behaviors as a result of the presence of a

high LGO. However, high levels of PGO have the potential to display positive motivational states especially when paired with a high LGO and low AGO. These potentially positive effects may not be seen if a low PGO is paired with a high LGO and low AGO. As such, the HLL pattern is expected to display lower levels of self efficacy and exerted effort than the proposed optimal pattern (HHL), which benefits from the positive effects of a both high LGO and high PGO while the negative effects of AGO are absent.

> *Hypothesis 3: The pattern that is characterized by a high LGO, high PGO and low AGO will exhibit higher levels of self-efficacy and exerted effort than the pattern characterized by a high LGO, low PGO and low AGO.*

Determination of the Least Optimal Pattern

In addition to understanding which pattern is likely to be the optimal pattern, it is equally important to understand which pattern would produce the lowest levels of self-efficacy and exerted effort (i.e., the least optimal pattern). As with the optimal pattern, no previous research has examined the existence of a least optimal pattern with regards to goal orientation. The determination of the least optimal pattern would have great implications for increasing the accuracy of the prediction of motivational outcomes variables. As such, the present study sought to expand our knowledge of goal orientation by examining the least optimal pattern produced by the simultaneous effects of the three dimensions of goal orientation.

Given the variable-oriented findings and theoretical assumptions regarding the three dimensions, the present study asserted that the least optimal pattern would be one in which the adaptive aspects of goal orientation such as achievement striving and challenge seeking are absent and the maladaptive aspects such as fear of negative evaluations and failure are made salient. As such, the present study proposed that the pattern in which LGO and PGO are low and

AGO is high (LLH) would be the least optimal pattern for the outcome variables being examined (i.e., self-efficacy and exerted effort). Because LGO and PGO are low it can be assumed that the achievement striving and task mastery focused behaviors associated with these dimensions will be largely absent in the LLH pattern. While these positive effects are dormant, the presence of a high AGO suggests that the maladaptive behaviors associated with the fear of failure and anxiety regarding competency evaluations will dominate this particular pattern. With no (or limited) adaptive behavior present to abate it, this negative motivational state will remain salient and diminish people's feelings of competence and their subsequent exertion of effort. Taken together, these findings suggest that the least optimal pattern with respect to self-efficacy and exerted effort would be the LLH pattern.

While no research has directly examined the existence of such a pattern, previous research findings have provided tentative support for this assertion. Specifically, Donovan et al. (2007) found that the LLH pattern produced the lowest level of self-efficacy of the eight patterns examined in their study. These findings support the above assertion that without the positive influences of high levels of LGO and PGO, the anxiety and helplessness associated with AGO will make salient feelings of incompetence and inhibit the exertion of effort, thereby resulting lower levels of the motivational outcome variables. As such, we expect that the LLH pattern will exhibit the lowest level of self-efficacy and exerted effort.

In addition, the exploration of the least optimal pattern would have great implications in terms of clarifying assumptions regarding the role of AGO in the exertion of effort, especially given that variable-oriented findings have suggested that AGO is unrelated to exerted effort (e.g., Elliot & McGregor, 1999; VandeWalle et al., 2001). As previously noted, components within a pattern gather their meaning and function based on the levels of the other components

present in that specific pattern (e.g., Bergman & Magnusson, 1997; Magnusson, 1997). This would suggest that when considered in the context of a pattern, AGO may actually play a role in influencing this motivational outcome variable. Past research suggests that the presence of high levels of LGO and its positive effects may attenuate the negative effects of a high AGO (Donovan et al., 2007; 2009). Thus, it is possible that the lack of correlation between AGO and exerted effort could be the result of the simultaneous presence of high levels of LGO which counteract the negative effects of high levels of AGO. This would suggest that in a situation where LGO was low and its positive effects are negligible, the negative motivational state associated with AGO may become salient and therefore should make effort exertion less likely. In addition, since the PGO dimension tends to be positively related to exerted effort, its positive effects may also play a role in counteracting the negative effects of high levels of AGO. Taken together, it can be argued that theoretically the AGO dimension should be negatively correlated with exerted effort. However, this effect may not be evident as past researchers have failed to examine AGO within the context of goal orientation patterns. The pattern approach suggests that the negative impact of AGO on exerted effort may be most salient in the LLH pattern.

To test the assertion that the LLH pattern is the least optimal pattern, the same methodology used to establish the optimal pattern was adapted for Hypotheses 4 through 6. That is, the LLH pattern was compared to three patterns each of which only differ on one dimension from this pattern.

Hypothesis 4 compared the LLH pattern to the HLH pattern. The HLH pattern represents the simultaneous presence of adaptive and maladaptive characteristics that are associated with the high levels of LGO and AGO salient in this pattern. Since PGO is low in this pattern its effects are negligible. As such, someone displaying the HLH pattern should be concerned with

mastering a task while at the same time avoiding negative evaluations. Although individuals with this pattern have a high level of AGO present, the simultaneous presence of a high LGO is likely to abate the negative effects associated with the high levels of AGO. As such, the least optimal pattern in which only the negative motivational state of AGO is salient and the positive effects of a high LGO (and perhaps a high PGO) are dormant should display lower levels of the motivational outcome variables than the HLH pattern.

Hypothesis 4: The pattern characterized by a, low LGO, low PGO and high AGO will exhibit lower levels of self-efficacy and exerted effort than the pattern characterized by a high LGO, low PGO and high AGO.

For Hypothesis 5 the LLH pattern was compared to the LHH pattern. In the LHH pattern the positive motivational states associated with LGO are absent, while the maladaptive behaviors associated with a high AGO are salient. As noted previously, a high PGO brings both an achievement striving motive and a fear of failure motive to the pattern. Although the addition of the fear of failure element of PGO to the high level of AGO present in this pattern could be very detrimental, the simultaneous presence of the positive motivational states that may be associated with PGO suggests that the LHH pattern will exhibit more adaptive behaviors (i.e., higher self-efficacy and more exerted effort) than the LLH pattern which is completely dominated by maladaptive behaviors.

Hypothesis 5: The pattern characterized by a, low LGO, low PGO and high AGO will exhibit lower levels of self-efficacy and exerted effort than the pattern characterized by a low LGO, high PGO and high AGO.

Hypothesis 6 compared the LLH pattern to the LLL pattern. The LLL pattern represents the absence of both adaptive and maladaptive behaviors. Thus, a person exhibiting this pattern is

neither driven by wanting to master a task, nor inhibited by the fear of failure since all three dimensions are low. Although some might argue that individuals exhibiting low levels of all three goal orientation dimensions would be characterized as apathetic or demotivated (which would certainly suggest having very low levels of effort and self-efficacy), these individuals do have the "advantage" of not possessing a strong fear of failure. In other words, the LLL pattern lacks the strong fear of failure that is inherent in a high level of AGO. As a result, this would suggest that individuals holding this pattern would not display the maladaptive behaviors associated with a strong AGO, and therefore would actually exhibit higher levels of self-efficacy and exerted effort than the LLH pattern.

> *Hypothesis 6: The pattern characterized by a, low LGO, low PGO and high AGO will exhibit lower levels of self-efficacy and exerted effort than the pattern characterized by a low LGO, low PGO and low AGO.*

The Inconsistent Effects of PGO

In addition to the examination of the optimal and least optimal patterns, the present study also sought to examine the role PGO plays within the context of patterns. As noted previously, the relationship between PGO and many motivational outcome variables is far from clear at the variable level. In fact, PGO is often considered to be the most inconsistent dimension of goal orientation (Payne et al., 2007). Research results regarding PGO are particularly confusing as the dimension has been associated with both positive and negative motivational processes and no clear trends exist in PGO's prediction of similar motivational constructs. Although past researchers have suggested that PGO is less important than the other dimensions in determining motivational outcomes such as self-efficacy, such conclusions may be premature.

The present study argues that the variation among findings reported in traditional goal orientation research may simply indicate past researchers' failure to take into account the fact that the effects of high levels of PGO may depend on the levels of LGO and AGO simultaneously exhibited by individuals. Theoretically, the PGO dimension contains elements of two contrasting motives: striving for achievement and the fear of failure (Elliot & Church, 1997). These motives are associated with contradictory motivational states which also reflect characteristics of the LGO and AGO dimensions. That is, achievement motivation is often associated with LGO, while the fear of failure is often associated with AGO. As such, it can be argued that either of these aspects of PGO may become more or less prevalent in a person's behavioral patterns when combined with varying levels of LGO and AGO. This suggests that the presence of high levels of LGO may compliment the achievement motivation aspect of PGO in individuals, especially when paired with a low AGO as the harmful anxiety-based behavioral characteristics of this dimension may be absent. Conversely, the fear of failure motive of a high PGO may be made more salient when paired with high levels of AGO and low levels of LGO, as the achievement striving motive is diminished.

Research examining this assertion with respect to self-efficacy has provided initial empirical support for these arguments. Specifically, Donovan et al. (2007) found that patterns that contained high levels of PGO coupled with high levels of LGO exhibited significantly higher levels of self-efficacy than patterns that contained high levels of PGO and low levels of LGO. In addition, these researchers also found that patterns that contained high levels of PGO coupled with high levels of AGO exhibited significantly less self-efficacy than patterns that contained low levels of AGO and high levels of PGO. These findings suggest that the simultaneous presence of LGO and AGO are important to the functioning of PGO in that LGO

will activate the adaptive motive of PGO, while AGO will activate the maladaptive motive of PGO. The activation of these contradicting motives results in differential relationships with self-efficacy that are only evident when PGO is examined the context of a pattern. Given the implications of this suggestion for expanding our understanding of the PGO dimension, along with the fact that only one study to date has examined these patterns, this proposition will be reexamined in the present study.

It must be noted that the inconsistent trends associated with PGO are not as evident in the research regarding exerted effort as the variable tends to be positively correlated with PGO (e.g., VandeWalle et al., 2001). However, the nature of the pattern approach suggests that PGO should still be impacted by the levels of LGO and AGO within a pattern. That is, when high levels of PGO are included in a pattern with high levels of LGO and low levels of AGO it may demonstrate higher levels of exerted effort than when a high PGO is in a pattern with low LGO and low AGO. In addition, high levels of AGO may have an inhibitory effect on the positive motivational outcomes (i.e., increased exertion of effort) associated with a high PGO within a pattern. It can be argued that the simultaneous presence of a high AGO will make salient the maladaptive aspects of PGO. As such, the pattern in which a high PGO is paired with a high AGO should exhibit lower levels of exerted effort than patterns in which PGO is paired with a low AGO.

As with previous examinations in this study, the exploration of the effect of the other dimensions on PGO was conducted by comparing patterns in which only one dimension within a particular pattern is different from the pattern with which it is being compared. For these comparisons the LHL pattern was chosen as the baseline for the comparison with other patterns that were high in PGO. This particular pattern was chosen because it is driven primarily by the

effects of a high PGO since the low levels of AGO and LGO present suggest that their effects were absent (or limited). As such, the LHL pattern seems most suitable for comparison with patterns that are high in PGO but also high in one of more of the other dimensions, as it provides us with a depiction of the effects of PGO without high amounts of influence from the other two dimensions. Given this argument, the present study compared the LHL pattern to the HHL pattern and the LHH pattern. It may be argued that the LHL should exhibit lower levels of self-efficacy and effort than the HHL pattern, as the high LGO in the latter pattern should bring out the achievement striving motive of the high PGO that would not be seen when a high PGO is paired with a low LGO and low AGO. The comparison of these two patterns has already been demonstrated in the analyses related to the optimal pattern (see Hypothesis 2).

Although the LHL pattern has already been compared to the HHL pattern, the aim here was to demonstrate that PGO's behavior is dependent on the levels of LGO and AGO simultaneously displayed in a pattern. Thus, in order to achieve this goal an additional comparison is needed. More specifically, the LHL pattern must be compared with the LHH pattern. Persons possessing the LHH pattern would exhibit fear of failure and anxiety associated with AGO and the maladaptive aspect of PGO while displaying no (or limited) adaptive characteristics, since LGO is low and its achievement striving motive is dormant. As such, it can be argued that when a high PGO is paired with a high AGO and low LGO the maladaptive nature of AGO activates the maladaptive aspect of PGO thereby resulting the exhibition of lower levels of self-efficacy and exerted effort than when a high PGO is paired with low AGO and low LGO.

Hypothesis 7: The pattern characterized by a, low LGO, high PGO and low AGO will exhibit higher levels of self-efficacy and exerted effort than the pattern characterized by a low LGO, high PGO and high AGO.

Summary

The present study highlights the importance of considering the impact of goal orientation on motivational states from a pattern perspective. Traditional variable-oriented research has provided us with a general understanding of how the dimensions of goal orientation may impact motivational variables such as self-efficacy and exerted effort. However, research examining these variables is limited, and may also be misleading due to the failure to consider how all three dimensions work together to impact motivational variables and outcomes. The present study sought to address these limitations by taking a pattern approach, using Elliot's three dimension model of goal orientation. Many of the hypotheses tested relationships that are important to understand that have never before been examined. As such, the present study contributes to expanding research in goal orientation beyond its current conceptualizations.

Method

Participants

Data from four hundred and sixty-five participants were used in the current study. Students were recruited from psychology and management classes at a large southeastern university to serve as participants. Data was collected in two phases. First, data from one hundred and seventy-two participants were collected by Hafsteinsson (2004). Because participants in Hafsteinsson's study were divided into two conditions (easy and complex) only the data from participants in the complex condition were used in the present study. To supplement the data from Hafsteinsson's study, 293 additional participants were recruited to participate in a study which replicated Hafsteinsson's methodology (Phase 2). T-tests revealed that participants in the two phases did not differ significantly in terms of demographic variables, goal orientation, or the outcome variables examined in the present study.

