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Flight Instructor and Student Pilot Training Preferences in
Relation to Myers-Briggs Types

Conrad Beckles

FLIGHT INSTRUCTOR AND STUDENT PILOT TRAINING PREFERENCES
IN RELATION TO MYERS-BRIGGS TYPES

DISSERTATION

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ABSTRACT

FLIGHT INSTRUCTOR AND STUDENT PILOT TRAINING PREFERENCES IN RELATION TO MYERS-BRIGGS TYPES

Conrad Beckles

Barry University, 2011

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Purpose

Using the Myers Briggs Type Indicator, Sohn and Jo (2003) studied the ideal flight crew combination for instructor and student pilots in order to enhance flight training. During their study it was evident, through interviews of past students who had dropped out of training, that the relationship between an instructor and a student had a considerable effect on successful completion of the training. The authors concluded that the results of their study provided a logical foundation for the ideal personality type combination of instructor and student pilot. The authors proposed that the results of their study would provide a theoretical basis for determining optimal flight crew combinations as well as improving the efficiency of flight training.

Many flight schools place students and instructors together based on nothing more than the admission date of the student into the program and the availability of any open instructor. This type of assignment may not produce the optimal pairing of instructor with student. The purpose of this study was to examine whether student pilots and instructors prefer flight training partners whose MBTI type is the same as their own.

Method

All participants in this study were students attending a local Aeronautical University and

a flight academy, or were flight instructors employed at either school. All participants were over the age of 17. Student pilots had or were working towards completion of their private pilot or instrument rating. The total number of participants was 44 student pilots and 43 instructors. Participants completed the questionnaires and the MBTI online by means of SurveyMonkey™. The students and instructors were asked to complete the MBTI, a preferences questionnaire specific to flight training, and a demographic survey. A chi-square analysis was conducted to evaluate whether student pilots and instructors prefer flight training partners whose MBTI type is the same as their own, according to Sohn and Jo's (2003) classifications. The following hypotheses were evaluated: Hypothesis 1: Student pilots will give higher preference ratings to flight instructor personality traits that are similar to their own; Hypothesis 2: Flight instructors will give higher preference ratings to student pilot personality traits that are similar to their own.

Major Findings

The data analysis did not find any statistically significant relationship between student MBTI types and preferences for instructor MBTI types, and there was no statistically significant relationship between instructor MBTI types and preferences for student MBTI types. Although not statistically significant, the direction of the result indicated that students preferred to work with instructors who fell into the creative classification. Instructors whose MBTI type fell into the sensible, creative, and concrete classifications preferred to work with students who fell into the concrete MBTI grouping, while instructors in the passionate MBTI classification rated the creative students as their preferred type, but these findings were not statistically significant. Implications for pilot training are discussed.

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This Dissertation is dedicated to the loving memory of my great aunts, Idalin Cooper and Amanda Simpson. Thank you both for being such a significant part of my childhood. Aunt Ida spent many hours taking me to parks, restaurants and telling me family stories. From Aunt Amanda I learned to balance humor and discipline. You kept the entire family laughing but we also knew when you were serious. To my cousin Edwin Seale; you are missed. You were like a big brother to me. I miss you dearly.

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CHAPTER I

THE PROBLEM

Introduction

Although a great deal of training efforts within the aviation community have focused on ensuring technical expertise, personality factors have been relatively unexplored. The personality make up of a flight crew, as well as their individual backgrounds, could play a large role in determining how instructors and student pilots interact with each other and negotiate various flight situations. Personality traits such as communication style, leadership style, and motivation could all potentially impact the student-instructor relationship.

Recently, many flight training programs have sought to address interpersonal issues associated with crew coordination under the general heading of cockpit resource management training (CRM; Funk, 1991). Funk suggested that accidents resulting from a lack of knowledge or technical skill are extremely rare. Instead, it appears that breakdowns in communication and workload distribution are typically cited as causal factors for accidents. Furthermore, Funk stated that personality characteristics and communication patterns could potentially affect the effectiveness of a flight crew.

Background

The relationship between student pilot and instructor is similar in training aspects to that of first officer and captain. Tjosvold (1990) stated that airplane management is moving from a heavy reliance on hierarchy to one that also encourages interactional processes among flight crew members. Traditionally, a highly centralized chain of command and rigid role prescriptions were considered the essential cornerstones of

effective airplane management and safety (Tjosvold,1990). This still remains true for the flight instructor student pilot relationship; however, personality differences may also affect the dynamics of a training situation.

Ayman, Chemers, and Fiedler (1995) believe that leadership effectiveness depends on both the leader's personality and the situation. They looked at three factors that determine the favorableness of a situation: 1) Leader-Member Relations, which is the degree of mutual trust, respect, and confidence between the leader and the subordinates; 2) Task Structure, the degree to which the task at hand is low in multiplicity and high in verifiability, specificity, and clarity; and 3) Leader Position Power, which refers to the power inherent in the leader's position itself. They felt that when there is a good leader-member relation, a highly structured task, and high leader position power, the situation is considered a "favorable situation."

Today airline companies, government regulators, and flight crew members recognize that, in addition to hierarchical structure and role prescriptions, flight crew members need to communicate and work together (Tjosvold, 1990). Tjosvold found that crews who communicated extensively, acknowledged each other's communication attempts, made commands, disagreed, and felt less angry and embarrassed, made fewer errors and crashes in simulated flights.

According to Helmreich, Foushee, Benson, and Russini (1996), improving coordination and management of cockpit resources has become an increasing concern for air carriers and the regulatory agency. This concern has been reflected in the development of formal courses aimed at improving crewmembers' technical skills in these areas. This approach focuses on the technical aspects of performance as opposed to the

psychological. Helmreich et al. (1996) focused on effective leadership and performance. They believed the effective manager recognizes personal limitations and encourages others to question decisions and actions. They stated that such a manager is sensitive to the personal problems of other crewmembers that might affect operations, and feels obligated to discuss personal limitations. The effective manager also recognizes the need for a relaxed flight deck management style that varies as a function of both situations and the characteristics of fellow crewmembers. With this held to be true, the difficulty lies in the fact that not all are capable of this level of positive self introspection, especially when this may be a function of unconscious disregard for other crew members due to personality differences.

Dolgin, Lambirth, Moore, and Rentmeister-Bryant (2003) stated that the promise of an improved aviation selection system might be realized with the continued exploration of alternative methods of personality assessment. They felt this area of endeavor may have significant practical impact not only for aircrew performance, but also for all human performance. Our ability to understand underlying individual personality attributes that might influence human performance needs to be ever-enhanced to catch up with the technology we are capable of creating. Personnel selection decisions can be facilitated through the use of personality assessment. Decision makers require a selection system that will decrease attrition and improve the quality of hired applicants. Helmreich, Foushee, Benson and Rossini (1996) also noted the importance of the culture of a community in understanding leadership effectiveness.

Frederick-Recascino and Hall (2003) felt educational situations are perhaps the best example of the motivation-performance relationship. They stated that most people

have an intuitive sense that motivation is linked with performance. Although some may disagree on how much impact motivation has on performance, most would agree that high levels of performance are difficult to achieve when little or no motivation to perform is present. The authors also discussed the many hurdles student pilots must face including flight courses on basic, private pilot training, to instrument-rated training, up through commercial and multiengine courses of study. In addition to flight training, pilots also need to accumulate flight hours to be competitive in the job market, and ideally, they will combine flight training with a college degree.

Frederick-Recascino and Hall (2003) theorized that motivation is directly related to issues of performance in flight training. As in other collegiate experiences, self-determination is up to the flight student. The student pilot must choose to attend courses, schedule flight times, practice specific skill sets, and study for written exams. Thus, the greater amount of self-determination the student has, reflective of identified or intrinsic motivation, the more persistent he/she will be in their training. Following the applied literature, these more self-determined students would also be expected to perform better on tests of flight skills and general pilot knowledge. Frederick-Recascino and Hall stated that if motivation is crucial for initiating behavior, then performance exists at the opposite end of the spectrum, and is defined as the outcome of a motivated act. They stated the belief that such a relationship exists is supported by motivational research across a variety of applied domains. Considering the importance of personal motivation and commitment, it is imperative that researchers examine how personal motivation relates to course performance and/or completion of flight education.

Theoretical Framework

The Myers Briggs Type Indicator (MBTI) is a psychometric test developed in the 1950s by Isabel Briggs Myers and Katherine Briggs. Based on the work of Swiss physician/psychologist C. G. Jung, the MBTI is concerned with the individual differences that result from the way people perceive information and prefer to use that information. Considered sound and well-validated, the MBTI is one of the most widely used psychological instrument in the world. Career development of health professionals is but one of its many uses (Burluson, Stilwel, Thal, & Wallick, 2000).

Using the Myers Briggs Type Indicator, Sohn and Jo (2003) studied the ideal flight crew combination for instructor and student pilots in order to enhance flight training. During their study it was evident through interviews of past students who had dropped out of training, that the relationship between an instructor and a student had a considerable affect on successful completion of the training. The authors concluded that the results of their study provided a logical foundation for the ideal personality type combination of instructor and student pilot. Further, they saw these results as being applicable, not only to flight training, but also to the staffing of pilots on general flight duty. They felt it would greatly contribute to flight safety and the effective performance of tasks. The authors proposed that the results of their study would provide a theoretical basis for determining optimal flight crew combinations as well as improving the efficiency of flight training.

Sohn and Jo's study does have some limitations. The questions the researchers asked measured responses of students only and not student and instructor. Another limitation of Sohn and Jo's study is that its sample population attended the Korea

Aviation University, and comes from an Uncertainty Avoidance culture (Helmreich, Foushee, Benson, Russini, 1996). It would be difficult to extrapolate their findings to an American flight school which could be a mixture of cultures, or predominantly an individualistic instructor and student culture. Sohn and Jo's study does, however, provide key elements that are the theoretical underpinnings of this present study.

Statement of the Problem

Many flight schools place student and instructor together based on nothing more than the admission date of the student into the program and the availability of any open instructor. These random matches can lead to personality conflicts and in some cases the student and/or the instructor requesting to work with someone else. Also, increasing safety margins throughout the aviation system has led to a great deal of research in aviation safety measures, and factors that can lead up to aircraft disasters. Several accidents have emphasized certain deficiencies in cockpit coordination and communication (Sukenik, 1998). Helmreich, Merritt, and Wilhelm (1999) discussed training in aviation, including its shift from cockpit to crew resource management. Their research identified the human error aspects of the majority of air crashes as failures of interpersonal communications, decision making, and leadership. Personality characteristics must be looked at as a important factors for successful completion of flight training and flight safety.

Purpose and Significance of the study

The purpose of this study was to examine the relationship of personality characteristics of student pilots and instructors, based on the Myers Briggs Type Indicator, on the level of student and instructor personality preferences with flight

training partners. There are historical, organizational, environmental, psychosocial, and regulatory factors that seem to have led to misunderstandings and problematic attitudes in aviation (Funk, 1991). Personality traits may serve to inhibit satisfactory teamwork and training. The makeup of a flight crew's personality traits such as communication styles, leaderships styles, as well as their individual backgrounds, could play a large role in determining how flight crews negotiate potentially dangerous situations, and may also impact on successful completion flight training programs for student pilots.

Research Question

The primary research question guiding this study was whether or not certain personality types of both student pilots and their flight instructors are related to personality preferences with flight training partners. The specific question to be investigated was: Will the combination of certain personality types of both student pilot and instructor be associated with personality preferences for flight training partners for student pilots, and their instructors?

Definition of Terms

Cockpit Task Management (CTM): How pilots initiate, monitor, prioritize, and terminate cockpit tasks (Chou, Funk, & Madhavan,1996).

Cockpit Task Management System (CTMS): Computer system that can manage and prioritize flight tasks, as well as inform the pilot of over looked tasks (Chou, Funk, & Madhavan,1996).

Collectivist cultures: a culture that emphasizes group members interdependence and priority for group goals, the concept of teamwork and training that stresses the need for effective group behavior may be readily accepted (Helmreich, Foushee, Benson, &

Russini,1996).

Extraversion or Introversion (E-I): Based on the Myers Briggs, the extravert's interests focus on the outer world of action, objects, and persons, whereas the introvert's interests focus on the inner world of concepts and ideas (Burleson, Stilwel, Thal, & Wallick, 2000).

Individualistic cultures: a culture such as the United States, that stresses independence from the group and priority for personal goals (Helmreich, Foushee, Benson, & Russini, 1996).

Judging or Perceiving (J-P): Based on the Myers Briggs, the judger prefers to live in a decisive, planned, and orderly way, so as to regulate and control events. The perceiver lives in a spontaneous, flexible way, aiming to understand life and adapt to it (Burleson, Stilwel, Thal, & Wallick, 2000).

Leader-Member Relations: refers to the degree of mutual trust, respect and confidence between the leader and the subordinates (Ayman, Chemers, & Fiedler, 1995).

Leader Position Power: referring to the power inherent in the leader's position itself. When there is a good leader-member relation, a highly structured task, and high leader position power, the situation is considered a "favorable situation" (Ayman, Chemers, and Fiedler, (1995).

Power Distance: cultures such as China and many Latin American countries in which the absolute authority of leaders is stressed (Helmreich, Foushee, Benson, & Russini, 1996).

Sensing or Intuition (S-N): Based on the Myers Briggs, the sensing person collects information from the immediate, real, practical facts of life, whereas the intuitive

person sees the possibilities, the relationships, and the meaning of experience (Burlison, Stilwel, Thal, & Wallick, 2000).

Thinking or Feeling (T-F): Based on the Myers Briggs, the thinker makes judgments objectively and impersonally, considering the causes of events and where decisions may lead. The feeler makes judgments subjectively and personally, weighing values of choices and how they affect others (Burlison, Stilwel, Thal, & Wallick, 2000).

Task Structure: refers to the degree to which the task at hand is low in multiplicity and high in verifiability, specificity, and clarity (Ayman, Chemers, & Fiedler, 1995).

Uncertainty Avoidance Cultures: cultures such as Greece, Korea, and Latin America, which have greater tolerance for behavioral uncertainty and less emphasis on operating procedures (Helmreich, Foushee, Benson, & Russini, 1996).

Organization of the Study

Chapter I presents an overview, background, theoretical framework, and purpose of the study. In Chapter II, related literature is reviewed to provide the reader with an expanded understanding of the subject area. The methodology, procedures, and data analysis techniques are described in Chapter III. The results of the study are reported in Chapter IV, and Chapter V contains conclusions, implications, and recommendations for future studies.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction and Overview

This study will assess the effect of varying personality types based on the Myers Briggs Type Indicator, on personality preferences for flight training partners for both student pilots and their instructors. Very little research has been done to determine how personality characteristics can affect preferences with flight training partners (Sohn & Jo 2003). To gain a better understanding of this relationship, this review will examine communication, leadership, motivation, cockpit task management, risk management in cockpit task management, and personality. This review of the literature will also include a discussion of the Myers Briggs as it relates to its uses for flight training and instruction.

Theoretical Framework

C. G. Jung's Theory of Psychological Type provides the theoretical framework for this study. McCaulley (2000) stated that the purpose of Jung's typologies is to provide a critical psychology which will make methodical investigation and presentation of empirical material possible. McCaulley sees it as a critical tool for the researcher, who needs definite points of view and guidelines if he/she is to reduce the chaotic profusion of individual experiences to any kind of order. Secondly, a typology is a great help in understanding the wide variations that occur among individuals, and it also furnishes a clue to the fundamental differences in the psychological theories now current. Last but not least, it is an essential means for determining the "personal equation" of the practicing psychologist, who, armed with an exact knowledge of his/her differentiated and inferior functions, can avoid many serious blunders in dealing with his patients.

McCaulley (2000) sees Jung's typology as assuming human beings differ in their choice of two attitudes (or opposite directions) for deploying mental energy; and their preferences for four functions (or basic mental powers). McCaulley discusses those types as follows:

The Attitudes: Extraversion and Introversion

Extraverted types habitually focus their mental energy on the objects and persons of the outer world. Introverted types habitually focus their mental energy on the concepts and ideas of the inner world. Type development requires use of both extraverted and introverted attitudes. Jung was a pioneer in his focus on extraversion and introversion. Later, many psychologists who were serious about describing human personality also identified extraversion and introversion. Most researchers have treated extraversion–introversion as a trait with extraversion at one end, introversion at the other, and with ambiversion reflected in low scores. Jung did not see extraversion–introversion as different poles of the same trait. For Jung, each person is born to prefer extraversion or to prefer introversion. These are qualitatively different. Furthermore, the manifestation of an attitude for any individual is colored by the function most favored by that type. For example, an extraverted sensing type will show extraversion differently from an extraverted thinking type. The introversion of an introverted feeling type leads to a quite different internal and external life than the introversion of an introverted intuitive type.

