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THE IMPACT OF SITUATIONAL FRAMING AND COMPLEXITY ON
CHARISMATIC, IDEOLOGICAL AND PRAGMATIC LEADERS:
INVESTIGATION USING A COMPUTER SIMULATION

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In partial fulfillment of the requirements for the

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By

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THE IMPACT OF SITUATIONAL FRAMING AND COMPLEXITY ON
CHARISMATIC, IDEOLOGICAL AND PRAGMATIC LEADERS:
INVESTIGATION USING A COMPUTER SIMULATION

A DISSERTATION APPROVED FOR THE
DEPARTMENT OF PSYCHOLOGY

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Abstract

Recent investigations of a new model of outstanding leadership suggest that, in addition to the often-researched charismatic pathway, there exist two additional, yet equally viable, pathways to outstanding achievement: ideological and pragmatic (Mumford, 2006). Despite the compelling results of these initial studies, additional questions remain as to when and under what situational conditions these leaders operate most effectively. Thus, an experiment was conducted to investigate two noteworthy contextual influences: 1) situational congruence with a leader's mental model and 2) environmental complexity. The experiment made use of a computerized leadership simulation where participants took on the role of a university chancellor. Results indicate that leader type, complexity, and situational framing were critical factors in determining leader performance on multiple game performance criteria as well as creative process criteria. Implications and avenues for future research are discussed.

The Impact of the Situation and Complexity on Charismatic, Ideological and Pragmatic Leaders: Investigation using a Computer Simulation

There is little denying the impact leaders have on our lives (Bass, in press; Yukl, 2006). Leaders possess both the capacity for outstanding achievement and at the same time, the faculty for deleterious harm (e.g., Bennett, 1976; Hyde, 1971). Not surprisingly then, there are few areas of organizational behavior as investigated as leadership (Mumford, Friedrich, Caughron, & Antes, in press) – an area of research that continues to grow each year (Hunt, 1999; Lowe & Gardner, 2000).

In examining the broad leadership research landscape, it is clear that a select number of theories of leadership have dominated the leadership arena for nearly the last thirty years (Hunt, 1999; Lowe & Gardner, 2000; Hunter, Bedell-Avers, & Mumford, in press; Yukl, 1999). Recently, however, a few models of leadership have begun to creatively explore new types of leadership (e.g., Strange & Mumford, 2002; Mumford & Van Doorn, 2001). One new model, in particular, has provided a rather compelling view of outstanding leadership suggesting that, in addition to the often-researched charismatic leadership approach, there exist two additional, yet equally effective, pathways to outstanding leadership: the ideological and pragmatic paths (Mumford, 2006).

This new model of leadership has been investigated in a number of studies with behaviors ranging from creative problem-solving (Bedell-Avers, Hunter, & Mumford, in press; Mumford, Bedell-Avers, Hunter, Espejo, & Boatman, 2006) to political tactics (Mumford et al., 2006) to Machiavellianism (Bedell-Avers, Hunter,

Angie, & Vert, 2006). The results of these studies have been compelling and strongly indicate that although the leader types do indeed differ on a number of key variables such as early-life experiences (Ligon, Hunter, & Mumford, in press) and mental-model formation (Strange & Mumford, 2002), each type is capable of outstanding achievement (Mumford, Strange, & Hunter, 2006).

Barring a few notable experimental studies (e.g., Strange & Mumford, 2002; Bedell-Avers et al. in press), the primary method used to investigate the new model has been historiometric – where historical data was quantified and subsequently analyzed using traditional statistical techniques (Simonton, 1990). This method has a number of unique advantages with regard to the study of outstanding leadership. For example, because outstanding leadership is a rare phenomenon, biographical accounts allow for a sample-size adequate enough to draw reasonable statistical inferences from. Historiometric data is also very rich, providing researchers with insight into a number of critical process variables that more typical survey approaches do not allow (Mumford, Gaddis, Strange, & Scott, 2006).

As useful as the historiometric approach may be, however, it is limited in that many environmental and situational conditions may only be controlled for rather than investigated directly. More precisely, the use of historical biographies to investigate situational influences of leadership is limited simply because leaders frequently self-select into domains where they may succeed or feel most comfortable. Witness the prevalence of ideological leaders in religious and social justice domains, for example. Similarly, little is known regarding how environmental

influences, such as complexity (Uhl-Bien, Marion, & McKelvey, in press) may impact leader behaviors as they encounter crises inherently characterized by high levels of ambiguity and change (Hunt, Boal, & Dodge, 1999).

In sum, the initial studies examining the new model of leadership have produced compelling results, strongly suggesting that there exist unique, distinct, yet equally viable leadership paths to outstanding achievement. Despite answering many questions, however, these studies and the methods applied now bring to fore a number of new questions regarding charismatic, ideological and pragmatic leaders and the contexts they operate in. Thus, the aim of the present effort is to experimentally investigate two important influences on leader behavior: 1) situational congruence with the leaders' mental-model and 2) environmental complexity.

The New Model of Outstanding Leadership

Outstanding leaders often emerge during times of crisis – a notion agreed on by most leadership scholars (e.g., Hunt, et al. 1999; Rivera, 1994; Mumford, 2006). What is unique with regard to the new model of leadership, however, is how these leaders *respond* to crises. Certainly, each type is compelled to offer some form of sensemaking to their followers; to provide an interpretation of the situation and offer direction and comfort during times of stress and ambiguity. How they make sense of the crisis, explicitly, is where these leaders fundamentally begin to differ.

Based at least in part on their early life experiences the three leader types form differing prescriptive mental-models to help guide sensemaking during crises

(Mumford, 2006; Ligon, Hunter, Mumford, in press). These differences may be summarized along seven key mental-model features: (a) time frame, (b) type of experiences available, (c) nature of outcomes sought, (d) type of outcomes sought, (e) focus in model construction, (f) locus of causation and (g) controllability of causation. A summary of these differences, taken from Mumford (2006), may be seen in Table 1.

Insert Table 1 About Here

These differences in mental-model formation have a number of important implications for how the leader types may perform in varying situations. Charismatic leaders, for example, employ a future-oriented timeframe within their respective mental-models. Under conditions of high complexity, however, the future may be relatively unknowable thereby reducing the influence and impact of these leaders under such conditions (Kukalis, 1991; Plumlee, 2003). Moreover, charismatic leaders are also vision-based and present their view of the future in a positive, almost utopian, light. Under many conditions, this vision may be highly appealing to followers and result in high-level achievement (e.g., de Groot, Kiker, & Cross, 2000; Judge & Piccolo, 2004; Lowe, Kroeck, & Sivasubramaniam, 1996). Under other conditions, however, being bound to a personal vision may be limiting, resulting in an overly narrowed focus and ultimately reduced performance (e.g., Payne, 1973).

Pragmatic leaders, on the other hand, are present-focused and problem-solving oriented (Mumford & VanDoorn, 2001). As such they are likely to prefer working on the specific task provided to them. Put another way, to the extent they are allowed to focus directly on problem-solving, they are likely to excel. Their general lack of affect and emotion in sensemaking suggests that they are likely to demonstrate a consistency in performance across a number of conditions, even those of high complexity (Bedell-Avers et al., in press). This also indicates, however, that pragmatic leaders are not likely to “lead the charge” or develop the emotionally provocative visions evidenced by charismatic and pragmatic leaders, when indeed, such visions may be necessary (Mumford, 2006).