Of the total 465 participants 10 participants were dropped from the data set because they needed assistance from the researcher to completing the task, and 84 participants were removed during the pattern formation procedure described below. As such, only the results produced by the remaining 371 participants were examined statistically.

The mean age of participants in the total sample was 19. 8 ($SD = 2.12$). Just under half of the sample were male (45.1%) and 79.6% was Caucasian. The descriptive statistics for the 371 participants used in the creation of patterns did not differ substantially from those of the total group. Specifically, the mean age was 19.8 ($SD = 2.24$), and 43.7% of the sample was male. 79.2 % of the sample was Caucasian, 6.5% African American, 9.4% Asian, 3.2% Hispanic and 1.3% reported themselves as mixed race or other. All participants received extra credit points towards their class grades in return for their voluntary participation.

Task

A computer-based puzzle program was used as the performance task for the present study. The puzzle task required participants to reconstruct images presented on a computer screen after pieces of the images were scrambled. Each participant was presented with images of box office movie posters that were divided into 36 pieces (a 6x6 grid). The participant was given 10 seconds to study the image after which the image is scrambled by randomly relocating the pieces of the picture to new locations within the grid. The participant was then asked to reconstruct the original picture as quickly as possible by swapping the relocated pieces using mouse clicks. Participants were able to monitor their times in minutes and seconds using a clock located on the lower left side of the screen outside of grid containing the images. When all the pieces of the puzzle had been returned to their original locations, the participants were notified that the puzzle had been solved, and of the length of time it took to solve it.

It must be noted that while the appropriateness and relevance of this task for the examination of motivational processes may be in question, several factors support the argument that the puzzle task was well suited for use in this manner. First, the present task along with other puzzle tasks have successfully been used to examine motivation, and specifically goal orientation by previous researchers (e.g., Breland 2004; Elliot & Harackiewicz, 1996; Donovan et al., 2007; 2009; Locke & Latham, 1990; Manderlink & Harackiewicz. 1984). Second, the puzzle task also creates an environment similar to those environments typically used in goal orientation research (e.g., Hoffman & Strickland, 1995; Yeo & Neal, 2004). Specifically, the puzzle task allows participants to display the same behaviors seen when other tasks are used (e.g., the learning, development and use of strategies in order to perform the task successfully). Third, researchers have noted that participants have found many puzzle tasks including the one used in the present study to be engaging and interesting, and have displayed keen interest in completing the task (Breland 2004; Donovan et al., 2007; 2009; Kaplan & Maehr, 2007; Manderlink, & Harackiewicz. 1984). This attribute circumvents a popular criticism that motivation research often utilizes tasks that participants find neither interesting nor motivating (Donovan, 2001). This evidence clearly indicates support for the use of the puzzle task in this setting.

Procedure

Data for this study was collected in 30 to 45 minute sessions in a 12 workstation computer laboratory. Upon arrival, participants were seated in front of a computer. First, participants gave informed consent and completed questionnaires assessing demographic variables, and goal orientation. Once this data was collected, participants were introduced to the puzzle task by way of written and verbal instructions on how to complete the task. To ensure that participants understand the task, they were given the opportunity to complete several practice

puzzles that served as a tutorial. After completing the practice puzzles, participants were informed that they would be performing three trials of the puzzle task. Before completing these puzzles they completed the goal orientation and self-efficacy questionnaires. Participants completed the self-efficacy measure for each trial. When the participant completed the three puzzles he/she responded to the questionnaire which examined exerted effort while working on the puzzle task.

Measures

Goal Orientation. Elliot and Church's (1997) 18- item measure was adapted for use in this study. The scale contains three subscales of six items each that correspond with the mastery (LGO), performance-approach (PGO), and performance-avoid (AGO) dimensions of goal orientation. It must be noted that one item in each subscale could not be adapted to suit the use of the puzzle task and was dropped. As such, five items were used to examine participants' standing on each of the three dimensions. Participants responded to LGO statements such as "I want to learn as much as possible about this puzzle task", PGO oriented statements such as, "It is important to me to do better than the other students on this puzzle", and AGO statements such as "I just want to avoid doing poorly in this puzzle" (See Appendix B). They were asked to rate their degree of agreement with each of the fifteen statements using a 5-point Likert scale where 1 represented "Strongly disagree" and 5 represented "Strongly agree". Reliabilities for the LGO, PGO and AGO subscales respectively were $\alpha = .79, .91$ and $.66$ for the first sample (Hafsteinsson's sample) and $.85, .94, .73$ for the second sample. Goal orientation scores were calculated by averaging each participant's ratings for each of the three dimensions.

Self Efficacy. Task specific self efficacy was measured by a 10-item scale adapted from Phillips and Gully (1997: See Appendix C). Participants responded to items such as: "I feel

confident in my ability to perform well on the upcoming puzzle" using a 5-point Likert scale where 1 represents "strongly disagree" and 5 represents "strongly agree". Reliabilities for this measure have been reported α= .85 for the first sample and .82 for the second sample. Scores for this scale were calculated by averaging each participant's responses to the statements.

Exerted Effort. Exerted effort was measured using five items adapted from the Effort/Importance subscale of Ryan's (1982) Intrinsic Motivation Inventory (See Appendix D). Items such as "I put a lot of effort into working on the puzzle task" were responded to using a 5-point Likert scale, where 1 represents "Strongly Disagree" and 5 represents "Strongly Agree". Reliability for this scale was reported at α = .83 for the first sample and .84 for the second sample. Scores for this measure were calculated by taking the average of each participant's responses to the statements.

Pattern Formation

Past researchers have used mean splits (e.g., Fox, et al., 1994; Hodge & Petlichkoff, 2000), median splits (e.g., Bouffard et al., 1995; Schraw, Horn, Thorndike-Christ, & Bruning, 1995), and cluster analyses (e.g., Fortunato, 2006; Harwood et al., 2000; Levy-Tossman et al., 2007) to form goal orientation patterns. Mean and median splits both serve the purpose of dividing persons into groups (high and low) by using the mean or median as the line of demarcation for separating the groups. Cluster analysis is a data reduction technique that shrinks large amounts of data into information specific smaller subgroups thereby allowing for a more concise description of observations (Hair et al., 2006). Because each of these methodologies has its advantages and disadvantages, no consensus exists regarding how best to statistically configure patterns.

In the present study, median splits were used to create patterns. While median splits have their disadvantages, some of these disadvantages have been found to be similar to those of cluster analysis. Specifically, there is a certain level of arbitrariness in the formation of patterns using both methods, neither method works well with small samples, and the outcomes of both methods are sample dependent (Hair et al., 1998; 2006; Solomon, 2006). However, the use of median splits does have some advantages that make it a more viable choice over cluster analysis. Specifically, when median splits are used there are clear rules regarding the designation of high and low scores, and the total number of possible patterns. One major concern in employing cluster analytic techniques is the formation of groups, when no strict criteria exists for making decisions regarding the number of clusters that truly represent the group structure (Hair et al.,1998; 2006). The knowledge of the total number of patterns that will be produced using median splits makes it much easier for researchers to make a priori hypotheses, a task that is made substantially more challenging when cluster analysis is used as clusters produced may not match those hypothesized (Hair et al., 1998; 2006). Also, median splits are not as sensitive to the existence of outliers as cluster analysis. In addition, the use of median splits to form patterns is consistent with previous studies that have used a pattern approach to study individual differences in the field of organizational behavior (e.g., Foti & Hauenstein, 2007; Smith & Foti, 1998).

However, it should be noted that the issue of classification accuracy is of great concern when median splits are used. Specifically, when traditional median splits are used, individuals whose scores are at, just above, or just below the median could possibly be classified into different groups even though their scores may only differ by one or two points. To address this problem researchers have suggested that individuals whose scores fall close to the median not be classified into high or low groups (e.g., Smith & Foti, 1998). One method of doing this is by

creating a confidence interval around the median of each variable of interest. Scores below the lower limit of this confidence interval are classified as low while scores above the higher limit of this interval are classified as high. This strategy was used in the present study to classify individuals into high and low groups.

When using confidence intervals there are two important but contrasting goals that affect the size of the interval chosen: Researchers are concerned with maximizing classification accuracy while at the same time minimizing the number of participants excluded from the classification. Given this, the standard error of the mean for each variable was used to calculate the confidence intervals around the median. Specifically, a confidence interval of one standard error of the mean was used. That is, participants whose scores were greater than or equal to one standard error of the mean above the median were classified as high on that particular dimension. Participants were classified as low if their scores were lower than one standard error below the median. The standard error of the mean was .03 for LGO, .04 for PGO and .03 for AGO. This resulted in 81.5 percent of the sample being retained after those participants within the confidence interval were removed. Using this method eight goal orientation patterns were created from the three dimensional model of goal orientation (see table 2). The number of participants in each pattern ranged from 23 in the HLH pattern to 76 in the HHH pattern. It should be noted that while persons within the sample were classified into high and low categories such classifications occur in a relative manner rather than in an absolute manner. That is, someone is classified as high or low with respect to the scores of other individuals within the sample and not according to some standardized scale. However, the means reported in the present study are similar to the means of studies of other studies that have used Elliot and

Church's (1997) scale (e.g., Barkoukis, Ntoumanis, &Nikitara, 2007; Fryer & Elliot, 2007; Lau & Lee, 2008; Murayama & Elliot, 2009).

It should also be noted that while the use of confidence intervals around the median increases the likelihood of classification accuracy, their use does not guarantee that the patterns formed accurately reflect patterns that occur naturally within a given population. That is, while median splits combined with the use of confidence intervals may be used to create patterns it does not mean that people generally possess such patterns. Of particular importance were the natural occurrence proposed optimal (HHL) and the proposed least optimal (LLH) patterns. Thus, in order to strengthen the generalizability of the results presented below cluster analysis was used to examine if similar patterns to those created artificially (using the median splits) occurred naturally within the sample of participants in the present study.

Hierarchical cluster analytic procedures which maximize between group heterogeneity and within group homogeneity by combining the participants most similar on the dimensions being examined were used to create patterns using the scores for LGO, PGO, and AGO. While the results of the cluster analysis produced a two cluster final solution that did not reflect any of the patterns created using the median splits, an examination of the alternative cluster solutions (i.e. three, four, five, six, seven and eight cluster solutions) produced clusters that reflected several of the patterns created using the median splits. Clusters similar to those of the artificially created HHL and LLH were evidence in the four, five, six and seven cluster solutions. However, since the eight patterns were artificially created, the results of the eight cluster solution are especially relevant. The eight cluster solution produced clusters that reflected the optimal (HHL) and least optimal (LLH) patterns, as well the HHH , HLL, LHLand the LLL patterns. The means produced by the cluster analytic results and those produced by the median split are presented in

Table1.While, clusters were not found to support the LHH and HLH patterns, the cluster analytic

results support the natural occurrence of the other six patterns thereby making the findings of the

present study more robust. Specifically, the natural occurrence of these patterns within the

sample suggests that enough convergence exists between the apriori artificially created patterns

and the naturally occurring patterns to confidently proceed with the planned analyses.

Data Analysis

Individual t-tests for independent samples were used to examine if the results found

supported the seven hypotheses explored in present study. Specifically, Hypotheses 1 through 3

compared the proposed optimal pattern (the HHL pattern) with the HHH pattern, the LHL

pattern and the HLL pattern. For each outcome variable an independent samples t-test was used

to test for significant differences between the HHL pattern and each of the three comparison

patterns. Similarly, Hypotheses 4 though 6 compared the proposed least optimal pattern (the

LLH pattern) to the HLH pattern, the LLL pattern and the LHH pattern. For each outcome

variable a t-test was used to test for significant differences between the LLH pattern and each of

the three comparison patterns. To test Hypothesis 7 an independent samples t-test was used to

examine the difference between the LHL pattern and the LHH pattern. In addition to the results

of these tests of significance, effect sizes were calculated to determine the meaningfulness of the

differences found between patterns.

<div align="center">Results</div>

The correlations among the variables included in the present study and the descriptive

statistics for each of these variables are presented in Table 2. The number of participants

categorized in each pattern and the means on the outcome variables for each pattern have been

presented in Table 3. Tables 4 and 5 summarize data related to the hypotheses tested in the present study.

Correlations among Study Variables

The correlations among the dimensions of goal orientation indicated that LGO is positively correlated with PGO ($r = .38$, $p < .01$), but not significantly correlated with AGO. The results also indicated that PGO is positively correlated with AGO ($r = .29$, $p < .01$). In terms of the correlations between the outcome variables and the dimensions of goal orientation, the results indicated that LGO is positively correlated with both self-efficacy ($r = .51$, $p < .01$), and exerted effort ($r = .42$, $p < .01$). The results also suggested that PGO is positively correlated with self-efficacy ($r = .41$, $p < .01$) and exerted effort ($r = .31$, $p < .01$). AGO was found to be negatively correlated with self-efficacy ($r = -.34$, $p < .01$), but uncorrelated with exerted effort.

Hypotheses 1-3

Hypothesis 1 through 3 sought to provide evidence to support the assertion that the HHL pattern could be viewed as the optimal pattern with regards to self-efficacy and exerted effort. The results produced partial support for all three hypotheses (see Table 4). These results suggested that the HHL pattern produced the highest average self-efficacy of all eight patterns formed. In terms of the comparisons among the focal patterns, the results indicated that the HHL pattern exhibited significantly higher levels of self-efficacy than the HHH pattern ($t(124) = 3.76$, $p < .001$, $d = .68$), the LHL pattern ($t(74) = 2.97$, $p < .001$, $d = .75$), and the HLL pattern ($t(90) = 3.99$, $p < .001$, $d = .85$). It should be noted that the effect sizes produced by these comparisons ranged from moderate to large based on Cohen's (1988) benchmarks of .50 for a moderate effect size and .80 for a large effect size. Taken together, these results offer strong support for Hypotheses 1, 2 and 3 with regards to self-efficacy.

