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STUDY OF THE RELATIONSHIP BETWEEN COGNITIVE STYLES OF
CREATIVITY AND PERSONALITY TYPES OF MILITARY LEADERS

A Dissertation

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In partial fulfillment of the requirements for the

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By

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AND PERSONALITY TYPES OF MILITARY LEADERS

A Dissertation APPROVED FOR THE
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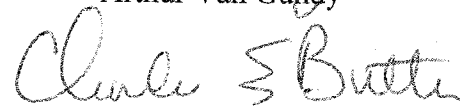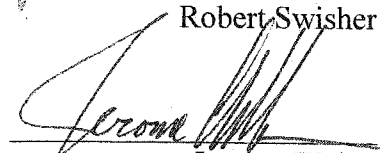
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ABSTRACT

Military leaders have experienced a cognitive paradigm shift in preparing for war. Since the Gulf War in 1991, the United States military has participated in operations other than war (OOTW) with greater frequency than before (Franke, 1997). These missions include peacekeeping operations in the Balkans and Sinai, humanitarian support for victims of natural disasters, and the post-September 11th global war on terrorism. Military leaders, now more than ever, must be able to make the cognitive leap required to meet the challenges posed by these ever-changing and unorthodox missions and environs.

This study replicated previous research that has examined the cognitive styles of creativity as measured by the KAI and personality types as indicated through the MBTI (Carne & Kirton, 1982; Gryskiewicz & Tullar, 1995). This was the first study known by this researcher to look specifically at a sample of military leaders in order to replicate the aforementioned studies. Two psychometric instruments were used in this study: (a) the Kirton Adaption-Innovation Inventory (KAI) and (b) the Myers-Briggs Type Indicator (MBTI). The findings demonstrated that a statistical significant relationship existed between Kirton's innovative creative style and the Myers-Briggs personality type of intuition and perception. Additionally, a relationship was found for the KAI score for innovation and the MBTI preference for extraversion. Military leaders were also discovered to be utilizing a more adaptive style of creativity (Metter, 1989) and had a preponderance of a particular personality type. As a result of this study, one could argue that styles of creativity coupled with an individual's personality type are both relevant factors when examining military leadership.

Chapter One: Introduction

In today's changing and turbulent times, leadership and creativity are the crucial components for the survival of any organization (Gryskiewicz, 1999). Leadership creates the environment that is necessary for success, while creativity can be viewed as the conduit for change. Leaders, in order to become more effective, must be able to identify their unique cognitive problem solving styles and personality types, along with those of their followers.

General Omar N. Bradley stated, "Leadership is an intangible. No weapon, no impersonal piece of machinery ever designed can take its place" (in Ulmer, 1998, p. 18). Military leadership today merits attention because the United States Armed Forces are in a state of transformation (Ulmer, 1998). Many recent studies have been conducted on military leadership (e.g., Franke, 1997; Hawkins, 2001; Jordan, 2002; Ulmer, 1998). These researchers have found that military leaders have experienced a cognitive paradigm shift in preparing for war. Since the Gulf War in 1991, the United States military has participated in operations other than war (OOTW) with greater frequency (Franke, 1997), to include peacekeeping operations in the Balkans and Sinai, humanitarian support for victims of natural disasters, and the post-September 11th global war on terrorism. Military leaders, now more than ever, must be able to make the cognitive leap required to meet the challenges posed by these ever-changing and unorthodox missions and environs.

Creativity is not a destination; it is a journey (Anonymous). Creativity has been defined in a variety of ways. Margaret Mead opined that "To the extent that a person makes, invents or thinks something that is new to him, he may be said to have performed

a creative act" (in Nierenberg, 1982, p. 3). Creativity, a notoriously elusive concept, is concerned with the generation of ideas, alternatives, and possibilities (Mumford & Gustafson, 1988). Creativity describes the ability to bring something new into existence. It (a) helps to identify situations and problems that require novel solutions, (b) allows one to alter one's thinking or manipulate a situation to better adapt to changing factors, and (c) aids in shaping the future (Longman, Atkinson, and Breeden, 1997).

Creativity is not a trait that one possesses or does not possess (Van Gundy, 1992), nor is creativity the sole domain of individuals that we consider to be creative geniuses (Ward, Smith & Vaid, 1997). Although there is no doubt that Michelangelo, Einstein and others fit the mold of creative genius (Simonton, 1984), Kirton (1980) theorizes that all individuals are creative. Kirton's Adaption-Innovation (A-I) theory regards creativity not in terms of level (or capacity), but rather considers creativity to be a matter of style. Creative style is the mode in which one solves problems, not in how well or how many problems are solved (Kirton, 1987). Kirton therefore hypothesizes that creative style is part and parcel of one's personality, while defining personality as "the total description of the stable, characteristic influences on behavior and the equally stable patterns of behavior that distinguish mankind from any other species and (in particular) one individual from any other" (Kirton, 1985, p. 17).

Rationale

Metters (1989) was the first to explore military leaders' cognitive style of creativity through the lens of the A-I theory, surveying a group of 192 military leaders using the Kirton Adaption-Innovation Inventory (KAI). Metters found that military officers had a lower overall KAI score (tending to be comfortable using a more adaptive

style of creativity) than the general population. His discovery gave credence to A-I theory in that the more structure a person prefers when confronted by a problem, the more that person will turn to an adaptive style of creative problem solving (Kirton, 1980). Not surprisingly, the United States Armed Forces have been a model in the development and implementation of a structured environment (Hawkins, 2001). This structure has made the armed service profession an attractive proposition for those whose personality type is compatible with the adaptive structure found in the military.

The Myers-Briggs Type Indicator (MBTI) is currently the most widely employed personality instrument (Myers, McCaulley, Quenk, & Hammer, 1998) with nearly three million annual administrations (Gardner & Martinko, 1996). The MBTI has been used in counseling, education, management and leadership settings in diverse organizations (Myers & Myers, 1980). Viewing the MBTI from a military perspective demonstrates its utility when examining personality type and leadership in military organizations (Atwater & Yammarino, 1993). The MBTI has been administered to cadets at the United States Naval Academy, the Virginia Military Institute (O'Connor, 1993) and to individuals at other military leadership academies.

Enhancing personal growth while increasing effectiveness in the workplace and on the battlefield is one of the primary reasons why leadership development is of paramount concern to the military (Jordan, 2002). This study therefore draws upon the theoretical frameworks of Kirton's cognitive style of creativity and the personality dyadic posited by Myers and Briggs. A-I theory purports that all personnel utilize a particular style of creativity when solving problems and making decisions. The Myers-Briggs theory of psychological types allows individuals to discover their strengths and

developmental needs while also exploring ways in which to understand and improve communication interactions with others.

Significance of Study

Two psychometric instruments were used in this study: (a) the KAI and (b) the MBTI. This study replicated previous research that has examined the cognitive styles of creativity as measured by the KAI and personality types as indicated through the MBTI. The importance of this study lies in the fact that military leaders are now charged with carrying out unconventional operational missions. Therefore, creative solutions will be required to meet these and other unprecedented challenges (Gryskiewicz, 1999).

Carne and Kirton (1982) and later Gryskiewicz and Tullar (1995) conducted studies on private sector leaders and both found a positive correlation between Kirton's innovative creative style and intuition as a personality trait. Each group of researchers used a Pearson's correlation to analyze the data that produced the stated correlation. This current study will replicate and build upon this past research by surveying a group of active duty military leaders.

Replication is important in social science studies because of the large natural variation over space, individuals, and time (King, 1995). The replicated studies were carried out in the United Kingdom (Carne and Kirton, 1982) and the United States (Gryskiewicz and Tullar, 1995). Both of the studies concerned private sector leaders, and the studies were conducted in the 1980's and 1990's. This study departed from the studies that were replicated in that: (a) the leaders served at military installations within the European Command; (b) the leaders were junior non-commissioned officers; and (c) the study was conducted in the year 2003.

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According to the Harvard Replication Standard, "Sufficient information exists with which to understand, evaluate, and build upon a prior work if a third party can replicate the results without any additional information from the author" (King, 1995, p. 443). Beginning in the real world by relying upon descriptive quantitative and qualitative data, and careful analysis of these data, replication allows one to better "understand, evaluate and build" upon existing bodies of research (King, 1995, p. 446).

Specific problems need to be considered before carrying out a replication study. The main problem facing researchers is an insufficient amount of methodology through the inadvertent omission of data sets by the author(s) of the study. Complete information is needed in order to understand a set of results. Other questions that need to be posed are: How were the respondents selected, who did the interviewing and surveying, what was the order of the questions, how is the data presented, which measure(s) were used, what statistical procedures were used, etc. Therefore, complete data, coupled with answers to common replication oversights, are imperative when conducting replication research.

This was the first study known by this researcher to look specifically at a sample of military leaders in order to replicate the aforementioned studies. The KAI and MBTI were administered to a group of attendees of a United States Air Force leadership developmental course at Ramstein Air Base, Germany. As a result of this study, one could argue that styles of creativity coupled with an individual's personality type are both relevant factors when examining military leadership.

Operational Terms

Conceptual and operational terms defined for this study are derived from the review of the literature:

1. Adaption – as posited by Kirton (1976); one of two distinct cognitive styles of creativity, problem solving and decision-making. Adaptors demonstrate a high regard for structure (policies, theories, mores) and consensus. Adaptors solve problems by defining, refining, extending and improving the current accepted pattern, usage, strategy or paradigm.

2. Innovation – the opposite end of the Adaption-Innovation dichotomy, a less tolerant regard for structure (guidelines, rules) and less respectful of consensus. Innovators prefer to do things differently and break current patterns, strategies or paradigms (Kirton, 1976).

3. Military Leadership – The process of influencing others. The art of direct and indirect influence and the skill of creating the conditions for organizational success to accomplish missions effectively in a military environment (Hawkins, 2001).

4. Creativity - the ability to bring something new into existence. Creativity: (a) helps identify situations and problems that require new solutions,

   (b) allows one to alter oneself or a situation to adapt to new situations, and (c) helps shape the future (Longman, Atkinson, and Breeden, 1997).

5. Style – the manner in which one solves problems; either by using adaptive or innovative techniques (Kirton, 1976).

6. Sufficiency of Originality (SO) – the first of three sub-scales in the KAI. The sufficiency and proliferation of original ideas one has. Items in this scale account for 43% of the total KAI score.

7. Efficiency (E) - the second of three sub-scales in the KAI. Measures how well a person operates within an existing paradigm. Score in this scale account for 20% of the total KAI score.

8. Rule group/conformity (R) – the third of the KAI sub-scales and pertains to how an individual responds to structure. Score makes up 37% of the total KAI score.

9. Personality type - a combination of mental attitudes (Extraversion or Introversion and Judging or Perceiving) and mental functions (Sensing or Intuition and Thinking or Feeling) that, when combined, make up 1 of 16 possible permutations, each type containing specific characteristics (Myers, McCaulley, Quenk, Hammer, 1997).