Finally, the mental-models of ideological leaders are typically founded in past events. Such ties to the past have their advantages. For instance, these leaders are often able to perform well under many complex conditions – in particular those situations where charismatic leaders may have difficulty in future-vision formation (Bedell-Avers et al., in press). Under certain conditions, however, these ties to the past can have their drawbacks as well, such as producing overly rigid thinking. Rigid thinking may also result vis-à-vis an emphasis on their personal beliefs and values when engaging in sensemaking activities. Ideological leaders, typically, also have an inward focus, which may compound their “tunnel-vision” approach to solving a given problem (Mumford, Scott, & Hunter, 2006). Finally, this leader type also tends to have transcendent goals and may prefer broad tasks to those that are more narrowly focused (Mumford, Scott, & Hunter, 2006).

Situation and Leader Mental-model

As noted earlier research on the new model reveals that, within each type, leaders typically emerge from similar domains (Mumford, 2006). For example, a large number of charismatic leaders emerge from the political arena – an arena that often rewards the promise of a better future. Pragmatic leaders, on the other hand, are often found in business settings where problem-solving is in high demand. Finally, it is common to witness ideological leaders emerging from social justice domains – domains emphasizing past wrongs and a strong commitment to ones personal beliefs. Because of this self-selection into, and emergence from, common domains we know very little with regard to how these leader types may perform under varying conditions. More specific to the present effort, we know little about how the leader types may perform in situations best-suited, or framed, for another leader type. For example, the question remains as to how a charismatic leader may perform a characteristically “ideological” situation (e.g., a situation calling for an emphasis on ones’ beliefs and values). Thus, a primary aim of the present effort was to examine meaningful conditions that may provide clues as to how these leaders might perform in varying circumstances.

The role of the situation in understanding how leaders behave is hardly a new area of investigation. For example, early LPC models examined leader-member relations, task structure and positional power as key situational influences (Fiedler, 1978). Other models such as path-goal (House, 1971) also focused on the situation, including aspects of the task as well as the subordinate. Some models have even

gone so far as to suggest that the situation may be such that a leader is not even necessary (e.g., Kerr & Jermier, 1978) – albeit with little empirical support (e.g., Dionne, Yammarino, Atwater, & James, 2000). Finally, recent considerations of situational influences on leadership demonstrate that research continues to focus on the context in which leadership operates (e.g., Sternberg & Vroom, 2002; Vroom & Jago, 2007). Thus, it is clear from the aggregate of these studies that the situation makes a difference in how leaders behave (Vroom & Yago, 2007).

If it is granted that the situation is important in understanding leadership, the emergent question for the present effort becomes: What aspects of the situation, specifically, are critical to investigating charismatic, ideological and pragmatic leaders? The answer, it seems, is inherently tied to the leaders' respective mental-models (Mumford, Marcy, Eubanks, & Murphy, in press). Based on earlier discussion, it is clear that mental-models play a critical role in how the differing leader types behave. For example, mental-models guide appraisal of threat, aid in information searching, provide a basis for forecasting and provide a basis for knowledge transfer – among others (Sein & Bostrom, 1989; Mumford et al., in press). Taken a step further, it appears reasonable to suggest that situations most directly impacting a leaders' mental-model are also most likely to influence performance. For example, we would expect to see performance differences in pragmatic leaders as they move from a situation framed consistent with a pragmatic mental-model (e.g., present-oriented, problem-focused) to situations that are framed in a more “ideological” fashion (e.g., emphasizing past errors). These general

observations led to the first study hypothesis:

Hypothesis 1: The performance of charismatic, ideological and pragmatic leaders will vary according to the mental-model situation (ideological, pragmatic, or charismatic- framed) they are placed in.

Complexity and Leadership

Examination of leadership research, broadly, would seem to indicate that the majority of studies implicitly assume leadership to be a relatively static phenomenon occurring in a generally stationary environment. This implicit assumption has been criticized by a number of scholars (e.g., Hunt & Ropo, 2004; Uhl-Bien et al., in press) – criticism warranted with even a cursory consideration of the situations and contexts leaders face on a daily basis. Consider, for example, the constituencies leaders may interact with: lower-level subordinates, key lieutenants, customers, suppliers, other leaders, their superiors, competitors, or even other organizational leaders – all of which may also interact with one another in some fashion (Mintzberg, 1973; Yukl, Gordon, & Tabor, 2002). If we also consider the complex cognitive tasks leaders must engage in, such as planning, forecasting and problem-solving, the contextual complexity increases nearly exponentially (e.g., Marta, Leritz, & Mumford, 2005; Mumford, Bedell-Avers & Hunter, in press). It is also important to realize that all of these interactions occur in an environment that can change very rapidly (Uhl-Bien, Marion, & McKelvey, in press). These environmental changes, moreover, will then impact any or all of the above issues leaders face in potentially reciprocal fashion. Thus, it may better be stated that

leadership is a form of managed chaos, with leaders clearly operating in ambiguous, dynamic, rapidly-changing contexts (Hunt & Ropo, 2004; Marion & Uhl-Bien, 2001, Mumford, Marcy et al., in press; Uhl-Bien et al., in press). Not surprisingly, there has been a recent call for greater emphasis on the impact and role of complexity in understanding leadership (cf. Uhl-Bien et al., in press).

From the above discussion, it seems clear that contextual complexity is an important aspect in understanding leadership. What is less clear at this point, however, is how complexity *explicitly* relates to the new model of leadership. The answer appears partially tied to the crises outstanding leaders often face – crises best characterized as ambiguous, rapidly-changing, and ill-defined. Simply stated, complexity is a fundamental component of the leadership model in that crises create the basic need for sensemaking. Going further, complexity is implicitly tied to the respective mental-models of the three leader types – the mental-models the leaders use to provide this sensemaking in complex, ambiguous, dynamic environments.

To illustrate, consider the mental-model of a charismatic leader, often comprised of a future-oriented vision. Under highly complex conditions, however, it may prove very difficult to forecast future events and as such, we may see decreased performance for this leader type. Pragmatic leaders, on the other hand, are less likely to be impacted by complexity given their emphasis on problem-solving versus future-oriented vision formation. Considerations such as these led to the second study hypothesis:

Hypothesis 2: The performance of charismatic, pragmatic and ideological

leaders will vary as a function of complexity.

Along similar lines, it seems reasonable to assume that complexity will also interact with the situational characteristics to produce differences in performance as well. Consider, for example, a situation in which a leader is *instructed* to focus on the future and *asked* to focus only on those elements external to the problem – conditions congruent with the mental-model of a charismatic leader. Intuitively, it seems reasonable to assume that framing a situation in this manner may result in an increased focus and provide general direction about what elements of the problem are most important. Now consider what may happen as task or environmental complexity is increased. Research suggests that this discrete focus, induced via situational framing, may actually reduce the leaders' capacity to work with multiple causes and, in turn, hamper performance (Bercovitz, de Figuieredo, & Teece, 1997; Dosi, & Lovallo, 1997; Kahneman & Lovallo, 1993). Thus, it seems reasonable to believe that performance may vary by situational framing and complexity, leading to the third study hypothesis.

Hypothesis 3: The performance observed in the three mental-model situations (pragmatic, ideological and charismatic-framed) will vary as a function of complexity.