The Four Functions

Jung's typology also assumes that every human being uses four basic mental processes or functions: two irrational perceiving functions and two rational judging functions. *Sensation* (sensing in MBTI terminology) is the irrational function that

perceives what is--what can be seen, touched, smelled, tasted, heard, or experienced kinesthetically. *Intuition* is the irrational function that perceives hidden possibilities in the background, pictures painted by the imagination, abstractions that describe components, or the theory that explains the applications. Jung described intuition as perception by way of the unconscious. He did not intend his description of the perceiving functions as irrational to be pejorative. What one perceives just appears--it is not reasoned out as are the conclusions from the rational functions, thinking and feeling. Jung's two rational judging functions use the mind to draw conclusions about what has been perceived by sensing or intuition. *Thinking* uses impersonal analysis and logic to recognize the meaning of our perceptions, and *feeling* comes to rational conclusions by weighing their value.

Much of the field of psychology is concerned with introverted concepts perceived with our intuition. We see, work with, and even measure self-esteem, defensiveness, alienation, and conscientiousness to the bemusement of extraverted sensing types who wonder how we can be so certain about mere concepts that cannot be seen or touched (McCaulley, 2000).

Nature-nurture issues have been and continue to be important to psychologists in explaining individual personality. McCaulley describes Jung's theory of psychological types as giving precedence to nature. In infancy, type preferences are undifferentiated. Type development is a lifelong journey toward consciousness and greater differentiation along the inborn pathway for one's type. The development of preferences is affected by the support or discouragement of families and the culture. Good support leads to good

type development. Lack of support or outright suppression of preferences can lead to falsification of type (McCaulley, 2000).

McCaulley continues her discussion of type dynamics by postulating that for each type, the preferences for the four functions--sensing, intuition, thinking, and feeling--will be ranked from the favorite to the least favorite. The first, or dominant, is the favorite, most consciously developed function. The dominant function gives direction and predictability to one's life. The second, or auxiliary, function provides balance to the dominant so that the person can consciously and efficiently direct energy both outward (E) and inward (I) and can have a conscious way for both perceiving (S or N) and judging (T or F). The tertiary, or third, function, opposite to the auxiliary, is less available in consciousness. The inferior, or fourth, function, opposite the dominant, is least conscious. The inferior may erupt under pressure when one is beside oneself or may provide creative insights. In Jung's model, everyone uses all four functions daily. Because the dominant and auxiliary functions are more conscious and more differentiated, they take up most of the energy. The less differentiated and less conscious tertiary and inferior functions are less available, but they provide information that would be missed if the person had access only to the dominant and auxiliary functions.

Jung's description of type dynamics is very different from much of our personality research in psychology, which seeks to describe traits so that the high end of the scale assumes a person has much of the trait and the low end has very little (McCaulley, 2000). We assume these traits are distributed normally and most people fall near the middle. Many times one end of the scale is a good characteristic and the low end of the scale is a deficit of something good (e.g., high self-esteem and low self-esteem). Jung's theory, and

the MBTI based on Jung's theory, seeks to identify type patterns, not traits. Type assumes dichotomous preferences, not continuous preferences. The perception preference is not a continuous scale with sensing at one end and intuition at the other. A sensing type is not an inferior intuitive, nor is an intuitive an inferior sensate. Rather, the preferences are better seen as two roads to excellence. On the perception highway, one child is drawn mainly to the sensing lane and becomes more and more conscious of the richness of the immediate environment. Another child is more drawn to the intuitive lane and becomes more and more conscious of unseen possibilities and the world of imagination. The two children develop qualitatively different interests and skills. Life will force each child to take the less-preferred lane from time to time, but the experiences on the preferred lane provide the most growth and satisfaction.

Burleson, Stilwel, Thal, and Wallick (2000) describe the four dimensions measured by the MBTI as follows:

1. Extraversion or Introversion (E-I). The extravert's interests focus on the outer world of action, objects, and persons, whereas the introvert's interests focus on the inner world of concepts and ideas.
2. Sensing or Intuition (S-N). The sensing person collects information from the immediate, real, practical facts of life, whereas the intuitive person sees the possibilities, the relationships, and the meaning of experience.
3. Thinking or Feeling (T-F). The thinker makes judgments objectively and impersonally, considering the causes of events and where decisions may lead. The feeler makes judgments subjectively and personally, weighing values of choices and how they affect others.

4. Judging or Perceiving (J-P). The judger prefers to live in a decisive, planned, and orderly way, so as to regulate and control events. The perceiver lives in a spontaneous, flexible way, aiming to understand life and adapt to it.

Individuals receive a score on each dichotomous dimension, resulting in a four-letter "type" (e.g., ENFJ); because there are four dimensions, there are 16 possible types. Each dimension is assessed on a continuous scale, with the resultant score indicating the strength and consistency of preference. Much like having a dominant hand, type indicates a natural inclination or a preferred process but assumes that an individual uses his or her non dominant traits as well. Certain types seem to self-select into various activities. Type theory postulates that "the intrinsic appeal of any kind of work (as distinguished from external advantages such as money or status) lies in the chance to use the mental processes one likes best, in the way one likes to use them" (Burleson et al., 2000, p. 15).

Myers-Briggs Type Indicator and Flight Training

Brown, Carmichael, Kutz, and Shandiz (2004) studied effective instructional strategy for flight students as they felt it was often essential to learning retention, especially in the aviation classroom. The authors saw student learning in the aviation environment with its numerous subspecialties and associated complexities as being affected by not only the unique personal preferences and attitudes of students, but also their individual responsiveness to instruction which could be related to the preferences and style of the instructor. Their research postulated that if there is a tendency for persons with the same MBTI type to exhibit similar career interests, MBTI preferences could serve as the scaffolding for a slowly evolving mosaic of the aviation student. Their

study investigated whether aviation instructor preferences and associated instructional strategies, combined with knowledge of aviation student preferences, could offer valuable implications for academic professionals in the field.

Brown et al. began their research with an attempt at understanding MBTI scores of aviation students with a study of the MBTI scores of students enrolled in either the Professional Pilot undergraduate degree option or the Aviation Management undergraduate degree option at Oklahoma State University. The OSU study represented a sample of 118 aviation students from a small population of 176, which were randomly selected from aviation management and professional pilot classes. It was the first in a series of samples to be collected from aviation student populations. Although their data represented only an early beginning of much needed long range research, their preliminary data indicated that aviation students in both major options had similar dominant preferences with only slight difference in the environmental orientation. The overall dominant MBTI type of the professional pilot majors was ESTP (Extroversion, Thinking, Sensing, Feeling), compared to ESTJ (Extroversion, Thinking, Sensing, Judging) for aviation management students. The dominant indicator of how aviation students of both major options focused attention was Extraversion, representing well over 55 percent of the respondents for both major options. The dominant indicator of how aviation students of both options took in data was Sensing, once again representing over 55 percent of the students sampled. The decision-making preference indicator of aviation management students was 57 percent Thinking, while the pilot indicator was 64 percent Thinking. It was the environmental orientation indicator that showed a slight difference in that approximately 52 percent of the aviation management students used

Judging as their dominant preference, compared to 59 percent of the pilots who used Perceiving as their dominant preference. In summary, the preliminary findings indicated that there was no significant difference between the aviation management and pilot training students on focusing attention, information taking, decision making, and environment orientation.

In further analyzing their data, Brown et al. found that modern aviation students, regardless of major option, may prefer to focus their attention and find energy in things and people. As Extraverts, they prefer interaction with others and are action oriented. The Center for Applications of Psychological Type (CAPT) reported that the majority of university faculty are Introverts preferring to find energy in the inner world of ideas, concepts and abstractions (Brightman, 2003). The authors state that teachers of an opposite dominant preference may struggle with allowing opportunities for Extraverts in the classroom to utilize discussion and possibly provide opportunities for students to explain it to themselves and others in an effort to ensure that they understand the material. Brown et al. suggested that teachers might consider providing opportunities to work in groups, either inside or outside of class. Further they stated it is important to recognize that even though Extraversion may be the dominant way aviation students process data, the remaining 44 percent of the students prefer Introversion and need some internal processing time to connect material and see the larger picture.

Aviation students in the Brown et al. study were also found to be Sensing in that they preferred to take in information through their senses. On the other hand, the majority of university faculty fall into the Intuitive category (Brightman, 2003). Sensing students like detail gleaned from their senses, while intuitive students look for the big

picture and watch for patterns and relationships. They stated that the Intuitive students need that linkage but Sensing students can also learn to appreciate it. The preliminary results of this portion of their study at OSU pointed to the possibility that aviation students across the board are more Thinking oriented than Feeling. They preferred to make decisions impersonally based on analysis and logic, while Feeling students prefer to make decisions based on emotion or human values and needs. CAPT data bases indicated that the majority of university faculty also have preferences for Thinking. In this one dimension, the dominant preference of student and faculty are similar (Brightman, 2003). Thinking students like clear, practical objectives, while Feeling students like group and team activities. Although there is a clear dominance in this dimension, it's important for instructors to remember that the Feeling students need some group and team activities for meaning and retention. It is important also for Thinking aviation students to be exposed to the values and feelings of people in order to raise awareness of the emotional side of aviation.

Brown et al. stated that aviation students often just want to fly and often do not recognize that their technical background must include team and communication skills--even in the air. For this reason, crew resource management classes have become required curriculum in most aviation academic and training environments. Requiring Thinking students to conduct interviews or work in teams to solve problems necessitates that they apply both knowledge and understanding of human values.

The authors found aviation management students and professional pilot students parted company somewhat. One of the surprise findings of this study was that the majority of aviation management students were Judging or decisive and deadline

oriented, while the majority of pilots were Perceptive or spontaneous and liked to think in terms of possibilities. Deadlines for Perceivers often are stretched while they procrastinate and seek more data. CAPT reported that the majority of university faculty have a preference for Thinking (Brightman, 2003). On this preference, they are similar to the aviation management types, but opposite of pilot types.

Brown et al. noted a few limitations of their study. They stated that the preliminary data was certainly not conclusive and the significance of it cannot be generalized to other populations. They saw it as providing a beginning baseline for an emerging profile of the aviation student population in two degree options at one of a limited number of universities offering aviation degrees. They noted that it is important to understand that the MBTI was designed to understand the whole person rather than four distinct preferences and that whole person concept is extremely important to teachers to nurture the academic growth of students.

Finally, Brown et al. noted that faculty and students may have opposite preferences that make it especially difficult when the instructor must work outside his or her own preference. Nevertheless, they felt it is important that the preferences of students be honored so that no one group of students is in the auxiliary mode at all times. For example, lecture for many professors is a preferred classroom instructional strategy. However, failure to recognize that extroverted students need opportunities for expression in order to learn, may result in burnout, absenteeism, and a variety of other symptoms of weak instruction.

Sohn and Jo (2003) studied the ideal flight crew combination for instructor and student pilots in order to enhance the flight training based on Myers Briggs Type

Indicator (MBTI) theory. During their study it was evident through interviews of the past drop-out training groups during training that the relationship between an instructor and a student had a considerable effect on successful completion of the training. Recognizing this relationship as relevant, in Air Force camps for field education, student and instructor pilot are paired according to similar MBTI personality types. Sohn and Jo felt such a practice is not based on well-developed theory, since there are no specific guidelines or criteria for the ideal flight crew combination of instructors and student pilots. Instead, this kind of crew manning is based on instructor pilots' experiences that the strongly extravert instructor pilot harmonizes very well with a student possessing the same type of personality. However, this concept conflicts with an assertion of MBTI personality type research that has found the opposite types of personality harmonize well in daily life (Bowersock, & Fox-Hines, 1995).

Sohn and Jo (2003) felt that the mental workload of student pilots' productivity and quality could be enhanced when a mixture of types takes into account the different contributions which each party brings. Their study used mental workload measures such as heart rate, altitude deviation, NASA-TLX and subjective degree of personality harmony to find an ideal combination of instructor student pilots according to MBTI personality type. They measured these factors under various flight-training conditions with different degrees of difficulty to investigate potential interaction effects. The results of this study were expected to provide a logical foundation for assignment of ideal pairing of student and instructor during pilot training, and set the following hypotheses:

H 1: There is an interaction between personality type combination and the successful completion of a flight training mission.

H2: The mental workload of student pilot decreases as the student pilot's personality type coincides with instructor's personality type.

H3: Students who are extravert tend to get along with instructors in a better manner than introverts.

A two-way factorial design was implemented using the combination of MBTI personality type as one factor and the flight-training mission as another factor. The researchers used the 16-cell MBTI type and divided the participants into four personality groups based on previous research by Maher et al. (1995) and Satava (1996). The four groups were as follows:

Group A is prudent, quiet, and has a high level of concentration.

Group B is creative, self-supportive, and persistent.

Group C is concrete, realistic, and has mechanical skills.

Group D is passionate, has a strong sense of responsibility, and tends to overlook details.

Sohn and Jo (2003) administered the MBTI to a total of nine instructors and 61 student pilots in the Korea Aviation University. When dividing the participants according to 'attitudes towards life' among four preference indicators of MBTI, the ratio of introvert to extravert for both groups was 5:4 and 31:40 respectively. Among the full combinations of 16 MBTI types, 10 combinations capable of sampling from existing pairs that had started training already were considered as levels of factor 1: AA, AC, AD, BB, BC, BD, CA, CB, CC, CD. Four dependent variables were measured: 1) the student pilots' mental workload in terms of a) heart rate, and b) altitude deviation; 2) the NASA-TLX (Task Load Index; and 3) the subjective degree of personality harmony.

The NASA-TLX is a subjective multi-dimensional workload technique. An overall workload rating was determined from a weighted combination of scores on the six dimensions. The weights are determined from a set of relevance ratings provided by the participants. The researchers state that the use of the TLX required two steps. First, participants rate each task performed on each of the six subscales: Mental demand, Physical demand, Temporal demand, Performance, Effort, Frustration level. They are measured in scales of 0 to 100. Secondly, participants performed 15 pair-wise comparisons of six workload scales. The number of times each scale is rated as contributing more to the workload of a task is used as the weight for that scale. Mean weighted workload of six subscales was used as an overall workload rating.

The questionnaire of the personality harmony was composed of six items that can judge the appropriateness of an instructor when a student is considering their own learning style. The questionnaire items were as follows and they are measured in scales of 0 to 100. The mean value of these six items was used as an indicator of the personality harmony.

1. I thought the instructor contributed to my flight skill enhancement.
2. My instructor spent too much time on details and concepts but not enough on practical things.
3. How would you rate your instructor's ability to explain your mistakes?
4. How would you rate your instructor's emphasis such as conceptual, general, and specific examples?
5. The instructor's teaching style was similar to my learning style.
6. Overall how would you rate your instructor's teaching style?

Sohn and Jo (2003) performed the experiment during the initial 4-6 flight hours in which students react most sensitively to the instructor's personality. This time interval was empirically observed to be effective. A wired portable device was used in the cockpit to measure the heart rate.. Their experiment was performed under the real flight conditions of a Cessna 310, which is an educational aircraft in Korea Aviation University, and was replicated three times. Heart rate and altitude deviation during flight were measured at 20 second intervals. After landing, the NASATLX and the subjective degree of personality harmony were immediately recorded, since those were impossible to measure during the flight. To compensate for individual heart rate baseline differences, the heart rate measured for a participant in their most comfortable situation was used for baseline measurement.

The researchers found significant effects of personality combinations in terms of all four outcome measures. Both group C types of instructors and students who were concrete, realistic and have mechanical skills turn out to be the ideal flight crew combination. A structural equation model indicated that as the heart rate increased, the altitude deviation increased. In addition, as the altitude deviation and personality harmony increased, NASATLX increased. Due to the restriction of sampling, all possible 16 personality combinations could not be examined. However, the authors felt the results of this study could provide a logical foundation for the ideal personality type combination of instructor and student pilot. Further, they see these results being applicable, not only to flight training, but also to the manning of pilots on general flight duty; and it will greatly contribute to flight safety and the effective performance of tasks. The results of this study are expected to provide a theoretical basis for manning the

flight crew combinations and thereby enhancing the efficiency of flight training.