10. Extraversion (E) – identifies the direction of energy to the external world (Myers, McCaulley, Quenk, Hammer, 1997).

11. Introversion (I) – identifies the direction and flow of energy to the internal world (Myers, McCaulley, Quenk, Hammer, 1997).

12. Intuition (N) – perceiving function related to meanings, associations, patterns, and possibilities (Myers, McCaulley, Quenk, Hammer, 1997).

13. Sensing (S) – perceiving function related with experiences available to the senses (Myers, McCaulley, Quenk, Hammer, 1997).

14. Feeling (F) – one of two dyadic judging functions (opposite of thinking), the one where decisions are made through ordering choices in terms of personal values (Myers, McCaulley, Quenk, Hammer, 1997).

15. Thinking (T) – the other judging function where decisions are made by ordering choices in terms of logical cause-effect and objective analysis of relevant data (Myers, McCaulley, Quenk, Hammer, 1997).

16. Perceiving (P) – the attitude that indicates that either Sensing or Intuition is the preferred way of dealing with the outer world (Myers, McCaulley, Quenk, Hammer, 1997).

17. Judging (J) – the attitude that indicates that either Thinking or Feeling is the preferred way of dealing with the outer world (Myers, McCaulley, Quenk, Hammer, 1997).

Chapter Two: Review of the Related Literature

A large body of literature exists covering the elements of leadership (Bass, 1990; Burns, 1978, Yukl, 1999; Zaleznik, 1988); creativity (Amiable, 1992; Glover, Ronning, & Reynolds, 1989; Isaksen, 1987; Runco & Alber, 1990) as well as research specifically focusing on military leadership (Franke, 1997; Jordan, 2002; Pagonis, 2001; Ulmer, 1998). This section will explore the literature pertaining to military and private sector leadership, Kirton's A-I theory, and the Jungian theory of personality type on which the MBTI is based. This literature review builds on the work of other researchers in the disciplines being examined, while providing a history of the variables of the problem and suggesting investigative tracks to pursue (Gall, Borg & Gall, 1996).

Is leadership in the military an area of value for scholars to research? Bass (1998) believes that the answer is an emphatic yes. He states, "Principles of leadership do not change; only the conditions in which they are applied. Over time, we gain a better and more accurate understanding of the concepts and principles, but they were in effect …when Caesar exhorted his troops" (Bass, 1998, p. 325).

Army Field Manual 100-1, Leadership (1994), further illustrates the point that the success of combat power is directly related to the leadership that is orchestrating the myriad elements involved in war. *Army Field Manual 100-5, Operations* (1993), states that leadership is the most essential element of combat power, while *Air Force Doctrine 1* (1997) asserts that competent leadership is the key to decisive military victory.

Leaders in the twenty-first century military face a plethora of challenges ranging from terrorist attacks, threats from rogue states armed with chemical, biological or nuclear weapons, and a seemingly never-ending series of peacekeeping deployments

(Zimmerman, 2000). These types of missions, along with the global war on terrorism (currently being fought in Afghanistan and Iraq), are not entirely new. However, what is different is their frequency, scope, and multifaceted nature (Franke, 1997), and a 300 percent increase in the degree of overseas deployments since the fall of the Berlin Wall (CSIS, 2000). This is the first war of the twenty-first century and it will require a twenty-first century military strategy (White House, 2002).

Military leadership in particular is in crisis. In times of war, when the only certainty is uncertainty, leadership becomes even more important in military organizations (Taylor & Rosenbach, 1984). The fear of failure is dissuading leaders from using creative techniques (Ulmer, 1998), while personality and systemic factors are undercutting aspects of leadership within the ranks (Ulmer, 1998). Studies carried out by the United States Army have produced data showing that levels of trust, commitment, and morale have dropped significantly during the 1990's (Ulmer, 1998). Therefore, military leaders will be required to execute a decentralized mission in a manner that utilizes all their problem-solving and decision-making skills.

Numerous reports have surveyed theories and research regarding various aspects of creativity (Amiable, 1990, Glover, Ronning, & Reynolds, 1989; Isaksen, 1987; Runco & Alber, 1990). Creativity is a valid and important research topic from a variety of disciplines, with each asking questions and stating hypotheses in unique ways (Treffinger, 1993). Creativity can be viewed as the ability to produce work that is novel, appropriate, useful or meets task limitations (Isaksen, 1987). Creativity is a topic of wide scope that is important at both the individual and societal levels, covering a multiplicity of domains including the United States Armed Forces. The significance of this study lies

in the need to take advantage of the creative potential of every individual. Creativity has become a necessary ingredient for leaders to possess in today's changing and turbulent military environment.

Personality types of individuals and military leaders in particular are instrumental to this study. An excerpt from the MBTI Manual (Myers et al., 1998) states:

> The purpose of the Myers-Briggs Type Indicator is to make the theory of psychological type described by Carl Jung understandable and useful in people's lives. The essence of the theory is that much seemingly random variation in behavior is actually quite orderly and consistent, being due to basic differences in the way individuals prefer to use their perception and judgment (Myers, et al., 1998, p. 11).

Personality types and creative styles of military leaders will be the focus of this study. Specifically, this paper will examine if the decision-making and problem-solving skills of military leaders can be understood on the basis of their individual style of creativity and personality type. The foundation of this study is the hypothesis that leaders who make use of a particular cognitive style of creativity will also show evidence of a specific personality type. The resultant correlation will influence the manner in which military leaders will solve problems and reach decisions.

This research continues the earlier investigations on the correlation between creative style and personality type (Carne & Kirton, 1982; Gryskiewicz & Tullar, 1995), with the supposition that there is a positive correlation between innovative creative style and intuitive personality type. This study will also seek to ascertain if there is a certain MBTI personality type for military leaders that is consistent with previous studies of military leaders. Lastly, this study will determine if military leaders possess a greater adaptive creative style than private sector leaders as originally postulated by Metters (1989) and Carne and Kirton (1982).

Sir William Francis Butler stated that "The nation that will insist on drawing a broad line of demarcation between the fighting man and the thinking man is liable to find its fighting done by fools and its thinking done by cowards" (in Franke, 1997, p. 7). Examining military leadership through the archetypes of cognitive style of creativity and personality types will allow one to begin to understand how military leaders solve problems and make decisions.

Leadership Models

The study of leadership helps to improve training, identify alternative selection and assessment procedures for identifying leaders' strength and weaknesses (Hogan, Curphy, & Hogan, 1994), and to increase the understanding of how leaders' decisions shape the behavior of organizations (O'Connor, Mumford, Clifton, Gessner, & Connelly, 1995). Organizations require leaders to have the requisite creative and problem solving skills in order to operate in extraordinarily volatile times (Gryskiewicz, 1999).

Many leadership studies fail to adequately define leadership. Rost (1991) examined more than 500 reports dealing with leadership and discovered that more than two-thirds of them did not define leadership at all. Military leadership is viewed as the art of exerting direct and indirect influence and the ability to create the conditions for the accomplishment of military missions (Hawkins, 2001).

Numerous leadership styles have been identified and popularized since the 1940's. The most recognizable styles are: (a) The trait approach, (b) the behavioral approach, (c) the contingency approach, (d) the new leader approach, (e) transactional leadership, and (f) transformational leadership.

Trait Approach

The trait approach was popular up until the late 1940's. It stated that leadership ability is innate: Leaders are born rather than made. Stodgill (1948) cast doubt on the trait approach as he failed to find empirical evidence that personal factors play a role in who becomes a leader. He conducted follow up studies in the 1970's, while Bass continued Stodgill's work into the 1980's. There does appear to be evidence that certain traits appear in the majority of leaders (intelligence, extroversion), however Stodgill's pioneering work led researchers to search for a replacement for the trait approach (Bryman, 1992).

Behavioral Approach

The behavioral approach, popularized by the Ohio State studies, was in vogue after the abandonment of the trait approach and through the 1960's; it brought into existence the Leader Behavior Description Questionnaire (LBDQ). The questionnaire was developed in the 1950's by Hemphill and Coons (Bass, 1990) and introduced two factors to the leadership equation: Consideration (maintenance) and initiating structure (also referred to as task orientation).

The Ohio State study was a longitudinal study that sought clustering patterns among the responses to the various questions. Initial results found that leaders who were concerned primarily with maintenance skills were perceived to be less effective than those who had a high structure of work activity.

Contingency Approach

The contingency approach theory as espoused by Fiedler (1967) states that the effectiveness of a leader is dependent on both the leader's personality and the situation. A leader might be effective because a particular style may work in one situation but will

not necessarily be effective in another situation. Fiedler developed the Least Preferred

Coworker Scale (LPC) to measure a leader's motivation. Fiedler's contingency theory is

an important theory because it proposed a new perspective for the study of leadership,

and many approaches to leadership since have adopted the contingency approach

(Bryman, 1992).

New Leadership Approach

The new leadership approach espoused by Bryman (1992) assumes that leaders

need to have a vision, and attempted to draw a distinction between charismatic leadership

and transformational leadership. He stated that charismatic leaders create new

organizations while transformational leaders change existing organizational culture.

Bryman (1992) cites a variety of organizational studies demonstrating that

transformational leader behaviors are positively related to employees' satisfaction, self-

reported effort, and job performance. Similar results have been reported in several field

studies (Bass, 1989) and from a variety of samples and organizational settings.

Additionally, positive results were observed in a laboratory study designed to examine

the relative impact of directive leader behavior versus charismatic leadership behavior

(Bass, 1989).

Transactional Leadership

Transactional leadership involves an exchange between the follower and the

leader. Followers receive certain rewards for acting according to the wishes of their

leader (Burns, 1978). Bass (1997) makes clear that all transactional leadership theories

are based on the contingent reward premise: That leader-follower relations are the result

of a series of exchanges or implicit bargains between both parties. Bargains can be

considered exchanges of reinforcements by the leaders in return for expected behavior on the part of the followers (Burns, 1997).

Transactional leadership can be and is effective in certain situations. In a transactional environment, people jockey for position according to the rules of the organization (Burns, 1997). This paradigm can be compared to the adaptive style of creativity where high structure and conformity to rules is the norm (Kirton, 1990). Burns (1978) believes that transactional and transformational leadership are on opposite ends of a continuum. Bass (1989) sees them as separate dimensions, meaning that a leader can move between these styles. Bass (1989) goes on to argue that transformational leadership is a form of transactional leadership in that they are both dependent on the follower's ability to achieve a pre-determined goal or objective. While the transactional leader motivates subordinates to perform as expected, the transformational leader typically inspires followers to do more than is expected.

Transformational Leadership

Transformational leadership theories presume followers' emotional attachment to the leader and regard the emotional and motivational arousal of followers as a consequence of the leader's behavior (Yukl, 1998). The dynamics of transformational leadership involve strong personal identification with the leader, joining in a shared vision of the future, or going beyond the self-interest exchange of rewards for compliance.