Finally, and most central to the present effort, we must consider the interactive effects of the leader type, the situation, and complexity. As noted earlier, it may be difficult for a charismatic leader to form a future-oriented vision in highly complex conditions (Kukalis, 1991; Plumlee, 2003). In these highly complex

conditions, however, charismatic leaders may be adequate problem-solvers if, indeed, asked to be (i.e., placed into a pragmatic situation). Ideological leaders, on the other hand, may suffer from over-rigidity if placed into ideological situations due to a resulting over-emphasis on past events, as well as a focus on their core beliefs and values. This performance decrement relationship may be compounded as complexity is increased and they default intuitively to the fundamental characteristics of their respective mental model. Considerations such as these led to the fourth study hypothesis:

Hypothesis 4: The performance of the charismatic, pragmatic and ideological leaders will vary as a function of complexity and the mental-model situation they are placed in.

Creative Thinking

Although it is useful, and indeed necessary, to consider the impact of the situation on relevant outcome criteria, it is just as critical to consider the processes leaders use to deal with problems (Hunter et al., in press; Mumford et al., in press). As noted earlier, outstanding leaders emerge during times of crisis (e.g., Rivera, 1994). As leaders face these crisis events – events characterized as ill-defined and complex – they must develop new and novel approaches to problem-solving (e.g., Reiter-Palmon & Illies, 2004). Thus, thinking creatively appears to be a critical process of outstanding leadership (Mumford & Licuanen, 2006; Mumford, Connelly, & Gaddis, 2003; Shalley & Gilson, 2004).

This notion of creativity being critical to leader performance has been

investigated in a number of studies. Some, such as those by West, Borrill and Lawson (2003) have clearly and directly illustrated the impact of leadership on creative performance. Other studies have examined potential moderators and boundary conditions of leadership and creative performance. For example, Baer, Oldham, and Cummings (2003) explored the role of the task, finding that task-challenge served as a moderator of leadership and creative performance. Studies on creative climate have shown that leaders may be more or less effective under certain conditions (Shalley & Gilson, 2004). Finally, in an experimental study examining the creative thinking of leaders, Mumford, Connelly, and Gaddis (2003) found that the creativity of the followers, as well as the actions of leaders, was critical to creative performance. Although additional examples exist, these studies appear to indicate that (a) creative problem-solving is critical to leadership and (b) that the situation plays an important role in understanding leader creativity. These observations led to the fifth study hypothesis:

Hypothesis 5: Creative performance will vary by the situation the leader is placed in.

In addition to studies investigating leadership and creativity broadly, there exist two studies that may provide insight into the present effort, directly. The first, conducted by Mumford et al. (2006), employed the historiometric approach to analyze the creative problem-solving of 120 historical leaders. Researchers examined the differences among the eight creative processes known to be used in creative thinking (e.g., Mumford, Baughman, & Threlfall, 1996). Examining

multiple problem-solving events at multiple points in the leaders' careers, the researchers found an interesting pattern of differences among charismatic, ideological and pragmatic leaders, with the exception of one notable "non-finding." Specifically, the researchers failed to observe a significant difference among the leader types on overall creative achievement – an observation consistent with the fundamental tenets of the new leader model (Mumford, Strange, & Hunter, 2006). Where the leaders did differ, however, were in the processes emphasized during creative problem-solving. Pragmatic leaders, for example, emphasized early stage processes, charismatic leaders emphasized idea-generation and ideological leaders emphasized idea-evaluation with respect to their personal beliefs and values. The most critical aspect of predicting creative performance, however, was found in how well the leaders integrated ideas and potential solutions in relation to the complex demands placed on them by the external environment.

In a second study experimentally examining differences in creative performance across the three leader types, Bedell-Avers et al. (in press), manipulated the type of problems given to the three leader types, as well as whether these leaders were, or were not, designated as leaders within the problem-scenarios provided. With respect to solution creativity, researchers found pragmatic leaders evidenced typical responses across most conditions. Ideological and charismatic leaders, on the other hand, evidenced notable differences in creative performance across conditions. For example, ideological leaders performed creatively under more structured conditions, yet had decreased performance in less structured conditions (i.e., not designated as

leaders). Finally, charismatic leaders appeared to prefer less structured situations, producing more creative responses under such conditions, although only in socially-oriented domains. These observations, as well as those noted above appear to indicate that situational complexity may interact with leader type, resulting in creative performance differences among conditions. This general observation led to our sixth and final hypothesis.

Hypothesis 6: Creative performance of charismatic, ideological and pragmatic leaders will vary by the complexity of the experimental condition.

Method

Sample

The sample used to test these hypotheses contained 247 undergraduates attending a large southwestern university. The sample was comprised of 132 men and 115 women who agreed to participate in the study in exchange for class extra-credit. Participants were recruited from both business ($n = 110$) and psychology departments ($n = 137$) via in-class requests as well as through use of the psychology department website. Most participants were in their sophomore year and had an average age of 19. Their academic ability, as indicated by scores on the Scholastic Aptitude Test (SAT) was roughly one quarter of a standard deviation above the national norm for individuals attending a four-year program.

General Procedure

Participants were recruited for a leadership study investigating problem-solving, and were told the study would make use of a computerized leadership

simulation. During the first hour of the three-hour study, participants were asked to complete a series of psychometric measures used to control for individual differences among the participants. In addition, participants were asked to complete a new measure designed to determine their leadership style: ideological, charismatic, or pragmatic.

Upon completion of the covariate and leadership measures, participants were asked to participate in a half-hour practice session to expose them to the computer simulation used in the experimental task and allow them to get acclimated to general game operations. After the training session, participants engaged in the experimental task, attempting to achieve the goal of improving research performance at a virtual university. Prior to playing the simulation, participants were randomly assigned to conditions in two manipulations: (1) complexity manipulation (high or low) as well as a (2) leader situation manipulation (ideological, pragmatic, or charismatic). At intervals during game play, participants were also asked to write down their strategy for how they approached goal achievement. These strategies were evaluated for quality and originality. Game performance was assessed using data derived from the virtual university simulation.

Control Measures

The first set of measures applied were intended to control for individual differences related to cognitive ability. Specifically, the Wonderlic Personnel Test was given as a measure of general cognitive ability. The test is comprised of 50 items and scores reflect the total number of items correct. The measure yields split-

half reliabilities above .80 (McKelvie, 1989). Evidence for the validity of this measure may be viewed by consulting Frisch and Jessop (1989) and Hawkins, Faraone, Pepple, Seidman, and Tsuang (1990).

In addition to a measure of general intelligence, participants were asked to complete a measure of creative thinking. Guilford's consequences measures (Merrifield, Guilford, Christensen, & Frick, 1962) was used and asked participants to complete five items that ask people to identify the likely outcomes of change events such as "What would happen if everyone lost the ability to read and write?" When scored for fluency and flexibility this measure yields internal consistency coefficients in the .70's. Evidence for the construct validity of this measure in accounting for leader performance may be obtained by consulting Vincent, Decker, and Mumford (2002).

In addition to the cognitive control measures, two non-cognitive control measures were applied. Because the experimental task asked participants to engage in an open-ended, relatively unstructured task, Cacioppo and Petty's (1982) need for cognition scale was used. This behavioral self-report measure presents 18 statements and asks participants to indicate their agreement on a five-point scale. The internal consistency coefficient obtained for the scale was .81. Evidence bearing on the construct validity of the scale may be obtained by consulting Cacioppo and Petty (1982).