Relationship of Personality to Pilot Training

Dolgin, Lambirth, Moore, and Rentmeister-Bryant (2003) studied selected personality characteristics of student naval aviators and student naval flight officers. Participants for this study were 129 aviation candidates in the U.S. Navy flight training program, four of whom were female, and five were members of minorities. All participants had completed basic officer indoctrination and were awaiting the beginning of basic flight school. Participants ranged in age from 21 to 29 years, with a mean age of 23 years. Seventy-nine participants were pilot candidates (SNAs), and 50 participants were student naval flight officer candidates (SNFOs). All participants were individually administered the TPQ and the Hand Test. The TPQ was computer-administered, and participants responded, via the keypad, to statements presented on the monitor. The Hand Test was administered to each participant by the first author who had extensive experience with these tests. Dolgin et al. (2003) found that the prototypical naval aviation candidate appeared to have high goals and engaged in constructive activity to achieve those goals. These goals typically included seeking novel and unfamiliar experiences and the pursuit of increased status, skills, and/or knowledge. Under ordinary circumstances, typical candidates were likely to appear more calm and uninhibited than the average individual and more willing to tolerate personal risk. They further stated that the possible interactive effects of training, operational stresses, and personality as determinants of performance need investigation.

Dolgin et al. (2003) stated that the promise of an improved aviation selection system might be realized with the continued exploration of alternative methods of

personality assessment. This area of endeavor may have significant practical impact not only for aircrew performance, but also for all human performance. Our ability to understand the underlying individual personality attributes that might influence human performance need to be ever-enhanced to catch up with the technology we are capable of creating. Personnel selection decisions can be facilitated through the use of personality assessment. Decision makers require a selection system that will decrease attrition and improve the quality of hired applicants. The results of this study suggest that personality interacts with job performance and complexity. Future psychobiological studies need to determine precisely how personality aspects are related to job performance. For example, should a particular mission require interpersonal traits such as persistence and flexibility, careful selection for these traits would theoretically yield a more successful mission.

Additional Influences on Pilot Performance and Training

In addition to personality factors, motivation, communication skills, and leadership skills also impact on performance and training of pilots (Benson, Foushee, Helmreich, Russini, 1986; Frederick-Recascino and Hall (2003). These factors are discussed in the following section.

Cockpit Task Management

Chou, Funk, and Madhavan (1996) investigated “cockpit task management” (CTM) which is how pilots initiate, monitor, prioritize, and terminate cockpit tasks. To understand the nature and significance of this process, they conducted three empirical studies: 1) a review of National Transportation Safety Board aircraft accident reports, 2) a review of Aviation Safety Reporting System (ASRS) aircraft incident reports; and 3) a simulator experiment. They first examined the abstracts of 324 National Transportation

Safety Board (NTSB) aircraft accident reports for accidents occurring between 1960 and 1989. After reviewing the abstracts of these reports, they removed accidents that were unrelated to this study from the screening process. For example, accidents due primarily to weather and mechanical failures were removed. Their elimination process left 76 accident reports for further analysis. Following the initial screening, they selected a representative set of cases for further study, based on the following considerations. First, they chose the cases so as to include a complete set of CTM errors. Second, they chose cases involving conditions they believed they could reconstruct in a simulated environment. Based on these considerations, they settled on a set of cases.

From accident and incident studies Chou, et al. (1996) determined that CTM is significant enough to warrant further study. However, they felt that a different approach was needed to better understand the nature of CTM behavior. Aircraft accidents are rare events, thus providing few opportunities for developing insights into error processes, which are, in any case, very difficult to reconstruct. By the same token, though ASRS incident reports can provide firsthand information on abnormal cockpit operations, they are subject to self-reporting biases and other problems. Therefore, the researchers saw controlled experimentation as a way to provide a useful alternative, serving to compensate for the drawbacks noted previously and to provide an opportunity for objective observations. They saw an additional advantage of the using the simulation method because it enables observation of how human operators manage tasks under normal conditions. The main objectives of their experiment was to elicit and observe CTM errors similar to those identified in the accident and incident analyses and to identify the factors leading to such errors. Their approach was to have participant pilots

fly a low-fidelity flight simulator in several flight scenarios and observe and analyze their behavior in managing and performing concurrent flight tasks. Results indicated that the resource requirements level had a significant effect on the average task response time. In other words, higher resource requirements increased delays in initiating a task. Neither combination of flight path complexity nor maximum number of concurrent tasks (alone or in combination) had a significant effect on task response time.

Chou et al. (1996) found that resource requirements (visual, manual, and mental) had a statistically significant effect on task initiation and task prioritization performance, and that the number of concurrent tasks coupled with flight path complexity had a statistically significant effect on task prioritization performance. From their studies of aircraft accidents and incidents, they conclude that CTM is a significant factor in flight safety. They offered four recommendations. First, that pilots receive instruction concerning CTM and how to avoid CTM errors. More specifically, pilots should be made aware that in periods of high workload, when large numbers of concurrent tasks are competing for their attention, there is danger that they will not initiate important tasks promptly and that their attention will be drawn away from safety-critical tasks. Second, they state pilots can be taught to recognize these precursor conditions and to develop personal strategies to avoid CTM errors when these conditions are present. They felt that CTM instruction might most naturally fit into existing crew resource management training programs. They based this recommendation on the assumption that their experimental environment, involving a low-fidelity simulator and (mostly) nonpilot participants, is at a very high level of abstraction, similar enough to the real commercial transport aircraft environment to warrant extrapolation. Third, they recommended that

research be conducted to develop and evaluate formal cockpit procedures to facilitate CTM performance. Such procedures might, for example, involve memory aids and elaborated versions of the well-known pilots' prioritization maxim: "aviate-navigate-communicate." Finally, their fourth recommendation was that research be conducted to develop and evaluate a computational aid to facilitate CTM performance: a Cockpit Task Management System (CTMS).

Risk Management in CTM

Maurino (1994) in his research on cross cultural perspectives, took from the work of Marin (1992), which stated that different societies have different prices for human life as a consequence of local religious, moral, ethical, and social values. Social perceptions of what constitutes risk also vary accordingly. He stated this makes comprehension, not to mention application, of the concept of risk management across cultures rather difficult. Risk management remains, however, the means to justify safety enhancing investments. Maurino also felt that the training development community should multiply their endeavors to devise more accessible means to deliver training on a large scale. In September 1989 an airliner crashed in the South American jungle. The flight departed on a heading almost 180 degrees apart from its intended track, due to a misinterpretation by the flight crew of the correct heading. This misinterpretation was strongly thought to be a result of the unclear presentation (not quality of printing) of the heading digits in the computer generated flight plan provided to the crew. The airliner eventually ran out of fuel and crashed. According to investigators a number of issues related to crew coordination and training contributed to this accident. The crew had few real options out of their predicament. The aviation system in this case was quite typical of developing

countries and failed to support the decision making process of this crew.

Motivation

Frederick-Recascino and Hall (2003) felt educational situations are perhaps the best example of the motivation-performance relationship. Their study used archival data to examine the link between student pilot motivation and performance during flight training to estimate the extent to which motivation levels account for performance. If motivation is crucial for initiating behavior, then performance exists at the opposite end of the spectrum and is defined as the outcome of a motivated act. The belief that such a relationship exists is supported by motivational research across a variety of applied domains.

Several studies exist that study links between motivation and performance (Frederick-Recascino and Hall, 2003). Pilot education in the United States involves a lengthy and rigorous course of study. Student pilots must attain levels of proficiency in a series of flight courses from basic, private pilot training, to instrument-rated training, up through commercial and multiengine courses of study. In addition to flight training, pilots also need to accumulate flight hours to be competitive in the job market, and ideally, they will combine flight training with a college degree. With such a substantial personal commitment, it is imperative that researchers examine how personal motivation relates to course performance and/or completion of flight education.

Frederick-Recascino and Hall (2003) studied the relationship between pilot motivation and flight performance in student pilots attending an aviation university. They theorized that motivation will be directly related to issues of performance in flight training. As in other collegiate experiences, they felt self determination is up to the flight

student. Further, a student pilot must choose to attend courses, schedule flight times, practice specific skill sets, and study for written exams. Thus, the greater amount of self determination the student has, reflective of identified or intrinsic motivation, the more persistent they will be in their training. Many "smart" students flunk out of college each year because they failed to attend class, failed to study, or simply became too distracted to perform their school duties.

Frederick-Recascino and Hall (2003) predicted that more self determined students would perform better on tests of flight skills and general pilot knowledge. Archival data were obtained from the flight department at an international aviation university through a systematic data selection and collection procedure. The study used a cross-sectional design, in that data collection occurred at a single point in time across four courses of flight instruction. The flight department provided the researchers with a list, generated from their database, of all student pilots who had finished their flight training within the last 6 months. That time frame was used because the flight department is only required to keep flight records for a period of 6 months; then the records are destroyed for security purposes.

The list of students was broken down by flight course, such as private license, multiengine license, and so on. Although many flight courses were offered by the flight department, only four of the courses were sampled: private pilot, instrument, commercial, and multiengine. These four courses are taken in the order listed, indicating increasing levels of difficulty. They were chosen because they reflect the most popular programs and would most likely produce adequate sample sizes. Once the sampling frames were established, the researchers went through the frames and used student names

to identify the sex of the student. All of the female students were selected, and the remaining male students were randomly selected in numbers to ensure a sample size of 50 from each sampling frame. In some cases, there were less than 50 names in a sampling frame; all students in those frames were selected. The researchers made sure to identify students who were listed in more than one of the sampling frames, and those duplicate student names were removed. Student identification numbers were used to extract demographic and performance information from the flight department's database, and only archival data were used in the study.

A total of 193 student records were used for the study, with 46 students falling in the private pilot course category and 49 students in the remaining three flight programs. Forty of the students were identified as being female, and 148 of the students were identified as male. The names of five of the students were judged ambiguous by two different coders and could not be used to establish sex. The students had a mean age of 22 years ($SD = 2.6$), a mean grade point average (GPA) of 3.18 ($SD = .54$), and a mean total flight time of 222.7 hr ($SD = 113.7$).

Frederick-Recascino and Hall (2003) designed their study to assess the relationship between motivation and flight performance. Motivation was represented by the number of times that a student either cancelled a lesson or did not show up for a lesson (not including student illnesses, student emergencies, poor weather, equipment unavailability, or flight instructor-initiated cancellations). The flight department recorded such events. Students were allowed to cancel flight lessons for a variety of reasons and were not penalized if sufficient notice (24 hr) was given. In the event that insufficient notice was given or if the student failed to meet with the instructor without notice, the

student was charged a fee. A cancellation or a no-show was interpreted as indicating a loss of interest or energy directed toward flight lessons and thus a motivational deficit. This motivational deficit was particularly telling if it becomes a pattern of action on the part of the student. In the case of cancellations of personal flight lessons, this behavior was indicative of a loss of self-determined motivation (e.g., intrinsic or identified regulation) to the extent that the student had chosen not to engage in a behavior that would lead to the completion of important life goals or plans.

Initial attempts to measure flight performance via flight lesson records proved unsuccessful because in-flight performance ratings lacked sufficient variability to be meaningful. Instead, the director of flight training indicated that poor performance during a flight lesson or on a written test required an additional flight lesson or test to ensure that the student was proficient in that area. The flight department viewed the number of extra lessons required and the number of extra tests required to be good measures of flight performance, in that high-performing students will require few, if any, additional lessons or tests. Therefore, two separate performance measures were defined and used: the number of additional flight lessons required and the number of additional written examinations required.

The relationship between motivation and performance was analyzed using separate multiple regression models for each of the two performance variables. In addition to the motivation variable, the flight program variable was also included in the analysis. Theoretically, this was meaningful because the students in the more advanced multiengine and commercial courses were expected to have higher levels of motivation compared to those in the private pilot and instrument courses. Many students complete

the private and instrument courses, but fail to complete the more advanced courses according to Frederick-Recascino and Hall (2003). To accommodate flight program in the regression analyses, a set of three vectors was created, and effect coding was used. Additionally, three product vectors were created to assess whether an interaction was present between flight program and motivation. Two parallel sets of analyses were performed one for each criterion variable. The data analysis process began by examining the overall practical and statistical significance of the regression models. Then, tests were performed to determine whether a significant interaction existed. Further tests were performed to determine the significance of the common regression coefficient and to determine the significance of the categorical program variable. The motivation variable (number of student cancellations) was further examined to better assess the validity of using the number of student cancellations as a measure of motivation.

The correlation coefficient between the motivation variable and GPA was computed. The presence of a significant and nontrivial correlation between the measure of motivation and GPA ($r = -.275$, $p < .01$), which is a performance variable in itself, provided evidence that the number of student cancellations was a measure of motivation. Other studies have also found a positive relationship between motivation and educational performance (Grolnick & Ryan, 1987; Miserandino, 1996). The results indicated that there was a robust relationship between motivation and performance, in that the greater the number of student cancellations during a course of training, the lower the student performance in actual flight training.

Communication

The performance of pilots can be seen as a product of training, attitude, personality factors and communication skills (Benson, Foushee, Helmreich, Russini, 1986). Bowers, Braun, Jentsch and Salas (1998) have done much work in the area of analyzing communication sequences for team training needs. Their research suggests that clear understanding of team processes to determine better training formats reduces crew-generated errors. Their research also suggests communication is largely equivocal and offers few useful directions for training. This has prompted a limited amount of researchers to suggest other methods of communication analysis. In particular, such analyses consider personality based differences in communication.

Increasing safety margins throughout the aviation system has led to a great deal of research in aviation safety measures, and the study of factors that can lead to aircraft disasters. Several accidents have revealed certain deficiencies in cockpit coordination and communication (Sukenik, 1998). In an effort to improve on this situation, Bowers, Braun, Jentsch and Salas (1998) assessed differences in communication sequences between effective and ineffective crews in two flight simulation studies. Flight teams are often required to perform complex, critical tasks. Bowers et al. investigated the degree to which analyzing communication sequences would contribute to the understanding of the crew communication process in two simulated flight tasks. Their results indicated that pattern analyses revealed additional strong differences in performance between groups that would have been overlooked by simple frequency counts of communication. These results were discussed in terms of their implications for team performance research and team training. Potential applications of this research include training needs assessment,

training design, and performance measurement after training. Training designed to improve team process and cultural sensitivity could potentially improve flight safety.

Although a great deal of effort within the aviation community has focused on ensuring technical expertise, personality has been relatively unexplored (Benson, Foushee, Helmreich, Russini, 1986). The makeup of a flight crew, as well as their individual backgrounds, could play a large role in determining how flight crews negotiate potentially dangerous situations, and may also impact on flight training for students. If the characteristics external to the flight crew are held constant, effectiveness can be viewed as a joint product of at least three components: technical skills, attitudes, and personality characteristics.

Traditional approaches of crew performance have emphasized selection on the basis of technical aptitude and training, not personality similarity and/or differences. Recently, many flight training programs have sought to address interpersonal issues associated with crew coordination under the general heading of cockpit resource management (CRM) training (Funk, 1991). Funk suggests that accidents resulting from a lack of knowledge or technical skill are extremely rare. Instead it appears that breakdowns in communication and workload distribution are typically cited as causal factors. Based on that finding, one could reasonably assume that communication patterns may result in misinterpretation due to several factors, one of which is might be personality traits. In addition, personality traits may serve to inhibit satisfactory teamwork and training.

Tjosvold (1990) suggested that cooperative goals and the constructive discussion of opposing views were powerful antecedents to using safe procedures expeditiously.

Tjosvold felt that airplane management is moving from a heavy reliance on hierarchy to one that also encourages interactional processes among flight crew members.

Traditionally, a highly centralized chain of command and rigid role prescriptions were considered the essential cornerstones of effective airplane management and safety. The captain had supreme authority and responsibility for the airplane and each crew member was trained and tested on fulfilling his or her job duties. Today, airline companies, government regulators, and flight crew members recognize that, in addition to hierarchical structure and role prescriptions, flight crew members need to communicate and work together. Crews that communicated extensively, acknowledged each other's communication attempts, made commands, disagreed, and reported feeling less angry and embarrassed have been found to make fewer errors and crashes in simulated flights.

Specificity of Leadership

The development of leadership may differ for specific populations (Bilimoria, Hopkins, O'Neil & Passarelli, 2008). The following discussion presents issues related to leadership development in two unique groups – women, and pilots in training.

Leadership and Women: A Unique Challenge

Bilimoria, Hopkins, O'Neil and Passarelli (2008) presents a comprehensive perspective of leadership development that addresses the unique needs of women in organizations. The authors propose seven categories of leadership development practice and examine the opportunities and obstacles in each of these practices for women. The authors offer recommendations for consulting psychologists and human resources professionals targeted to female clients and to organizational practices in order to advance women's leadership development, and discuss the implications for women and

leadership development.

Bilimoria et al. (2008) build the case for why leadership development needs to be unique and different for women, tailored to meet their specific developmental needs. Based their account of leadership development for women, they propose recommendations for consulting psychologists and human resources professionals targeted to female clients and to organizational practices. They offer a comprehensive viewpoint that addresses the individual and structural challenges of leadership development for women, the development strategies that are effective for women, and the support structures and encouragements that organizations can undertake to create sustainable leadership development contexts for women.