Transformational leaders broaden and elevate the interests of followers, generate awareness and acceptance among the followers of the purposes and mission of the group, and motivate followers to go beyond their self-interests for the good of the group (Bass,

1990). The transformational leader articulates a realistic vision of the future that can be shared, intellectually stimulates subordinates, and understands and accepts the differences among the subordinates. These leaders inspire trust by providing an example, meaning and challenges to their followers, serving as a model. These leaders can have a transforming effect on organizations and individuals alike. Defining the need for change, creating new visions, and mobilizing commitment to these visions are some ways in which leaders can ultimately transform the organization. According to Bass (1997), this transformation of followers can be achieved through individualized consideration by: (a) Raising the awareness of the importance and value of designed outcomes, (b) getting followers to transcend their own self-interests and, (c) altering or expanding followers' needs.

Burns (1978) described transformational leadership as leadership that "occurs when one or more persons engage with others in such a way that leaders and followers raise one another to higher levels of motivation and morality" (p. 311). Transformational leaders help people and organizations survive in a complex world, master change, and move ahead in the future. Such leaders also help instill in their followers a greater sense of self-worth.

In light of these factors, leadership constitutes the determining factor in the success or failure of an organization (Bass, 1990). Military leadership is often compared to directing a large corporation or political body. Nothing could be further from the truth. Field Marshall Montgomery deemed that one of the requirements for military leadership is "selflessness, by which I mean absolute devotion to the cause he serves with no

thought of personal reward or aggrandizement" (in Stokesbury, 1984, p.12).

Military Leadership

The United States Armed Forces are unique in that they place a high value on educating both its current and future leaders. It has been argued that the military does more than the private sector to prepare and develop its leaders (Pagonis, 2001). This preparation is accomplished through both formal and informal methods. Lieutenant General Jack Woodmansee, United States Army retired, vouches for the effectiveness of formal Professional Military Education (PME). He states:

> Non-commissioned officers (NCOs) are counted on to take initiative and capitalize on opportunities while working within the framework of orders of superiors. The U.S. military's NCO corps is the envy of the world. As you move up the ranks you are put through a series of leadership development courses (Jordan, 2002, p.8).

Leadership is learned and created by the challenges individuals face on a daily basis. The challenges facing leaders and the amount of information available to them are unprecedented. The amount of information they receive is unprecedented. Therefore leaders find themselves in a constant balancing act, the job demands more and more productivity while employees require a leader who is attuned to their needs (Gryskiewicz, 1999). An excerpt from a military leadership guide provides an idea of the importance the military places upon leaders and creative problem solving:

> A commander is always looking for new and innovative solutions to problems. The staff officer must be creative in researching solutions to difficult and unique situations. Creative thinking and critical reasoning are skills that aid the staff officer in developing and analyzing courses of action. If he cannot recommend a course of action in one direction or area, he must find an alternative. He must be a team player and use the creativity of all the members of the staff and command (*Army Field Manual 101-1*, 1994, p. 3).

Military leaders have traditionally scored high in conformity, as evidenced in a test given to a wide range of occupations. This survey quantified the tendency to conform and found that military officers outscored the nearest participants by seven percentage points (McCall, 1998).

Studies have listed the essential competencies for twenty-first century leaders in diverse societal sectors (Ward, Smith, & Vaid, 1997). Leaders will be required to have the ability to deal with cognitive complexity, tolerance of ambiguity, intellectual flexibility, self-awareness, and an understanding of the relationships among organizational sub-systems that permeate the environment. The U.S. Armed Forces will certainly require their leaders to possess these skills as the global war on terrorism increases uncertainty. However, few institutions provide reliable support for the kind of learning or the creativity and innovation that is essential in a rapidly changing and dynamic environment (McCall, 1998).

Creativity

Kirton's Adaption-Innovation Theory.

Kirton's Adaption-Innovation (A-I) theory is grounded in the field of management initiative (Kirton, 1976). Organizations can act under the assumption that their members possess original ideas and the strategies to implement them. A-I theory helps explain the ways people approach and solve problems (Kirton, 1980). It further demonstrates that all individuals are creative problem solvers with the only variation being their style of problem solving (Kirton, 1976).

The theory clearly asserts that all individuals fall along a continuum between being more adaptive and more innovative. Just as people who are five feet tall can be

considered tall in pygmy societies in central Africa, individuals will find themselves more adaptive or more innovative, based on the composition of the group to which they belong (Kirton, 1976). This statement is particularly relevant for groups and organizations because some people are more comfortable with those of the same creative style and may feel vulnerable when confronted with someone who exhibits a divergent style.

Having a diversity of problem solvers in a group or organization is vital to the functionality of that group. A-I theory distinguishes among differences in styles of creativity and it also clearly delineates between creative level and style (Kirton, 1980). A person's cognitive style and level of intellectual competence are totally unrelated. Style is the manner in which one solves problems by either adaptive or innovative techniques (Kirton, 1976), whereas level is viewed as how much capacity one possesses and is expressed separately from cognitive style.

Puccio, Treffinger, and Talbot (1995) put forth that a small number of studies have thrown light on Kirton's argument concerning the dissimilarity between cognitive style and cognitive level. Various studies (Isaksen & Puccio, 1988; Torrance and Horng, 1980) have all found significant relationships between creative level and creative style. However, Kirton asserts that A-I theory relates to the way in which a creative thought is achieved, not in the number of ideas generated (Kirton, 1980).

All people solve problems; therefore, all people are creative. Creativity is a subset of problem solving. Problem solving is the product of cognitive function operating within an environment (Kirton, 1980). Amabile (1995) describes creativity along a continuum from low to high levels of creativity, while Kirton (1990) sees

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cognitive style as uncorrelated with cognitive level (potential). All elements of cognitive function interact with, but are influenced by the environment. All the main elements of cognitive function are associated with cognitive processes: problem solving, learning and memory (Kirton, 1999).

Individuals can be located on a continuum of cognitive style, ranging from adaptor to innovator, depending on the characteristic mode in which they solve problems (creating or making decisions), with the KAI as the measure devised to locate respondents along this continuum. The theory measures the creative style of an individual (Kirton, 1974).

A summary of attributes of those who favor either adaptive or innovative behavior when solving problems would find the following:

1. The higher adaptor (KAI score <96) would appear to an innovator to be overly-cautious who produces but a few relevant and safe ideas for prompt implementation.

2. An adaptor views a high innovator (KAI score >96) as being reckless, producing many ideas that may be seen as irrelevant or unfounded.

3. An innovator solves problems despite the rules while the adaptor works within the existing paradigm.

4. Precise, reliable, prudent are all terms to describe the adaptor, while the innovator is non-conformist, undependable and reckless.

5. Both the adaptor and innovator are creative but solve their problems and make decisions using different techniques (Kirton, 1999).

Kirton (1993) argues that these style preferences are established at an early age and therefore impervious to change; however the resultant behavior can be situationally

flexible. Structure also plays a part in understanding the nature of adaption-innovation theory. Structure is omnipresent in problem solving. The lower a person's tolerance for structure, the higher the degree of innovative behavior. The adapter has a higher level of tolerance and in fact relishes the structure in the problem-solving environment. An individual displaying an adaptive style of creativity is creative working within the existing structure to solve a problem, while the innovator often goes beyond and outside the structure to find a solution.

The Kirton Adaption-Innovation Inventory provides respondents with three subscales: (a) Style of originality (SO), (which is labeled Sufficiency–Proliferation of originality), (b) style of efficiency (E), and (c) style of rule/group conformity (R). Together these subscales yield three scores that, when combined, provide the total KAI score (range 32 – 160).

These sub-scores have been obtained through factor analysis. Kirton's desire was to find factors as far apart as possible. All of the items on the KAI are statistically related to the rest of the items since they are all designed to measure the Adaption-Innovation cognitive preference. However, these interrelated items can be divided into comparable groups, resulting in the three sub-scales (Kirton, 1999).

Sufficiency – Proliferation of Originality (SO) contains the largest number of KAI factors (13 items) that relate to the sufficiency and proliferation of ideas that an individual is comfortable in producing. An adaptor prefers a minimum of sound, solid ideas that are relevant to the problem at hand. The innovator will generate a surplus of ideas with the thought that the idea they want is somewhere within the ideas they produced. An adaptor, when operating within the SO mode, will understand (and accept)

only adaptive ideas inside of clearly defined parameters. The innovator does not have much regard for boundaries and is willing to consider adaptive and innovative ideas. An advantage that the adaptor has is when the best possible answer is to be found in the existing paradigm. The innovator has the benefit when the problem needs to be fine-tuned or when the existing paradigm requires alteration.

Efficiency (E) is the experimental makeup of the KAI (7 items) in regards to creativity and is concerned with thoroughness, precision, reliability and efficiency (Kirton, 1999). Adaptors will take the extra effort to ensure that their tasks are completed in a more thorough, meticulous and orderly manner than expected. Innovators appear to be more carefree when completing tasks. An adaptor is concerned with improving the paradigm, while the innovator wishes to depart from it.

Rule/group conformity (R) acknowledges a preference for operating within rules, policies, and consensus (12 factor items). Innovators may wish to tweak the structure of a problem one too many times, while the adaptor likes to operate within the rules and structure of a situation.

Jungian Psychological Types

Jung's Psychological Type Theory is based on the four basic mental functions, or processes, recognized as thinking, feeling, sensing and intuition (Jung, 1971). Jung originally envisioned psychological type as "an effort to deal with the relationship of the individual to the world, to people and things" (Jung, 1971). He further elucidated that introversion and extraversion are two poles of personality and that individuals within either extreme can display a variety of differences (Jung, 1971).

Thinking and feeling are "judging" functions while sensing and intuition are "perceiving" functions. We use judging functions when making decisions and use the perceiving functions when gathering information. Jung's type theory posits that personality is differentiated by the dominance of one of these processes over the others (Jung, 1971).

Jung's (1971) initial focus on psychological type theory was directed toward the realization that there were two types of people: Introverts and extraverts. Introverts are people who use their dominant process in a way that is directed inwardly toward thoughts and experiences in their own internal atmosphere. Extraverts are those who direct their abilities outwardly toward people and events in their external atmosphere. Jung further stated that these two functions are used in conjunction with the dominant functions of thinking, feeling, sensing and intuition.

Extraversion/Introversion

Seventy percent of us are extraverts, with the remained classified as introverts. This preference tells us how we direct our energy and attention. Introverts are energized from their inner world of thoughts and ideas. For the introvert, there is reflecting on a problem is imperative, while the extravert finds energy in things and people. Whether we are introverts or extraverts, we need to deal with the world both inwardly and outwardly. Each of us has our preferred ways of interacting with the world, and Jung suggests there are four basic ways or functions: sensing, thinking, intuiting, and feeling.