Given the complexity of the game as well as the experimental manipulations applied, it also appeared necessary to control for the participants' general desire for

structure. Thus, this individual difference was controlled for using Neuberg and Newsom's (1993) personal need for structure scale. A sample item is: "It upsets me to go into situations without knowing what I can fully expect from it." Participants are asked to indicate their agreement on a five-point scale. Internal consistency for the measure was .80. Construct validity for the scale may be examined by viewing Neuberg and Newsom (1993).

The final set of control measures were designed to control for the participant's experience in task and game-related areas. Thus, video-game experience, business experience and leadership experience were all assessed using direct behavioral reports. To account for prior video-game experience, participants were asked to indicate (a) how many video games they played in the previous year, (b) how many simulation-type games they played in the previous year, (c) how many hours they play video games in an average week and (d) how many hours they play simulation-type games in an average week. To control for business experience, participants were asked (a) how many business courses they have taken in college and (b) how many different jobs they have held. Finally, to control for leadership experience participants were asked (a) how many leadership positions they have held and (b) how many leadership positions they are currently in. Because these measures were direct, behavioral reports they were treated as single-item, indicators (DeSalvo et al., 2006; Wanous & Hudy, 2001). Pilot testing revealed an average test-retest reliability of .93 across the eight items.

Identifying Leader Types

To identify leader types, a measure developed by Bedell-Avers, Hunter and Mumford was used. The measure is based on a variation of procedures suggested by James (2005), LeBreton, Barksdale, Robin, and James (2007), and Mumford, Connelly, Helton, Van Doorn, and Osborn (2002). These studies indicated that personality may be determined via examination of complex problems that allow for expression of differential beliefs. More specifically, the measure was based on the proposition that people are attracted to, or like, those leaders that are similar to themselves. For a full description of the measure development, please see Bedell et al. (in press).

The measure contains 12 items and each item is comprised of three possible choices. The choices represent behavioral incidents of each of the three theorized leader types: charismatic, ideological, and pragmatic. For each of the 12 items, the participant is asked to read three possible responses and select the leader most similar to them. No description of the leader is given in the behavioral incident. The items were selected to cover a broad range of leader behaviors (e.g., consideration, initiating structure, participative, change management).

Participants were then assigned scores for their preference for the given leadership style (charismatic, pragmatic or ideological) based on the frequency with which they selected the given leader incidents. More precisely, participants were categorized into one of the three leader types if they selected responses above a random choice baseline. Individuals who did not express a preference above the baseline were classified as undifferentiated. Application of these scoring rules

resulted in 72 individuals expressing charismatic preferences, 113 expressing pragmatic preferences and 43 expressing ideological preferences and only 19 were classified as undifferentiated. The reliability estimates of these classifications, as estimated using a split-half procedure, are reported as .74, .81, and .82 for the charismatic, ideological and pragmatic pathways (Bedell-Avers et al., in press).

Simulation Training and Acclimation

To investigate the study's research questions, a computerized leadership simulation called Virtual University (Rainwater, Salkind, Sawyer, & Massey, 2000) was used. Developed by the Sloan Foundation with notable aid from a former university president, the Virtual University simulation is based on university data from over 1,200 universities (Rainwater et al., 2000). The game provides users with a complex simulation of a university played from the university chancellor's perspective. Users are able to make a large number of and wide range of decisions, varying from hiring choices to budget allocations. The game moves in a calendar sequence and can be played across a number of virtual academic years.

Over 40 hours of pilot testing with the simulation revealed that, because the game is relatively complex, a training session was necessary to provide participants with a basic understanding of how to interact with the game prior to the experimental manipulation. As such, participants were initially allowed to explore the game with no instructions other than how to interact with the various buildings, departments and units on the campus screen (e.g., double click on a building to view the options for that department). After this practice session, participants were given the task of

improving athletic performance at the university. The task was chosen because it was unrelated to the experimental manipulation, yet would allow participants to explore the university with a specific goal in mind. Pilot testing also revealed that, without a specific task provided, participants would not adequately acclimate themselves to the various nuances of the game. In addition, this practice session allowed for pre-measures of game performance to be taken and later used as control variables. Specifically, pre-training performance was assessed via two outcomes: (1) task specific performance – the degree to which athletic performance was improved and (2) general game performance – the total gamescore which reflects an aggregation of over 16 different performance criteria (Rainwater et al., 2000).

Experimental Task

To participate in the experimental task, participants were asked to engage in the leadership problem-solving simulation. Specifically, participants were asked to improve research performance at the virtual university over a three-year virtual simulation period. Each simulated year lasted roughly twenty minutes. Prior to playing each year, participants were asked to write down their strategy for how they would achieve the task assigned to them.

Complexity. As noted earlier, complexity was expected to interact with leader type in shaping game performance and strategy formation. Accordingly, half of the participants were placed into a high complexity situation and half were placed into a low complexity situation. Complexity was manipulated by changing game settings for the two conditions. In the high complexity condition, there were more

university departments, a greater number of undergraduate students and more graduate students. In addition, the random events and random objectives settings were enabled and set to high frequency. Selecting these options causes information to be presented to the user at random points during game-play and does so with notable frequency. In the low complexity situation, there were fewer departments, undergraduate students and graduate students. The random events and objectives options were set to “none.” As a manipulation check, participants were asked to report how complex the game was upon completion of the experimental task. Reported complexity was significantly higher in the high complexity condition ($F(1, 221) = 7.10, p \leq .05$).

Leadership Situation. It was also expected that the situation the participant was placed in would impact game performance as well as strategy development. As such, participants were randomly assigned into one of three leadership situations, manipulated vis-à-vis the goals given to the participants during game play. Specifically, participants were all given the task of improving research performance in the university but the mental-model framework for the three situations was varied by condition. These variations were based on the seven theoretical mental-model differences put forth by Mumford (2006). For example, one difference among the leader mental-models is time-frame. Charismatic leaders are said to form their mental-model using a future-oriented vision. Thus, in the charismatic situation, participants were informed that “...the board believes that you will be able to draw on your previous successes to develop a new vision to achieve a brighter future for

the university.” Ideological leaders, on the other hand, are theorized to have mental-models based on previous events or to develop past-oriented visions. As such, in the ideological situation participants were given a scenario that read: “...the senate believes that by focusing on prior mistakes that have been made here and developing new goals based on your beliefs and values, it may be possible, although difficult, to correct such errors and help improve research performance at our institution...” A total of seven mental-model differences were considered and incorporated in the situational-scenario formation. A summary of differences used may be seen in Table 1 (Mumford, 2006).

To insure that these situational scenarios accurately reflected the theorized mental-model differences, the three scenarios were presented to a panel of judges who were informed that situational scenarios had been randomly selected from a larger pool of nine. Informing the judges that the situational scenarios were derived from a larger pool ensured an absolute versus relative comparison during category assessment. Following a four-hour training session on mental-model differences the judges were asked to assess the situation type for each scenario. Judges displayed 100% agreement on the classifications. The three situational manipulations may be viewed in Figure 1.

Dependent Variables

Game performance. One of the advantages to using a computer simulation is the generation of objective performance criteria. For the present study, two game performance criteria were used: task-specific performance and general performance.