The systematic development of women's leadership must take into account three aspects of sex-related differences demonstrated by previous empirical research Bilimoria et al. (2008). The authors list them as follows; first, women and men differ in leadership styles. They cite a meta-analysis done by Eagly & Johnson in 1990 of more than 160 studies of sex-related differences found that women use a more participative or democratic (communal) style and a less autocratic or directive (agentic) style than men do, although this tendency declines in highly male-dominated settings. Other cited research was that of Carli & Eagly in 1999 that focused on performance, leadership, and influence in teams. That research has shown that men display a more self-assertive and dominant style and less deference and warmth with team members than do women. Female managers more than male managers tend to adopt a transformational leadership style, especially in mentoring followers and attending to them as individuals.

Second, women and men differ on the behaviors of leadership. According to the

authors, several studies using 360 degree feedback processes indicate that women managers and executives consistently score higher on behavioral competencies such as teamwork, empowerment, sharing information, and care for employees. Other studies of leadership competencies reveal that women, on average, are more aware of their emotions, show more empathy, and are more adept interpersonally, whereas men, on average, are more self-confident, optimistic, adaptable, and able to manage stress (Goleman, 1998).

Third, sex-related differences emerge in the evaluation of leadership. Although a meta-analysis of 82 studies measuring leadership effectiveness (Eagly, Karau, & Makhijani, 1995) found that male and female leaders do not differ overall in effectiveness, comparisons of leader effectiveness favor men when the setting is male-dominated, when a high percentage of subordinates are male, or when the role is seen as more congenial to men (in terms of self-assessed competence, interest, and low requirements for cooperation or high requirements for control). Comparisons favor women when the above conditions are reversed (Eagly et al., 1995).

In addition to sex differences related to leadership, the authors state organizational environments are themselves gendered, also affecting leadership development efforts. Organizations, particularly those that are male-dominated, are not gender-neutral--they reflect environments where women's presence, performance, and success are scrutinized, measured, and evaluated differently from men's (O'Neil, Hopkins, & Bilimoria, 2008).

The authors further state that for women of color, opportunities to advance in the ranks of organizational leadership are even more difficult than for White women (Bell & Nkomo, 2001; Catalyst, 1999). In a comprehensive study on women of color in

organizations, Catalyst (1999) found that study participants reported less access to mentors and sponsors, and those women who intended to leave their organizations said that ineffective organizational diversity initiatives had failed to address subtle gender and racial biases. Bell (1990) found that African American women live “bicultural life experiences,” resulting in increased stress and pressure that occur from having to navigate two world--their predominantly White professional work world and their predominantly Black community world.

Bilimoria et al. (2008) built an illustrative overview of the literature to provide an understanding of the extent to which women’s leadership development is emphasized. They see academic research as relevant to leadership development for women scattered across a variety of fields, including management, business, and psychology. This diffusion of literature dilutes cumulative knowledge as they see it, make it difficult to derive an overarching framework.

Individual leadership development has moved increasingly toward an emphasis on development through experience in the context of the work itself (McCall, 2004). The intent is to work with individual members to improve their skills and knowledge in service of building the overall capacity and effectiveness of the organization (Cummings & Worley, 2005). The best leadership development programs do not stand alone but are closely aligned and integrated with the strategic objectives of the organization (Cohn, Khurana, & Reeves, 2005). Ultimately, leadership development offers opportunities for organizational transformation (Leonard & Goff, 2003). Effective metrics for the appraisal of leadership development programs measure individual learning and performance as well as organizational impact (Holton, 1996). Although top leadership must champion

leadership development, it is the responsibility of leaders at all levels, line managers as well as human resource managers, to develop organizational leaders (Cohn et al., 2005). Ready and Conger (2003) propose that individuals take responsibility for their own leadership development and that organizations provide a menu of development opportunities for employees.

The authors make several recommendations for consultants working with individual women:

- Encourage women to obtain 360 degree feedback that is crucial for development and assist in interpreting the results in the context of the work environment. Facilitate the client's understanding of the impact of leadership behaviors, and help her develop a broad repertoire of behaviors and styles, for example, instrumental and relational.
- Ensure that leadership-relevant competencies and behavioral indicators are included in leadership assessment tools, especially in male-dominated workplaces; help the organization become aware of bias in merit-based decisions using assessment tools; provide training to reduce possible evaluation bias; and work to deconstruct gender stereotypes around leadership so that women and men can more fully employ a variety of leadership styles.
- Assist the organization in providing opportunities for assessing development distinct from performance, engaging in developmental discussions regarding leadership assessments, integrating leadership development assessments within a comprehensive leadership development and succession planning process for women, and creating a culture of assessment and development targeted to women.

- Assist clients in cultivating both female and male mentors, in actively managing their mentoring relationships, and in defining strategic learning objectives for the mentoring relationships.
- Support women in developing the skills needed to play the role of both mentee and mentor.
- Structure mentoring programs that match high-potential women with people in high-profile executive roles who have decision-making authority and can provide access to opportunities.
- Construct opportunities for women to mentor other women and men in the organization.
- Support mentoring relationships at all levels in the organization, and design programs that assist women in structuring and managing their mentoring relationships.

In their study of women in health care, Hopkins, O'Neil, and Bilimoria (2006) found that increasing knowledge, skills, and education through access to training courses was one of the most frequently cited strategies for building leadership skills. Feldman (1989) reported that in US West, a Colorado-based telecommunications company, the ratio of women of color having opportunities to advance to midlevel management and above was 1 in 289 versus 1 in 21 for White males. This stark finding led to the creation of the Women of Color Project, which provides leadership training opportunities for women in the organization. According to Feldman, outcomes of the program were impressive, with 46% of the first group of attendees having been promoted at least once.

The authors state leadership training can also be reinforced by the use of and

development of executive coaches. Kilburg (1996) defines executive coaching as a helping relationship formed between a client who has managerial authority in an organization and a consultant who uses a wide variety of behavioral techniques and methods to help the client achieve a mutually identified set of goals to improve his or her professional performance and personal satisfaction and, consequently, to improve the effectiveness of the client's organization within a formally defined coaching agreement.

The writers of this article feel consulting psychologists and human resources professionals can play an integral role in helping women and organizations highlight these three themes: increasing women's portfolios of human, social, and political capital; recognizing women as a strategic business advantage; and strengthening women's connections to their organizations. They have proposed that consultants can advocate for individual and organizational changes that support these themes, and assist in designing leadership development programs, policies, and procedures that effectively address the underlying issues. The construction of leadership development that recognizes and addresses women's unique contributions will result in women realizing their individual potential and in organizational transformation, the two primary objectives of effective, sustainable leadership development.

Leadership and Pilot Training

Ayman, Chemers, and Fiedler (1995) believe that leadership effectiveness depends on both the leader's personality and the situation. They state that certain leaders are effective in one situation but not in others. They see three factors that determine the favorableness of a situation: (1) Leader-Member Relations, referring to the degree of mutual trust, respect and confidence between the leader and the subordinates; (2) Task

Structure, referring to the degree to which the task at hand is low in multiplicity and high in verifiability, specificity, and clarity; and (3) Leader Position Power, referring to the power inherent in the leader's position itself. When there is a good leader-member relation, a highly structured task, and high leader position power, the situation is considered a "favorable situation."

According to Helmreich, Foushee, Benson, Russini (1996) improving coordination and management of cockpit resources has become an increasing concern for air carriers and the regulatory agency. This concern has been reflected in the development of formal courses aimed at improving crewmembers' technical skills in these areas. This is important because it shows that the focus has been on technical aspects as opposed to the psychological. Helmreich et al. in their article on cockpit management attitudes, stated there is a direct linkage between self-reported attitudes and independent valuations of performance. Helmreich et al. believed the effective manager recognizes personal limitations and diminished decision making in emergencies and encourages other crewmembers to question decisions and actions. They stated such a manager is sensitive to personal problems of other crewmembers that might affect operations and feels obligated to discuss personal limitations. The effective manager also recognizes that the need for a relaxed flight deck management style varies as a function of both situations and the characteristics of fellow crewmembers. With this held to be true, the difficulty lies in the fact that not all are capable of this level of positive self introspection, especially when this maybe a function of unconscious disregard for other crew members due to personality differences.

Helmreich, Merritt, and Wilhelm (1999) discussed training in aviation, including

its shift from cockpit to crew resource management. Their research identified the human error aspects of the majority of air crashes as failures of interpersonal communications, decision making, and leadership. They see it as possibly a function of culture. They use the example of high “Power Distance” cultures, such as those in China and many Latin American countries, cultures in which the absolute authority of leaders is stressed. Subordinates in these cultures are reluctant to question the decisions and actions of their superiors because they do not want to show disrespect. Junior crew members who question their captains may find it falls on deaf ears in these cultures. Many cultures that are high in Power Distance are also collectivist. In collectivist cultures, the emphasis is on interdependence and priority for group goals along with the concept of teamwork. Training that stresses the need for effective group behavior may be readily accepted. In contrast, highly individualistic cultures, such as the United States, stress independence from the group and priority for personal goals. Individualists may cling to the stereotype of the lone pilot braving the elements and be less attuned to the group aspects of flight deck management. Helmreich et al. also discuss High Uncertainty Avoidance Cultures such as Greece, Korea, and Latin America, in which there is greater behavioral uncertainty and less emphasis on operating procedures.

Implications for Counselors: Vocational Development

Hartung , Porfeli &Vondracek (2008) call childhood the dawn of vocational development. They state that it involves developmental tasks, transitions, and change. Children must acquire the rudiments of career adaptability to envision a future, make educational and vocational decisions, explore self and occupations, and problem solve. The authors situate child vocational development within human life span and life course

development paradigms and career development theory. They then consider the theoretical origins of career adaptability and examine it as a critical construct for construing vocational development. Two models derived from career construction theory offer guides for research and counseling practice designed to foster development through work and other social roles.

Childhood signifies the threshold of vocational development and involves an active period of preliminary self-engagement in the world of work (Hartung, Porfeli, & Vondracek, 2005). The opportunities and experiences of childhood typically serve to arouse curiosities, fantasies, interests, and capacities as children playfully construct future possible selves to be realized in work and other social roles (Ginzberg, Ginsburg, Axelrad, & Herma, 1951; Mead, 1932; Super, 1990). The authors state that although play has long been characterized as a childhood activity, children in today's increasingly complex world often find less time for unstructured play because of escalating pressures to engage in organized school, extracurricular, and other activities that make childhood less and less a period of cultural moratorium involving freedom from work and responsibility (Zinnecker, 1995). Children must learn to imagine, explore, and problem solve in order to construct a viable work future consistent with cultural imperatives reflected in family and community contexts. Career counselors who take a developmental perspective realize that children must accrue an array of experiences that promote foundational attitudes, beliefs, and competencies for envisioning a future, making career decisions, exploring self and occupations, and shaping their life careers. These attitudes, beliefs, and competencies represent core dimensions of career adaptability as it has evolved as an important construct in the theory and practice of career construction

(Savickas, 2002).

Adaptability has become an essential characteristic of workers in the modern world. Recognizing childhood as the dawn of vocational development and the centrality of career adaptability across the life span in the modern world, Savickas (2002) asserts that the antecedents of career adaptability are established during the childhood period. The author begins by situating child vocational development within the human life span and life course development paradigms and career development theory. Subsequently, Savickas considers the theoretical origins of the career adaptability construct.

Childhood has long been considered within the frameworks of developmental psychology, developmental sociology, and life span vocational psychology (Hartung , Porfeli & Vondracek (2008) . These frameworks offer distinct yet interrelated perspectives on childhood that are useful for comprehending the structure, function, and process of career development in childhood and across the life span. Each of these perspectives contributes to an understanding of career adaptability as it is rooted in development during childhood. Contemporary life span developmental psychology conceptualizes human psychosocial development, or ontogenesis, as a lifelong process extending from infancy through childhood, adolescence, adulthood, and older adulthood (Baltes, Lindenberger, & Staudinger, 1998). Human development, including vocational development, proceeds continuously and in historical and cultural contexts across these age periods in dynamic, multidimensional, multifunctional, and nonlinear ways (Baltes et. al., 2008). The life span perspective casts human development as a fluid, seamless phenomenon rather than one characterized by relatively discrete age periods or stages. Although a prototypical chronology of development can be identified, the interaction of

personal and contextual factors yields significant individual variability within this chronology. Taking into account this perspective, career adaptability develops at varying rates beginning in childhood and continuing across the lifespan.

Younger workers generally adapt by elaborating their behavioral repertoire, whereas older workers tend to compensate for their declining capabilities (Porfeli & Vondracek, 2002). On both sides of the life span, adaptability is a critical element of work success and will become even more important in an increasingly changing and competitive workforce. The authors discuss the developing person, who they say makes choices and acts within the constraints of social, cultural, and historical circumstances to construct and edit an individual life course trajectory. The increasing variability in role sequence and timing suggests that a stable vocational identity may hinder favorable functioning; hence, theory has begun to embrace adaptability as a favorable career-long characteristic in ongoing career change and transformation (Riverin-Simard, 2000).

Developmental Systems Theory, consistent with life span theory and life course theory, shares common ground with the developmental systems perspective Elder (1998), which offers an overarching conceptual framework that comprehends human development. Developmental systems theory suggests that individuals are both the product and producer of their own development. In other words the authors state, elements of life span and life course theory meet when intentional action and self-regulation interact with the social structure to yield person-context relations and propel humans along a developmental trajectory.

The seeds of the career adaptability construct are found in Super's (1957) original model, with early childhood fantasy-involving role play to explore the meanings and

possibilities of work-eventually giving way in later childhood to interests and capacities that guide aspirations, activity selection, and career planning. Always innovative, Super updated the Growth stage to comprise a period spanning ages 4 to 13 years, typified by three revised sub-stages named Concern (developing a future orientation), Control (gaining mastery over one's life), Conviction (believing in one's ability to achieve). Theory refinement has led to the replacement of the biologically derived construct of career maturity with the more psychosocially derived construct of career adaptability, which specifically denotes the person's "readiness to cope with the predictable tasks of preparing for and participating in the work role and with the unpredictable adjustments prompted by changes in work and working conditions" (p. 254).

Research has also concentrated mostly on studying career maturity/adaptability in adolescent samples because the construct emerged from Super's structural model of adolescent vocational development, which includes five dimensions: planfulness, exploration, information, decision-making knowledge, and realism. However, critical antecedents of career maturity/adaptability, such as autonomy, self-esteem, and future time orientation, are thought to develop in childhood and consolidate in adolescence (Savakis, 1997). The rudiments of looking ahead to envision the future, taking authorship of one's own life career decisions to construct the future, looking around to explore opportunities, and building self-efficacy to solve problems form critical dimensions of life span vocational development that normatively first emerge during childhood. The four developmental lines of career adaptability (i.e., concern, control, curiosity, and confidence) extend through the traditional developmental career stages of Growth, Exploration, Establishment, Management. Career counselors in schools and other settings

use time perspective interventions to increase career concern by heightening awareness, fostering optimism, and increasing future planning orientation and behaviors (Savickas,1991).

Career confidence deals with acquiring problem solving ability and self-efficacy beliefs. The child develops an efficacious attitude and an ability to solve problems and effectively navigate obstacles to constructing the future. Persistence and industrious behavior nurture the child's sense of self-assurance and equality in relation to others. interventions to increase self-efficacy beliefs and foster self-esteem. Curiosity fuels the exploration of possible selves and occupations, career concern prompts the establishment of possible futures, confidence empowers individuals to construct a preferred future and overcome obstacles, and career control affords individuals ownership of their chosen future. Savickas (2002), states that career construction counseling has as a primary aim to increase an individual's level of career adaptability so that they can more effectively produce their own development in changing opportunities and constraints.

Holland's Theory

Nauta (2010) celebrates the 50th anniversary of the introduction of John L. Holland's (1959) theory of vocational personalities and work environments by describing the theory's development and evolution, its instrumentation, and its current status. Nauta considers the hallmarks of Holland's theory to be its empirical testability and its user-friendliness. By constructing measures for operationalizing the theory's constructs, Nauta states Holland and his colleagues helped ensure that the theory could be implemented in practice on a widespread basis. Empirical data offer considerable support for the existence of Holland's six personality types: Realistic, Investigative, Artistic, Social,

Enterprising, and Conventional (commonly abbreviated with the acronym RIASEC) and their ordering among persons and environments.

Although Holland's congruence hypotheses have received empirical support, congruence appears to have modest predictive power. Mixed support exists for Holland's hypotheses involving the secondary constructs of differentiation, consistency, and vocational identity. Evidence of the continued impact of Holland's theory on the field of counseling psychology, particularly in the area of interest assessment, can be seen from its frequent implementation in practice and its use by scholars. Nauta also includes ideas for future research and practice using Holland's theory are suggested.