Sensing/Intuition

Seventy percent of us are sensors (S), the remainder intuitors (N). The S/N dichotomy reveals how you learn and accept information. Sensors tend to focus on facts,

details, and that which is present or real. Intuitors have a preference for possibilities, theories and futuristic implications. Sensors tend to be more grounded in reality, while intuitors may be more creative and oriented toward the abstract (Jung, 1971), which corresponds with the findings of the studies that the current research is based on. Some of us choose to rely on our five senses. Some prefer taking in information through our "sixth sense." Sensing people are detail oriented, want facts, and trust them. Intuitive people seek out patterns and relationships among the facts they have gathered. They trust hunches and their intuition and look for the "big picture." The quintessential intuitive was Albert Einstein whose fanciful thought experiments revolutionized the twentieth century. He could see patterns where others saw randomness or chaos.

Thinking/Feeling

Fifty percent of us are thinkers (T), the remainder feelers (F). The T/F dichotomy indicates how we make decisions. Thinkers tend to be objective and are potentially impersonal. Feelers give greater weight to the consequences of decisions on people. Some of us choose to decide things distantly on analysis, logic, and principle, while others make decisions by focusing on human values.

Judging/Perceiving

Fifty percent of us are judgers, the remainder perceivers. This final dichotomy was added by Myers and Briggs (1985) and considers how we live our lives. Judgers live organized lives in accordance with rules, lists, and agendas. Perceivers value a more spontaneous, flexible lifestyle.

These functions, combined with the concepts of introversion and extraversion, guide us to Jung's (1971) arrangement of eight psychological types:

1. Extraverts with dominant thinking – seek logical order to the external environment by applying clarity, goal-direction, and decisive action.

2. Introverts with dominant thinking – search for accuracy and order in internal thoughts through reflecting on and developing logical systems for understanding.

3. Extraverts with dominant feeling – seek out harmony through organizing and structuring the environment to meet people's needs and their own values.

4. Introverts with dominant feeling – look for intensely meaningful and complex inner harmony through sensitivity to their own and others' values and outer behavior.

5. Extraverts with dominant sensing – direct energy outwardly and acquires information by focusing on detailed, accurate accumulation of sensory data in the present.

6. Introverts with dominant sensing – direct energy inwardly and stores facts and details of both external reality and internal thoughts and experiences.

7. Extraverts with dominant intuition – focus energy outwardly to scan for new ideas, interesting patterns, and future possibilities.

8. Introverts with dominant intuition – directs energy inwardly to focus on unconscious images, connections, and patterns that create inner vision and insight.

Psychological types are not designed as scales, per se, but rather suggest a preference among alternatives. An analogy would be if you were right or left-handed. Although most of us use both hands, we usually reach for something with a particular hand. Likewise, a person is presumed to use each of the four bi-polar personality dimensions, but usually responds to a particular one first.

We all have these functions in differing proportions. Each of us has a superior function, which we prefer and which is best developed in us, a secondary function, which

we are aware of and use in support of our superior function, a tertiary function, which is only slightly less developed but not terribly conscious, and an inferior function, which is poorly developed and so unconscious that we might deny its existence in ourselves.

Myers-Briggs Type Indicator

Katharine Briggs and her daughter Isabel Briggs Myers found Jung's types and functions so revealing of people's personalities that they decided to develop a paper-and-pencil test. The MBTI became one of the most popular, and most studied, tests (O'Conner, 1993). One is placed in one of sixteen personality types on the basis of answers on 93 questions. A person's particular type reveals quite a bit about them: Likes and dislikes, likely career choices, compatibility with others, and so on. Four letters such as ENFJ identify each type. Extrovert is designated with an E and introvert with the letter I; sensing is S and intuition is N; thinking is given the letter T and feeling the letter F; with perceiving is P and judging receives a J. Combination of these letters produces one of sixteen types.

Hypotheses

In a study of leaders attending a management course, Carne and Kirton (1982) found that individuals who scored high on the innovative style of the KAI continuum were likely to score high on the Myers-Briggs scale of intuition and perception. Gryskiewicz and Tullar (1995) later corroborated these findings in a sample of managers in a management development seminar. Therefore, it was hypothesized that:

Hypothesis 1a: A significant positive relationship exists between KAI innovative problem-solving style and MBTI intuition preference in military leaders.

Hypothesis 1b: A significant positive relationship exists between KAI innovative problem-solving style and MBTI perception preference in military leaders.

The second hypothesis again considers the innovative style of the KAI problem-solving continuum. This hypothesis examines whether there is a correlation with the KAI innovative creative style and MBTI extraversion type. Carne and Kirton (1982) found significant correlations in magnitude and direction between innovative creative style and extraversion personality type. Gryskiewicz and Tullar (1995) conducted a further study that determined the existence of a clear association between innovative and extraversion among their sample of middle-level managers, therefore:

Hypothesis 2: There will be a positive relationship between KAI innovative problem-solving style and MBTI extraversion personality type found in military leaders.

Metters (1989) conducted a survey of problem-solving styles on a sample of military leaders. He noticed that military leaders scored higher toward the adaptive end of the KAI continuum. Military leaders in his sample had a total KAI score of 89 (N = 192, SD = 17.74), which is significantly less than the Carne and Kirton's (1982) mean of managers, which is a total KAI score of 101 (N = 109, SD = 16). A one-way ANOVA was conducted to compare the means of the studies of Metters (1989), Carne and Kirton (1982) and the current study.

Hypothesis 3: Military leaders will score higher on the KAI adaptive problem-solving style than previously surveyed civilian leaders.

Studies carried out at the Virginia Military Institute (O'Connor, 1993) show that the typical military cadet has an ESTJ personality type and tends to think in a deliberate way using the five senses rather than intuition. ESTJs solve problems based on

established facts and procedures. A chi-square goodness of fit test will be run to determine if there is a similar preponderance of ESTJs in the present sample.

Hypothesis 4: The prevailing personality type found in military leaders will be the ESTJ personality type.

Assumptions

Assumptions for this study are:

1. Respondents understand the surveys and provide accurate responses to questions concerning styles of creativity found in the KAI, as well as with the dichotomy of choices presented in the Myers-Briggs Type Indicator.

2. Research took place in an atmosphere of trust and understanding with little to no interference from military authorities.

3. The instruments measuring creativity (KAI) and personality type (MBTI) accurately reflected an individual's cognitive style of creativity and personality type at the time of survey.

Limitations

The limitations identified for this study are:

1. Limitations could occur because of environmental factors such as being unable to find a large enough number of subjects and subject's low motivation to participate in the study.

2. The inclusion of persons from just one branch of the United States Armed Forces could limit the implications of the results. Surveying another branch of the armed forces could help in the generalizability of the results.

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Chapter Three: Method

The intent of this chapter is to present the methodology used in studying military leaders to determine if cognitive creative style is correlated to a particular personality type. This chapter is organized into five segments: Research design, sampling, measures, procedures, and data analysis. The research design describes the experimental format that was employed. The sample section presents the process by which the sample was selected and describes the population being studied. The measures section describes the instruments that were used, followed by procedures, which illustrates all of the steps and actions that were taken in the study. Finally, the data analysis segment gives details of the statistical interpretative methods that were carried out.

This study was based upon previous inquiries that investigated the relationship between creativity styles and personality types among a sample of private sector managers. These studies examined the relationship between creative style and personality type in management students in the United Kingdom (Carne and Kirton, 1982) and a variety of managers in the private sector in the United States (Gryskiewicz and Tullar, 1995). The current inquiry initiated a new line of exploration and be the first known study investigating military leaders in the framework of their personality type and creative style.

In November 2001, the researcher attended a five-day certification workshop on the Kirton Adaption-Innovation Inventory (KAI) conducted by Dr. Michael Kirton, the originator of A-I theory. The researcher obtained certification from the Consulting Psychologists Press (CPP, 2002) to administer the Myers Briggs Type Indicator (MBTI).

Research Design

This study was exploratory in nature and made use of a correlation approach in order to investigate and discover relationships between creative style and personality type in military leaders. The variation that is expected to be found among the subjects will come from two surveys conducted at a single point in time, hence the reason for the between-subject research methodology. Military leaders were instructed to complete two psychometric instruments pertaining to creativity and personality. Random selection of subjects was not used during this inquiry because the purpose of the study was to detect a correlation in the leaders being surveyed, not to obtain a statistical representation of all leaders in the US Armed Forces.

This study examined U.S. military leaders attending a professional leadership development course, in order to measure their creative style along with their personality types. The cognitive creative style and personality type of 150 junior level United States Air Force non-commissioned officers was surveyed and examined using the KAI and the MBTI. These military leaders were requested to complete two psychometric instruments, one measuring creative style (KAI) and the other measuring personality type (MBTI). The researcher controlled and administered both instruments and was the only person collecting and analyzing data. The value of using surveys that have been proven to be reliable and valid is that this may act to control threats to the internal validity of the study (Gall, Borg, & Gall, 1996).

Informed Consent

This study posed no significant threat to any of the subjects and risks were minimal. Both of these surveys are non-invasive and did not cause any undue stress or

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harm to participants once they discovered their creative style or personality type. Involvement in this study was strictly voluntary without any penalty for non-participation. Participants signed an informed consent release that explained the confidentiality of their responses, the procedures for data handling, and how the results would be reported.

Potential benefits are a better understanding of their own cognitive style of creativity and personality type. As Air Force leaders, the participants gained self-knowledge and insight of their own creativity and personality style. These leaders also appreciated that individuals solve problems and make decisions in their own particular manner.

Collected data was secured under lock and key at all times by the principal investigator. The identities of the subjects will not be discernible, and no third party will be privy to any data. Participants were informed that their involvement would provide data on Air Force leaders that could be of importance to the study of military leadership.

In collecting and analyzing data, the following steps were taken to ensure the safety and well being of the individuals, as well as guard the confidentiality of their responses. Each participant in this study was a volunteer, and received a full explanation of the program from the researcher. Additionally, each subject received, and signed a consent form. All participants were informed that they could receive a copy of the completed study by requesting it from the researcher. All instruments and the procedures for their use have been submitted to and were approved by the University of Oklahoma's Internal Review Board.

Participants

The participants were leaders who had recently been selected to promotion to the grade of master sergeant in the United States Air Force. A master sergeant is a senior non-commissioned officer who has the duties and responsibilities to include financial management, control of equipment, and providing leadership to junior enlisted personnel. This study was limited to non-commissioned officers in the United States Air Force assigned to the European theatre of operations. Both male and female leaders were studied since research indicates that there are few identifiable sex differences in creative performance (Barron & Harrington, 1981). Nor was intelligence a factor in sample selection, because creativity and personality type cannot be accurately measured by standard intelligence tests (Kirton, 1988). The only exclusionary factor that was considered was if a participant decided not to partake in the study. A tracking system was developed to document the number of individuals contacted for participation and the number of subjects who actually volunteer for the study.