When the focus was shifted to exerted effort, the results suggested that the HHL pattern exhibited significantly more exerted effort than the LHL pattern ($t(74) =3.90, p < .001, d =.93$) thereby supporting Hypothesis 2. It should be noted that the effect size produced for the difference between the means of the two patterns was large (Cohen, 1988). The results only produced partial support for Hypotheses 3 regarding exerted effort. Specifically, the HHL pattern did not exhibit significantly more exerted effort than the HLL pattern ($t(90) = 1.34, ns$). Despite this lack of statistical significance, the comparison between the HHL pattern and the HLL did produce a small effect ($d = .28$) that was in the hypothesized direction. No support was found for Hypothesis 1 with regards to exerted effort. Specifically the HHL pattern did not differ significantly from the HHH pattern ($t(124) = -.23, ns, d =-.04$). Taken together, these results suggest that the HHL is the optimal pattern for the exhibition of self-efficacy but may not be the optimal pattern for the exhibition of exerted effort.

Hypotheses 4- 6

Hypotheses 4 through 6 examined whether the LLH pattern could be considered the least optimal pattern. The results provided support for Hypotheses 4 and 5 and partial support for Hypothesis 6 (see Table 4). Specifically, LLH persons reported the lowest mean self-efficacy of all eight patterns produced. In support of Hypothesis 4, the results suggested the LLH pattern exhibited significantly lower levels of self-efficacy and exerted effort than the HLH pattern with moderate to large effect sizes ($t(73) = -2.60, p < .001, d = -.64$ and $t(73) = -3.50, p < .001, d = -.86$, respectively). In support of Hypothesis 5, the results suggested that the LLH pattern exhibited significantly less self-efficacy and exerted effort than the LHH pattern with small to moderate effect sizes, ($t(94) = -2.88, p < .01, d = -.59$ and $t(94) = -2.29, p < .02, d = -.46$, respectively). Hypothesis 6 was partially supported. Specifically, the LLH pattern exhibited

significantly lower levels of self-efficacy than the LLL pattern ($t(108) = -3.66$, $p < .001$, $d = -.68$) and that this difference was moderate in magnitude (Cohen, 1988), thereby providing support for Hypothesis 6. However the findings regarding exerted effort did not support Hypothesis 6. The LLH pattern did not exhibit significantly less exerted effort than the LLL pattern ($t(108) = .17$, *ns*). Taken together, the findings of the present study suggest that the LLH pattern can be considered the least optimal pattern for producing self-efficacy, but only produced partial support for the assertion that this pattern is the least optimal pattern for producing exerted effort.

Hypothesis 7

Finally, Hypothesis 7 sought to clarify inconsistent findings regarding PGO by examining the behavior of high levels of PGO in the context of goal orientation patterns. The results of the comparison between the HHL pattern and the LHL pattern (examined in Hypothesis 2) suggested that the HHL pattern exhibited significantly more self-efficacy and exerted effort than the LHL pattern. These findings support the assertion that the presence of high levels of LGO will bring out the achievement striving motive of PGO thereby resulting in the exhibition of greater levels of each of these motivational outcome variables as compared to the LHL pattern. To compliment these findings, Hypothesis 7 sought to examine if high levels of AGO would bring out the fear of failure motive of PGO. As hypothesized, the LHL pattern exhibited significantly more self-efficacy than the LHH pattern, ($t(68) = 3.01$, $p < .05$, $d = .78$) with a moderate effect size. The LHL pattern also exhibited significantly higher levels of exerted effort ($t(68) = 1.32$, $p < .001$, $d = .33$) than the LHH pattern with a small effect size. Thus, taken together these findings provide support for Hypothesis 7.

Supplemental Analyses

  Regression analyses. The pattern approach suggests that patterns are more viable

predictors in a given setting because they account for more variance in outcome variables than

the variable oriented approach. In order to supplement the effect sizes and significant findings

presented above, it was important to demonstrate that the use of the patterns accounts for a

substantial amount of variance and adds incremental variance to the prediction of self-efficacy

and effort exerted above and beyond the variance accounted for by the individual dimensions of

goal orientation and the interactions among these dimensions. To achieve this goal regression

analyses were conducted for each of the outcome variables. First, analyses examining the

predictive abilities of the variable approach (main effects and interactions) were conducted for

each criterion variable. Second, regressions were conducted to examine the amount of variance

accounted for by the patterns alone. Finally, regression analyses were conducted to see if patterns

added incremental validity to the prediction of the two outcome variables above and beyond the

variance accounted for by the variable approach. For this (final) analysis the main effects of

LGO, PGO and AGO were entered in step 1, the two way interactions were entered in step 2, the

three way interactions were entered in step 3, and the goal orientation patterns were entered in

step 4. Since the present paper examines the optimal and least optimal patterns the predictive

validities of these patterns were the focal areas of the regression analyses. As such, the optimal

pattern, least optimal patterns and remainder of the other patterns were entered at step 4 of the

regression analyses. Dummy coding was used to create these three groupings. That is three

dummy codes where created- one for the optimal pattern, one for the least optimal pattern and a

third for the remaining patterns (referred to as mixed). Each dummy code was created by

assigning a value of zero to all the participants who exhibited that specific pattern or group of

patterns and a value of one for remaining patterns. Crosstabs were used to verify the accurate creation of the dummy codes. The results of these analyses are presented below.

The regression results indicated that that the variable approach significantly predicted self-efficacy, ($\beta = 5.09$, $t(370) = 6.65$, $p < .01$) and accounted for a substantial proportion of variance in this outcome variable $R^2 = .49$, $F(7, 363) = 50.31$, $p < .01$. Patterns also significantly predicted self-efficacy ($\beta = 3.82$, $t(370) = 46.33$, $p < .01$). While patterns accounted for a substantial proportion of variance in self-efficacy $R^2 = .27$, $F(7, 363) = 19.56$, $p < .01$, the proportion of variance accounted for was smaller than the proportion accounted by the variable approach. The regression analyses indicated that the use of goal orientation patterns added incremental variance to the prediction of self efficacy (see Table 6). The results suggested that there were significant main effects of LGO, and AGO, and significant two and three-way interactions among the dimensions of goal orientation. In addition, to these significant predictions at the variable oriented level the results also suggested that the goal orientation patterns significantly predicted self-efficacy, and accounted for an additional .9% of variance in predicting the outcome variable.

In terms of exerted effort the regression results indicated that that the variable-oriented approach significantly predicted the criterion variable, ($\beta = 2.58$, $t(370) = 2.08$, $p < .05$). The variable-oriented approach accounted for a substantial proportion of variance exerted effort $R^2 = .23$, $F(7, 363) = 15.15$, $p < .01$. Patterns also significantly predicted self-efficacy ($\beta = 3.58$, $t(370) = 31.42$, $p < .01$). Patterns also accounted for a substantial proportion of variance in self-efficacy $R^2 = .20$, $F(7, 363) = 12.72$, $p < .01$. The use of pattern approach only added .3% incremental variance to the prediction of this motivational outcome variable (See Table 7). This finding raises questions about the suitability of the pattern approach for predicting exerted effort

above and beyond the use of the variable oriented variables. However, given that no significant predictors were found among the variable oriented predictors and the pattern predictors the results related to variance accounted for must be interpreted with caution.

The regression analyses suggest that while the pattern approach accounted for a substantial proportion of variance in the outcome variables, it only accounted for a small amount (less than 1%) of incremental variance in predicting both self-efficacy and exerted-effort. For both variables the main effects of the individual goal orientation dimensions accounted for the largest proportion of variance, while the interactions and patterns accounted for a cumulative 2.1% and 2.3% additional variance in predicting outcomes for self-efficacy and exerted effort respectively. These findings indicate that the pattern approach does not account for more variance in outcome variables than the variable-oriented approach.

Comparison of median split methodologies. As has been previously discussed, the standard error of the mean was used to create confidence intervals around the median in order to maximize classification accuracy and minimize the loss of participants. However, it should be noted that the use of this statistic to form the confidence intervals is only one of many avenues that could have been taken when using median splits to create high and low distinctions. In order to support the argument that the use of the standard error of the mean created a confidence interval that was sufficiently large to create clear demarcations of high and low categories yet sufficiently small to prevent loss of data, two alternative median split based methodologies were also used to create patterns. Specifically, effect sizes for each hypothesis were recalculated after the standard error of measurement was used to create a confidence interval around the median, and a pure median split were used to create patterns. The effect sizes produced by each of these methodologies for each of the seven hypotheses are presented in Table 8.

Similarly to the use of the standard error of the mean, when the standard error of measurement was used to create confidence intervals around the median, participants who scored one standard error of the measurement or greater above the median were considered to be high on that particular dimension and participants who scored lower than one standard deviation below the median were considered as low on the respective dimension. The standard error of the measurement was .13 for LGO, .02 for PGO and .23 for AGO. This resulted in a loss of 40.2% of the sample and 272 participants being placed into 8 patterns. The number of participants in each pattern ranged from 13 to 53.

When the pure median split was used to create patterns, participants who scored at or above the median were considered as being high on that particular dimension and participants that scored below the median were considered as low on a particular dimension. With the pure median split no participants were lost. As such, scores from 455 persons were used to create patterns. The number of participants placed in each pattern ranged from 28 to 107.

With regards to self-efficacy, when the effect sizes produced by the use of all three methods were examined the results produced *d* statistics that were quite close in magnitude across each of the methods for all but two of the hypotheses (See Table 8). The standard error of measurement created the largest confidence interval among the three methods used. As such, this should theoretically create larger behavior differences between persons scoring highly on one or more dimensions and persons with low scores on one or more dimensions as compared to the differences found when a pure median split was used. However, this was only seen for hypotheses 3 and 6. The similarities among the effect sizes could be explained by the fact that these patterns occur naturally (as was shown by the cluster analytic results). Given this, it may be

argued that the use of the standard error of the mean was able to accomplish the goal of maximizing classification accuracy while at the same time minimizing the loss of participants.

In terms of effort exerted there was more variation in effect sizes across the three methods used to create patterns than there were for self-efficacy. While the effect sizes for hypotheses 1 and 3 were quite similar across the three methods, some variation existed in the effect sizes for the other hypotheses. It should be noted that even with the variation the effect sizes for each hypothesis were either all low, all moderate or all high. The pure median split consistently produced the lowest effect size of the three methodologies. Thus the variation in the effect sizes were seen primarily when the standard errors were used to create confidence intervals. For hypotheses 2, 5 and 7 the standard error of the mean produced the highest effect size while, for hypotheses 4 and 6 the use of the standard error of measurement produced the largest effect size. Taken together, it seems that while some variation in effect sizes does exist the fact that the standard error of the mean produced higher effect sizes more frequently than the standard error of measurements, coupled with its ability to retain more participants than the standard error of measurement suggests that it may be the most viable median split based method for the creation of patterns.

Discussion

The present study sought to examine the differences among distinct goal orientation patterns using self-efficacy and exerted effort as outcome variables. Specifically, this study explored the assertion that there is an optimal and a least optimal pattern of goal orientation dimensions. This study also sought to better explain the behavioral inconsistencies of the PGO dimension of goal orientation. The findings of the present study produced some support for all seven hypotheses tested. These findings are discussed in the subsequent sections.

Identification of the Optimal and Least Optimal Patterns

The results of Hypotheses 1 through 3 offer support for the existence of an optimal pattern with regards to the exhibition of self-efficacy. The results suggested that the proposed optimal pattern (i.e., the HHL pattern) exhibited a higher mean self-efficacy than all other patterns. The moderate and large effect sizes associated with these comparisons are noteworthy, as they provide evidence that the differences that exist between the optimal pattern and each of the comparison patterns are not trivial. These findings also offer concrete support for the trends in the means reported by Donovan et al. (2007) and Fortunato and Goldblatt (2006). Consistent with the findings and propositions of past researchers and the conceptual background of the goal orientation construct, the pattern that was high in LGO, high in PGO and low in AGO produced the highest levels of self-efficacy. It appears that the achievement striving and task mastery oriented characteristics salient in the optimal pattern drives the exhibition of greater levels of self-efficacy, especially since the negative motivational state associated AGO is absent. More importantly, these findings clearly indicate that the unique combination of dimensions in the HHL pattern is vital to the display of the highest levels of competence in achievement settings and that no other combination of dimensions can produce the highest levels of self-efficacy. These findings indicate that the pattern approach is indeed a useful approach for understanding the exhibition of competence in achievement settings. Specifically, the results suggest that persons will display different levels of self-efficacy in accordance with the characteristics of the goal orientation patterns they possess, and that persons who exhibit a HHL pattern can be deemed as being the most efficacious in achievement settings.