When an article written by John L. Holland (1959) entitled, "A Theory of Vocational Choice," was published in the *Journal of Counseling Psychology* 50 years ago, it is unlikely that many readers would have anticipated the theory's eventual impact. Nauta states Holland's typology now pervades career counseling research and practice. This article summarizes Holland's theory, reviews historical information that provides the context for his theory and its impact, discusses the evolution and refinement of his theory and instruments over the years, and summarizes the theory's current status.

Nauta's article starts with an overview of Holland's Theory, instruments, and classification materials that help people make career decisions and have been fundamental to counseling psychology since its emergence as a profession. By helping to generate core knowledge related to career development, assessment, and practice, Holland's theory and research have contributed in innumerable and significant ways to the field of counseling psychology. Holland's greatest contribution and his most well-renowned work pertains to his theory of vocational personalities and work environments.

The theory's core idea is that most people resemble a combination of six personality types: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional (RIASEC). Each type is characterized by a constellation of interests, preferred activities, beliefs, abilities, values, and characteristics. A Holland code (typically the first letters of the three RIASEC types the person most resembles) can be generated on the basis of assessments, although Holland recommended using the rank ordering of all six types to describe individuals. Likewise, work environments can be categorized by their resemblance to a combination of the RIASEC types, and Holland codes are often used to describe them as well. The RIASEC personality and environment types and their relationships to each other provide the basis for several testable hypotheses. Most importantly, Holland asserted that individuals search for and enter work environments that permit them to "exercise their skills and abilities, express their attitudes and values, and take on agreeable problems and roles" (Nauta, 2010, p. 4). Consistency, a measure of the overlap or internal coherence of an individual's or environment's type scores, is represented by greater proximity on Holland's hexagon. Differentiation, or the degree to which a person or environment clearly resembles some RIASEC types and not others, reflects greater clarity with respect to making vocational choices.

The final construct, identity, refers to the degree to which an individual has a clear "picture of one's goals, interests, and talents" (p. 5) or, among environments, reflects the degree to which a work setting has clear goals, tasks, and rewards that remain stable over time. Consistent and well-differentiated individuals should have more crystallized vocational identities and, as a result, are expected to make career choices with less difficulty and to "do competent work, be satisfied and personally effective, and engage in

appropriate social and educational behavior” (Holland,1997). Likewise, environments characterized by a high degree of consistency and differentiation and that possess a clear identity are expected to have employees with higher levels of satisfaction, stability, and productivity. Second only to his theory in terms of impact on the field of counseling psychology are Holland’s instruments for assessing persons and environments with respect to the RIASEC types. Assessing clients’ RIASEC personality types would be of limited value without a corresponding way to link them to congruent environments (Holland, 1997). Nauta states a third major contribution of Holland’s, therefore, was the development of Holland-code classifications for environments. Along with colleagues, Holland helped to develop materials for classifying occupations.

Nauta (2010) feels it is useful to consider the historical context in which Holland’s theory emerged. In addition, to the extent that theories are the products of their creators, knowledge about the theorist has value (Weinrach,1996). When viewed in the context of history, Holland’s theory and instruments are remarkable for having extended others’ ideas and translated them into forms that are easily accessible to clients and counselors. Influences of Holland’s academic training and work experiences can be seen in his theory and instruments and help account for their user-friendliness and impact. Few theories emerge as fully developed from their inception, and Holland’s is no exception. The theory’s core assertion of the existence of six personality and environment types remained constant, but new concepts and reformulations of the relationships among constructs developed over time. Consistent with his training’s emphasis on empiricism, and in response to having been challenged by Bill Alston, a philosopher, to refine the theory so that it would be more defensible (American Psychological Association, 1995),

Holland's revisions were driven primarily by evidence. Throughout the revisions of his work, however, Holland remained motivated to articulate a theory that was simple and practical (Holland, 1999).

Evolution of Holland's Instruments and Classification Materials

As with his theory, Holland's instruments and environment classification materials underwent multiple revisions. Two themes mark the changes to these over time: refinement based on research and data, and attempts to be more practical and user-friendly. After the VPI first appeared in print (Holland, 1958), Holland continued to work toward improving it. By 1969, scores were organized according to the hexagonal model, which helped counselors and clients understand the relationships among the RIASEC types. This was followed by refinements that incorporated findings from item analyses and research on the occupational titles that best depicted the types and distinguished among occupational groups, as well as revision to reduce gender-biased language. Although the VPI represented a step toward user-friendliness, Holland remained convinced that interest inventories could be made even more helpful to clients. As with the VPI, later versions also reduced gender biased language. Holland's environmental classifications became more sophisticated over time. Nauta states he and others began by classifying environments in terms of the mean profiles of people comprising them. This approach was limited, however, because it was impractical to assess large numbers of employees in every occupation (Swanson, 1999).

The RIASEC types exhibit one important quality of traits. Research has shown that some individuals' interests change substantially over time (Swanson, 1999). Holland (1997) explained such fluctuations in terms of inconsistent, undifferentiated profiles or a

less crystallized vocational identity, but again, these hypotheses have received only mixed support. Holland conceptualized the RIASEC types as broad expressions of personality, each with associated abilities, self-views, preferences, and characteristics. Therefore, the types should correspond to other individual difference variables. More recently, scholars have examined how other domains of individuality overlap with the RIASEC types. Several points of convergence between models of interests and personality are consistent with Holland's (1997) RIASEC type descriptions. A frequently studied topic has been the relationships of the Big Five personality dimensions with the Holland RIASEC types. Holland (1999) reported that an early study in this line of research reinvigorated his interest in research during his retirement because it provided support for his long-held conviction that interests were manifestations of personality. Subsequently, meta-analyses (Barrick, Mount, & Gupta, 2003; Larson, Rottinghaus, & Borgen, 2002) have confirmed several areas of overlap between RIASEC scores and personality dimensions. Among the most consistently found relationships are those between Extraversion and both Social and Enterprising interests, Openness and both Artistic and Investigative interests, and Agreeableness and Social interests, findings that are largely consistent with the Holland type descriptions.

Nauta also points to the work of Ackerman & Heggestad (1997) which examined associations between the RIASEC types and indices of actual or perceived ability (Ackerman & Heggesta, 1997). For example, Randahl (1991) found that RIASEC personality type scores were related to corresponding ability scores from the General Aptitude Test Battery. Swanson (1993) also found support for predictable relations between interests, skills, and abilities within the same Holland type, although these

relationships tended to be fairly small. Relations between RIASEC interest and corresponding self-efficacy types are more substantial, with correlations ranging from .20 to .70 (Betz, Harmon, & Borgen, 1996).

Given what we now know about Holland's theory and about career development and the work force in general, Nauta feels some implications for using Holland's theory in practice might be offered. First, because we now have considerable data suggesting that Holland's congruence construct has only modest power to predict important outcomes such as job satisfaction, it is imperative that clients be encouraged to view RIASEC interest scores as only one of a complex array of individual difference variables that might be used to identify potentially good-fitting work environments. It is also important to clarify with clients that although RIASEC scores may help them anticipate satisfaction with respect to the nature of work activities, such scores would be less useful in helping them anticipate extrinsic work satisfaction (Prediger, 2000).

Second, Holland's "other things being equal" qualifier is particularly important to emphasize in current practice. Economic changes and shifts in the labor force mean that substantial proportions of individuals have limited career options from which to choose (Blustein, 2006; Fouad, 2007), making it crucial not to assume that all individuals are free to use interests as the primary basis for educational and career choices. Limited choices need not render Holland's theory irrelevant but simply require counselors to be mindful of the constraints of reality. Holland's theory and clients' RIASEC scores may be used to help clients explore career options from within the range of those that are feasible.

Finally, economic constraints have resulted in an increase in forced career transitions, and globalization and technological developments have led to rapid shifts in the nature of the world of work (Blustein, 2006; Fouad, 2007). Holland's theory and type scores may be particularly useful in such a context, because they help provide clients with families of occupations, rather than single occupational titles, to explore. To the degree that counselors can help clients view RIASEC scores not only as information upon which to base current career decisions but also future career decisions, the better equipped clients will be to face transitions. Nauta summarizes by stating that Holland's contributions to counseling psychology are remarkable not so much because his theory advanced completely novel ideas but because it built upon the work of others to organize and make interest assessment and career materials user friendly. Holland's academic training and work experiences contributed to the development of a theory that is empirically grounded and widely applicable.

Lowman (1987) states that research supports the idea that career choices are not made randomly and that persons choosing similar occupations share many important psychological characteristics. As examples, there is evidence to support the stereotype of the accountant as being introversive and emotionally constricted while research suggests that persons going into acting careers are likely to have permeable identity boundaries, tend toward exhibitionism and histrionics and, for males, to femininity and homosexuality (Chyatte, 1949; Fisher & Fisher, 1981). Engineers have been shown generally to prefer depersonalized relationships with minimized Social/interpersonal involvement (Beall & Bordin, 1964).

To the extent that meaningful occupational personality differences exist across vocations, career choice therefore provides a potentially important and largely neglected variable to guide psychotherapeutic method and style. Vocational choice has the additional advantage of being an unobtrusive and easily obtained datum. However, there are literally thousands of occupations, and unless this diversity can be reduced, there is little a psychotherapist can easily incorporate into clinical practice. One of the most widely researched schema for grouping diverse occupations according to their psychological characteristics is that of Holland, who developed and validated a 6-factor typology of individuals and occupations. This typology groups occupations on the basis of shared ability and personality characteristics, incorporating into each grouping a number of cognitive, affective, and personality variables. The six types (elaborated below) are: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional. The authors states that the factorial and external validity of the types and their applicability to a wide variety of occupations, races, and both sexes are well established.

Although conceptually elegant in having only six types, each with a well-defined relationship to the other, the theory also permits individual complexity, since each individual or job may be grouped on the three most highly elevated scores on measures of Holland's constructs (e.g., Strong Campbell, Self-Directed Search), so that rather than an unrealistically simple taxonomy, there are 720 possible three-code "types." In this article, only the six generic types are addressed. Lowman (1987) states at the outset that occupational personality typologies may not apply when individuals choose their occupations because of perceived barriers to career choices otherwise more appropriate to their interests and abilities. Women and minorities, for example, in most cultures have

historically often been forced by societal factors to choose occupations on the basis of factors other than personal . Such individuals may have chosen their work because more appropriate jobs may have been perceived to have been blocked to them or may have avoided work altogether because of cultural stereotypes. In discussing psychological characteristics associated with various occupational groups, it is therefore important to ensure that the career choice was not forced on the individual or one in which the individual is unhappily carrying out sex or other role stereotypes rather than personal preferences (Lowman, 1987).

The Types and Their Implications for Psychotherapy

Lowman states that there are few studies which have examined the applicability of vocational choices to psychotherapy and even fewer have elaborated the implications for clinical practice. In this next section, Lowman summarizes each of the major Holland types and describes the advantages and disadvantages of various psychological modalities for each.

Realistic

Description of the Type. The essence of Holland's Realistic type (more common among males than females; see Holland, 1987), is a preference for working with one's hands and with objects as opposed to intellectual, interpersonal, or artistic pursuits. There is some evidence, but limited, that persons enter Realistic careers, by definition asocial occupations, because of emotionally traumatic experiences in childhood. Defensively, the Realistic type is likely to rely on repression and avoidance. The preference is for a simple, well-defined and ordered universe in which the expression of emotions and conflict are minimized. Pleasure comes through the act of physical manipulation or

creation. Sexual appetites would therefore be expected to be strong and Conventional (stereotypically, the strong, silent male); desire for innovation or change limited. This type tends to be nonintellectual and uninsightful. The orientation is pragmatic rather than intellectual or imaginative. In an analysis of the average education levels of the six types, the Realistic occupations were higher only than the Conventional group.

Implications for Psychotherapy. The asocial nature of Realistic types suggest that they would generally not seek out psychotherapy on their own. When help is sought, it is likely to be at someone else's suggestion and to focus on such issues as marital conflict (since the Realistic personality style would be expected to prefer a "traditional" marital partner, that is, a more hysterical and emotionally expressive spouse); depression, due to external circumstances (such as job loss); and family conflict, especially during adolescence when a parent's Realistic style is most likely to be stressed. The therapeutic style to which a Realistic type would be most responsive would likely be a behavioral/prescriptive one directed primarily to symptom relief. Alternatively, a client-centered, nonjudgmental approach with more emphasis on acceptance and clarification than on interpretation might also be effective. Intrusive therapies which attempt to confront feelings or use group process to force awareness of affect, would be expected to arouse great anxiety and therefore to be of little help to the patient.

Investigative

Description of the Type. Investigative types believe in the primacy of reason and see the world as, essentially, a place in which disorder can be made tidy through intellectual means. Logical argument is the vehicle for control and intellectualization would be expected to be the most likely used defense. Because of their asocial nature,

investigative types tend to meet interpersonal needs primarily through work contacts and their families. While there may be great creativity in scientists' professional lives, in their personal lives they are generally quite Conventional, choosing spouses who embody the typical sex-role stereotype and, in essence (at least in the case of males), delegating emotional caretaking to the spouse. When dependency needs of the spouse are unmet by the Investigative type, the result may be arguments in which logic is used to counter or defuse the spouse's "emotional" responses, resulting in marital conflict. Other problems are likely to arise from career issues (one's scientific productions not being adequately recognized, not achieving tenure, etc.), since work issues tend to dominate the concerns of Investigative individuals, who mostly are employed in the professions.

Implications for Psychotherapy. The scientific type does not naturally gravitate to psychotherapy, except perhaps as an intellectual exercise in understanding (e.g., psychoanalytical approaches). The Investigative type would be expected to do best with a nonjudgmental, but intellectually able therapist whom the patient can respect as, if not an intellectual equal, at least in the same general league. In this context, "nonjudgmental" refers especially to a therapist's willingness to accept the patient's intellectual defenses without trying to force the patient too quickly to greatly modify this cognitive-intellectual style. While use of interpretations may have great appeal and relevance to an Investigative type, the obvious danger with such patients is allowing the patient's intellectual defenses to dominate treatment sessions. On the other hand, moving too quickly or too deeply into the realm of emotions may threaten the patient and potentially lead to premature abandonment of therapy. Lowman states that use of therapeutic metaphors which may maintain the patient's interest by indirectly appealing to the

intellect may also prove useful. Paradoxical strategies such as helping the patient "logically" accept the inevitability of emotional life and the need to accept feelings in order to understand them may also work effectively. A final goal often appropriate for therapy with Investigative types is the diversification of sources of self-esteem. Since so much psychic energy is tied up with intellectual pursuits (and this type seldom has nonintellectual hobbies), diversifying avocational interests should be encouraged.

Artistic

Description of the Type. Lowman discusses the contrast to the Realistic and Conventional types, Artistic individuals emphasize unstructured creative process and are stereotypically isolated from cultural norms and in keen touch with their emotions. Artistic-type individuals may be more likely to experience emotional distress and to need and seek out psychotherapy. It is also possible that Artistic types seek therapy not just to alleviate personal suffering but also as a means of calibrating or adjusting their affect, which appears to play such a critical role in the creative process. It would appear that there is something about the creative process which requires affect to be experienced and used as the vehicle of creation. Thus, affect may become not only a means for the expression of personal reactions to one's environment but also a vehicle for creative expression. It may thereby be more accessible and, potentially, more vulnerable to dysfunction. The previously mentioned tendency to diffuseness of sexual identity, combined with a built-in tendency toward alienation from cultural norms make the defense of "differentness" especially problematic. The Artistic type is likely to perceive himself or herself as being estranged from dominant and Conventional cultural norms. Attempts to move the patient's behavior or values in a more traditional direction are

therefore likely to be resisted. Of course, the Artistic type's conflicts can be interpersonal as well as intrapsychic. Matching of such individuals with constricting or Conventional mates would likely cause interpersonal strain on the Artistic type.

Implications for Psychotherapy. Lowman states that treatment with Artistic types generally needs to address affective concerns. Because Artistic individuals appear to rely on affect in the pursuit of occupational goals, there may be less capacity to balance work and nonwork spheres in a compensatory manner. Therapy may appropriately tap into the artist's sense of the dramatic and unconventional, and use the important defense of "differentness" (from societal norms, from others) to further the goals of the treatment. The narcissism that attends the creative process lends itself naturally to seeking out therapy and enjoying and perhaps lengthening the course of treatment. While introspection and self-focus are important parts of the psychotherapeutic process, with Artistic types there may be a need for the patient to modulate self-absorption in the interests of balance in their personal lives. Balance between self-absorption in work and focus on the needs and interests of others in nonwork ways may therefore need to be encouraged. Psychopharmaceutical treatment of the acute phases of affective disorder may also be required.