Task-specific performance reflects the extent to which the participant increased research performance at the university. This could be achieved a number of ways, including reducing teaching loads, increasing funding to productive departments, or hiring strong research oriented faculty – among many others. General game performance reflects how well the participant engaged in all other major aspects of the university. This general game score is derived from 16 different aspects of the game, including: institutional prestige, educational quality, scholarship, diversity, alumni donations, etc. In general terms, research performance reflects how well the participant did on the specific task given to them, and general game performance reflects how well they did in all other areas of the simulation. Final simulation scores were used for both performance variables. It should also be noted that because each variable was outputted in differing metrics, they were standardized and put on a 1 – 5 scale, with 1 reflecting low performance and 5 reflecting high performance.

Strategy creativity. Although outcome variables are useful in assessing differences among the varying conditions, they paint only part of the research picture. It is critical that a greater understanding of how leaders think and go about solving problems be gained (Hunter, Bedell-Avers, & Mumford, in press; Mumford et al., in press). As such, participants were asked to write down their strategies for achieving the goals given to them thereby allowing for a consideration of the processes participants engaged in as they played the game. As is common practice when examining complex, ambiguous tasks, these strategies were assessed for

creativity vis-a-vis the quality and originality of the written responses (Baughman & Mumford, 1995; Redmond, Mumford & Teach, 1993). Strategy quality was defined as a logical, coherent, and viable approach to improving research productivity at the university. Originality was designated as a novel, surprising strategy that was notably different from the average response. Three judges, all doctoral students in psychology, were asked to review the strategies and provide ratings on quality and originality, each on a five point scale ($1 = low$, $5 = high$).

Prior to making these ratings, judges were asked to participate in a 20-hour training program. In this training program, judges became familiar with the nature of the task and simulation as well as the operational definitions and benchmarks of quality and originality. Subsequently, judges were asked to rate a set of pilot responses and then met to discuss any rating discrepancies. Following this training, the interrater agreement coefficients for these evaluations were .80 (originality) and .82 (quality). Examination of the intercorrelations among the two variables revealed a very high correlation ($\bar{r} = .84$). This relationship, along with the theoretical consensus that quality and originality are sub-components of creativity (e.g., Mumford & Gustafson, 1988) justified the aggregation of these two constructs into a single creativity variable.

Analyses

To assess the effects of leader type, complexity, and situation type, an analysis of covariance (ANCOVAs) was conducted for each of the game performance variables: (a) task-specific performance and (b) general game

performance. To assess the effects of leader type, complexity, and situation type over time, a repeated measures analysis of covariance was conducted for the creativity of the strategies. In all analyses, respective covariates were retained if they were significant beyond the $p \leq .10$ level.

Results

Task-Specific Game Performance

General findings. Table 2 presents the results obtained in the univariate analysis of covariance for task-specific game performance. Given the complexity and difficulty of the game, it is relatively unsurprising that task-specific training performance was retained as a significant covariate ($F(1, 221) = 5.075, p \leq .05$), as was previous business experience measured by the total number of business courses taken ($F(1, 221) = 6.42, p \leq .05$).

Insert Table 2 About Here

In examining the task-specific performance (i.e., improving research performance at the university), a significant interaction was found between complexity and the leader situation ($F(6, 221) = 3.297, p \leq .05$). Table 3 presents the overall means and standard deviations for the study dependent variables. Inspection of the cell means revealed that under conditions of low complexity, the charismatic situation produced higher performance ($M = 2.67, SE = .20$), but lower performance in complex conditions ($M = 2.39, SE = .18$). This relationship is reversed for the

pragmatic situation where, under conditions of low complexity, a lesser mean was observed ($M = 1.90, SE = .17$), contrasted by a greater mean in the high complexity condition ($M = 2.53, SE = .17$). Not surprisingly, complexity had little or no impact on the ideological condition, where means were comparable across both low ($M = 2.43, SE = .17$) and high ($M = 2.43, SE = .21$) complexity conditions. Apparently, low complexity situations allow for the formation of future oriented visions (i.e., charismatic situations), but may not be engaging enough to stimulate high-level problem-solving (e.g., pragmatic situations).

Insert Table 3 About Here

Leader Type Findings. More central to the present effort, it was found that leader type, leader situation and complexity produced the predicted three-way interaction ($F(6, 221) = 2.161, p \leq .05$) with respect to task-specific performance. Inspection of the cell means revealed a number of interesting trends across leaders. For example, charismatic leaders performed well in low complexity, charismatic situations ($M = 2.77, SE = .20$), but more poorly in high complexity, charismatic situations ($M = 2.05, SE = .33$), highlighting the difficulty charismatic leader may face when forming their future-oriented visions in complex environments.

Contrasting this set of relationships were the pragmatic leaders who, under conditions of low complexity, performed relatively poorly in both charismatic ($M = 1.95, SE = .26$) and pragmatic situations ($M = 2.34, SE = .21$) and seemed to prefer

the more focused and narrowed ideological situation ($M = 2.98, SE = .17$). Under conditions of high complexity, however, the pragmatic leader performed similarly across all three conditions: charismatic ($M = 2.43, SE = .21$), ideological ($M = 2.38, SE = .24$), and pragmatic ($M = 2.40, SE = .25$). It would seem that, under conditions of high demand and complexity, the pragmatic leaders were relatively indifferent to the situation.

The ideological leaders exhibited a rather interesting pattern of results across the complexity and situational conditions. Under conditions of low and high complexity, the ideological leaders appeared to do well in the charismatic situation ($M = 2.84, SE = .36$ vs. $M = 2.64, SE = .31$). They also performed fairly similarly in the ideological situation, as complexity varied from low ($M = 2.39, SE = .38$) to high ($M = 1.95, SE = .36$) albeit with a general downward trend in performance as complexity increased for both situations. This trend, however, is reversed in the pragmatic situation, where under conditions of low complexity, ideological leaders performed fairly poorly ($M = 1.71, SE = .36$), but performed fairly well under high complexity conditions ($M = 2.76, SE = .35$). It appears that, for specific tasks (i.e., improving research performance), ideological leaders are able to use their strong values, or emphasis on the past, to focus on specific problem-solving in environments that might negatively impact other leader types.

Finally, under conditions of low complexity, undifferentiated leaders performed fairly poorly in ideological ($M = 1.67, SE = .47$) and pragmatic situations ($M = 1.25, SE = .47$). They performed very well, however, under low complexity,

charismatic situations ($M = 3.13, SE = .66$). It would seem that that the charismatic situation is particularly appealing to several leader types – but generally only under conditions of low complexity.

General Game Performance

General findings. Table 4 presents the results obtained in the univariate analysis of covariance for task-specific game performance. As was the case with task-specific performance, business experience as indicated by the number of business courses taken, was a significant control variable ($F(1, 221) = 6.47, p \leq .05$). Along similar lines it was found general training performance was a significant covariate ($F(1, 221) = 8.40, p \leq .05$).

Insert Table 4 About Here

Leader Type Findings. As predicted, a significant three-way interaction of leader type, complexity and situation was found for general game performance ($F(6, 221) = 2.18, p \leq .05$). Inspection of the cell means reveals that, once again, charismatic leaders performed well in low complexity, charismatic situations ($M = 2.71, SE = .21$), but poorly in high complexity, charismatic situations ($M = 1.71, SE = .34$). Relatively similar means were found across the remaining conditions for charismatic leaders.