With regards to exerted effort, the results only offered partial support for the assertion that the HHL pattern can be viewed as the optimal pattern. Specifically, the findings suggested

that HHL displayed significantly higher levels of exerted effort than the LHL pattern. In addition, the large effect size suggested that the difference in means between the two patterns was not trivial. While the HHL pattern did not exhibit significantly more exerted effort than the HLL pattern, the small effect size in the hypothesized direction suggested that the proposed optimal pattern did exhibit more exerted effort than the HLL pattern. Finally, the results suggested that the HHL pattern did not differ significantly from the HHH pattern. This particular finding did not support the proposed hypotheses, and the similar means and small effect size suggested that the two patterns produce similar amounts of exerted effort. These findings imply that the adaptive characteristics of the goal orientation dimensions within these patterns play a crucial role in the exertion of effort while the maladaptive dimensions may not be as influential. This assertion is supported by the similarity in means between the HHL and HHH patterns which suggests that high levels of PGO and high levels of LGO are the primary drivers of the exertion of effort while AGO plays a smaller role in terms for goal orientation patterns producing this outcome. The results suggest that while the HHL may not be the optimal pattern for the exertion of effort, both high levels of LGO and high levels of PGO are needed to promote the exertion of the greatest amounts of effort. In addition, the findings indicate that the LGO dimension specifically plays a substantial role in the exertion of effort. A review of the means produced by all eight patterns showed that persons in the four patterns that contained high levels of LGO reported higher levels of exerted effort than those in the four patterns that contained low levels of LGO. However, the patterns that produced the highest levels of exerted effort contain both high levels of LGO and high levels of PGO. This finding suggests that the pattern approach may still be a viable approach for explaining the exertion of effort. Although the HHL pattern did produce higher levels of exerted effort than some other patterns the results raise questions with regards to

it being considered as the optimal pattern. Taken together, the results suggest that persons whose patterns are high in adaptive motives are likely to exert more effort than persons whose patterns are low in adaptive motives. The results also indicate that the maladaptive motives may not have a great impact in the context of goal orientation patterns with regards to exerted effort as when LGO and PGO were held constant and AGO changed from low to high the patterns exerted similar levels of effort. Overall, these findings suggest that if an optimal pattern does exist for the exertion of effort this pattern would depend primarily on the simultaneous impact of the adaptive dimensions of goal orientations within a pattern.

Hypotheses 4 through 6 were focused on establishing the least optimal pattern. The results suggested that the proposed least optimal pattern (LLH) does exist. The LLH displayed the lowest mean self-efficacy of all the patterns examined in the present study. The effect sizes produced suggest that the differences found between the least optimal pattern and each of the comparison patterns were not trivial. These findings are consistent with Donovan et al.'s (2007) finding that the LLH pattern exhibited the lowest mean self efficacy of all the patterns examined in their study. The results of the present study also support conceptual assertions regarding the goal orientation construct. Specifically, it is believed that when a maladaptive motivational state is made salient (by the presence of a high AGO), and the presence of adaptive motives are dormant (as indicated by the presence of low LGO and PGO) the fear of failure and anxiety expressed by this pattern would result in the highest feelings of incompetence and thus the exhibition of the lowest levels of self-efficacy. Taken together these findings suggest that the unique combination of the dimensions in the LLH pattern is essential to experiencing the least amount of competence in achievement settings. As such, other combinations of dimensions will not have as deleterious an effect on self-efficacy as the LLH pattern. This means that persons

who possess the LLH pattern can be considered the least efficacious group in achievement settings.

When the proposed least optimal pattern was examined for exerted effort, the results offered partial support for the existence of this pattern. Specifically, the results suggested that the LLH pattern exhibited significantly less exerted effort than the LHH pattern and the HLH pattern. The moderate to large effect sizes produced by these comparisons indicated that the differences between the LLH pattern and each of these comparison patterns were large enough to be considered meaningful, thereby supporting the existence of a least optimal pattern. However, it must be noted that the results did not produce a significant difference between the LLH pattern and the LLL pattern. These findings suggest that while the persons exhibiting the LLH pattern clearly exert less effort than persons exhibiting some other patterns (especially those patterns that exhibit simultaneous adaptive and maladaptive motives) it does not exhibit less effort than all patterns and therefore cannot be confidently considered as the least optimal pattern. The failure to find a difference between the LLH and LLL patterns coupled with the similarities in means and small effect sizes suggest that the maladaptive effects assumed to be salient in the LLH pattern may not have as large an effect on the exertion of effort as originally hypothesized. These findings seem to reinforce the aforementioned assertion that the AGO dimension may not play as critical a role in goal orientation patterns with regards to exerted effort as originally hypothesized. Similar to the findings produced for the examination of the optimal pattern patterns in which LGO and PGO are constant and AGO switches from low to high tend to produce similar outcome scores. The findings also support the assertion that LGO and PGO are the drivers in patterns related to the exertion of effort. In the case of producing the least amount of effort, it seems that it is the lack of adaptive motives evident in low levels of LGO and PGO

that have the greatest impact not the presence of a high AGO. With regards to exerted effort, the findings related to the exploration of the least optimal pattern indicate that it is not the presence of the potential maladaptive motives that drive a potential least optimal pattern but the absence of adaptive motives that might be most important to consider in determining the least optimal pattern. Thus, persons who have patterns which are dominated by a low LGO and low PGO are likely to display lower levels of exerted effort than persons who had patterns that are characterized by high levels of both dimensions regardless of the level of AGO within these patterns.

As a whole, the findings of the present study seem to present clear support for the existence of an optimal and least optimal pattern with regards to self-efficacy. However, when effort was examined the results produced only partial support for the existence of an optimal and least optimal pattern. Overall, the findings of Hypotheses 1 through 6 support the argument that taking a pattern approach to the exploration of goal orientation and its outcomes is beneficial to understanding human behavior. Although some hypotheses were no fully supported, the results clearly indicated that different combinations of the dimensions of goal orientation can and do produce different amounts of the outcome variables.

The results of Hypotheses 1 through 6 with regards to self-efficacy clearly add to the small body of research that supports these assertions. Specifically, the findings related to the optimal and least optimal patterns support previous researchers' arguments that the dimensions of goal orientation work together simultaneously to impact the display of motivational outcome variables such as self-efficacy (e.g., Button et al., 1996; Fortunato & Goldblatt, 2006; Harackiewicz et al., 2002; Pintrich, 2002). In addition, the results of the present study indicate that the specific combination of a high LGO, high PGO and low AGO represents the optimal

pattern. The results suggest that if any one of the three dimensions within this pattern is changed the new pattern will exhibit less self-efficacy than the optimal pattern. A similar argument can be made for the least optimal pattern: the unique combination of a low LGO, low PGO and high AGO is needed in order to make salient the maladaptive motivational state of this pattern. If any one of the three dimensions within this pattern is changed the new profile will exhibit significantly more self-efficacy than the LLH pattern that is considered the least optimal pattern. Thus, the results support the assertion that the dimensions of goal orientation work together uniquely to produce varying degrees of self -efficacy. As such, persons who display different goal orientation patterns are likely to exhibit different amounts of self-efficacy in achievement settings.

The results related to exerted effort for Hypotheses 1 through 6 were not as straight forward. Reasons for the failure to find differences between some patterns will now be discussed. First, it should be noted that both theoretical assumptions and empirical findings were used to educate the formation of hypotheses relating to exerted effort. Unfortunately, the limited number of prior research studies available for review led to the formation of hypotheses that were based primarily on theoretical assumptions about this variable's relationships with the dimensions of goal orientation. These assumptions were incongruent with the empirical findings related to the AGO dimension. Specifically, variable-oriented research has suggested that AGO is uncorrelated with exerted effort (e.g. Vandewalle et al. 2001), while theoretical assumptions regarding this dimension argues that AGO should be negatively correlated with exerted effort. This suggests that failure to confirm that the HHL pattern is the optimal pattern and the LLH pattern is the least optimal pattern may be in part due to AGO's lack of relationship with exerted effort. The results of the present study support this possibility, as the findings produced showed that AGO was not

significantly correlated with exerted effort (see Table 1). In addition, the examination of findings related to the optimal and least optimal patterns revealed that patterns that displayed the same levels of LGO and PGO but only differed on their level of AGO were not found to be significantly different from each other. The effect sizes produced by the comparisons related to the optimal and least optimal patterns suggested that such patterns exhibited similar levels of exerted effort to one another. Other patterns outside of those compared to the optimal and least optimal patterns also revealed a similar trend. The HLL and HLH pattern exhibited the same mean ($M = 4.00$) and similar standard deviations ($SD = .55$ and ,59). These findings indicate that failure to give more weight to the possibility that AGO may not be related to exerted effort limited the researcher's ability to thoroughly and effectively test for an optimal and least optimal pattern with regards to exerted effort. .

Another possible explanation for the findings related to exerted effort may simply be that the variable itself is distinct from other motivational outcome variables such as self-efficacy. As such, exerted effort is typically measured differently from other variables. Specifically, in the present study participants were asked to report their own perceptions of the amount of effort they exerted *after* completing the puzzles. This methodological practice leaves room for participants to rationalize their previous behavior which could have affected their self-ratings of the amount of effort they exerted. For example, a participant may argue that since they took a long time to complete a puzzle they must have exerted a lot of effort. This suggests that participants could suffer from errors in perception when making judgments about their own behavior. That is, participants may display signs of a self-serving bias where they believe they are exerting more effort than they are in fact exerting. It should also be noted that for certain dimensions of goal orientation the exertion of effort is seen as bad thing. Specifically, the exertion of effort may

reflect lack of ability, and as such, persons high in dimensions in which the display of competence is important (PGO and AGO) may be unwilling to admit that they exerted effort. Taken as a whole the idiosyncrasies associated with this variable may explain the failure to support the hypotheses of the current study. Such idiosyncrasies need to be further examined and more weight given to them in future pattern research and hypotheses with regard to exerted effort.

Despite, not completely supporting all 6 hypotheses, the results of the explorations of the optimal and least optimal patterns clearly provide evidence that the dimensions of goal orientation do work together in the context of patterns to produce varying amounts of the outcome variables. The results also supported the argument that variable oriented results do inform goal orientation patterns. As such, the same pattern may function differently for various outcome variables as a result of the relationship of the components of that pattern with each outcome at the variable level. Thus, the results indicated that it was the maladaptive nature of the LLH pattern that lead to the exhibition of the least amount of self-efficacy the absence of the adaptive motives that resulted in the exhibition of the lowest exertion of effort. Regardless of the motives that drive the behavior of each pattern the results clearly support that a combination of dimensions is needed to produce the highest and lowest amounts of motivational outcome variables.

Towards and Understanding of the Effects of PGO

In addition, to the findings related to the optimal and least optimal patterns, the results of the present study suggest that the PGO dimension may be best understood by examining it in the context of goal orientation patterns. In support of previous research by Donovan et al. (2007, 2009), these results indicate that across both outcome variables, the PGO dimension behaves

differently depending on the levels of the other two dimensions with which is it is combined. Specifically, when a high PGO was included in a pattern with high levels of LGO and low AGO, the dimension exhibited greater levels of self-efficacy and exerted effort than when a high PGO was paired with low levels of LGO and AGO. In addition, the moderate to large effect sizes associated with the difference between the HHL and LHL patterns indicate that a substantial difference is seen between the means of the two patterns with regards to both self-efficacy and exerted effort. These findings imply that the presence of the positive motivational states associated with LGO prime the achievement striving motive of PGO, and with AGO being low, task mastery and achievement striving were allowed to dominate the pattern. This resulted in the display of greater levels of self-efficacy and exerted effort than for a "pure" PGO pattern, where PGO was the only strong dimension within the pattern. In addition, the findings also suggest that when PGO was paired with a high AGO and low LGO, the negative motivational states associated with AGO are likely to prime the behavior of PGO leading to the display of greater amounts of negative behavioral characteristics than when a high PGO is paired with a low LGO and low AGO. This combination therefore resulted in lower levels of self-efficacy and exerted effort been displayed than in the LHL pattern.

Finding support for Hypothesis 7 is particularly interesting as to this point patterns that varied only the AGO dimension have produced similar amounts of exerted effort. This particular finding suggests that while the AGO dimension may not play as strong a role in the context of goal orientation patterns as the other two dimensions, the presence of high levels of AGO within a pattern does still have some impact on the function of the pattern with regards to exerted effort. Thus AGO's role in goal orientation patterns with regards to the exertion of effort should not be

discounted. Instead this dimension's impact in the context of goal orientation patterns needs to be further explored.

Overall, use of goal orientation patterns has helped to provide support for arguments that PGO may not be as capricious and inconsistent as the use of the variable-oriented approach has led researchers to believe. These findings suggest that examining PGO independently of the other two dimensions may not provide an accurate depiction of the variable and its behavior. As such, examining PGO within the context of goal orientation patterns extends our understanding of the dimension and how it behaves above and beyond information that is provided at the variable level. The present findings go against previous researchers' conclusions that PGO may exhibit a null relationship with motivational outcome variables (e.g., Payne et al., 2007; VandeWalle et al., 2001), thereby highlighting the value of the pattern approach for expanding our knowledge and understanding of goal orientation. These findings support arguments by Magnusson (1997; 1999) and colleagues (Bergman & Magnusson, 1997) who suggest that the use of the pattern approach may help explain complex relationships, and produce conclusions that are not evident in the results of variable-oriented results. Thus, while the variable-oriented findings would suggest the persons who posses high levels of PGO may behave inconsistently in terms of their feelings of efficacy and their exertion of effort, the pattern approach clearly demonstrates that persons who posses patterns in which PGO is paired with a more adaptive dimension will display higher levels of efficacy and exerted effort than those persons whose patterns are driven by PGO alone. Also the results indicate that persons who posses patterns in which PGO is paired with the maladaptive dimension are likely to exhibit more maladaptive behaviors and as such exert less effort and feel less efficacious than those persons whose patterns are driven by PGO alone. Overall, the findings regarding the effects of PGO within the context

of goal orientation patterns suggests that the dimension is a complex one which gathers meaning and impacts motivational outcome variables through its simultaneous effects with the other dimensions of goal orientation.