Social

Description of the Type. Social types are generally viewed as being pleasant, nonaggressive individuals who get along easily with others. There is evidence of a sex difference in Social vocational interests in favor of women (Holland, 1987). Social types prefer working with other people, most typically as members of one of the "helping professions." They typically are high in extraversion and have strong dependency needs.

Passive and nonjudgmental, Social types typically avoid intellectual roles. Typically, the Social type finds therapeutic roles appealing. Among other things, the helping role offers the sense of access to secrets which are not generally accessible, and hence, the possibility of at least symbolic intimacy. Their personality type draws them to individuals in need of help, often individuals least able to offer fulfillment of another's needs. There has been considerable debate on the finding (Holland, 1987) that Social types are more often female than male and that there is more congruity, given existing cultural norms, in sex stereotypic roles for Social females than males. By implication, there is greater likelihood that women with Social interests and filling Social occupational roles will be synchronous with role expectations, while the Social male may be something of a misfit with Western cultural norms and ideals of masculinity, resulting, potentially, in identity conflicts. As cultural roles about sex-appropriate behavior change the consequences of perceived congruity and incongruity may also change.

Implications for Psychotherapy. Of all the occupational types, those with Social interests predominating are perhaps the most likely to come to treatment. Psychotherapy provides an intimacy and closeness that may be missing from their personal lives. They may prefer individually oriented treatment such as psychoanalysis which characteristically involves a long-term dependent relationship. Part of the therapeutic task with Social types is helping the patient get dependency needs met in "real life" relationships through the choice of realistic and appropriate love objects rather than those who also are in need of nurturance themselves to reciprocate love.

Enterprising

Description of the Type. Like the Social category, Enterprising types prefer working with people to things or ideas. However, the orientation is one of controlling and leading rather than helping or therapeutic roles. The Enterprising type applies verbal skills and persuasiveness to the tasks of leadership or management of others. The focus is on getting a job done through the means of other people. Enterprising types have been widely studied in the literature and a prototypical portrait of managers emerges of intelligent, forceful, well-adjusted individuals who are comfortable with dominant and aggressive roles. Lowman notes that most studies of managers' psychological characteristics have examined individuals at the middle manager or higher level whereas many of Holland's Enterprising occupations are at lower organizational levels.

Implications for Psychotherapy. Therapy with Enterprising types inevitably raises issues of control. Because Enterprising types are often counter dependent, those who do enter therapy may in subtle and overt ways fight the therapist for control. Two approaches are suggested: either the therapist must respond paradoxically, appearing to give in as a means of maintaining control; or the therapist must explicitly maintain control and demonstrate that in this relationship the therapist is in charge, and therefore the patient can afford to relax controls. Interpersonal conflict is also likely to involve issues of control; loss of job or other status-defining events can cause the Enterprising individual to seek assistance.

Conventional

Description of the Type. The Conventional-type individual prefers an orderly, predictable universe in which emotions are controlled and life is lived according to well-

defined rules. The Conventional type would be expected to have few problems as long as others similarly play by the same rules. They prefer predictable, repetitive tasks, often involving clerical or computational work, seldom with high levels of intellectual demand. They are likely to be viewed as conforming, inflexible, pragmatic, and inhibited. Should the conventional type become paired with, say, an Artistic type, considerable conflict would be expected to ensue. Moreover, times of significant life change would be expected to create conflict and possibly the need for help.

Implications for Psychotherapy. Therapy would be expected to be more beneficial when it is oriented to restoring order in the patient's life. Granting permission for minor deviations from the "rules" would also be expected to be beneficial (e.g., "permission" to divorce an inappropriate spouse). Guidelines for interacting with others, particularly those more emotionally oriented, would be suggested. In many ways, the personality characteristics attributed to Conventional types by Holland's theory are obsessive-compulsive ones. The need for therapy would therefore be expected to result from a failure of these defenses and treatment guided accordingly. Because the intellectual level of many of the conventional positions may not be high, this may suggest restitution of obsessive defenses rather than depth therapy aimed at personality restructuring.

Additional Implications for Therapists

Being Aware of Occupational Differences. Psychotherapists will benefit by attending to the occupations of their patients and patients' spouses. This information is easily collected as part of the intake process. By attending to this information, the

therapist can generate testable hypotheses about expected behavior and conflicts about the patient, consistent with the theory.

Adjust Psychotherapy Approach to Occupational Personality Type.

Certain therapy modalities would be predicted to work better than others with different occupational groupings. Investigative types respond to intellectual approaches, Artistic types to explorations of affect, Social to support and dependency, and so on. Since therapists are themselves typically Social types, they are especially prone to styles emphasizing emotional intimacy and closeness. For many occupational types, these may be parenthetical concerns.

Attend to the Interaction of Occupations of Both Parties in a Relationship.

Sources of conflict in a relationship can often be predicted by occupational types. The stereotypical marriage in our culture is of a Realistic or Enterprising male and a Social or Conventional female. The conflicts of such a relationship can be predicted from Holland's theory. Such relationships may work reasonably well as long as each partner fulfills the aspects of behavior in which the other is deficient but may suffer when their own needs cannot be met. Counseling in such cases was most often initiated most commonly by a Social type.

Assess Occupational Problems and Fit. In considering the degree to which occupational stereotypes apply in a particular case, the therapist needs to determine whether occupational choice was one chosen by the patient or one in which the career decision was primarily influenced by perceived barriers to more appropriate work. This issue should especially be assessed in considering the therapeutic implications of the career choices of women and minorities. Psychological testing of vocational interests as

well as abilities and personality characteristics should be considered for patients experiencing misfit or underachievement.

Implications of the Therapist's Own Occupational Choice. Concerning psychotherapy, most therapists have Social prominent in their vocational codes and in their personality makeup. This would suggest that they seek careers in helping others in part to meet their own dependency needs through their involvement with others. What the prototypical therapist may experience difficulty with, in applying Holland's theory, is that not all individuals seek the same intimacy in relationships with others that they do. Thus, such techniques as paradoxical interventions, symptom prescriptions, and refraining may work well with Realistic, Conventional, and Investigative types precisely because they indirectly rather than directly deal with the issue of feelings. While a Social psychotherapist may aim to make the patient more capable of emotional intimacy, this goal may be of little interest or relevance to the patient.

Needed Research. Lawson summarizes by discussing epidemiological studies assessing incidence and prevalence of various types of psychopathology. Lawson states that one should consider occupation as a variable on which to group individuals much like sex or race. Occupations should also be included in psychotherapy outcome studies of employed adults to determine whether the principles of differential responsiveness to psychotherapy is modified by occupational types. The extent to which occupational stereotypes are valid for both sexes and for different races also needs much more exploration. Additionally, the effects on well-being of individuals who occupy work roles which are atypical for their sex or race need more study in terms of role conflict and (especially for women) role overload. While this article emphasizes those aspects of

personality which influence career choice, it is also important to know the extent to which personality is affected by occupational choice. Finally, more studies are needed on the interaction between various occupational personality types.

Summary

Jung's Theory of Psychological Type provides the theoretical framework for this study. A review of the literature found personality factors including MBTI types, motivation, communication skills, and leadership skills related to pilot training and performance. Vocational development theory and Holland's theory of vocational personalities suggest implications for clinical practice. The methodology for the current study is presented in Chapter III.

CHAPTER III

METHODOLOGY

Introduction

Chapter III includes a description of the research design and discusses the rationale for the approach. In addition the sample population, research procedures, and instrumentation are described. Finally, issues of external validity, data analysis, and limitations are discussed.

Research Design & Rationale

The main purpose of this study was to investigate the relationship between MBTI personality types and training preferences ratings for student pilots and flight instructors. Statistical analysis was conducted to assess the relationship between MBTI personality types and training preferences.

The MBTI was given to all subjects participating in this study. For the purpose of this research, the 16-cell MBTI type was divided into four similar personality groups (Maher et al., 1995; Satava 1996) as illustrated in Figure 1. Similar to Sohn and Jo's 2003 study, four groups will be classified as follows:

Group A is prudent, quiet and with high concentration.

Group B is creative, self-supportive, and persistent.

Group C is concrete, realistic, and has mechanical skills.

Group D is passionate, having a strong sense of responsibility and tending to overlook details.

ISTJ	ISFJ	INFJ	INTJ
A		B	
ISTP	ISFP	INFP	INTP
C		D	
ESTP	ESFP	ENFP	ENTP
ESTJ	ESFJ	ENFJ	ENTJ

Figure 1. MBTI groupings according to Sohn and Jo (2003)

Research Question & Hypotheses

The primary research question guiding this study was whether or not certain personality types of both student pilots and their flight instructors were related to personality preferences with flight training partners. The specific question to be investigated was: Will the combination of certain personality types of both student pilot and instructor be associated with personality preferences for flight training partners for student pilots, and their instructors?

Hypothesis 1: Student pilots will give higher preference ratings to flight instructor personality traits that are similar to their own.

Null Hypothesis 1: Students pilots will not give higher preference ratings to flight instructor personality traits that are similar to their own.

Hypothesis 2: Flight instructors will give higher preference ratings to student pilot personality traits that are similar to their own.

Null Hypothesis 2: Flight instructors will not give higher preference ratings to student pilot personality traits that are similar to their own.

Role of the Researcher

The researcher is a licensed private pilot and licensed mental health therapist. The researcher had no affiliations with the Aeronautical University or the flight academy.

Participants

All participants in this study were students attending a local aeronautical university and a local flight academy or flight instructors employed at either school. All participants were over the age of 17. Student pilots had or were working towards, completion of their private pilot or instrument rating. The total number of participants were 44 student pilots and 43 instructors. Participation in the research study was voluntary.

Selection of Participants

The Director of Flight Operations at both schools was contacted to request permission to conduct the research study. A private meeting was held to discuss the guidelines and requirements of the aeronautical university in order to facilitate this research. Permission was obtained in writing to begin this research (Appendix A-1). The flight academy presented this proposal to its educational department for permission to begin this research. (Appendix A-2). The researcher submitted the proposal to the Flight School's Institutional Review Board (IRB) as well as Barry University Review Board to request approval to conduct the research. The researcher completed documents required by both the Barry University IRB and the aeronautical universities IRB and did not begin collecting data until final approval was obtained from all three schools.

Student participants were recruited by posting a notice (Appendix B) in the Flight Operations Building, cafeteria, resident halls, and other locations where students

congregate. The notice described details of the study and asked for volunteers.

Participants were offered \$15.00 for their participation in the study. It was expected that participants would be truthful about their completion of the study in order to receive the payment. After reading the notice, students interested in participating in the study went to the URL for SurveyMonkey™, read the Cover letter (Appendix C), and decided if they wanted to participate.

The flight instructors were recruited by posting a notice (Appendix B) in the Flight Operations buildings, office areas, and other locations where staff normally congregate. A notice was posted which described the details of the study and asked for their voluntary participation. Participants were offered \$15.00 for their participation in the study. It was expected that participants would be truthful about their completion of the study in order to receive the payment. After reading the notice, the instructors interested in participating in the study went to the URL for SurveyMonkey™, read the Cover letter (Appendix C), and decided if they wanted to participate.

Participants completed the questionnaires and the MBTI online by means of SurveyMonkey™. It was made clear that if they declined to participate, or chose to drop out at any time during the study, there would be no adverse effects whatsoever.

The participants were asked to complete a preferences questionnaire specific to flight training (Appendix D) or flight instruction (Appendix E). They were also asked to complete a demographic survey (Appendices G and H). This data was used to describe the participants as a group. The participants were then asked to complete the MBTI which took approximately 15-20 minutes.

Confidentiality

There were no known potential risks of participating this study. However, there was no guarantee of absolute anonymity due to the medium of this second party – SurveyMonkey™. Nevertheless, SurveyMonkey™ emphatically declares “Our privacy policy states that we will not use your data for our own purposes.” In addition, this researcher requested that SurveyMonkey™ "disable the SSL" before data collection thereby assuring the fact that the results were truly anonymous and there were no record kept of neither an IP address nor linkages that could be utilized to identify the participant.

If the participant wanted to receive the \$15.00 for participating, they had to email the researcher, and in this case the researcher would have the participant’s email address, name and mailing address, in order to mail the \$15.00. However the identifying information was not associated with any of the data collected.

No names were used on any of the forms. Only group mean data was used when describing the results of this study. Once the data was collected, it was kept in locked file cabinet to which only the researcher has access. Consent forms and the key code was also stored in a separate locked file cabinet. All raw data was stored on a secure hard drive.

Instrumentation

The Myers-Briggs Type Indicator (MBTI) is one of the most widely used personality assessments in the world (Rajagopal, 2008). It offers a foundation for understanding individual differences and applying that understanding to the ways people think, communicate, and interact. The instrument has 93 items and provides the basic MBTI four-letter type: Extraversion–Introversion, Sensing–Intuition, Thinking–Feeling, and Judgment–Perception. Each type reflects one of four basic preferences which, under

Jung's theory, direct the use of perception and judgment. The preferences affect not only what people attend to in any given situation, but also how they draw conclusions about what they perceive.

Extraversion–Introversion (E–I)

The E–I index is designed to reflect whether a person is an extravert or an introvert in the sense intended by Jung. Extraverts are oriented primarily toward the outer world; thus they tend to focus their perception and judgment on people and objects. Introverts are oriented primarily toward the inner world; thus they tend to focus their perception and judgment upon concepts and ideas.

Sensing–Intuition (S–N)

The S–N index is designed to reflect a person's preference between two opposite ways of perceiving; one may rely primarily upon the process of sensing (S), which reports observable facts or happenings through one or more of the five senses; or one may rely upon the less obvious process of intuition (N), which reports meanings, relationships and/or possibilities that have been worked out beyond the reach of the conscious mind.

Thinking–Feeling (T–F)

The T–F index is designed to reflect a person's preference between two contrasting ways of judgment. A person may rely primarily through thinking (T) to decide impersonally on the basis of logical consequences, or a person may rely primarily on feelings (F) to decide primarily on the basis of personal or social values.

Judgment–Perception (J–P)

The J–P index is designed to describe the process a person uses primarily in

dealing with the outer world, that is, with the extraverted part of life. A person who prefers judgment (J) has reported a preference for using a judgment process (either thinking or feeling) for dealing with the outer world. A person who prefers perception (P) has reported a preference for using a perceptive process (either S or N) for dealing with the outer world.

Fleenor (2004) summarized the reports of the usual estimates of reliability, including split-half, coefficient alpha, and test-retest reliabilities, which indicate acceptable levels of reliability for the scores. Most of these reliabilities, however, are based on the use of the continuous preference scores from the instrument. He states such analyses are contrary to the theory underlying the MBTI—that the instrument is designed to sort individuals into types rather than to assign continuous scores to them. Fleenor discusses one reliability analysis that reports the percentage of agreement for the dichotomies for three test-retest samples. The percentage of participants reporting the identical four preferences after a 4-week interval range from 55% to 80%, with an average of 65%.

Fleenor (2004) also discussed the construct validity of the four-factor model of the MBTI which was investigated using confirmatory factor analysis. He stated the predicted four-factor model appeared to be the best fit for the data, compared to two competing models. In the manual, numerous validity studies are reported that correlate MBTI continuous scores with other instruments, such as the California Psychological Inventory. Fleenor did caution that the use of continuous scores is contrary to the theory underlying the instrument, so these results should be interpreted with caution.

Flight instructor and student pilot questionnaires were designed by pulling

characteristics directly from the MBTI. Using the 16 cell MBTI type, four personality groups were created based on the works of Maher et al. (1995) and Satava (1996). The four groups were as follows:

Group A is prudent, quiet, and has a high level of concentration.

Group B is creative, self-supportive, and persistent.

Group C is concrete, realistic, and has mechanical skills.

Group D is passionate, has a strong sense of responsibility, and tends to overlook details.

The instructor or student pilot was then asked to rank from 1 to 4 the most to least preferred personality traits of a training partner.

Data Analysis

The Statistical Package for the Social Sciences for Windows, Version 11 was used to analyze the results (SPSS, Chicago, IL). A correlational analysis was conducted.

Limitations

Potential limitations of the study included the following. For generalization purposes, the sample size of subjects participating in the study was considered small. The results pertain only to the scores on the MBTI and may not be generalized to other test scores.

Assumptions

It was assumed that the participants were honest with their responses on the MBTI and the questionnaires.

Delimitations

The student pilot participants were limited to private pilot or instrument ratings (or working towards those licenses). The participants were from a local aeronautical university or a local flight academy.

Summary

This study investigated the relationship between MBTI personality types and training preferences ratings for student pilot and flight instructors. Statistical analysis was conducted using the combination of MBTI personality type as one factor and a preferences questionnaire as another factor. It was predicted that students and instructors would report higher levels of preferences when they have similar personality types.