The population under study consisted of 150 junior Air Force leaders from throughout the European command. The demographic composition closely resembled the overall Air Force mix of 80 percent male and 20 percent female, 67 percent Caucasian, 18 percent African-American, six percent Hispanic-American, and three percent Asian-American (HQ AFPC, 2003).

Measures

This study examined the military leaders' style of creativity and personality type by using the following psychometric instruments. All of the surveys were scored by the researcher and remained under his control at all times.

Kirton Adaption-Innovation Inventory.

British organizational researcher Dr. Michael J. Kirton developed the A-I theory of creativity and the resultant survey through quantitative research methods and studies. This 33-item inventory measures individuals on their style of creativity, problem solving and decision-making. The inventory is based on A-I theory that postulates that all individuals solve problems and are therefore creative. A critical assumption of the theory is that creativity is a part of an individual's problem solving cognitive function. The theory differentiates between level and style of creativity, with the style difference found on a normally distributed continuum, ranging from high adaptive to high innovation.

Kirton developed and refined the KAI in the late 1960's and early 1970's. The KAI was normed on a general population sample of 532 individuals in the United Kingdom producing a mean value of 95, a standard deviation of 17.9 and a distribution that conformed almost perfectly to the normal distribution curve (Kirton, 1976). Five subsequent population samples yielded means within one point of the original findings. Factor analysis suggested that the KAI measures three sub-scales consisting of style of originality, style of efficiency, and style of rule/group conformity. These three sub-scales are statistically related to each other with reliability coefficients ranging from .36 to .47, and each sub-scale measures cognitive preference. The internal consistency reliability coefficients for the sub-scales were .83 for style of originality, .76 for style of efficiency, and .83 for rule-group conformity (Kirton, 1999). The internal consistency reliability coefficient for the KAI, as measured by using the Kuder-Richardson 20, in the original

general population sample was .88 and a further 31 studies have demonstrated Cronbach alpha coefficients from .79 to .91.

Respondents taking the inventory are asked "to imagine that they had been asked to present, consistently for a long time, a certain image of themselves to others" (Kirton, 1977, p.6). Respondents are then asked to "state the degree of difficulty that such a task would entail for them" (Kirton, 1977, p.7) for each of the 33 items (one item is for control purposes only) on a five-point Likert-type scale ranging from very hard (1) to very easy (5). The range of scores is 32 (adaptive) to 160 (innovative) with a theoretical mean of 96.

Myers-Briggs Type Indicator.

The other instrument used was the Myers-Briggs Type Indicator (MBTI), Form M (Briggs-Myers & McCaulley, 1998). It is a self-report, forced-choice measure of personality type based on Jung's theory of personality types and is one of the most widely used psychometric instrument in use, administered to over three million people per year (Gardner & Martinko, 1996).

Based on Jung's psychoanalytic conceptualization, the MBTI classifies individuals into four types and 16 subtypes based on responses to the indicator. The bipolar elements are: extraversion/introversion (E/I), sensing/intuition (S/N), thinking/feeling (T/F), and judgment/perception (J/P). The MBTI then produces one of 16 potential personality types. The MBTI mainly measures differences of how people tend to use judgment and perception. The controlling hypothesis for the theory is that certain differences in people result from their preferred ways of using judgment and perception.

Two categories must be examined to when discussing the validity of the MBTI, exploratory and confirmatory factor analysis. Various studies examining the exploratory factor analysis of the MBTI (Thompson & Borrello, 1986; Tischler 1994; and Harvey, Murry, and Stamoulis, 1995) have produced results that nearly match the hypothesized four-factor model. Thompson and Borrello (1989) conducted a confirmatory factor analysis of the MBTI that showed support for the four-factor model. Harvey, Murray, and Markham (1995) tested the MBTI against three competing view models of the MBTI and provided strong support for the predicted four-factor model.

There is evidence pointing to the concurrent validity of the instrument in terms of content validity, factor analysis, and correlation of the MBTI with other personality instruments (Brown, 2001). Item weights of the questions in the instrument are based on a standardization sample of 3,200 adults in a random national sample (Briggs-Myers & McCaulley, 1998). Studies have reported a positive correlation between the MBTI and other instruments to include the California Psychological Inventory (Mastrangelo, 1999), the Kirton Adaption and Innovation Inventory (Gryskiewicz and Tullar, 1995) and the Time Management Questionnaire (Harvey & Murry, 1994).

Test-retest of the MBTI shows consistency over time, with correlations ranging from .57 for the thinking-feeling dichotomy to .85 for the sensing-intuition dichotomy (Johnson, 1992). Other studies (Harvey & Murry, 1994; Harvey et al., 1995) have also demonstrated stability in the test-retest utility of the MBTI.

Procedures

All leadership course participants were given the opportunity to participate in this project. Participation was on a voluntary basis and each individual who elected to

participate in the survey was asked to sign an informed consent form that introduces and explains the study. Each volunteer received a packet containing an Informed Consent Form (Appendix A), Subject Instructions (Appendix B), Subject Data Inventory (Appendix C), Subject Debriefing Form (Appendix D), Kirton Adaption-Innovation Inventory (Appendix E) and Myers-Briggs Type Indicator (Appendix F). Each of these packets was assigned a numeric designation in order to ensure subjects' confidentiality.

The consent form explained the scope and details of the experiment along with the requirements of participation. The form indicates that participation is strictly voluntary and that no penalty will be assessed to those individuals who choose not to partake in the experiment. Individuals were assured that their participation may be terminated at any time. Those who agreed to participate in the study were asked to sign and date the consent form.

Subject instructions provided details on completing the consent form, the data inventory, the Kirton-Adaption Innovation Inventory and the Myers-Briggs Type Indicator. Participants were informed that there are no time limits for completing the two surveys, and that all of their responses would be kept confidential. Individuals with a control number ending in an even number began by completing the MBTI, and those with an odd control number started with the KAI. Participants were advised that study data will only be presented in a collective mode and responses will not be linked to any individual participant.

The subject debriefing statement informed the participants about the two instruments they completed, the importance of their participation in this study, and the protocol they must follow if they wish to discover their particular results.

Data Analysis Procedures

Descriptive statistics that were collected include the means, standard deviations and score ranges from each variable in the study. KAI total score measuring adaptive and innovative style of creativity was measured. Four attributes of the MBTI were used. These are the dichotomous scales of Extroversion/Introversion, Sensing/Intuitive, Thinking/Feeling, and Judging/Perceiving.

Kirton and Carne (1982) followed by Gryskiewicz and Tullar (1995) used Pearson's r correlation coefficient to assess the correlation between creative style and personality type. It is expected that a statistically significant relationship will exist between Kirton's innovative style and Myers-Briggs intuition. Additionally a positive correlation between innovative style and perceiving dimension of the MBTI is expected.

Hypothesis 1a stated that a significant positive relationship exists between KAI innovative problem-solving style and the MBTI intuitive personality type preferences in military leaders. This hypothesis suggested that an innovative problem solving style would be related positively to the intuitive personality type in military leaders. Since the hypothesis concerns the relationship between pairs of interval scale variables, the Pearson r correlation coefficient was used to test the hypothesis. The data should indicate that the score on the KAI innovative problem solving style scale and the MBTI intuitive personality scale should have a significant positive correlation, therefore supporting the hypothesis.

Hypothesis 1b suggested that a significant positive relationship exists between KAI innovative problem-solving style and the MBTI perception personality preference.

Using a Pearson r correlation, the data should indicate that the scores between the KAI and MBTI should have a significant positive correlation.

The second hypothesis was similar to the first in that a positive relationship between KAI innovative problem-solving style and MBTI extraversion personality type was expected to be found in military leaders. A Pearson r correlation coefficient was again utilized to test the hypothesis. It was expected that the data would indicate a positive correlation between the two pairs of scores.

Hypothesis Three stated that military leaders would score higher on the adaptive scale of the KAI continuum than civilian leaders. Carne and Kirton (1982) ascertained a mean KAI score of 101 (N = 109, SD = 16) for civilian leaders, while Metters (1989) found that military leaders had a KAI score of 89 (N = 192, SD = 17.74) indicating a clear preference for adaptive problem-solving style. A one-way ANOVA was conducted to compare the results of the Metters' study and Carne and Kirton's (1982) original sample with the current study. It is therefore suggested that military leaders will score in a more adaptive manner (Metters, 1989) than private sector leaders.

The prediction for Hypothesis Four is that the majority of military leaders will have an ESTJ personality type. This personality type has been found to be the most prevalent personality type in military leaders (O'Connor, 1993). A chi-square goodness-of-fit test was conducted to determine if there is a difference in personality types in the aforesaid study. It was therefore expected that the frequency of ESTJ personality type would be found in this current study.

Statistical Analysis

As noted, four hypotheses were tested. This section describes the statistical methods employed to address each of these hypotheses. In Hypotheses 1 and 2, one-tailed tests and levels of .05 were employed which ensures that the Type I error rate will not exceed 5% for each statistical test.

As described earlier, Hypothesis 1 was that there will be a positive correlation between KAI innovation and MBTI intuition scores, and a positive correlation between KAI innovation and MBTI perception scores. Hypothesis 2 was that there will be a positive correlation between scores on the KAI innovation and MBTI extraversion scores. Hypotheses 1 and 2 were tested with Pearson correlation coefficients.

Hypothesis 3 was that military leaders would score lower (i.e. be more adaptive and less innovative) than the civilian leaders on the KAI innovation scale. To test this hypothesis, three samples were examined: The sample of military leaders employed by Metters (1989), the sample of civilian leaders (managers) employed by Carne and Kirton (1982), and the current sample of military leaders. A one-way ANOVA was employed to determine if any of the three groups differed. If the ANOVA result is statistically significant, it will be followed by three independent samples t-tests to compare each pair of samples. Because of the accumulation of Type I error probability due to running three tests, a Bonferroni-adjusted level of .017 (.05/3) will be employed for these tests.

Hypothesis 4 was that the most common personality type among the current sample of military leaders would be the ESTJ type. There are 16 personality types defined by the four dimensions of the MBTI, and a test of goodness-of-fit was employed to determine if the 16 types conformed to a uniform distribution. That is, the null

distribution tested is that all 16 types are equally likely. Rejection of the null distribution indicates that the 16 types are not equally likely. Examining the frequencies for each type then provides information on which types are more or less likely to occur.

Chapter Four: Results

The origin for this study was to replicate prior research in the field of creative style and personality type in military leaders. The following hypotheses were advanced to direct the study.

Hypotheses

H1a: There is a statistically significant relationship between the KAI score for innovation and the MBTI score of intuition of military leaders.

H1b: There is a statistically significant relationship between the KAI score for innovation and the MBTI score of perception of military leaders.