Other Findings

The supplemental regression analyses indicated that the use of goal orientation patterns significantly predicted the self-efficacy but not exerted effort. The patterns accounted for a substantial proportion of variance in these outcome variables but only added a small proportion of variance to the prediction of self-efficacy and exerted effort above and beyond the variance accounted for by the variable oriented methods. While this finding implies that the use of the variable oriented methods may be better suited for predicting these specific outcome variables, one should not discount the valuable contributions of the pattern approach in explaining human behavior as it pertains to these variables. First, the results of the cluster analysis suggests that goal orientation patterns occur naturally. The natural occurrence of goal orientation patterns make them worthy of further exploration. Second, the results of the present study indicated that specific patterns produced specific amounts of outcomes that were not seen when any dimension within those patterns was changed. This implies that goal orientation patterns can be used to better explain the occurrence of certain amounts of self-efficacy and possibly exerted effort. In addition, the use of the pattern approach helped to provide clarification regarding the inconsistent findings related to the PGO dimension which was not have been evident in the results of variable oriented findings. Given these observations, it is evident that despite the small proportion of incremental variance explained the examination of goal orientation patterns still contributes meaningfully to the body of research.

Summary

Taken together, several conclusions may be drawn from the present study's exploration of goal orientation patterns. First, goal orientation patterns exist naturally. Second, these patterns behave differently from each other and have unique impacts on motivational outcome variables. Third, the dimensions of goal orientation work together in a complex but lawful fashion thereby supporting the assertion by Magnusson and colleagues (e.g., Magnusson, 1997). The findings of the present study suggest that when one dimension in either the optimal or least optimal pattern was changed the pattern exhibited lower levels of self efficacy in terms of the optimal pattern and higher levels of self-efficacy in terms of the least optimal pattern. The results also showed that the combination of high LGO and high PGO is needed for the highest exertion of effort while the absence of these adaptive motives will result in the lowest exertion of effort. Forth, the present findings also reinforce the assertion by Magnusson (1997) that the components of patterns receive their meaning from the other components with which they are simultaneously paired. It was shown that PGOs adoption of adaptive or maladaptive characteristics was based on the levels of LGO and AGO working simultaneously in a pattern. These findings also highlight the fifth major conclusion. The results of the present study offer support for previous research assertions that the use of the pattern approach is useful for expanding researchers' knowledge of the goal orientation construct above and beyond the results presented by the variable-oriented findings (e.g., Magnusson, 1997; von Eye et al., 2006). Specifically, by using the variable-oriented approach researchers may not have arrived at similar conclusions regarding the conditions under which PGO displays adaptive and maladaptive behaviors. As a whole, the findings of the present study demonstrate that continued examination of goal orientation patterns

may be helpful in providing us with a better understanding of people's behavior in achievement contexts, and the goal orientation construct.

Implications and Suggestions for Future Research

The results of the present study suggested that goal orientation patterns can and do exhibit unique behaviors which are not seen using the variable-oriented method by itself. These findings imply that not only can the use of the pattern approach compliment the use of the variable-oriented approach, it also can explain human behavior with regards to motivation above and beyond the findings produced at the variable level. While the additional variance produced by pattern approach was small in the present study, researchers and practitioners who are focused on developing a thorough understanding of motivation should still consider taking a more holistic approach their examination of goal orientation in order to compliment their findings at the variable level. In doing so researchers' focus can switch from understanding how specific motivational variables work in isolation to understanding how such variables work together simultaneously within people. Given the number of motivational outcome variables, the need for such investigations will provide the opportunity for future explorations across several different domains.

The results of the present study also imply that the use of goal orientation patterns may enhance the prediction of some motivational outcome variables but not others. It is evident from the present findings that goal orientation patterns though adding incremental variance to the prediction of self-efficacy and exerted effort only accounted for a small proportion of variance above and beyond the variance accounted for by the main effects and interactions. It is possible that there may be situations in which use of goal orientation patterns may account for incremental variance above the variance accounted for by the variable-oriented findings. This

suggests that researchers should continue to explore the circumstances under which the use of the pattern approach is appropriate for predicting motivational outcome variables and when the variable-oriented approach is better suited for such predictions. Attention should be given to the examining which of the many motivational outcome variables benefits from the use of the pattern approach to predict their occurrence and which variables benefit most from the use of the variable-oriented approach.

The existence of the optimal and least optimal patterns, and the various combinations in between also offer the potential for use in future applied settings to explain behavior. Since this is the first study to examine the existence of optimal and least optimal patterns, and since very few studies have examined the behavioral characteristics of different goal orientation patterns, making specific recommendations regarding the application of patterns for use in applied settings may be premature. Nevertheless the results of the present study does lend itself to the implication that goal orientation patterns may one day be used in applied settings. For example, in the future goal orientation patterns could potentially be used in the selection and promotion process to assist practitioners in selecting the best candidate for available positions. Specifically, goal orientation patterns could provide practitioners with an understanding of what dimension combinations may be best suited for what types of jobs, and what types of people will exhibit the highest level of motivation.

Given these implications, future research in the examination of goal orientation patterns is encouraged. The supplemental cluster analyses revealed that many of the patterns formed artificially in the present study existed naturally within the sample. Future studies should focus on examining whether such patterns exist naturally in a variety of samples taken from different populations. Such explorations may provide evidence to support the generalizability of the

patterns examined in the present study. In addition, future research should also examine which of these patterns are likely to occur most (common types) and least (anti-types) frequently. By exploring the occurrence of these types and anti-types researchers may be better able to provide practitioners with the tools they need to use goal orientation patterns effectively.

In addition to the examination of naturally occurring patterns, types and anti-types, future research should focus on re-examining the effects of goal orientation patterns on exerted effort. Given that effort is an important motivational variable that mediates the effects between goal orientation and distal outcomes, having a thorough understanding of the impact of goal orientation patterns on this variable is important. Specifically, the reexamination of exerted effort should focus on answering questions regarding the role of AGO within the context of goal orientation patterns. In addition, a reexamination of this variable may help to determine whether an optimal and least optimal pattern exists and what such patterns are likely to look like.

Future research should also focus on examining the impact of goal orientation patterns on additional motivational outcome variables such as feedback seeking behavior, response to feedback and performance. Of particular interest should be the prediction of distal motivational outcome variables such as performance which usually produces small correlations with the dimensions of goal orientation at the variable level. However, the use of goal orientation patterns may enhance the predication of such variables. By examining the predictive abilities of various goal orientation patterns on different motivational outcomes researchers will be better able to draw conclusions regarding which patterns exhibit generally adaptive behaviors and which patterns exhibit generally maladaptive behaviors. An understanding of how each pattern predicts these outcomes, coupled with an understanding of which variables are best predicted using the pattern approach will help researchers make meaningful recommendations to practitioners about

how best to implement goal orientation patterns in their practice (e.g. in selection and training processes).

Sustained motivation over time is also important to practitioners. Implicit in the pattern approach is the belief that patterns can successfully predict future behavior; that is for example from time 1 to time 2 (e.g., Magnusson, 1997). This would suggest that goal orientation patterns should be examined longitudinally. Thus, future research in goal orientation should also focus on examining the robustness of these patterns over time. The use of longitudinal studies would also help to examine if the behavioral characteristics of specific patterns remain constant over time and help to provide a more in depth understanding of goal orientation patterns. The longitudinal exploration of goal orientation patterns would also help provide more accurate predictions of motivational outcomes such as job performance and goal setting.

Taken together, the exploration of goal orientation patterns have several avenues that have not yet been explored. The above listed suggestions serve only as a starting point for continued examinations into the use of pattern approach in predicting and explaining motivational outcomes.

Limitations

Although the present study provides us with a better understanding of goal orientation, several limitations associated with the methodology used must be discussed. One of the major limitations of the present study is the fact that participants were placed into high and low categories on each dimension based on median splits. Although confidence intervals were used to eliminate persons whose scores were close to the median, the use of this method resulted in the artificial creation of patterns that did not accurately reflect all the naturally occurring goal orientation patterns (i.e., common types and antitypes). Although cluster analytic results

suggested that some of the patterns created in the present study do occur naturally within the sample, the generalizability of the results is still limited. Cluster analysis creates groupings based on the characteristics of sample. This means that the clusters found in the present study may not be replicated in another sample. Thus, it is important to note that while six of the eight patterns artificially created were replicated using the cluster analysis, generalizing the findings of the present study to other populations should be done with caution. In addition, it may be argued that the exclusion of participants from the sample using the confidence intervals around the medians could have resulted in the loss of valuable data which also could affect the external validity of the present findings. However, the similarities between the findings produced by the pure median split and the use of the confidence intervals suggest that the loss of data may not have had a great effect on the results produced. It seems that the removal of those persons who scored within the confidence interval did not diminish the external validity of the present findings.

A second limitation was the use of the task specific measure of goal orientation which is a state based measure of the variable. Given that the pattern approach is focused on examining different types of people, trait based measures are traditionally used and deemed more appropriate for the creation of patterns. Thus the use of state specific measure of goal orientation could have limited the findings of the present study. However, it is believed that the findings of the present study may not have been greatly affected by the use of state based measures instead of trait based measures as state based and trait based dimensions of goal orientation are positively correlated with each other. A recent meta-analysis reported strong positive correlations between the state based and trait based dimensions of goal orientation (e.g. Payne et al. 2007).

A third limitation of the present study is the use of self-report methods of data collection. Although the results of the scales used in the present study produced reliable results that were

consistent with those of previous researchers, the use of self report methods still raises questions with regards to the accuracy of the data reported. That is, the responses given by participants on such scales are subject to biases in perception and interpretation, and rationalization of behavior. Thus a participant's score on a given scale may not accurately reflect his/ her true standing on that dimension. However, despite these limitations researchers within the field of work motivation have found externally valid results using such scales.

A fourth limitation of the present study was the use of college students as participants. While college students are often used as participants in goal orientation research their use limits the generalizability of the findings to broader populations. Within the fields of Industrial/Organizational Psychology and Organizational Behavior, goal orientation studies are often meant to expand researchers' understanding of work motivation. As such, the use of college students as participants in such studies makes it difficult to draw conclusions regarding how the behaviors exhibited by student participants in the present study translates to behavior in the work environment. However, since the purpose of this study was to examine whether goal orientation patterns exhibited differential behaviors thereby focusing on answering theoretical questions, the control associated with the use of college students in a laboratory environment may be seen as advantageous for the interpretation of the results of the present study.

A fifth limitation concerns the puzzle task utilized in the present study. Because the task is an artificial laboratory task, one must be cautious in drawing inferences and arriving at conclusions about people's behavior in contexts outside of the present study. However, it should be noted that the puzzle task has qualities that makes it a good tool to use in research related to work motivation. Specifically, previous researchers have noted that participants find the task interesting and engaging (e.g., Breland, 2004). This is a noteworthy advantage of the puzzle task

as stereotypically motivation research often makes use of boring trivial tasks (e.g., finding creative uses for everyday objects such as paper clips or bricks; Locke & Latham, 1990). In addition, the task requires the development and use of behaviors that mirror those behaviors used and displayed in the workplace. For example, the puzzle task requires the development and use of strategies in order to successfully complete the puzzles. Thus the opportunity to learn, as well as develop and display strategies help to make the puzzle task more suitable for use in work motivation research.

Conclusion

The present study sought to examine the behavior of goal orientation patterns using Elliot's three dimensional model of the construct. The findings suggest that an optimal and least optimal pattern can exist, and that the behavior of the PGO dimension is best understood in the context of goal orientation patterns. Overall, the results of the present study indicate that the use of the pattern approach compliments the variable-oriented approach traditionally used. Specifically, present study demonstrated that the pattern approach can produce unique findings not found using the variable-oriented approach. In addition, the results indicated that the pattern approach may help to provide a clearer explanation of complex relationships among motivational variables for various subgroups of people. Taken as a whole, the results of the present study suggest that future use of the pattern approach to examine goal orientation will serve to expand our understanding of this complex multidimensional motivation construct.

References

Ames, C. (1984). Competitive, corporative, and individualistic goal structures: A cognitive-motivational analysis. In C. Ames & R. Ames (Eds.), *Research on motivation in education* (Vol.3, pp. 177-207). New York: Academic Press.

Ames, C., & Archer, J. (1987). Mothers' belief about the role of ability and effort in school learning. *Journal of Educational Psychology, 79,* 409-414.

Ames, C., & Archer, J. (1988). Achievement goals in the classroom: Students' learning strategies and motivation processes. *Journal of Educational Psychology, 80,* 260-267.

Asendorpf, J.B. & Denissen, J. J. A (2006). Predictive validity of personality types versus personality dimensions from early childhood to adulthood: Implications for the distinction between core and surface traits. *Merrill-Palmer Quarterly,52,* 486-513.

Attenweiler, W. J., & Moore, D. (2006). Goal Orientations: Two, Three, or More Factors? *Educational and Psychological Measurement, 66,* 342-352.

Bandura, A. (1986). *Social foundations of though and action: A social cognitive theory.* Englewood Cliffs, NJ: Prentice Hall.

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

Barkoukis, V., Ntoumanis, N., & Nikitaras, N. (2007). Comparing dichotomous and trichotomous approaches to achievement goal theory: An example using motivational regulations as outcome variables. *British Journal of Educational Psychology, 77,* 683-702.

Barron, K. E.& Harackiewicz, J. M. (2001). Achievement goals and optimal motivation: Testing multiple goal models. *Journal of Personality and Social Psychology, 80,* 706-722.

Bell, B. S., & Kozlowski, W. J. (2002). Goal orientation and ability: Interactive effects on self-efficacy, performance, and knowledge. *Journal of Applied Psychology, 87,* 497-505.

Bembenutty, H. (1999). Sustaining motivation and academic goals: The role of academic delay of gratification. *Learning and Individual Differences, 11,* 233-257.

Bergman, L.R. (1997). A pattern-oriented approach to studying individual development: Snapshots and processes. In R.B. Cairns, L.R. Bergman, & J. Kagan (Eds.), *Methods and models for studying the individual* (pp. 33 – 63). Tall Oaks, CA: Sage.

Bergman, L.R., & Magnusson, D. (1997). A person-oriented approach in research on developmental psychopathology. *Development and Psychopathology, 9,* 291-319.