Pragmatic leaders, on the other hand, performed relatively similarly across all

conditions, although they did show a slight a general preference for complexity in both the charismatic and ideological situations. In the pragmatic situations, however, they demonstrated a seemingly surprising, reverse relationship. Specifically, in low complexity, pragmatic situations they performed fairly well ($M = 2.84, SE = .22$) but demonstrated a slight decrease in performance under high complexity situations ($M = 2.44, SE = .25$). Although this finding is somewhat counter-intuitive given the pragmatic leader's general preference for problem solving, it is important to bear in mind the nature of this performance variable. General game performance reflects how well a participant did on all aspects of the game *other* than research performance. Thus, it seems that under conditions of high complexity, pragmatic leaders may turn their attention more directly to the specific task at hand.

On the general performance game variable, ideological leaders produced some of the lowest scores on the simulation under low complexity conditions. For example, ideological leaders scored fairly low in the low complexity, charismatic ($M = 1.63, SE = .33$) and ideological situations ($M = 1.92, SE = .39$) – illustrating the potentially negative effects of rigidity in an ideologue's mental-model. In contrast, they showed a general preference for complexity, producing some of the highest scores across all study conditions. Specifically, they produced a very high mean in the high complexity, pragmatic situation ($M = 3.19, SE = .36$) once again demonstrating their capacity to be “problem-solvers” when, indeed, necessary.

Finally, undifferentiated leaders produced a pattern of means similar to those

found on task-specific performance. Under conditions of low complexity, undifferentiated leaders preferred the charismatic situation, producing fairly high means ($M = 3.06, SE = .68$), but much lower means in the high complexity situation ($M = 1.42, SE = .55$). Although caution is warranted in interpreting these means given the low cell-size and sizable standard errors, the general trend among performance indicators would seem to support the difficulty found in complex, charismatic-suited situations.

Strategy Creativity

General findings. Table 5 presents the results obtained in the repeated measures univariate analysis of covariance for the quality of the strategies generated. After examining all covariates, only two were retained: video game experience as measured by the total number of games played last year ($F(1, 221) = 4.547, p \leq .05$), and business experience as indicated by the total number of jobs held ($F(1, 221) = 6.556, p \leq .05$). Not surprisingly, these two covariates would seem to indicate that expertise, or knowledge about the task, influenced the creativity of strategies developed.

Insert Table 5 About Here

As might be expected, time produced a fairly strong main effect ($F(1, 221) = 5.611, p \leq .05$) and examination of the cell means revealed a general downward trend for strategic creativity with means decreasing from year one ($M = 3.20, SE = .06$) to

year two ($M = 2.90$, $SE = .06$), and finally reaching their lowest point at year three ($M = 2.74$, $SE = .06$). Thus, it appears that an initial flurry of creative ideas was generated early on in the simulation, and the participants became more functional and less innovative as gameplay continued. This effect is not surprising, as participants likely received feedback as to which creative ideas would work and which would not, in turn focusing more directly on those that appeared most viable. This trend is also consistent with the Finke, Ward & Smith (1992) model of innovation, where ideas move from generative to exploratory stages.

There was also a general main effect for the situation ($F(2, 221) = 3.672$, $p \leq .05$), with the ideological situation ($M = 3.12$, $SE = .09$) resulting in slightly higher means than pragmatic ($M = 2.92$, $SE = .08$) and charismatic situations ($M = 2.75$, $SE = .09$). These results are congruent with findings related to the focus induced by ideological situations. It would seem that providing participants with a clear, focused goal will result in more creative strategies overall (Hunter, Bedell-Avers & Mumford, in press).

Leader Type Findings. Finally, as predicted, there was a significant interaction between leader type and complexity ($F(3, 221) = 3.888$, $p \leq .05$). Inspection of cell means again revealed an interesting pattern of results. Under conditions of low complexity, ideological leaders ($M = 3.10$, $SE = .14$) and charismatic leaders ($M = 2.98$, $SE = .10$) produced higher means than pragmatic leaders ($M = 2.70$, $SE = .08$). However, under high complexity conditions, pragmatic leaders produced a larger mean ($M = 2.95$, $SE = .08$) than both charismatic

($M = 2.76$, $SE = .11$) and ideological leaders ($M = 2.73$, $SE = .13$). Undifferentiated leaders also preferred high complexity situations, producing a very high mean in the high complexity situation ($M = 3.28$, $SE = .21$). In light of these results, it appears that under conditions of high complexity, ideological and charismatic leaders may turn to their vision or beliefs to attempt to deal with the situation presented to them – an effort that results in less creative idea generation. Pragmatic leaders and undifferentiated leaders, on the other hand, are apparently more comfortable being creative in high complexity situations – possibly even using those additional environmental cues to guide their creative thinking. Given pragmatic leaders' skill in information gathering and problem construction, this effect is not wholly surprising (Mumford, Bedell-Avers, Hunter et al., 2006).

Discussion

Limitations

Before turning to the broader conclusions of the present study, it is important that a number of limitations first be addressed. To begin, the present study made use of a classic experimental approach and as such, is limited with regard to generalizing the findings to “real-world” situations. Although this approach was necessary to examine the study manipulations in controlled conditions, there are certainly a number of potential boundary conditions that may impact the generalizability of the findings that are unaccounted for. Such boundary conditions stand as important and viable areas for future research.

Second, the nature of the study task allowed for only specific cognitive

indicators of leader performance to be examined. As such, a number of important leadership behaviors could not be examined, including: subordinate reactions to sensemaking, leader-member exchange, inspirational motivation, intellectual stimulation, or other relationship-based influence and motivational tactics (e.g., Bass, 1985; Bass & Avolio, 1990; Graen & Uhl-Bien, 1995). Although the study would have been richer with the inclusion of such relationship data, the focus on leader decision making and problem-solving was intentional, given that the vast majority of leadership studies fail to examine critical cognitive aspects of leader behavior (Hunter et al., in press; Mumford et al., in press). It must be noted, however, that the behaviors examined in this effort are limited by design and caution is warranted in drawing conclusions beyond these primarily cognitive indicators.

Third, the leader measure employed in the study was ipsative in nature and is therefore only appropriate for categorizing leaders into preferred types (Baron, 1996; Chan, 2003). More directly, total scores on the various leader types (e.g., a participant's degree of pragmatic leadership) could not be obtained. Given this, we concede that a non-ipsative, normative measure may provide a greater indication of these preferred leader styles and enhance results even further by providing potential interaction information. We do feel, however, that because of the nature of the measure, the results in the present effort represent a more conservative estimate of the observed relationships.

Fourth, the use of undergraduate students in the present effort brings into question the liberal use of the term "leader" when describing their behaviors on a

relatively controlled experimental task. However, results in several studies (e.g., Bedell-Avers, et al., in press; Ligon, et al., in press) suggest that there is some stability in the leader pathways and that undergraduate students produce reasonably interpretable, valid, reliable results. Again, we feel that the undergraduate sample represents a conservative sample of leader responses and behaviors and believe even stronger results may be found with future field-based samples.

Fifth, no attempt was made to control or account for a personalized versus socialized leadership distinction. A number of issues led to our decision to omit a measure of personalized and socialized leadership (House & Howell, 1992). The first and foremost issue is that no current measures for personalized and socialized leadership currently exist. The second issue, tied to the first, is that creation of such a measure is highly difficult given the social desirability issues affiliated with the personalized/socialized distinction. Third, recent studies have revealed general main effects versus interactions among the leader type (ideological, pragmatic, charismatic) and leader orientation (socialized versus personalized) indicating that there are many general behaviors exhibited for the three leader types. Fourth, cell sizes would have required an unwieldy number of participants to investigate the proposed research questions. The above being stated, it is clear that the study would have been improved and results likely stronger if the personalized and socialized distinction could be controlled for. We strongly hope that future efforts are made to generate a valid, reliable measure of these leader behaviors.