H2: There is a statistically significant relationship between the KAI score for innovation and the MBTI score of extraversion of military leaders.

H3: There is a statistically significant relationship between the KAI score for innovation of military leaders and previously surveyed civilian and military leaders.

H4: There is a statistically significant relationship between personality type and military service.

Statistical Analysis

The analysis of H1a, H1b, and H2 was conducted using Pearson correlation coefficients with the significance level set at .05. The Pearson correlation statistic is used to express the direction and magnitude of the relationship between two measures

that yield continuous scores. The correlation statistics for these hypotheses are used to explore relationships between the variables, not to predict one variable from another.

H3 was analyzed using the chi-square statistic, with a significance level of .05. The chi-square statistic is used to test whether the observed frequency in a study differ significantly from the expected frequencies if there were no relationship between variables.

The analysis of H4 was conducted using a one-way ANOVA. The purpose of analysis of variance is to test differences in means (for groups or variables) for statistical significance. This is accomplished by analyzing the variance, that is, by partitioning the total variance into the component that is due to true random error and the components that are due to differences between means. These latter variance components are then tested for statistical significance, and, if significant, we accept hypothesis that the means (in the population) are different from each other.

The results are reported for the four hypotheses suggested for this study. The first hypothesis was as follows:

H1a   There is a statistically significant relationship between the KAI score for innovation and the MBTI score for intuition of military leaders.

There was a statistically significant relationship between the creative style of innovation, as measured by the KAI and the personality type of intuition as measured by the MBTI. The correlations between KAI and MBTI scores are presented in Table 1. As can be seen, the correlation between KAI innovation and MBTI intuition was statistically significant and in the predicted direction ($r = .449$, $df = 126$, $p < .05$).

H1b   There is a statistically significant relationship between the KAI score for innovation and the MBTI score for perception of military leaders.

There was a statistically significant relationship between the creative style of innovation, as measured by the KAI and the personality type of perception as measured by the MBTI. KAI innovation scores and MBTI perception scores were positively correlated ($r = .379$, $df = 126$, $p < .05$). Based on the significance of the correlations ($r = .449$ and $r = .379$), the Hypotheses 1a and 1b were supported.

The second hypothesis stated:

H2   There is a statistically significant relationship between the KAI score for innovation and the MBTI score of extraversion of military leaders.

There was a statistically significant relationship between innovation as measured by the KAI and extraversion as measured by the MBTI. As can be seen from Table 1, the correlation was positive (the hypothesized direction) and statistically significant ($r = .295$, $df = 126$, $p < .05$). Therefore, the hypothesis was supported.

Table 1

Correlations between KAI Innovation, Time to Promotion, and the four MBTI Scales

	1.	2.	3.	4.	5.
1. KAI Innovation	1.00				
2. MBTI Extraversion	.295*	1.00			
3. MBTI Intuition	.449*	.229*	1.00		
4. MBTI Thinking	.058	-.111	-.257*	1.00	
5. MBTI Perceiving	.379*	.127	.340*	-.167	1.00

Note. *$p < .05$

The third hypothesis was as follows:

H3   There is a statistically significant relationship between the KAI score for

innovation of military leaders and previously surveyed civilian and military leaders.

There was a significant relationship between the KAI score for innovation

between leaders in the current study and previously surveyed civilian and military

leaders. This hypothesis contends that military leaders will score higher on the KAI

adaptive problem-solving style than civilian leaders. Metters (1989) surveyed military

leaders ($N = 192$, $\mu = 89.0$, $SD = 17.74$) and Carne and Kirton (1982) surveyed civilian

leaders ($N = 109$, $\mu = 101.0$, SD 16.0). A one-way ANOVA was performed to examine

the hypothesis that military leaders would have lower scores on the KAI innovative scale

than civilian leaders. The result was statistically significant ($F (2, 426) = 12.11, p < .05$).

Thus, the three groups were not equivalent, and follow up t-tests (using the Bonferroni

correction) were conducted.

The Bonferroni correction is a post-hoc test and is applied when in a particular

study the alpha level requires to be adjusted downward to consider accumulation of Type

I error probability. Therefore, if a Bonferroni correction would not be applied there

would be a chance of 14.26 percent of finding one or more significant differences when

conducting three separate statistical tests. Lowering the alpha for each test to 0.017

(.05/3) makes the maximum probability of at least one Type I error among all the tests

will bring the overall alpha level back to 0.05.

The first test, comparing the innovation scores of Metters (1989) and the present

study (the two military leader samples) as found in Table 2 resulted in a t-value of .84 (df

$= 318$), which was not statistically significant. That is, the two samples of military

leaders did not differ. The second test, comparing the innovation scores of Metters'

military leaders (1989) and Carne and Kirton's civilian leaders (1982) resulted in a *t*-

value of 3.89 (df = 299), which was statistically significant (p < .017). The final test,

between the innovation scores of Carne and Kirton (1982) and the present study of

military resulted in a *t*-value of 5.06 (df = 235), which was statistically significant (p <

.017). Therefore, the hypothesis that military leaders would have lower scores on

innovativeness than civilian and other military leaders was supported in both tests.

Table 2

Means, Standard Deviations, and Sample Sizes for the ANOVA and Independent Samples t-tests on KAI Innovation Scores

	Mean	SD	N
The Present Study's Military Leaders	91.46	13.04	128
Metters (1989) Military Leaders	89.00	17.74	192
Carne & Kirton (1982) Civilian Leaders	101.00	16.00	109

The fourth hypothesis stated:

Ho$_4$ There is a statistically significant relationship between personality type and service in the U.S. armed forces.

There was a statistically significant relationship between personality type and military service. The observed X^2 statistic for the test of goodness-of-fit to a uniform distribution of personality types was 64.5, which, with 15 degrees of freedom, is statistically significant ($p < .05$). Therefore, it can be concluded that the 16 personality types are not equally likely among military leaders. As indicated in Table 3 the most frequently occurring type was ISTJ, with 21.0% of the total sample. The next most frequently occurring type was ESTJ, with 11.7%. Individual tests were run for ISTJs versus all other types, ($X^2 = 48.1$) and for ESTJs versus all other types ($X^2 = 6.5$), both with 1 degree of freedom. Both types occurred more frequently in this sample than would be expected if they were no more common than the other types in the population ($p < .05$). Therefore, the hypothesis was supported, with the additional finding that ISTJs were even more common. This study found that the personality types were in line with previous studies that demonstrate that the ESTJ and ISTJ personality types would combine for over 40% in a sample of leaders (Garden, 1997). Interestingly, Myers and McCaulley (1985) in a sample of MBTI types in the U.S. general population reported that ESTJ, ESFJ, and ESFP accounted for over 40% of all personality types.

Table 3

Percentage in Each Personality Type

	N	Percentage
ISTJ	27	21.0
ISTP	5	3.9
ISFJ	8	6.3
ISFP	4	3.1
INTJ	7	5.5
INTP	10	7.8
INFJ	7	5.5
INFP	5	3.9
ESTJ	15	11.7
ESTP	7	5.5
ESFJ	3	2.3
ESFP	3	2.3
ENTJ	7	5.5
ENTP	9	7.1
ENFJ	5	3.9
ENFP	6	4.7

Table 4

Percentage in Each of the Personality Dyadic

	N	Percentage
Extraverted (E)	55	43
Introverted (I)	73	57
Sensing (S)	73	57
Intuition (N)	55	43
Thinking (T)	86	67
Feeling (F)	42	33
Judging (J)	80	63
Perceiving (P)	48	37

Table 5

Personal Biographical Characteristics of Military Leaders

	N	Percentage
Gender		
Male	109	85.1
Female	19	14.9
Ethnicity		
Caucasian	81	63.2
African American	28	21.8
Hispanic	12	9.4
Asian American	7	5.6
Rank		
E-6	120	94
E-7	8	6

Chapter Five: Discussion

Conclusion

Researchers (Bass, 1990, Yukl, 1998) have documented a wealth of research on

the aspect of leadership and personality. Additionally, studies have been conducted on

leaders and their personality types and creative styles (Carne & Kirton, 1982;

Gryskiewicz & Tullar, 1995). These are the studies that formed the basis of this

investigation. The findings of this study confirm and found support for the four

suggested hypotheses.

A considerable magnitude of exploration has revealed the association between

personality traits and conceptual (cognitive) skills (Yukl, 1994). Conceptual skills are

critical for leadership in order to accomplish missions effectively in today's tumultuous

military environment. This study contributes to the body of literature by utilizing past

research in order to explore associations between personality and creativity research.

The preceding four chapters of this study concentrated on the purpose and

significance of the study, a review of the related literature, the research hypotheses,

assumptions and limitations of this study, a discussion of the methods and procedures,

and the statistical analyses for this study. This chapter puts forward a summary of the

study, summary of the results, implications, limitations and recommendations for future

research.

Summary of the Study

The objective of this study was to explore the relationship between the cognitive

style of creativity and personality types of military leaders, as characterized by Kirton's

Adaption-Innovation theory and Myers-Briggs type indicator, respectively. The

importance of this study can be paraphrased from an excerpt from Army Field Manual

22-100, Military Leaders (1999). According to Army doctrine, the number one principle

of leadership is "to know yourself and seek self-improvement" (p.11). This study

concentrated on a group of military leaders in a professional development course with the

goal of obtaining useful data for research. Additionally, it was hoped that the study

would provide the potential for application to military leadership endeavors, particularly

in the current condition of a rapidly changing military environment.

One hundred fifty students attended the Professional Development Seminar at

Ramstein Air Base, Germany from September 22 - 26, 2003. The purpose of the training

was to provide leadership information and tools to individuals who had just recently been

selected for promotion to the position of master sergeant. In the U. S. Air Force, a master

sergeant is considered a senior non-commissioned officer, and is afforded the leadership

opportunities that are analogous to those carried out by a major.

A key objective of this training was to teach these personnel how to effectively

lead, both in peacetime and wartime. Additionally, one of the primary tenets of

professional military education is the enhancement of personal growth while increasing

leader effectiveness (Ulmer, 1997). Intellectual flexibility, combined with self-awareness

are both key competencies for the twenty-first century leader. Military leaders must

sustain intellectual and cognitive vigor due to the scope, intensity and complexity of modern warfare (Ulmer, 1997).

One hundred thirty-five students volunteered to take part in this study, a response rate of 90 percent. Of these respondents, seven returned incomplete survey instruments that were not used for data analysis procedures. Therefore the size of the sample ended up at one hundred twenty-eight non-commissioned officers. The demographics of the group closely resemble that of master sergeants in the whole U. S. Air Force. Males comprised 85 percent of the group with females at 15 percent; Caucasians were the largest racial group at 63 percent, with African-Americans at 22 percent, Hispanics at 10 percent, and Asian Americans at 5 percent. The age of the participants ranged from 28 to 45 years, with a mean of 36.41. This group held an experience level of sixteen years of total service and two years of time in current grade. Their prevalent personality type was ISTJ (21 percent) and the creativity choice was adaptive (63 percent).