Bergman, L.R., Magnusson, D., & El-Khouri, B.M. (2003). *Studying individual development in an interindividual context.* Mahwah, NJ: Lawrence Erlbaum Associates.

Bergman, L. R., & Trost, K. (2006). The person-oriented versus the variable-oriented approach: Are they complementary, opposites or exploring different worlds? *Merrill-Palmer Quarterly, 52,* 601-632.

Bong, M. (2008). Effects of parent-child relationships and classroom goal structures on motivation, help-seeking avoidance, and cheating. *Journal of Experimental Education, 76,* 191-217.

Bouffard, T., Boisvert, J., Vezeau, C., & Laraouche, C. (1995). The impact of goal orientation of self regulation and performance among college students. *British Journal of Educational Psychology, 65,* 317-329.

Brdar, I., Rijavec, M., & Loncaric, D. (2006). Goal orientations, coping with school, failure and school achievement. *European Journal of Psychology of Education, 21,* 53-70.

Breland, B. T. (2004). *The role of 3-dimensional state goal orientation in the process of goal establishment and task performance.* Unpublished doctoral dissertation. Virginia Polytechnic Institute and State University, Virginia.

Breland**,** B. T. Donovan, J. J. (2005). The role of state goal orientation in the goal establishment process. *Human Performance, 18,* 23-53.

Brett, J. F., & VandeWalle, D. (1999). Goal orientation and goal content as predictors of performance in a training program. *Journal of Applied Psychology, 84*, 863- 873.

Brookhart, S. M., Walsh, J. M., & Zientarski, W. A. (2006). The dynamics of motivation and effort for classroom assessments in middle school science and social studies. *Applied Measurement in Education, 19,* 151-184.

Brown, K. G. (2001). Using computers to deliver training: Which employees learn and why? *Personnel Psychology, 54*, 271-296.

Button, S. B., Mathieu, J. E., & Zajac, D. M. (1996). Goal orientation in organizational research: A conceptual and empirical foundation. *Organizational Behavior & Human Decision Processes, 67*, 26-48.

Chen, G., Gully, S. M., Whiteman, J., & Kilcullen, R. N. (2000). Examination of relationships among trait-like individual differences, state-like individual differences, and learning performance. *Journal of Applied Psychology, 85,* 835-847.

Church, M. A., Elliot, A. J., & Gable, S. L. (2001). Perceptions of classroom environments, achievement goals and achievement outcomes. *Journal of Educational Psychology, 93,* 43-54.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Earlbaum Associates.

Colquitt, J. A., & Simmering, M. J. (1998). Conscientiousness, goal orientation, and motivation to learn during the learning process: A longitudinal study. *Journal of Applied Psychology, 83*, 654-665.

Coutinho, S. A., & Neuman, G. (2008). A model of metacognition, achievement goal orientation, learning style and self-efficacy. *Learning Environments Research, 11,* 131-151.

Cron, W. L., Slocum, J. W. Jr., VandeWalle, D., & Fu, Q. (2005). The role of goal orientation on negative emotions and goal setting when initial performance falls short of one's performance goal. *Human Performance, 18,* 55-80.

Cumming, J. & Hall C. (2004). The relationship between goal orientation and self-efficacy for exercise. *Journal of Applied Social Psychology, 34,* 747-763.

Cumming, J., Hall, C., Harwood C. G., & Gammage, K. (2002). Motivational orientations and imagery use: A goal profiling analysis. *Journal of Sport Sciences, 20,* 127-136.

Cury, F., Biddle, S., & Famose, J. (1996). Personal and situational factors influencing intrinsic interest of adolescent girls in school physical education: A structural equation modeling analysis. *Educational Psychology, 16,* 305-315.

Deshon, R. P., & Gillespie, J. Z. (2005). A motivated action theory account of goal orientation. *Journal of Applied Psychology, 90,* 1096- 1127.

Diefendorff, J. M. (2004). Examination of the roles of action-state orientation and goal orientation in the goal-setting and performance process. *Human Performance, 17,* 375-395.

Donovan, J. J. (2001). Work motivation. In N. Anderson, D.S. Ones, H. K Sinangil, & C. Viswesvaran, C. (Eds.), *Handbook of Industrial, Work, and Organizational Psychology* Vol. 2. (pp.53-76). Sage Publications: London.

Donovan, J. J., Esson, P. L., & Backert, R. G. (2007). *An examination of goal orientation patterns and task-specific self-efficacy.* Paper presented at the 22nd Annual Conference of the Society for Industrial Organizational Psychology, New York, NY.

Donovan, J.J., Esson, P.L., & Kutcher, E, J. (2009). *An examination of goal orientation from a pattern perspective.* Paper presented at the 24th Annual Conference of the Society for Industrial Organizational Psychology, New Orleans, LA.

Donovan, J. J. & Hafsteinsson, L. G. (2006). The Impact of goal-gerformance discrepancies, self-efficacy, and goal orientation on upward goal revision. *Journal of Applied Social Psychology, 36,* 1046-1069.

Duda, J. L., & Nicholls, J. G. (1992). Dimensions of achievement motivation in schoolwork and sport. *Journal of Educational Psychology, 84,* 290-299.

Dweck, C. S. (1975). The role of expectations and attributions in the alleviation of learned helplessness. *Journal of Personality & Social Psychology, 31*, 674-685.

Dweck, C. S. (1986). Motivational processes affecting learning. *American Psychologist, 41*, 1040-1048.

Dweck, C. S. (1989). Motivation. In A. Lesgold & R. Glaser (Eds.) *Foundations for a psychology of education (pp 87-136)*. Hillsdale, NJ: Lawrence Erlbaum.

Dweck, C. S., & Elliott, C. S. (1983). Achievement motivation. In E. M. Hetherington (Ed.), *Socialization, personality, and social development* (pp. 643-691). New York: Wiley.

Dweck, C. S., & Legget, E. L., (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 95,* 256 -273.

Elliot, A. J. (1999). Approach and avoidance motivation and achievement goals. *Educational Psychologist, 34,* 149-169.

Elliot, A. J. (2005). A conceptual history of the achievement goal construct. In, A. J. Elliot & C.S. Dweck (Eds.), *Handbook of competence and motivation* (pp.54 – 72). New York: The Guilford Press.

Elliot, A. J., & Church, M. A. (1997). A hierarchical model of approach and avoidance achievement motivation. *Journal of Personality & Social Psychology, 72*, 218- 232.

Elliot, A. J., & Harackiewicz, J. M. (1996). Approach and avoidance achievement goals and intrinsic motivation: A mediational analysis. *Journal of Personality & Social Psychology, 70*, 461-475.

Elliot, A. J. & McGregor, H. A. (1999). Test anxiety and the hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology,76,* 628-644.

Elliot, A. J., & McGregor, H. A. (2001). A 2 x 2 achievement goal framework. *Journal of Personality & Social Psychology, 80*, 501-519.

Elliot**,** A. J., McGregor, H. A., & Gable, S. (1999). Achievement goals, study strategies, and exam performance: A mediational analysis. *Journal of Educational Psychology, 91,* 549-563.

Elliot, A. J., & Moller, A.C., (2003). Performance-approach goals: Good or bad forms of regulation? *International Journal of Educational Research, 39,* 339–356.

Elliot, A, J. & Thrash, T. M. (2001). Achievement goals and the hierarchical model of achievement motivation. *Educational Psychology Review, 13,* 139-156.

Etnier, J. L., Sidman, C.L., & Hancock, Lee, C. (2004). An examination of goal orientation profiles and motivation in adult team sport. *International Journal of Sport Psychology, 35,* 173-188.

Fisher, S. L., & Ford, K. J. (1998). Differential effects of learner effort and goal orientation on two learning outcomes. *Personnel Psychology, 51,* 397-420.

Farr, J. L., Hoffman, D. A., & Ringenbach, K. L. (1993). Goal orientation and action control theory: Implications for industrial and organizational psychology. In C. L. Cooper & I. T. Robertson (Eds.), *International Review of Applied Psychology* (Vol. 8), pp. 193-232.

Ford, J. K., Smith, E. M., Weissbein, D. A., Gully, S. M., & Salas, E. (1998). Relationships of goal orientation, metacognitive activity, and practice strategies with learning outcomes and transfer. *Journal of Applied Psychology, 83,* 218-233.

Fortunato, V. J. (2006). Validating a four- profile goal orientation solution using cluster analysis: examining stress and attitudinal response patterns among organizational employees. *Applied Multivariate Research, 12,* 125- 152.

Fortunato, V. J., & Goldblatt, A. M. (2006). An examination of goal orientation profiles using cluster analysis and their relationships with dispositional characteristics and motivational response patterns. *Journal of Applied Social Psychology, 36,* 2150-2183.

Foti, R., & Hauenstein, M.A. (2007). Pattern and variable approaches in leadership emergence and effectiveness. *Journal of Applied Psychology, 92,* 347-355.

Fox, K., Goudas, M., Biddle, S., Duda, J., & Armstrong, N. (1994). Children's task and ego goal profiles in sport. *British Journal of Educational Psychology, 64,* 253-261.

Fryer, J. W., & Elliot, A. J. (2007). Stability and change in achievement goals. *Journal of Educational Psychology, 99,* 700-714.

Gershenoff, A. B. & Foti, R. J. (2003). Leader emergence and gender roles in all-female groups: A contextual examination. *Small Group Research, 34,* 170-196.

Hafsteinsson, L.G. (2004). *The interactive effects of achievement goals and task complexity on effort, mental focus and enjoyment.* Unpublished dissertation. Virginia Polytechnic Institute and State University, Virginia.

Hair, J.F., Jr., Anderson, R. E., Tatham, R.L. & Black, W.C. (1998). *Multivariate data analysis*. (5th ed.). Upper Saddle River, NJ: Prentice Hall.

Hair, J.F., Jr., Black, W.C., Babin, B.J., Anderson, R.E., & Tatham, R.L. (2006). *Multivariate data analysis*. (6th ed.). Upper Saddle River, NJ: Pearson Education.

Harackiewicz, J.M., Barron, K.E., Carter, S.M., Lehto, A.T., & Elliot, A.J. (1997). Predictors and consequences of achievement goals in the college classroom: Maintaining interest and making the grade. *Journal of Personality and Social Psychology, 6,* 1284-1295.

Harackiewicz, J.M., Barron, K.E., Tauer, J. M., Carter, S. M. & Elliot, A.J. (2000). Short-term and long-term consequences of achievement goals: Predicting interest and performance over time. *Journal of Educational Psychology, 92,* 316-330.

Harackiewicz, J. M., Barron, K. E., Pintrich, P.R., Elliot, A.J., & Thrash, T.M. (2002). Revision of goal theory: Necessary and illuminating. *Journal of Educational Psychology, 94,* 638-645.

Harackiewicz, J. M., Barron, K.E., Tauer, J. M. & Elliot, A.J. (2002). Predicting success in college: A longitudinal study of achievement goals and ability measures as predictors of interest and performance from freshman year through graduation. *Journal of Educational Psychology, 94,* 562-575.

Harackiewicz, J. M., & Elliot, A.J. (1993). Achievement goals and intrinsic motivation. *Journal of Personality and Social Psychology, 65,* 904-915.

Harwood, C., Cumming, J., & Fletcher, D. (2004). Motivational profiles and psychological skills use within elite youth sport. *Journal of Applied Sport Psychology, 16,* 318-332.

Harwood, C., Cumming, J., & Hall, C. (2003). Imagery use in elite youth sport participants: Reinforcing the applied significance of achievement goal theory. *Research Quarterly for Exercise and Sport, 72,* 292- 300.

Heintz, P., Jr., & Steele-Johnson, D. (2004). Clarifying the conceptual definitions of goal orientation dimensions: Competence, control, and evaluation. *Organizational Analysis, 12,* 5-19.

Higgins, E. T. (1995). Ideals, oughts, and regulatory focus: Relating affect and motivation to distinct pains and pleasures. In P. Gollwitzer & J. Bargh (Eds.), *The psychology of action: Linking cognition and motivation for behavior* (pp. 91-117). New York: Guilford Press.

Hodge K., Allen, J.B., & Smellie, L. (2008). Motivation in masters sport: Achievement and social goals. *Psychology of Sport and Exercise, 9,* 157-176.

Hodge, K., & Petlichkoff, L. (2000). Goal profiles in sport motivation: A cluster analysis. *Journal of Sport & Exercise Psychology, 22,* 256-272.

Hoffman, D.A., & Strickland, O.J. (1995). Task performance and satisfaction: Evidence for a task by ego-orientation interaction. *Journal of Applied Social Psychology, 25,* 495-511.

Hole, J. L., & Crozier, W. R. (2007). Dispositional and situational learning goals and children's self-regulation. *British Journal of Educational Psychology, 77,* 773-786.

Hsieh, P., Sullivan, J. R., & Guerra, N. S. (2007). A closer look at college students: Self-efficacy and goal orientation. *Journal of Advanced Academics, 18,* 454-476.

Intrinsic Motivation Inventory. Retrieved July 20, 2008, from:

    http://www.psych.rochester.edu/SDT/measures/intrins_scl.html

Kanfer R. (1990). Motivation theory and industrial organizational psychology. In M.D. Dunnette

    & L. M. Hough (Eds.), *Handbook of Industrial and Organizational Psychology* (Vol 1.

    pp 75-170). Palo Alto, CA: Consulting Psychologists Press.

Kanfer, R., & Ackerman, P. L. (1989). Motivation and cognitive abilities: An

    integrative/aptitude-treatment interaction approach to skill acquisition. *Journal of Applied*

    Psychology, 74, 657-690.

Kaplan, A., & Maehr, M. L. (2007). The contributions and prospects of goal orientation theory.