CHAPTER IV

RESULTS

Introduction

This chapter provides a comprehensive analysis of the data obtained from the study using descriptive and inferential statistics. In the tables and charts below, descriptive statistics summarize the demographic data. The data was analyzed by means of chi-square, using SPSS version 17.0.

The first hypothesis tested was: Student pilots will give higher preference ratings to flight instructor personality traits that are similar to their own. The second hypothesis was: Flight instructors will give higher preference ratings to student pilot personality traits that are similar to their own. The research question was: Will the combination of certain personality types of both student pilot and instructor be associated with personality preferences for flight training partners for student pilots, and their instructors?

This question was examined by administering the MBTI to all subjects participating in this study. For the purpose of this research, the 16-cell MBTI type was divided into four similar personality groups (Maher et al., 1995; Satava,1996) as follows:

Group A is prudent, quiet and with high concentration.

Group B is creative, self-supportive, and persistent.

Group C is concrete, realistic, and has mechanical skills.

Group D is passionate, having a strong sense of responsibility and tending to overlook details.

All participants in this study attended a local aeronautical university, a local flight academy or were flight instructors employed at either school. All participants were over

the age of 17. Student pilots had, or were working towards, completion of private pilot or instrument ratings. Participation in the research study was voluntary.

The participants were asked to complete a preferences questionnaire specific to flight training or flight instruction. They then completed a demographic survey. This data was used to describe the participants as a group. The participants then completed the Myers Briggs Type Indicator (MBTI).

Descriptive Statistics: Demographic Data

The total number of participants was 44 student pilots and 43 instructors.

Age of Participants

The number of total number of participants to complete the study was 87. Three student pilots and two instructors did not disclose their ages. Student pilots ranged in age from 17 - 25 with a mean age of 20. Instructors ranged in age from 20 - 64 with a mean age of 25. On average, the instructors were somewhat older than the students. Figures 2 and 3 present the participants' ages as histograms.

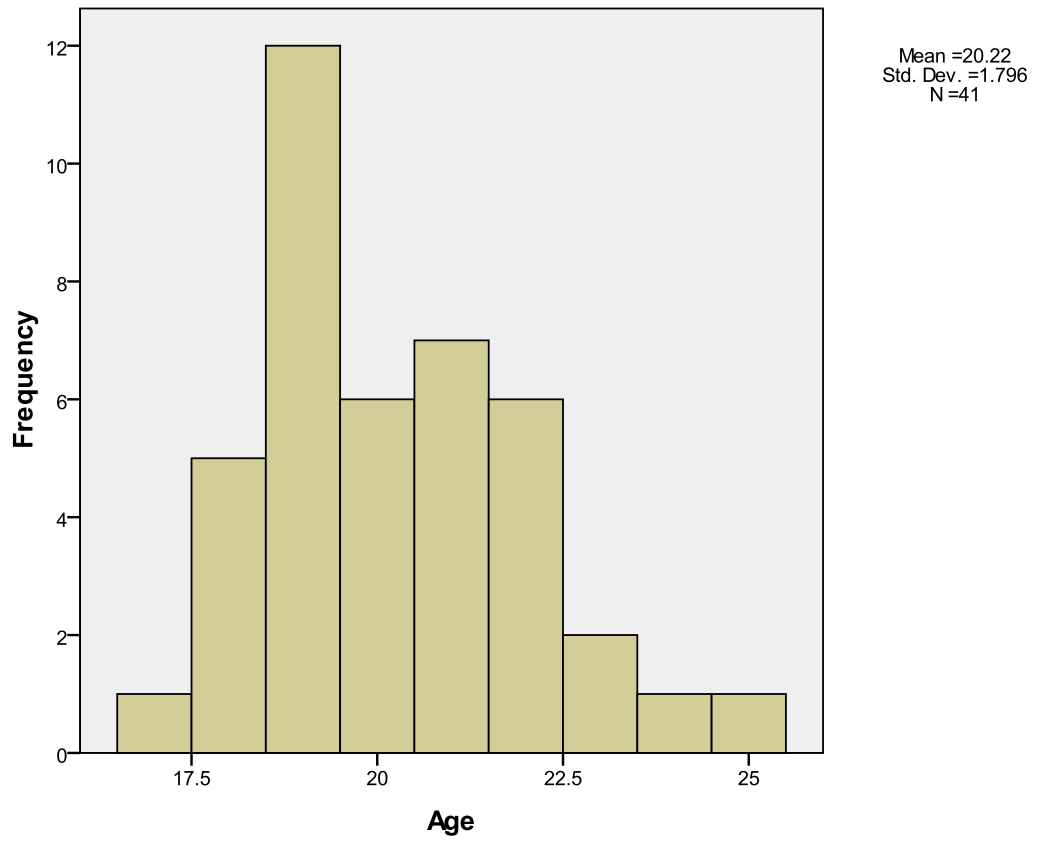


Figure 2. Age of students.

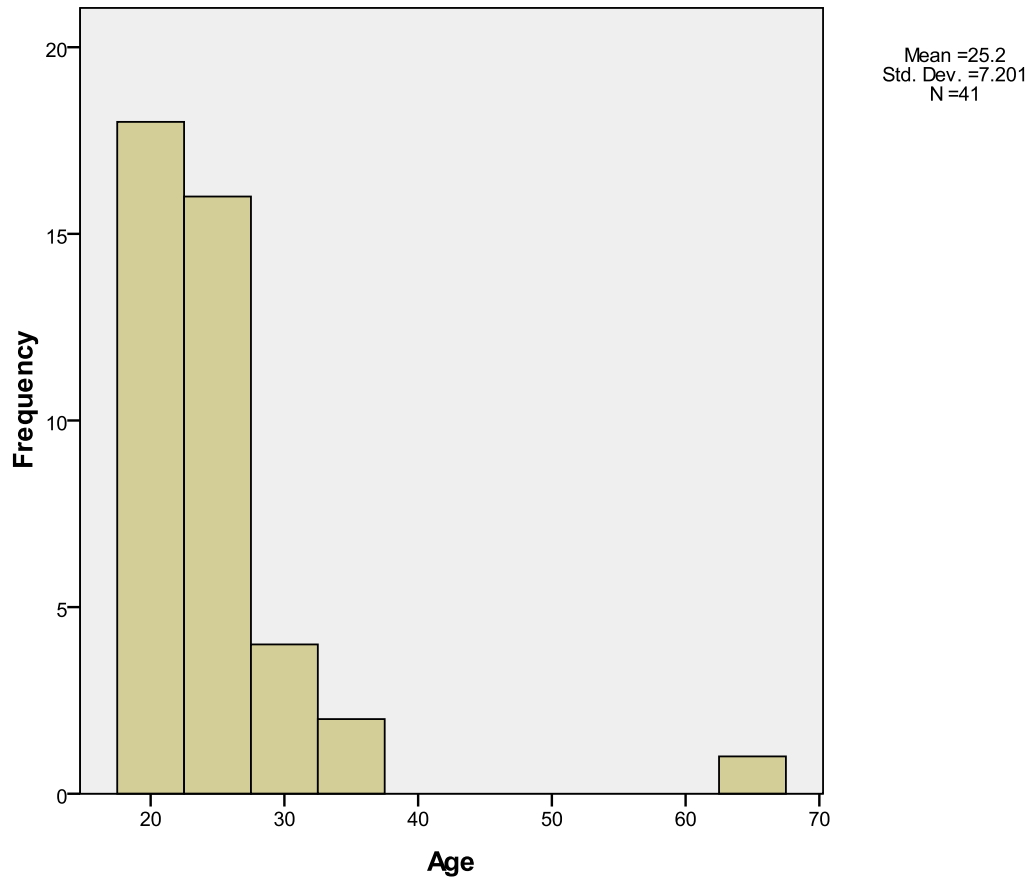


Figure 3. Age of instructors.

Gender

In the student group there were 44 total responses and in the instructor group there were 43 respondents to this question. There were 6 female students and 38 male students. In the instructor group there were 4 female instructors and 39 male flight instructors. Overall, there were more males than females in the sample. Figure 4 presents gender graphically.

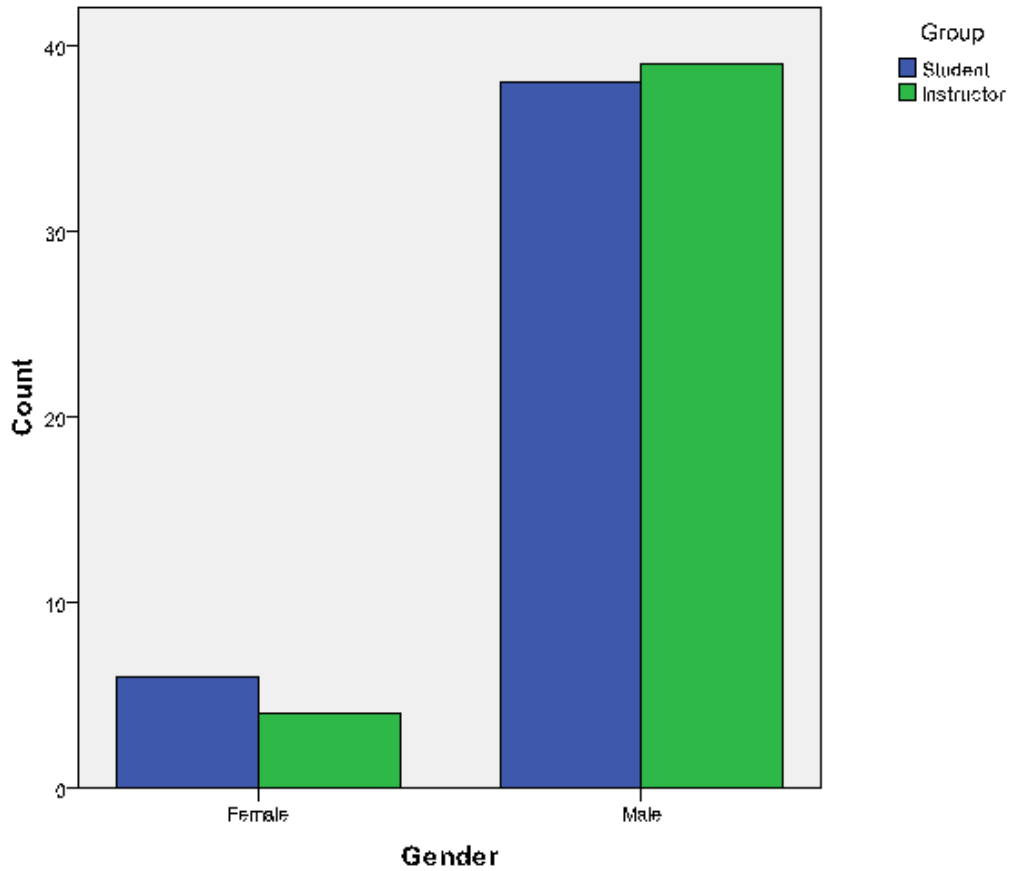


Figure 4. Gender.

Marital Status

In the student group there were 43 total responses and in the instructor group there were 43 respondents to this question. There were 41 single students, 2 married students, and no students that were divorced. In the instructor group there were 30 single instructors 11 married and 2 divorced. The majority of the participants were single.

Figure 5 presents marital status graphically.

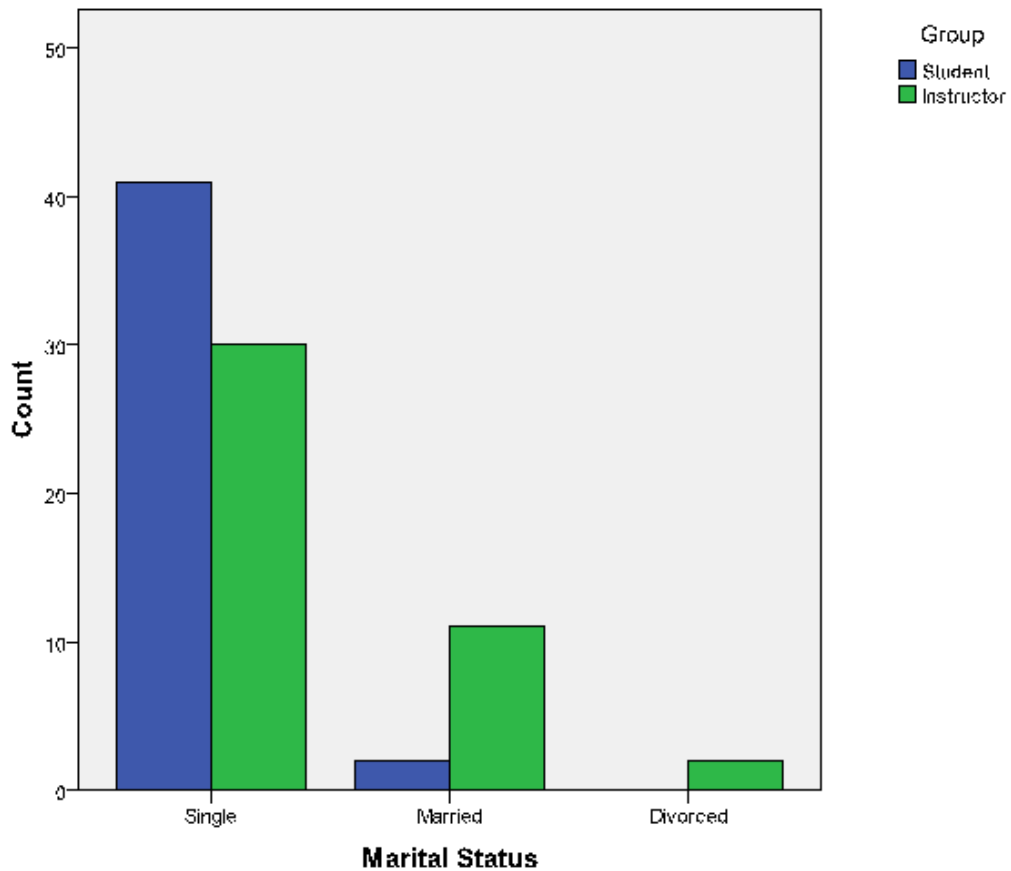


Figure 5. Marital status.

Ethnicity

In the student group there were 44 total responses and in the instructor group there were 43 respondents to this question. The majority of the participants were Caucasian non-Hispanic. Thirty-four students were Caucasian non-Hispanic, 5 were black African American, 2 were Caucasian Hispanic and 3 were Asian. In the instructor group 41 were Caucasian non-Hispanic, none were black African American, 1 was Caucasian Hispanic and 1 was Asian. Figure 6 presents ethnicity graphically.

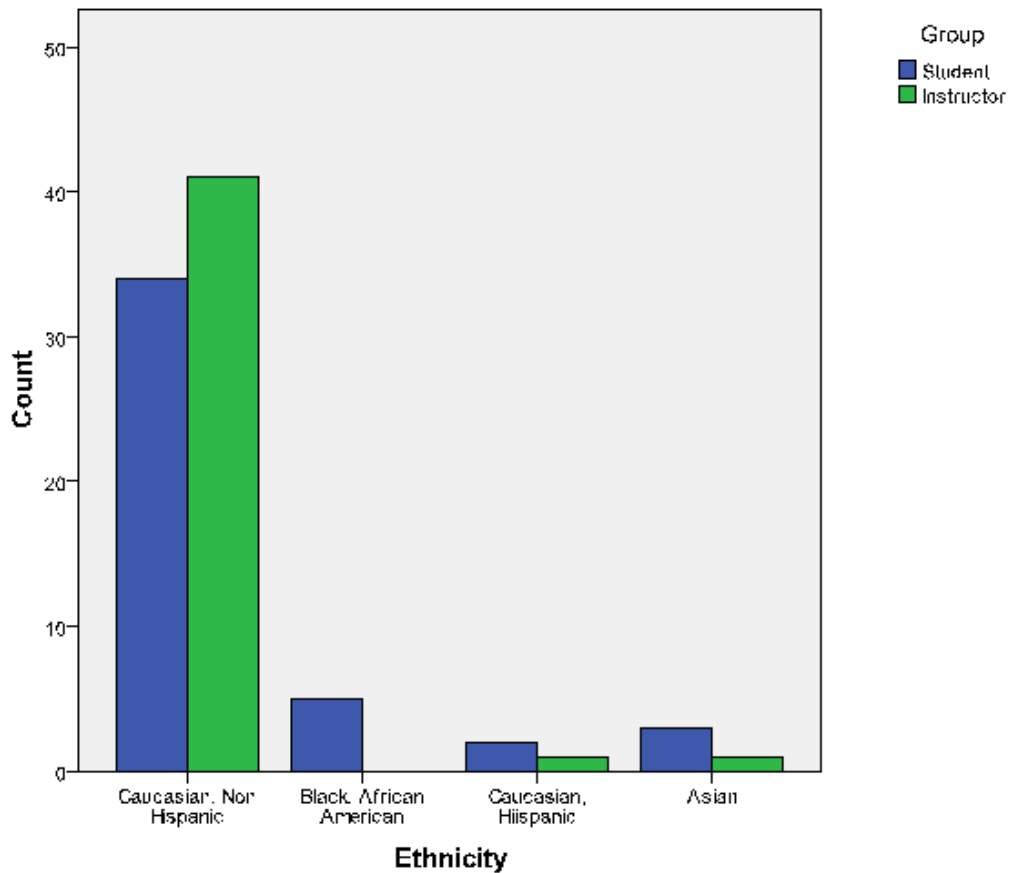


Figure 6. Ethnicity.