Informed consent to participate in this study was received from all the participants in this study. Each participant was given a packet containing and Informed Consent Form, Subject Instructions, Subject Data Inventory, Subject Debriefing Form, Kirton Adaption-Innovation Inventory and Myers-Briggs Type Indicator. 50 percent of the participants first received the MBTI, with the other half of participants beginning with the KAI to facilitate randomization of results. Each of the packets was assigned a numeric label in order to guard the confidentiality of the participants' responses.

Summary of the Results

Hypotheses 1a and 1b suggested that there would be a relationship between the innovative style of creativity as measured by the KAI, and the MBTI personality factors

of intuition and perception. Studies by Carne and Kirton (1982) and Gryskiewicz and Tullar (1995) both found a correlation between the innovative style of creativity and the intuition personality preference in their sample of civilian leaders. Pearson r correlation coefficient was used to test this hypothesis, and the current study supported the hypothesis with both intuition and perception showing a correlation to the innovative creativity style.

This hypothesis looked at individuals displaying an innovative style of creativity. These individuals made up 37 percent of the sample. Innovators prefer to question a problem's fundamental assumptions, while solving problems despite the rules (Kirton, 1999). This creative style was found to correlate with the intuitive and perception personality type preference, which means they look for meaning and associations while using their five available senses to perceive the world around them.

Hypothesis 2 relates to the correlation between KAI innovation and MBTI extraversion scores. Carne and Kirton (1982) found support for this hypothesis ($r = .44$, $p = .05$) while Gryskiewicz and Tullar (1995) tested but found little support for this hypothesis ($r = .21$, $p = .001$). Pearson r correlation coefficient was used to test this hypothesis and the present study supported this hypothesis ($r = .295$, $p = .05$), agreeing with the tests of Carne and Kirton (1982) and but disagreeing with Gryskiewicz and Tullar (1995).

One would be safe to assume that innovation and extraversion would show a degree of correlation. MacKinnon (1961) initially indicated that participants considered to be creative showed a preference for introversion, while Kirton reported a correlation between extraversion and creativity (1999). Critics have often overlooked the creative

factor when considering what constitutes effective leadership (Simonton, 1994). The creativity component in leadership was examined from the perspective of cognitive style of decision-making and creative problem solving.

Different analyses of creativity (Glover & Sautter, 1977; Hampton, 1987) have shown the significance of personality characteristics in the creativity discipline. Some of these attributes are a tolerance for ambiguity, willingness to take risks, ability to overcome obstacles, to name but a few. Amabile (1983) believes that even with these characteristics, unless an environment that is conducive to creative expression is established; quite often creativity fails to reveal itself.

Hypothesis 3 had to do with the supposition that surveyed leaders would score toward the adaptive extremity of the Adaption-Innovation continuum on the KAI, in line with findings by Metters (1989) and Carne and Kirton (1982). It has been demonstrated that military leaders, when faced with a problem will revert to an adaptive style of problem solving (Metters, 1989).

The twenty-first century military leader requires new skills and techniques to wage modern warfare (Ulmer, 1998). These skills will be instilled through education and training, which must be institutionalized throughout the military if leaders are going to be successful. President Bush (2002) stated the following concerning the military and innovation in an address to cadets at the Naval Academy.

> "We cannot transform our military using old weapons and old plans. Nor can we do it with an old mindset that frustrates the creativity and entrepreneurship that twenty-first military will need." Bush said creativity and imaginative thinking is America's great competitive edge. "Today, I call upon you to seize and to join this tradition of creativity and innovation. Our national and military leaders owe you a culture that supports innovation and a system that rewards it. If you pick up this mantle some of your ideas may fail, but we need to give

you this freedom and we will. It is from our failures that we will learn and acquire the knowledge that will make successful innovation possible. As president I am committed to fostering a military culture where intelligent risk-taking and forward thinking are rewarded, not dreaded."

As hypothesized, military leaders were found to have a significant difference in innovation creative style from civilian managers; in other words military leaders are more adaptive than civil sector leaders. A one-way ANOVA was conducted to test the hypothesis. The military leaders from the present study did not differ significantly from the study of military leaders conducted by Metters (1989), that is, both populations were found to have adaptive creativity styles; while differing from the style found by Carne and Kirton (1982).

Hypothesis 4 declared that military leaders would have a higher proportion of a particular personality type than would be expected to be found in a normal distribution. This hypothesis was supported, with the additional finding that a higher proportion of ISTJs were also found in this sample. This is consistent with findings at the Virginia Military Institute. Gardner & Martinko (1990) propose that lower and middle-level military managers often possess personality factors of S, T, and J. Thompson (1993) found military officers mostly had personality types of ESTJ and ISTJ, in line with the current studies findings. Roush's (1992) study of student leaders at a military academy showed a high percentage to be sensing types (S). An individual who has an S, T, and J personality factors is said to have many of the behaviors that the military is enamored with: (a) logical thinking, (b) decisiveness, (c) an organized and structure approach to the outer world, and (d) an analytical mind (Fitzgerald, 1992).

Implications

Fighting and winning the nation's wars and serving the common defense of the United States is the primary mission for the U. S. armed forces. One factor in this endeavor is to insure that the force structure is highly educated, well trained and has a high degree of self-awareness (Ulmer, 1997). The respondents in this study learned that problem-solving style could be either adaptive or innovative. Varma (2001) argues that operational military commanders must be educated with new skills and methods to solve problems on the complex modern battlefield.

These results have raised several areas of recommendations that military units can contemplate. Increased training can lead to increased understanding; therefore in order for leaders to have a greater self-awareness, these surveys should be conducted at various times during a leader's career. This survey was taken at the U. S. Air Force in Europe Professional Leadership Development Seminar, a course that is used to supplement Professional Military Education.

It is recommended that leaders have the opportunity to take these and/or other personality measures to assess their individual personality type. It is hoped that the results from this study can be used to assist Air Force leaders to understand the importance of being familiar with their individual style of creativity and personality types, and that of others. While it is inconceivable to think that a study of this type could be conducted throughout the entire Air Force; rather what is being suggested is that individuals who are in professional military environments receive training in personality assessment and creativity styles.

Bridges (1992) asserts that the four MBTI dimensions supply an authoritative concept to consider the character of organizations. He goes on to assert that disproportionate number of police, detectives, and military are sensing (S) types while an equal number of writers, social scientists and educators have the intuitive (N) personality type factor. The net result is a non-random population of individuals with similar preferences in many organizations. Allen (1998) posits that this could explain the possible homogeneity found in the upper echelon of enlisted ranks in the U. S. Air Force.

RiCharde (1996) found that the three top MBTI profiles in the Virginia Military Academy were ISTJ, ESTJ and ISTP. Other researchers (Fitzpatrick, 2000; Reynolds, 1999) have had similar results in that military leaders have been demonstrated to have ESTJ and ISTJ personality types more than any other. More research could be conducted to determine if a certain personality type is drawn to the military, and if so then why?

Limitations

Table 3 indicates that a major cross section of airmen in the U. S. Air Force assigned to Ramstein Air Force Base, Germany participated in this study. While this study examined a different population than the studies being replicated, there are still several limitations that require to be addressed. Firstly, the military leaders being surveyed are all of a specific rank (master sergeant) and come from the same branch of the U.S. military (Air Force). This hinders the generalizability of both the correlations identified and the nature of said correlations. Additionally, further research is needed to

cross-validate the findings with respect to the variables of gender, ethnic group and career field.

The instrumentation for this study was determined by the two studies that were being replicated. As previously stated the reliability of both the KAI and MBTI has a substantial amount of empirical support. However, the correlations obtained by the results of this study cannot demonstrate cause-and-effect relationships between the variable that are shown to correlate.

A major source of threat to the internal validity of this study was that the population surveyed was not a random sample. This survey was conducted at a U. S. Air Force professional development seminar for one hundred fifty technical sergeant who were recently promoted to master sergeant. As a result, the findings may not apply to other military leaders with different ranks, or even to Master Sergeants who have held that rank for a number of years.

External validity was restricted by the characteristics of the population. The instrumentation for this study was determined by the two studies that were being replicated. As previously stated the reliability of both the KAI and MBTI has a substantial amount of empirical support.

The participants may have perceived a situation where authority figures observing the participants (e.g., the military personnel in charge of the training were higher in rank than the participants) or they may have been in a stressful situation (e.g., the possibility of deployment to Iraq) which could have resulted in less than true information being provided.

Various measures could have been done differently during this study. A different range of subjects in a wider range of military ranks could have produced different results. Although creative style and personality type is generally stable, it would be interesting to explore the relationship between the different ranks within the Air Force.

Education level was a variable that would have been very easy to collect, and could have produced some relationships of interest. The variables of gender, ethnicity and job specialty could also have been examined. Lastly, a longitudinal study design could have observed the individuals as they progress through the system, which could lead to implications as to which type is more likely to make the military a career.

Recommendations

The results of this study pose a number of questions for continued research regarding the relationship between creative styles and the personality types of military leaders. Fitzpatrick (2000) did not find a significant relationship between MBTI personality type preference and branch of military service; however there are no other studies of style of creativity using the KAI with U.S. Army personnel. Therefore this study might be useful in being applied to U.S. Army personnel.

This study replicated prior research conducted on civilian leaders in the United Kingdom and the United States. Military leaders from the U.S. Air Force in Europe were chosen for this study, primarily because a study of this nature has never been carried out on military personnel. A related research project could be accomplished using military members of another rank, for example senior military officers. Using a

population such as this would contribute to the literature by allowing a more "executive" look at leadership in the military.

A question that could have been posed was to ask the leaders was whether or not they intended to make a career out of the Air Force. RiCharde (1996) ascertained that individuals that discontinued their military career happened to be of a particular personality type (ISTJ, INFP). What type of personality type (or creative style) would be more likely to drop out of the military?

Emotional intelligence consists of five domains under two areas that relate to the MBTI: (a) interpersonal which contains empathy and relationships and are by nature extraverted, and (b) intrapersonal factors such as self-awareness, emotions, and motivation, which are similar to introverted personality traits (Latour & Hosmer, 2002). As with the two instruments used in this study, awareness of one's emotional intelligence can assist a leader in being more attuned to those they lead.

Rothmann, Scholtz, Sipsma, and Sipsma, (2002) surveyed management students to determine the relationship between emotional intelligence as measured by the Bar-On Emotional Quotient Inventory (Bar-On EQ-I) and the Myers-Briggs Type Indicator (MBTI). Their results showed that emotional intelligence is related to the personality variables of extraversion, intuition, feeling and perception. This study illustrated that preference were the strongest between interpersonal component of emotional intelligence and personality preference of extraversion ($r = .68$, $p = .05$). A slight preference for the emotional intelligence component of stress tolerance was correlated with the personality preference of perception ($r = .54$, $p = .05$). Studies using emotional intelligence as a

variable could be valuable to Air Force leaders, as some studies have shown that leaders with high emotional intelligence are highly productive (Latour, & Hosmer, 2002).