    Educational Psychology Review, 19, 141-184.

Kaplan, A., & Midgley, C., (1997). The effect of achievement goals: Does level of perceived

    academic competence make a difference. *Contemporary Educational Psychology, 22,*

    415- 435.

Kolić- Vehovec, S., Rončević, B., & Bajšanski, I. (2008). Motivational components of self-

    regulated learning and reading strategy use in university students: the role of goal

    orientation patterns. *Learning and Individual Differences, 18,* 108-113.

Kozlowski, S. W., Gully, S. M., Brown, K. G., Salas, E., Smith, E. M., & Nason, E. R. (2001).

    Effects of training goals and goal orientation traits on multidimensional training

    outcomes and performance adaptability. *Organizational Behavior &Human Decision*

    Processes, 85, 1-31.

Kristof-Brown, A. L., & Stevens, C. K. (2001). Goal congruence in project teams: Does the fit

    between members' personal mastery and performance goals matter? *Journal of Applied*

    Psychology, 86, 1083- 1095.

Lau, K., Lee, J. C. K. (2008). Validation of a Chinese achievement goal orientation questionnaire. *British Journal of Educational Psychology, 78,* 331-353.

Lee, F. K., Sheldon, K. M., & Turban, D. B. (2003). Personality and the goal-striving process: The influence of achievement goal patterns, goal level, and mental focus on performance and enjoyment. *Journal of Applied Psychology, 88,* 256-265.

Levy-Tossman, I., Kaplan, A., & Assor, A. (2007). Academic goal orientations, multiple goal profiles, and friendship intimacy among early adolescents. *Contemporary Educational Psychology, 32,* 231-252.

Locke, E. A., & Latham, G. P. (1990). *A theory of goal setting & task performance.* Englewood Cliffs, NJ: Prentice-Hall.

Maehr, M. L. (1983). On doing well in science: Why Johnny no longer excels, why Sarah never did. In S. Paris, G. Olson, & H. Stevenson (Eds.), Learning and motivation in the classroom (pp. 179-210). Hillsdale, NJ: Erlbaum.

Maehr, M.L. (1984). Meaning and motivation: Toward a theory of personal investment. In R. Ames & C. Ames (Eds.), *Research on motivation in education: Student motivation* (Vol. 1, pp. 115-144). New York: Academic Press.

Magnusson, D. (1995). Individual development: A holistic, integrated model. In Moen, P., & Elder, G. H. Jr. *Examining lives in context: Perspectives on the ecology of human development* (pp. 19-60). Washington, DC, US: American Psychological Association.

Magnusson, D. (1997). The logic and implications of a person-oriented approach. In R.B. Cairns, L.R. Bergman, & J. Kagan (Eds.), *Methods and models for studying the individual* (pp. 33 – 63). Thousand Oak, CA: Sage.

Magnusson, D. (1999). On the individual: A person-oriented approach to developmental

    research. *European Psychologist,4,* 205- 218.

Magnusson, D. (2000). The individual as the organizing principle in psychological inquiry: A

    holistic approach. In L.R. Bergman, R.C. Cairns, L. Nilsson, & L. Nystedt (Eds.),

    Developmental science and the holistic approach (pp. 33-48). Mahwah, NJ: Elbaum.

Magnusson, D. (2003). The person approach: Concepts, measurements models, and research

    strategy. *New Directions for Child and Adolescent Development, 101,* 3- 23.

Magnusson, D., & Törestad, B (1993). A holistic view of personality: A model revisited. *Annual*

    Review of Psychology, 44, 427-452.

Manderlink, G., & Harackiewicz, J. M. (1984). Proximal versus distal goal setting and intrinsic

    motivation. *Journal of Personality and Social Psychology, 47,* 918-928.

Mangos, P. M., & Steele-Johnson, D. (2001). The role of subjective task complexity in goal

    orientation, self-efficacy, and performance relations. *Human Performance,14*, 169-186.

Meece, J., & Holt , K. (1993). A pattern analysis of students' achievement goals. *Journal of*

    Educational Psychology, 85, 582-590.

Middleton, M., & Midgley, C. (1997). Avoiding the demonstration of lack of ability: An

    underexplored aspect of goal theory. *Journal of Educational Psychology, 89,* 710-718.

Middleton, M. J., & Midgley, C. (2002). Beyond motivation: Middle school students' perceptions

    of press for understanding in math. *Contemporary Educational Psychology, 27,* 373-391.

Murayama, K. & Elliot, A. J. (2009). The joint influence of personal achievement goals and

    classroom goal structures on achievement-relevant outcomes. *Journal of Educational*

    Psychology,101, 432-447.

Nicholls, J. G. (1975). Causal attributions and other achievement-related cognitions: Effects of task outcome, attainment value, and sex. *Journal of Personality and Social Psychology, 31,* 379–389.

Nicholls, J. G. (1984). Achievement motivation: Conceptions of ability, subjective experience, task choice, and performance. *Psychological Review, 91*, 328-346.

O'Shea, P.G. (2002). *A different way of looking: Application of a pattern approach to understanding transformational and transactional leadership.* Unpublished dissertation. Virginia Polytechnic Institute and State University, Virginia.

Park, G., Schmidt, A. M., Scheu, C., & Deshon, R. P. (2007). A process model of goal orientation and feedback seeking. *Human Performance, 20,* 119- 145.

Payne, S. C., Youngscourt, S. S., & Beaubien, J. M. (2007). A meta-analytic examination of the goal orientation nomological net. *Journal of Applied Psychology, 92,* 128-150.

Pekrun, R., Elliot, A.J., & Maier, M.A. (2006). Achievement goals and discrete achievement emotions: A theoretical model and prospective test. *Journal of Educational Psychology, 98,* 583-597.

Phillips, J. M., & Gully, S. M. (1997). Role of goal orientation, ability, need for achievement, and locus of control in the self-efficacy and goal--setting process. *Journal of Applied Psychology, 82*, 792-802.

Pintrich, P. R. (2000). Multiple goals, multiple pathways: The role of goal orientation in learning and achievement. *Journal of Educational Psychology, 92,* 544- 555.

Pintrich, P. R., Conley, A. M., & Kempler, T. M. (2003). Current issues in achievement goal theory and research. *International Journal of Educational Research, 39,* 319-337.

Porath, C.L., & Bateman, T. S. (2006). Self-regulation: From goal orientation to job performance. *Journal of Applied Psychology, 91,* 185-192.

Potosky, D. & Ramakrishna, H. V. (2002). The moderating role of updating climate perceptions in the relationship between goal orientation, self-efficacy, and job performance. *Human Performance, 15,* 275-297.

Roedel, T. D., Schraw, G., & Plake, B.S. (1994). Validation of a measure of learning and performance goal orientations. *Educational and Psychological Measurement, 54,* 1013-1021.

Schraw, G., Horn, C., Throndike-Christ, T., & Bruning, R. (1995). Academic goal orientations and student classroom achievement. *Contemporary Educational Psychology, 20,* 359- 368.

Schmidt, A. M., & Ford, K. J. (2003). Learning within a learner control training environment: The interactive effects of goal orientation and metacognitive instruction on learning outcomes. Personnel Psychology, 56, 405-429.

Seijts, G. H., Latham, G. P., Tasa, K., & Latham, B. W. (2004). Goal setting and goal orientation: An integration of two different yet related literatures. *Academy of Management Journal, 47,* 227-239.

Sideridis, Georgios D. (2005). Goal orientation, academic achievement, and depression: evidence in favor of a revised goal theory framework. *Journal of Educational Psychology, 97,* 366-375.

Sins, P. H. M., van Joolingen, W. R., Savelsbergh, E.R., & van Hout-Wolters, B. (2008). Motivation and performance within a collaborative computer-based modeling task: Relations between students' achievement goal orientation, self-efficacy, cognitive processing, and achievement. *Contemporary Educational Psychology, 33,* 58-77.

Sit, C. H., & Lindner, K. J. (2007). Achievement goal profiles, perceived ability and

    participation motivation for sport and physical activity. *International Journal of Sport*

    Psychology, 38, 283- 303.

Smith, A.L., Balaguer, I., & Duda, J. L. (2006). Goal orientation profile differences on perceived

    motivational climate, perceived peer relationships, and motivation-related responses of

    youth athletes. *Journal of Sport Sciences, 24,* 1315-1327.

Smith, J. A. & Foti, R. J. (1998). A pattern approach to the study of leader

    emergence. *Leadership Quarterly, 9,* 147-160.

Stephens, D. E. (1998). The relationship of goal orientation and perceived ability to enjoy and

    value in youth sport. *Pediatric Exercise Science, 10,* 236-247.

Stevens, C. K., & Gist, M. E. (1997). Effects of self-efficacy and goal-orientation training on

    negotiation skill maintenance: What are the mechanisms? *Personnel Psychology, 50,*

    955-978.

Towler, A. J., & Dipboye, R. L. (2001). Effects of trainer expressiveness, organization, and

    trainee goal orientation on training outcomes. *Journal of Applied Psychology, 86*, 664-

    673.

VandeWalle, D. (1997). Development and validation of a work domain goal orientation

    instrument. *Education and Psychological Measurement, 8,* 995- 1015.

VandeWalle, D., Brown, S. P., Cron, W. L., & Slocum, J. W. (1999). The influence of goal

    orientation and self- regulation tactics on sales performance: A longitudinal field test.

    Journal of Applied Psychology, 84, 249-259.

VandeWalle, D., Cron, W. L., & Slocum, J. W., Jr. (2001). The role of goal orientation following

    performance feedback. *Journal of Applied Psychology, 86,* 629-640.

VandeWalle, D., & Cumming, L. L. (1997). A test of the influence of goal orientation on the feedback-seeking process. *Journal of Applied Psychology, 82*, 390-400.

VandeWalle, D., Ganesan, S., Challagalla, G. N., & Brown, S. P. (2000). An integrated model of feedback-seeking behavior: Disposition, context, and cognition. *Journal of Applied Psychology, 85*, 996-1003.

Veermans, M., & Tapola, A. (2004). Primary school students' motivational profiles in longitudinal settings. *Scandinavian Journal of Educational Research,* 48, 373- 395.

von Eye, A., & Bergman, L. (2003). Research strategies in developmental psychopathology: Dimensional identity and the person-oriented approach. *Development and Psychopathology, 15,* 553-580.

von Eye, A., & Bogat A. G. (2006). Person-oriented and variable-oriented research: Concepts, results and development. *Merrill-Palmer Quarterly, 52,* 390-420.

von Eye, A., Bogat, G.A. & Rhodes, J. E. (2006). Variable-oriented and person-oriented perspectives of analysis: The example of alcohol consumption in adolescence. *Journal of Adolescence, 29,* 981- 1004.

Wang, C.K. J., & Biddle, S.J.H. (2001). Young people's motivational profiles in physical activity: A cluster analysis. *Journal of Sport & Exercise Psychology, 23,* 1-22.

Wang, C.K. J., Chatzisarantis, L.D., Spray, C. M. & Biddle, S. J.H (2002). Achievement goal profiles in school physical education: Differences in self-determination, sport ability beliefs, and physical activity. *British Journal of Educational Psychology, 72,* 433-445.

Wechsler, D. (1997). *Wechsler Adult Intelligence Scale-Third Edition.* San Antonio, TX: The Psychological Corporation.

Wolters, C. A., & Rosenthal, H. (2000). The relation between students' motivational beliefs and

   their use of motivational regulation strategies. *International Journal of Educational*

   Research, 33, 801-820.

Yeo, G.B., & Neal, A. (2004). A multilevel analysis of effort, practice, and performance: effects

   of ability conscientiousness and goal orientation. *Journal of Applied Psychology, 89,* 231-

   247.

Table 1

Means and Standard Deviations of the Goal Orientation Dimensions for Patterns Created using

Median Splits and for Patterns Created using Cluster Analysis

Pattern	Median Split with Confidence Intervals			Cluster Analysis		
	LGO	PGO	AGO	LGO	PGO	AGO
HHH	4.08 (.35)	3.99 (.47)	3.38 (.42)	3.62 (.35)	3.59 (.64)	3.52 (.47)
HHL	4.15 (.37)	3.96 (.50)	2.22 (.32)	4.08 (.45)	4.11 (.46)	2.19 (.45)
HLL	4.13 (.33)	2.32 (.53)	2.13 (.38)	3.92 (.33)	1.98 (.36)	2.41 (.51)
LHL	3.12 (.31)	3.81 (.43)	2.27 (.36)	3.08 (.31)	3.33 (.45)	2.17(.57)
LLH	2.94 (.39)	2.31 (.51)	3.36 (.41)	2.58 (.60)	2.27 (1.07)	4.27(.32)
LLL	2.81 (.41)	2.09 (.57)	2.18 (.42)	2.59 (.47)	2.00 (.57)	2.14 (.42)

Note. Values in parentheses represent standard deviations, H = High, L= Low, LGO = learning goal orientation. PGO = performance-approach goal orientation. AGO = performance-avoid goal orientation. The standard error of the mean was used to create confidence intervals around the median during cluster formation. Equivalent clusters were not found for the HLH and LHH patterns

Table 2

Means, Standard Deviations, and Intercorrelations Among Study Variables

Variable	*M*	*SD*	1	2	3	4
1. LGO	3.54	.70				
2. PGO	3.16	.98	38.**			
3. AGO	2.82	.73	-.07	.29**		
4. Self Efficacy	3.67	.49	.51**	.41**	-.34**	
5. Exerted Effort	3.86	.64	.42**	.31**	.06	.32**

Note. *N* = 371. LGO = learning goal orientation. PGO = performance-approach goal orientation. AGO = performance-avoid goal orientation. ** denotes a correlation that is significant at the .01 level.