Sixth and finally, the statistical approaches applied (i.e., controlling for

covariates) precluded specific cell-mean testing and as such, caution is warranted in interpreting differences among individual conditions. Although this limitation is regrettable, we believe there is still value in interpreting basic trends across conditions as they correspond to fundamental theory and extant findings.

General Findings

Even bearing these limitations in mind, we believe that the present effort makes a number of noteworthy contributions to the study of leadership broadly as well as to the new model of leadership directly. The first is that the use of a complex computer simulation appears to be a viable approach to examining leadership behaviors. The simulation used in the present effort allowed for a dynamic approach to leadership investigation, as well as the generation of objective performance criteria. Moreover, the experimental task used allowed for the investigation of cognitive processes leaders may engage in as they solve complex problems. The coupling of both objective and subjective performance criteria as well as the use of a relatively high fidelity, dynamic simulation allowed for relatively strong conclusions to be drawn with regard to the new model of leadership.

The second, and arguably most important finding, is that the type of leader, the situation and the task complexity all interact to produce differing performance and process outcomes. This interaction was observed on two, relatively unrelated, indices of game performance. Moreover, two-way interactions were also observed for strategic creativity on the task. On the whole, these results suggest, rather convincingly, that both complexity and situation-framing must be considered when

examining charismatic, ideological and pragmatic leaders. In fact, the lack of significant main effects observed for any of the study criteria indicates that the context may play the *primary* role in understanding performance differences among the leader types.

The results of the study also provide clues to how the various leaders performed under differing situations and conditions of complexity. Although caution is warranted when interpreting these trends, they do provide general clues as to the circumstances in which leaders excel or demonstrate performance decrements. Specifically, cell means across conditions and criteria seem to indicate that charismatic leaders performed fairly well in charismatic situations – but only in low complexity conditions. As complexity increased, charismatic leaders seemed to prefer the pragmatic situation to either the ideological or charismatic situation. This finding is consistent with Mumford (2006), Kukalis (1991), and Plumlee (2003) who suggested that vision formation may prove difficult in ambiguous conditions. At first glance, this pattern is somewhat contradictory with the findings of Bedell-Avers et al. (in press) that seemed to suggest charismatic leaders preferred less-structured conditions. It is important to bear in mind, however, that this was only the case in socially-oriented conditions – conditions best suited for charismatic leaders (Mumford, Antes et al., in press) Thus, it seems that the future-oriented focus of the charismatic leaders' mental model may lead to performance decrements on certain cognitive tasks, but may serve them well on more socially-oriented problems.

Pragmatic leaders also produced a rather interesting pattern of results. Under

conditions of low complexity, pragmatic leaders seemed to prefer the ideological situation. This finding may appear somewhat surprising, given the minimal interest in providing a vision to followers and general lack of emotion displayed by pragmatic leaders. The clues to interpreting this finding, however, may be in the focus induced by the ideological situation. In this situation, participants were asked to place an emphasis on the past, think more internally, and limit their attention to specific research-oriented tasks. It seems reasonable to believe that all of these aspects of the situation may contribute to a greater task focus. If we consider this in light of this leaders' general preference for problem-solving, we see that pragmatic leaders may simply enjoy the liberation of being allowed to focus on a clear, finite objective. Along related lines was the finding that pragmatic leaders performed similarly across most conditions in high complexity conditions. This finding is consistent with those in Bedell-Avers et al. (in press), where pragmatic leaders performed similarly across most study conditions. It seems that, as complexity increases, pragmatic leaders may pay less attention to the context and simply go about solving the problem.

Of the three leader types, ideological leaders may have produced the most dynamic pattern of results – in some cases producing the lowest means observed, in others demonstrating the highest means observed. In terms of high performance, ideological leaders showed a preference for the pragmatic situation – but only in highly complex conditions. Thus, it appears that their relatively rigid beliefs serve them well in dealing with complexity, but only in situations where they are asked to

be problem-solvers. With regard to lower performance, ideological leaders seemed to perform poorly in the ideological situation, overall. This finding is somewhat counter-intuitive, as one may predict that congruence between leader type and situation type (i.e., ideological leader in an ideological situation) would result in higher performance. When we consider the ideological leader's relatively narrowly framed mental-model, however, it seems that the pairing may result in a coupled form of "tunnel-vision" (Mumford, 2006). The results observed on the creativity criteria also indicate that this may be the case as ideological leaders were less creative as complexity increased, suggesting that they may turn to their mental-model in times of stress and ambiguity, resulting in more narrowed thinking. It is important to bear in mind, however, the observed differences across game criteria, where ideological leaders seemed to perform more strongly in broader, rather than narrower tasks. Thus the decrements may only hold for certain tasks these leaders engage in. Hopefully, future research will explore this important finding more directly.

Finally, the study results do offer insight into the importance of the situation, as well as the role of complexity in understanding leader behavior. With respect to the situation, it was interesting to note that the ideological situation produced more creative strategies overall. This finding is not wholly surprising given the sizable literature on goal-setting and creativity (e.g., Amabile & Gryskiewicz, 1987; Pinto & Prescott, 1998; Shalley, 1995). It is interesting to note the focusing effects of the ideological mental-model and how that may impact the various leader types. Pragmatic leaders, for example, seemed to prefer the ideological situation, whereas

ideological leaders suffered from potentially compounding rigidity effects.

With respect to complexity, it was interesting a main effect was not observed in either the game performance criteria or the creativity criteria. The results of this study, particularly the observed interactions would seem to indicate that complexity stands as a powerful moderator, at times enhancing patterns that exists and, potentially more critical, resulting in reverse performance relationships. In either case, it appears important to consider the moderating role of complexity in studies of leadership, as the presence or lack thereof, may substantially alter relevant leadership outcomes.

Implications

The results of this study have a number of noteworthy theoretical and practical implications for understanding the new model of leadership. From a theoretical standpoint, results suggest that a greater emphasis should be made in considering the context these leaders operate in lending credence to the recent call for an increased focus on complexity when investigating leadership (Hunt & Ropo, 2004; Uhl-Bien et al., in press; Marion & Uhl-Bien, 2001). Investigation of complexity as well as other boundary conditions, moreover, should be considered in light of the differing leader's mental-models. It is clear that how leaders frame a given problem and make sense of an ambiguous, crisis situation impacts how they approach its solution. A greater emphasis, therefore, should be placed on understanding these relationships, and more importantly, investigating these processes from a substantive standpoint. Although the present study provides clues

to these relationships, it is important that future research explore each aspect of the leader's mental-model explicitly and directly.

From a practical perspective, the results of the present effort would appear to speak to the criticality of considering the situation when selecting leaders for, or placing leaders into given leadership roles. Consider, for example, the hiring of an individual for the position of CEO. If the organization operates in a highly turbulent, changing environment – environments often faced by entrepreneurs (Cogliser & Brightham, 2004) – selecting a charismatic leader may prove a poor choice if stakeholders are requesting a new, future-oriented vision. If this organization, however, were to select a pragmatic leader, we might expect to see consistent performance, independent of the environment. Finally, ideological leaders may prove highly effective if allowed to focus on problem-solving among a broad range of performance outcomes. Of course, such applications still stand as speculative at this point and future field-based studies are required before any substantial conclusions may be drawn. Still, the results seem to underscore the practical importance of context and environment in understanding effective leadership.