Another fertile path for future research could be to examine the leaders from the military of nations allied to the U.S., particularly members of NATO. Both of the instruments in this study have been employed in a number of different nations including the United Kingdom, France, and others. KAI results in these countries have been comparable to the general sample conducted by Kirton (1990), however comparing the results to members of allied and non-allied nations could provide utility for military planners. Using military leaders from other nations would enhance the findings of this study by showing instances of concurrence and variance within the samples employed.

Lastly, can leaders be selected based on their individual personality and creative style? The military places extreme importance in matching the right person for the proper profession, outlaying vast amount of resources on the technical training of individuals. Traditionally, an individual is placed into a specialty by the military by one of two methods: (a) by volunteering, or (b) placed by the Air Force. Both methods require that an individual undertake an aptitude exam that provides scores (range 40 – 100) in four sections: (a) administrative, (b) mechanical, (c) electrical, or (d) general. Each specialty has a cut-off score for entrance into that career field. Sumer, H., Sumer, N., Demirutku, and Cifci (2001) suggest that personality constructs be assessed in the selection of personnel in the military positions. Tests such as the Myers-Briggs Type Indicator and the Kirton Adaption-Innovation Inventory might be effective in assisting the military in job analysis and selecting the right person for the job.

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Appendix A

Consent Form

Informed Consent Form – University of Oklahoma

Introduction – This study is titled <u>The Relationship Between Cognitive Styles of Creativity and Personality Types in Military Leaders.</u> The sponsor of this study is Dr. Arthur B. Van Gundy, Department of Communication, University of Oklahoma. The principal investigator is Ronald C. Johnson, University of Oklahoma. The purpose of this document is to obtain an individual's consent for participating in the study.

Description of the Study – This research duplicates prior studies to determine if an individual's style of creativity is related to their personality type. Each participant in the study will be asked to participate in two surveys. The Kirton Adaption-Innovation Inventory (KAI) measures style of creativity; the Myers-Briggs Type Indicator (MBTI) provides respondents with one of 16 possible personality types. Both of the surveys are paper based and administered individually, under strict conditions to insure privacy. The principal investigator will administer both surveys, each requiring approximately 30 minutes to complete. The investigator will score the surveys, and feedback will be provided upon request.

Potential risks and benefits of participation – There are no known or foreseeable risks to the individuals participating in this study. A potential benefit is that individuals who take the surveys will gain insight into their style of creativity and personality types.

Subject's Assurances –

A. **Conditions of Participation** - Participation in this study is voluntary. Refusal to participate will involve no adverse action to the individual. *To participate, you must be 18 years of age or older.*

B. **Confidentiality** - Confidentiality of the results is of vital concern to the investigator; he will not release any of the results to any third parties. Additionally, identities of the participants will not be evident to those who read the results of the study.

C. **Compensation for Injury** – Not applicable.

D. **Course Credit/Compensation for Participation** – Not applicable.

E. **Video/Audio Taping of any research activities** – Not applicable.

F. **Use of Electronic Media for Informed Consent** – Not applicable.

G. **Contacts for Questions about Research Subject's Rights** – Each participant can contact the principal investigator at 0621-7889930. Any inquiries about the rights of a research participant can be made to the University of Oklahoma Office of Research Administration at (405) 325-4757, or email at irb@ou.edu.

I hereby agree to participate in the above-described research. I understand my participation is voluntary and that I may withdraw at any time without penalty or loss of benefits.

_____   _____
Subject's Signature   Date Signed

Appendix B

Subject Instructions

SUBJECT INSTRUCTIONS

Please read this page before completing the Kirton Adaption-Innovation

Inventory (KAI) and the Myers-Briggs Type Indicator (MBTI).

1. Read the Informed Consent Form that has been provided. Please ask the principal

   investigator if you have any questions concerning this form. After you have read,

   understand and agree with the conditions, please sign and date the form.

2. Next, please fill out the subject data sheet. Your identity is protected by a

   numerical code.

3. Please follow these steps to complete the KAI:

   a. This survey is not timed, but can be completed in 10-15 minutes. Fill in

      the respondent details in the upper left of the form.

   b. Look at each statement and place an X along the scale from very hard to

      very easy. Answer each of the 33 statements by indicating how hard or

      easy it is for you to maintain the image presented by the statement.

   c. The survey will be scored and evaluated by the principal investigator and

      you can find out your results by indicating so on your data sheet.

4. Please adhere to the following steps to complete the MBTI:

a. The MBTI has no time limit. There are no right or wrong answers, however it is best not to spend too long on any question, your first response is likely to be most true for you.

b. Read each question carefully and indicate your answer by marking an "X" in the appropriate box next to your response. There are 93 questions on the form and you are encouraged to answer each item.

c. The survey results are confidential and will only be released to the respondent. Results from the whole group will be presented in the research, however individual's identities will not be detectable.

5. Thank you for your participation in the study.

Appendix C

Subject Data Inventory

Subject Data Inventory

1. Gender: Male: _____   Female: _____

2. Military Rank: _____

3. Ethnic Group: (Check only one).

   African American: _____   Caucasian: _____

   Hispanic: _____

   Asian American or Pacific Islander: _____

   Other: Please specify: _____

4. Age: _____

5. Years of Military Service: _____

6. Years in Current Rank: _____

7. Years in Supervisory Position: _____

Appendix D

Subject Debriefing Statement

DEBRIEFING STATEMENT FOR STUDY PARTICIPANTS

You have participated in a study that is investigating the relationship between cognitive styles of creativity and personality types of military leaders. Specifically, this study is seeking to determine if there is a correlation between style of creativity and personality type in military leaders.

The first questionnaire, The Kirton Adaption-Innovation Inventory (KAI), is a measure of creativity. There were no right or wrong answers, but responses indicate how comfortable you are in a particular situation. The second questionnaire, The Myers-Briggs Type Indicator (MBTI), helps show you how you look at things and how you like making decisions. Knowing your creative style and personality type can help you understand yourself and better relate to others. There are no better or worse styles or types. Your results are unique and will remain private. Only trends of the group as a whole will be investigated and reported upon.

The implications from this research are relevant in the field of military leadership studies. The results will allow leaders to better understand how their own style of creativity impacts their decision making process. Also, the leader will have a better understanding of personality type and how this influences individual behavior in themselves and others.

Thank you for your participation in this study. You may contact me at maccreate@mac.com or by telephone (0621) 788-9930, if you have any questions or concerns about the study.

Appendix E

Kirton Adaption-Innovation Inventory

Appendix F

Myers-Briggs Type Indicator

PLEASE NOTE:

Copyright materials in this document have not been reproduced at the request of the author. They are available for consultation, however, by request.

These materials consists of:

Appendix E, Kirton Adaption-Innovation Inventory (KAI)

Appendix F, Myers-Briggs Type Indicator (MBTI)

Appendix G

Institutional Review Board Approval

Informed Consent Form for research being conducted under the auspices of the University of Oklahoma-Norman Campus

<u>Introduction</u> – This study is titled <u>The Relationship Between Cognitive Styles of Creativity and Personality Types in Military Leaders.</u> The sponsor of this study is Dr. Arthur B. VanGundy, Department of Communication, University of Oklahoma. The principal investigator is Ronald C. Johnson, University of Oklahoma. The purpose of this document is to obtain an individual's consent for participating in the study.

<u>Description of the Study</u> – This research duplicates prior studies to determine if an individual's style of creativity is related to their personality type. Each participant in the study will be asked to participate in two surveys. Before receiving the surveys, the participant will be asked to complete a Subject Data Sheet. The purpose of this form is to permit the researcher to categorize the participants based on gender, age, and military rank. Your name is not required on the Subject Data Sheet, or on either of the surveys. If you require an explanation of your survey results, then your name and contact phone number or email address is requested. The Kirton Adaption-Innovation Inventory (KAI) measures style of creativity; the Myers-Briggs Type Indicator (MBTI) provides respondents with one of 16 possible personality types. Both of the surveys are paper based and administered individually, under strict conditions to insure privacy. The principal investigator will administer both surveys, each requiring approximately 30 minutes to complete. The investigator will score the surveys, and feedback will be provided upon request.

<u>Potential risks and benefits of participation</u> – There are no known or foreseeable risks to the individuals participating in this study. A potential benefit is that individual's who take the surveys will gain insight into their style of creativity styles and personality types.

<u>Subject's Assurances</u> –
   A. **Conditions of Participation** - Participation in this study is voluntary. Refusal to participate will involve no penalty and will not affect your participation in the military leadership course. *To participate, you must be 18 years of age or older.*
   B. **Confidentiality** - Confidentiality of the results is of vital concern to the investigator; he will not release any of the results to any third parties. Additionally, identities of the participants will not be evident to those who read the results of the study.
   C. **Contacts for Questions about Research Subject's Rights** – Each participant can contact the principal investigator with questions about the research at 0621-7889930. Dr. Arthur VanGundy, the sponsor of the research may also be contacted with any questions at (405) 325-6042. Any inquiries about the rights of a research participant can be made to the University of Oklahoma Office of Research Administration at (405) 325-4757.

I hereby agree to participate in the above-described research. I understand my participation is voluntary and that I may discontinue participation at any time without penalty or loss of benefits.

_____   _____
Subject's Signature   Date

APPROVED ⊠ 8/12/02

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The University of Oklahoma

OFFICE OF RESEARCH ADMINISTRATION

August 12, 2002

Mr. Ronald C. Johnson
CMR 418 Box 548
APO AE 09058

Dear Mr. Johnson:

Your research application, "The Relationship Between Cognitive Styles of Creativity and Personality Types in Military Leaders," has been reviewed according to the policies of the Institutional Review Board chaired by Dr. E. Laurette Taylor, and found to be exempt from the requirements for full board review. Your project is approved under the regulations of the University of Oklahoma - Norman Campus Policies and Procedures for the Protection of Human Subjects in Research Activities.

Should you wish to deviate from the described protocol or the research is to extend beyond 12 months, you must notify this office, in writing, noting any changes or revisions in the protocol and/or informed consent document, and obtain prior approval or request an extension of this ruling. A copy of the approved informed consent document is attached.

Should you have any questions, please contact me at irb@ou.edu.

Sincerely,

Susan Wyatt Sedwick, Ph.D.
Director of the Office of Research Administration and
Administrative Officer for the
Institutional Review Board – Norman Campus (MPA #1146)

SWS:lk
FY2002-430

cc: Dr. E. Laurette Taylor, Chair, Institutional Review Board
        Dr. Arthur Van Gundy, Communication