Table 3

Means and Standard Deviations by Goal Orientation Pattern for Self-Efficacy and Exerted Effort

Patterns	*n*	Self-efficacy	Exerted Effort
HHH	76	3.81 (.44)	4.18 (.49)
HHL	50	4.11 (.44)	4.16 (.60)
HLH	23	3.52 (.45)	4.00 (.59)
HLL	42	3.78 (.33)	4.00 (.55)
LHH	44	3.51 (.47)	3.80 (.67)
LHL	26	3.82 (.32)	3.58 (.64)
LLH	52	3.24 (.42)	3.51 (.55)
LLL	58	3.53 (.43)	3.49 (.62)

Note. Values in parentheses represent standard deviations. H = High, L= Low. Patterns were created using median splits with confidence intervals around the median: The standard error of the mean was used to create the confidence intervals.

Table 4

Planned Comparisons between the HHL pattern (optimal pattern) and the Three Comparison Patterns. (Hypotheses 1 through 3)

Hypothesis	Pattern	Mean (SD)	df	t-value	p	d
			Self-Efficacy			
	HHL	4.11 (.44)	-	-	-	-
1	HHH	3.81 (.44)	124	3.76	.00	.68
2	LHL	3.82 (.32)	74	2.97	.00	.75
3	HLL	3.78 (.33)	90	3.99	.00	.85
			Exerted Effort			
	HHL	4.16 (.60)	-	-	-	-
1	HHH	4.18 (.49)	124	-.23	.82	-.04
2	LHL	3.58 (.64)	74	3.90	.00	.93
3	HLL	4.00 (.55)	90	1.34	.18	.28

Note. LGO= Learning Goal Orientation, PGO = Performance Approach goal Orientation, AGO = Performance Avoid Goal Orientation. Values in parentheses represent standard deviations. HHL represents the proposed optimal pattern with which the other three patterns are compared. Patterns were created using median splits with confidence intervals around the median: The standard error of the mean was used to create the confidence intervals.

Table 5

Planned Comparisons between the LLH Pattern (least optimal pattern) and the Three Comparison Patterns. (Hypotheses 4 through 6)

Hypothesis	Pattern	Mean (SD)	df	t-value	p	d
			Self-Efficacy			
	LLH	3.24 (.42)	-	-	-	-
4	HLH	3.52 (.45)	73	-2.60	.00	-.64
5	LHH	3.51(.47)	94	-2.88	.01	-.59
6	LLL	3.53 (.43)	108	-3.66	.00	-.68
			Exerted Effort			
	LLH	3.51 (.55)	-	-	-	-
4	HLH	4.00 (.59)	73	-3.50	.00	-.86
5	LHH	3.80 (.67)	94	-2.29	.02	-.46
6	LLL	3.49 (.62)	108	.17	.87	.03

Note. LGO= Learning Goal Orientation, PGO = Performance Approach goal Orientation, AGO = Performance Avoid Goal Orientation. Values in Parentheses represent standard deviations. LLH represents the proposed least optimal pattern with which the other three patterns are compared. Patterns were created using median splits with confidence intervals around the median: The standard error of the mean was used to create the confidence intervals.

Table 6

Regression Estimates for Predicting Self-Efficacy

Step	Independent Variable	B	R^2	ΔR^2	Lower 95% CI	Upper 95% CI
			Self Efficacy			
1	LGO	-.537*			-1.011	-.063
	PGO	-.479			-1.008	.049
	AGO	-1.328*			-1.951	-.705
	Model		.480	.480		
2	LGO*PGO	.203*			.046	.361
	LGO*AGO	.288*			.105	.472
	PGO*AGO	.250*			.068	.433
	Model		.487	.007		
3	LGO*PGO*AGO	-.071*	.492	.005	-.126	-.017
4	Optimal Pattern	-.271*			-.487	-.056
	Other Patterns	-.162*			-.313	-.012
	Model		.501	.009		

Note: R^2 values are unadjusted, Lower 95% CI = lower bound of 95% confidence interval, Upper 95% CI = upper bound of 95% confidence interval, LGO = Learning Goal orientation, PGO = Performance-approach Goal orientation, AGO = performance-avoid goal orientation, The least optimal pattern was excluded by the regression analyses, * $p < .05$.

Table 7

Regression Estimates for Predicting Exerted Effort

Step	Independent Variable	B	R^2	ΔR^2	Lower 95% CI	Upper 95% CI
	Exerted Effort					
1	LGO	.553*			-.222	1.327
	PGO	-.339*			-1.203	.525
	AGO	.293			-.726	1.311
	Model		.206	.206		
2	LGO*PGO	.058			-.200	.315
	LGO*AGO	-.130			-.430	.170
	PGO*AGO	.092			-.206	.391
	Model		.226	.019		
3	LGO*PGO*AGO		.226	.000		
4	Optimal Pattern	.201			-.151	.554
	Other Patterns	.146			-.100	.392
	Model		.229	.003		

Note: R^2 values are unadjusted, Lower 95% CI = lower bound of 95% confidence interval, Upper 95% CI = upper bound of 95% confidence interval, LGO = Learning Goal orientation, PGO = Performance-approach Goal orientation, AGO = performance-avoid goal orientation, the least optimal pattern was excluded by the regression analyses, * $p < .05$.

Table 8

Comparison of Effect Sizes Produced by Different Methods of Median Splits

	Self Efficacy			Effort Exerted		
Hypothesis	Standard Error of the Mean	Standard Error of Measurement	Pure Median Split	Standard Error of the Mean	Standard Error of Measurement	Pure Median Split
1	.68	.64	.62	-.04	-.01	-.07
2	.75	.65	.71	.93	.75	.75
3	.85	.81	.66	.28	.27	.20
4	-.64	-.62	-.68	-.86	-.90	-.72
5	-.59	-.55	-.51	-.46	-.40	-.34
6	-.68	-1.00	-.68	.03	.11	.07
7	.78	.99	.69	.38	.26	.19

Note: Values represent effect sizes as measured by Cohen's *d*, *N* for standard error of the mean = 371, *N* for standard error of measurement = 272, *N* for pure median splits = 455

Appendix A: The Pattern Approach versus the Variable Approach: An Example

Table A.1

Summarizing the Characteristics of the Variable-Oriented and Pattern Approaches

Approach → Characteristics ↓	Variable-Oriented Approach	Pattern Approach
Unit Of Analysis	The variable	The person or the group
Research Question	How do variables' behave with regard to some particular phenomena?	How do different types of people behave with regard to some particular phenomena?
Methodology/Statistics	Linear based statistics are usually used: For example Correlations, Regression, Structural Equation Modeling	Several types of statistics can be used to create patterns. These include cluster analysis, configural frequency analysis and median splits.
Homogeneity	Homogeneity is across individuals and is evidenced by a small between groups variability and large within groups variability.	Homogeneity exists within patterns and can be evidenced by a large between groups variability and small within groups variability
Generalizing Results	Results generalize to variables not people.	Results are generalizable to people who exhibit similar patterns.
Other characteristics	Always takes measurement error into account.	Measurement error is not accounted for in the formation of patterns

Empirical Aspects of Example

The program developers received applications from students to join the accelerated academic

program. Students were placed into patterns using median splits. Students who scored at or

above the median were considered high on a particular dimension and those students who scored

below the median were considered low. For ease of explanation, a sample of 32 applicants

dispersed amongst 4 patterns were used in the results described below. The descriptive statistics

related to these patterns are presented in Table A.2 below.

Table A.2

Means and Standard Deviations by Goal Orientation Pattern for Self-Efficacy and Exerted Effort

Patterns	n	Self-efficacy	Exerted Effort
HHH	8	2.23 (.10)	4.44 (.42)
HHL	8	4.78 (.10)	4.43 (.34)
HLH	8	1.25 (.09)	4.41 (.36)
HLL	8	3.34 (.11)	4.43 (.38)

Note: Patterns are presented in order of LGO, PGO, AGO, H denotes a high standing on the

dimension, L denotes low standing on the dimension, values in parentheses represent standard

deviations.

Assessing Homogeneity

Although the developers of the program have already placed applicants into patterns it is

important to ensure that the pattern approach is the most suitable approach for examining each of

the outcome variables based on the data available to them. In order to make the decision as to

which approach is best suited to describe and explain self-efficacy and exerted effort from the

data available, Two One Way ANOVAS were run- one for each outcome variable. The patterns

served as the independent variables.

The results of the ANOVA in which self-efficacy served as the dependent variable are

presented in Table A.3 below. The results suggested that there were significant differences in

self-efficacy among the four patterns, $F(3, 28) = 1780.39$, $p < .01$. Post hoc results revealed that

all four patterns, HHH ($M = 2.23$, $SD = .10$), HHL ($M = 4.78$, $SD = .10$), HLH ($M = 1.25$, $SD =$

.09), and HLL ($M = 3.34$, $SD = .11$), differed significantly from each other. The significant

differences among patterns provide one piece of evidence to suggest that the pattern approach

may be the appropriate approach to be used to examine self efficacy in this scenario. However, a

second piece of evidence comes from examining the variability within and between patterns. As

noted, in the theoretical explanation of this example, the pattern approach can be deemed the

most appropriate method when the between groups variability is high and the within groups

variability is low. A high between group variability suggests that the groups are distinct, and a

low within groups variability suggests that the members of each respective group are similar.

The results presented in Table A.3 below provide further evidence to support that the pattern

approach is the appropriate method for examining self-efficacy. Specifically, the sum of squares

indicated that the between groups variability was high while the within groups variability was

low, thereby indicating the existence of distinct homogeneous groups.

Table A.3

Results of ANOVA in which Self-Efficacy Served as the Dependent Variable

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	55.08	3	18.36	1780.39	.000
Within Groups	0.29	28	.010		
Total	55.37	31			

When exerted effort served as the dependent variable the ANOVA did not produce

significant results *F* (3, 28) = .006, *ns* (See Table A.4). This suggests that the differences among

the four patterns, HHH (*M* = 4.44, *SD* = .42), HHL (*M* = 4.43, *SD* = .34), HLH (*M* = 4.41, *SD* =

.36), and HLL (*M* = 4.43, *SD* = .38) were not large enough to achieve significance, and also

raises initial questions about the suitability for the pattern approach for examining effort. The

sum of squares results indicated that the between groups variability was small while the within

groups variability was large. This finding suggests that groups were not distinctly different from

each other and that each unique group was not made up of similar applicants. This implies that

the variable approach is better suited for examining effort as an outcome variable.

Table A.4

Results of ANOVA in which Effort Served as the Dependent Variable

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.002	3	.001	.006	.999
Within Groups	3.958	28	.141		
Total	3.960	31			

Given the findings of both ANOVAs the program developers can conclude that the

pattern approach would be more suitable for use in predicting levels of self-efficacy while the

variable-oriented approach would be more useful for predicting exerted effort.

Appendix B – Goal Orientation Measure
Instructions: Please indicate the extent to which degree you agree or disagree with the following statements.

❶	❷	❸	❹	❺	❻	❼
Strongly Disagree	Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Agree	Strongly Agree

Mastery Goal Orientation (LGO)

1. I want to learn as much as possible about this puzzle task.

2. It is important for me to understand how to perform this puzzle task as thoroughly as possible.

3. I would like to completely master this puzzle task.

4. I prefer puzzles that arouse my curiosity, even if they are difficult to solve.

5. I prefer working on puzzles that really challenges me so I can learn new things.

Performance-Approach Goal Orientation (PGO)

6. It is important to me to do better than the other students on this puzzle.

7. My goal on this puzzle is to get a better time than most of the students.

8. I am motivated by the thought of outperforming my peers on this puzzle.

9. It is important to me to do well compared to others on this puzzle.

10. I want to do well on this puzzle to show my ability to others.

Performance-Avoidance Goal Orientation (AGO)

11. I worry about the possibility of taking too long to solve this puzzle.

12. My fear of performing poorly in this puzzle task is often what motivates me.

13. I just want to avoid doing poorly in this puzzle.

14. I'm afraid that if I ask the experimenter a "dumb" question, they might not think I'm very

smart.

15. I wish this puzzle was not timed.

Note: The following items could not be adapted for use in the present study
I hope to have gained a deeper knowledge of psychology when I am done with this class.
I am striving to demonstrate my ability relative to others in this class.
I often think to myself, "What if I do badly in this class?"

Appendix C – Task-Specific Self-Efficacy Measure
<u>Instructions:</u> Please think about your performance on the upcoming puzzle and indicate the extent to which you agree with the following statements.

❶	❷	❸	❹	❺
Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

1. I feel confident in my ability to perform well on the upcoming puzzle.

2. I think that I can eventually solve this puzzle in a satisfactory time.

3. I am not confident that I will do as well on this puzzle as I would like.*(R)

4. I don't feel that I am capable of performing as well on this puzzle as other students.*(R)

5. I am a fast learner for these types of games, in comparison to other people.

6. I am not sure I can ever do well on these puzzles, no matter how much I practice.*(R)

7. I would have to practice for a long time to be able to do well on these puzzles. * (R)

8. I think that my performance will be adequate on this puzzle.

9. I am sure that I can learn the techniques required for the next puzzle in a short period of time.

10. On average, other individuals are probably not as capable of doing as well on these puzzles as I am.

*(R) = Items that are reverse coded

Appendix D – Exerted Effort Measure

Instructions: For each of the following statements, please indicate how true it is for you, using the following scale:

❶	❷	❸	❹	❺	❻	❼
not at all true			somewhat true			very true

1. I put a lot of effort into working on the puzzle task.

2. I didn't try very hard to do well at on the puzzle task in this study.(R)*

3. I tried very hard on the puzzle task in this study.

4. It was important to me to do well at the puzzle task in this study.

5. I didn't put much energy into working on the puzzle task.(R)*

*(R) = Items that are reverse coded