In addition to offering insight into leadership hiring and placement, the present effort also speaks to the types of errors the differing leader-types may make once in positions of influence. For example, it is possible that under complex crisis conditions, ideological leaders may inherently place too great of an emphasis on ideological concerns and not on problem solving – particularly if the problems they face are laden with ideological issues and those around them are rallying around such

issues. Pragmatic leaders, on the other hand, may operate too distantly from their followers in situations where emotional appeals would be welcomed, and indeed, necessary. Charismatic leaders, finally, show particular weakness in high complexity situations where they are asked to focus on a new vision and not on problem-solving. The results of this study, then, would seem to highlight the importance of appropriately framing the situation relative to leaders' respective mental-models. Previous studies indicate that key-lieutenants, in particular, may play a critical role in this respect (Mumford et al., 2006). Although speculative, it seems reasonable that the leaders' close and trusted cadre may help them deal with the errors they are most likely to make by helping frame the situation in light of the respective leaders' mental-model. Thus, investigation of both errors and the role of key-lieutenants play in guiding and limiting those errors stand as critical and exciting areas of future research.

In sum, the results of the present effort have demonstrated unique differences among the three leader types. Although these leaders did not perform differently on the various outcome criteria in general, they did demonstrate interesting differences when the situational context was investigated. It is our hope that future efforts will continue to explore the impact of these contexts – particularly with respect to additional performance and process criteria.

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Table 1: *Summary of Theorized Mental-model Differences*

	<i>Time Frame Orientation</i>	<i>Type of Experienced Used</i>	<i>Nature of Outcomes Sought</i>	<i>Number of Outcomes Sought</i>	<i>Focus in Model Construction</i>	<i>Locus of Causation</i>	<i>Controllability of Causation</i>
<i>Charismatic</i>	Future	Positive	Positive	Multiple	External	People	High
<i>Ideological</i>	Past	Negative	Transcendent	Few	Internal	Situations	Low
<i>Pragmatic</i>	Present	Both	Malleable	Variable	External	Interactive	Selective

Note. Table based on framework presented in Mumford, Ligon, & Hunter (2006)

Table 2: *Summary of Univariate Analysis of Covariance for Task-Specific Performance*

	<i>F</i>	<i>df</i>	<i>p</i>	η^2
<u>Covariates</u>				
Training performance (task-specific)	5.075	1, 221	.025	.022
Business experience (total number of jobs held)	6.418	1, 221	.012	.028
<u>Main Effect</u>				
Leader Type	.570	3, 221	.635	.006
Complexity	.516	1,221	.473	.002
Situation	1.570	2,221	.210	.014
<u>Interactions</u>				
Leader Type * Complexity	.570	3, 221	.635	.008
Leader Type * Situation	2.035	6, 221	.062	.052
Complexity * Situation	3.297	2, 221	.039	.029
Leader Type * Complexity * Situation	2.161	6, 221	.048	.055

Note: *F* = F-ratio, *df* = degrees of freedom, *p* = significance level, η^2 = partial eta squared effect size

Table 3. *Means and Standard Deviations for Study Criteria*

	<i>Mean</i>	<i>SD</i>
Task specific game performance	2.50	1.00
General game performance	2.50	1.00
Strategy creativity (average)	2.86	.63
Strategy creativity (Time 1)	3.10	.77
Strategy creativity (Time 2)	2.80	.74
Strategy creativity (Time 3)	2.66	.70

Table 4: Summary of Univariate Analysis of Covariance for Overall GameScore

	<i>F</i>	<i>df</i>	<i>p</i>	η^2
<u>Covariates</u>				
Training performance (total game)	7.486	1, 221	.005	.036
Business experience (number of jobs held)	5.938	1, 221	.012	.029
<u>Main Effect</u>				
Leader Type	.465	3, 221	.677	.007
Complexity	.628	1,221	.409	.003
Situation	1.111	2,221	.299	.011
<u>Interactions</u>				
Leader Type * Complexity	2.434	3, 221	.066	.032
Leader Type * Situation	.926	6, 221	.477	.025
Complexity * Situation	1.947	2, 221	.145	.017
Leader Type * Complexity * Situation	2.154	6, 221	.049	.055

Note: *F* = F-ratio, *df* = degrees of freedom, *p* = significance level, η^2 = partial eta squared effect size

Table 5: *Summary of Repeated-Measures Univariate Analysis of Covariance for Strategy Creativity*

	<i>F</i>	<i>df</i>	<i>p</i>	η^2
<u>Covariates</u>				
Video game experience (num of games played this year)	6.56	1, 221	.011	.029
Business experience (num of business classes taken)	4.54	1, 221	.034	.020
<u>Main Effect</u>				
Time	5.611	2, 221	.004	.023
Leader Type	1.708	3, 221	.166	.023
Complexity	.066	1, 221	.797	.001
Situation	3.672	2, 221	.027	.032
<u>Interactions</u>				
Time * Leader Type	.356	6, 221	.906	.005
Time * Complexity	.744	2, 221	.476	.003
Time * Situation	.298	6, 221	.879	.003
Leader Type * Complexity	3.888	3, 221	.010	.050
Leader Type * Situation	1.435	6, 221	.202	.037
Complexity * Situation	.940	2, 221	.392	.008
Time * Leader Type * Complexity	.598	6, 221	.732	.008
Time * Leader Type * Situation	.592	12, 221	.849	.016
Time * Complexity * Situation	1.327	4, 221	.259	.012
Time * Leader Type * Complexity * Situation	.619	12, 221	.827	.017

Note: *F* = F-ratio, *df* = degrees of freedom, *p* = significance level, η^2 = effect size

Figure 1: Leader Situation Manipulation

Ideological

At our last meeting the Board determined that that faculty research has substantially declined over the years and is now poor by national standards. Something must be done to achieve the successes once enjoyed in the past. We believe that by examining and considering previous failed attempts it may be possible to determine what could be done to help transcend such failures and arrive at a place of true research achievement. The senate believes that by focusing on prior mistakes that have been made here and developing new goals based on your beliefs and values, it may be possible, although difficult, to correct such errors and help improve research performance at our institution. The Board is aware there are certainly other aspects of the university to be aware of, but it is important to be focused on the most critical university activities that will help restore research success.

Charismatic

At our last meeting, the Board determined that there is an opportunity to make a substantial, important, and necessary improvement to the university. Specifically, it appears critical to increase and improve the amount of faculty research at our university. The Board believes that you will be able to draw on your previous successes to develop a new vision to achieve a brighter future for the university. The senate believes that, by making use of the talented individuals around you, you can easily achieve great success. It is important to keep in mind, however, that realizing your new vision of research success must not hamper the achievement of other university goals – we expect your new vision to allow for success in all other areas as well.

Pragmatic

At a recent meeting the Board determined that faculty research at our university are mediocre by national standards and must be increased. It is essential, however, that past errors and mistakes are forgotten and that your focus is placed on solving the research problem at hand. To begin to solve this problem, it is critical that you draw on your previous experiences, both good and bad, to help guide the improvement of research performance. The senate believes that by using talented individuals around you by placing them in situations where they can succeed, you will be able to solve these research concerns. It is important to keep in mind, however, that solving this problem must not get in the way of other university issues - we expect you to make decisions necessary to handle these additional problems if they arise.