Educational Level

In the student group there were 44 total responses and in the instructor group there were 35 respondents to this question. Forty-three of the students were working towards their bachelor's degree, and one was in a master's program. For the instructors, 18 were working towards their bachelor's degree, 17 were in a master's program. Figure 7 presents the educational levels graphically.

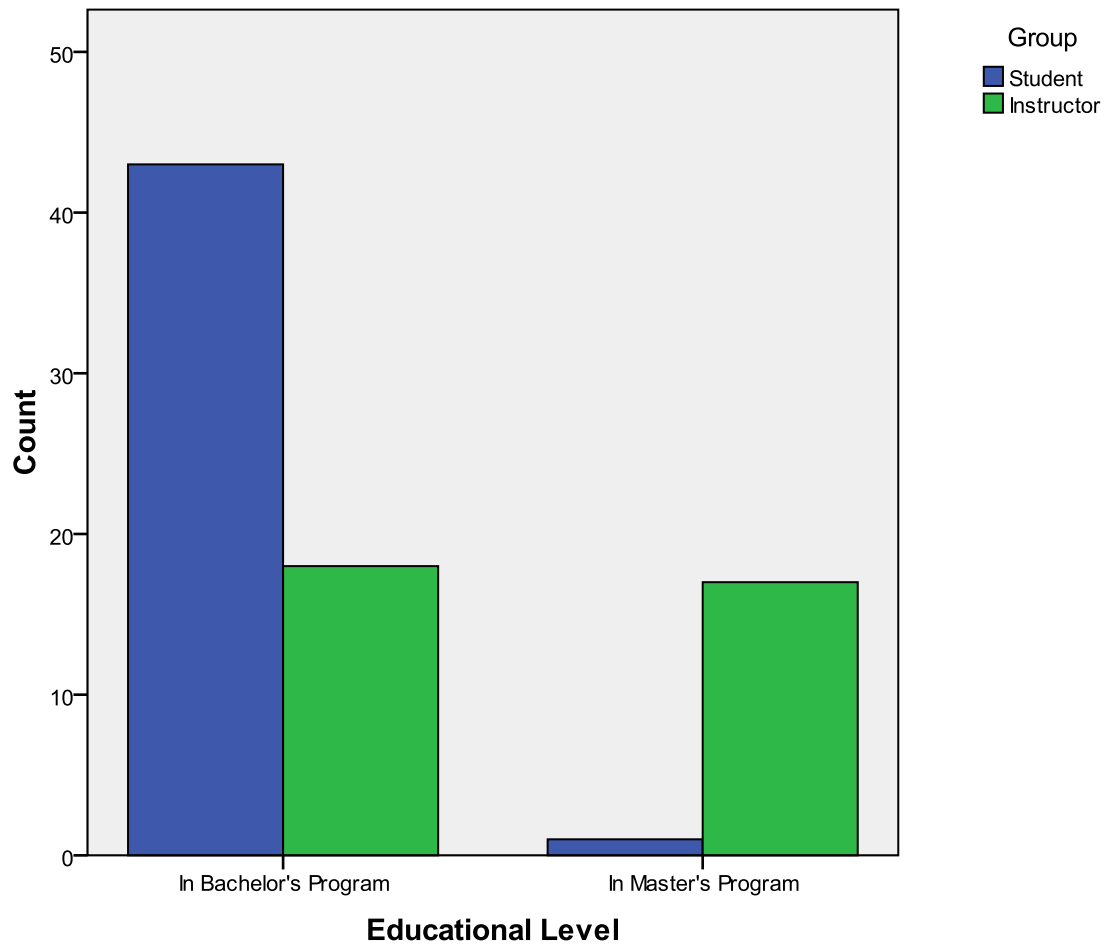


Figure 7. Degree program.

Work Status

In the student group there were 44 total responses and in the instructor group there were 43 respondents to this question. Five students were employed full-time, 11 were employed part-time, 25 were unemployed, and 3 had never been employed. Twenty six instructors were employed full-time, 15 were employed part time, 2 were unemployed, and 0 had never been employed. Figure 8 presents work status graphically.

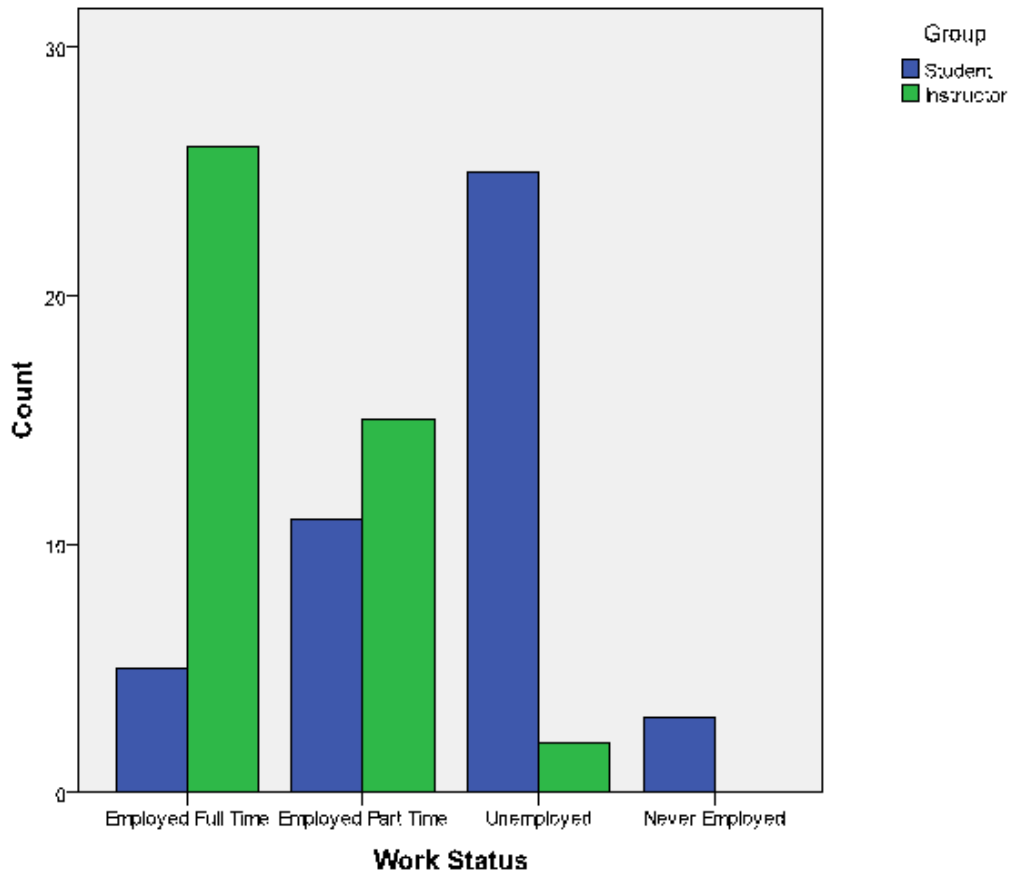


Figure 8. Work status.

Pilot Rating

In the student group there were 44 total responses and in the instructor group there were 43 respondents to this question. In the student group 16 had student pilot ratings, 11 had private pilot ratings, 9 had instrument ratings, 6 had commercial ratings, and 2 had instructor and/or advanced ratings. In the instructor group all 43 respondents had instructor and/or advanced ratings. Figure 9 presents Pilot ratings graphically.

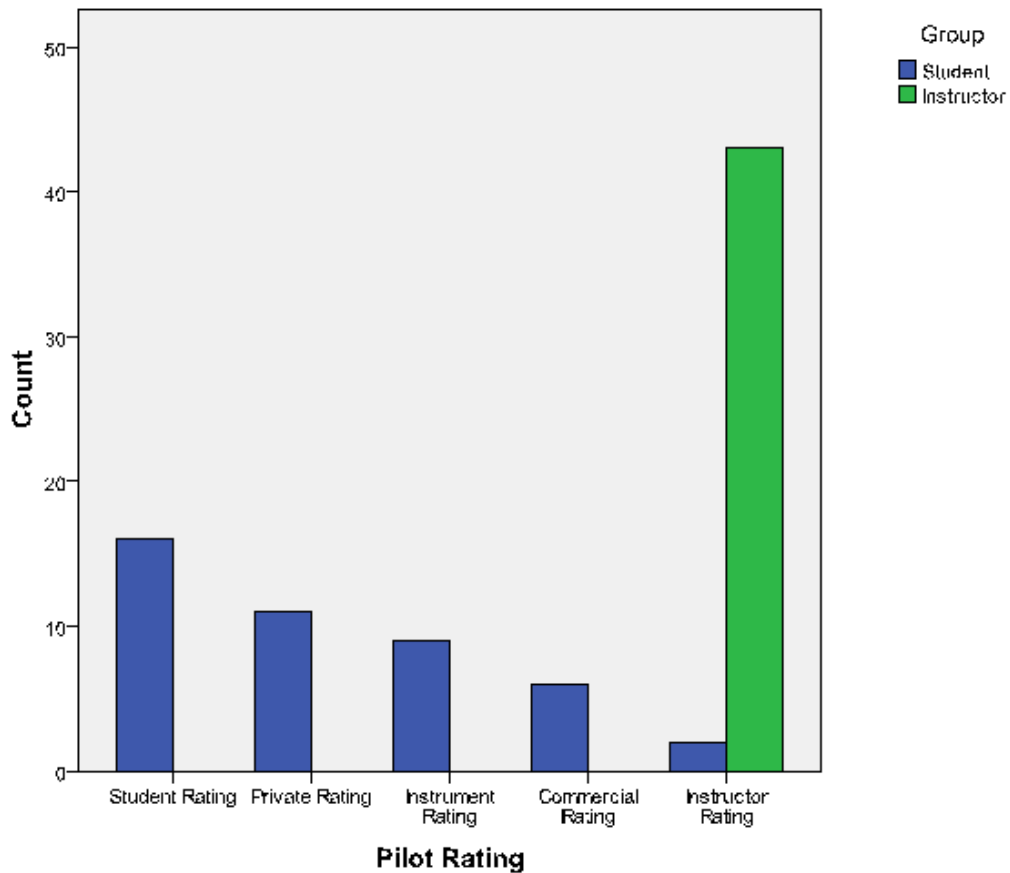


Figure 9. Pilot ratings.

Full-time/Part-time Teaching

In the Student group there were 11 total responses and in the instructor group there was 43 respondents to this question. In the student group 2 did full-time flight instruction, 0 were part-time instructors 5 were adjunct, and 4 listed themselves as “other.” In the instructor group 20 did full-time flight instruction, 8 did part-time instruction, 1 was adjunct, and 14 listed themselves as “other.” Figure 10 presents Full-time/Part-time teaching graphically.

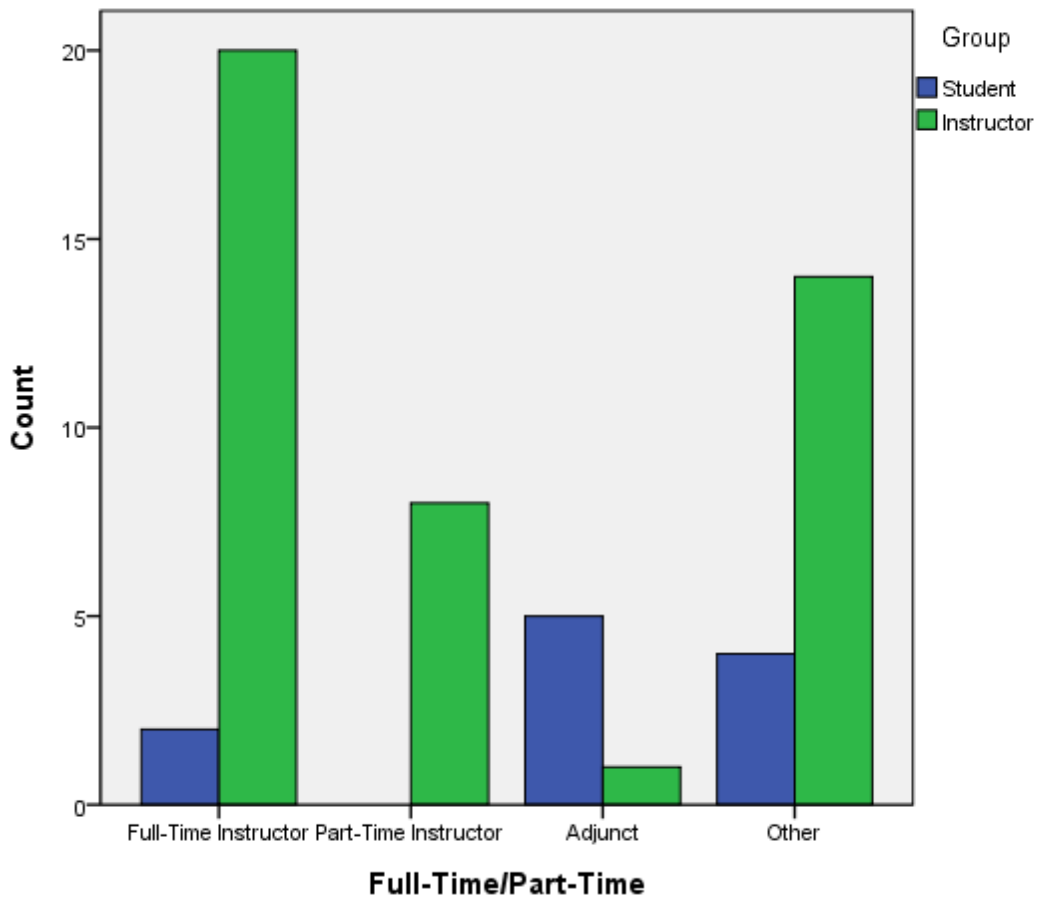


Figure 10. Full-time/Part-time teaching

Years of teaching experience

In the student group years of teaching experience ranged from 0 to 2 years out of 44 respondents with a mean of .05. In the instructor group years of teaching experience ranged from 0 to 11 years with a mean of 2 years out of 43 respondents.

Inferential Statistics

Student and Instructor MBTI types

A chi-square analysis was conducted to evaluate if students and instructors differed on the MBTI types according to Sohn and Jo's (2003) classifications:

Group A is sensible, prudent, quiet and with high concentration;

Group B is creative, self-supportive, and persistent;

Group C is concrete, realistic, and has mechanical skills;

Group D is passionate, having a strong sense of responsibility and tending to overlook details. The MBTI types which correspond to the four groups are presented in Figure 11.

ISTJ	ISFJ	INFJ	INTJ
A		B	
ISTP	ISFP	INFP	INTP
C		D	
ESTP	ESFP	ENFP	ENTP
ESTJ	ESFJ	ENFJ	ENTJ

Figure 11. MBTI groupings according to Sohn and Jo (2003).

There were no significant differences between the students and instructors in relation to their MBTI types, $\chi^2(3, N = 87) = 2.07, p = .557, \text{Cramer's } V = .15$. For both

groups, the sensible and concrete types were the most common (38.6% and 34.1% for students, and 37.2% and 37.2% for instructors). These results are similar to Sohn and Jo's sample in which students were predominantly concrete, and instructors were predominantly sensible. The ratio of introverts to extroverts was 38:49, which is similar to Sohn and Jo's (2003) sample. Table 1 presents the percentages of the four classifications for students and instructors. Figure 12 presents the MBTI classifications graphically.

Table 1
 MBTI Classifications for Students and Instructors

Group * Myers Briggs Group Crosstabulation

			Myers Briggs Group				Total
			Sensible IS	Creative IN	Concrete ES	Passionate EN	
Group	Student	Count	17	4	15	8	44
		% within Group	38.6%	9.1%	34.1%	18.2%	100.0%
	Instructor	Count	16	1	16	10	43
		% within Group	37.2%	2.3%	37.2%	23.3%	100.0%
Total		Count	33	5	31	18	87
		% within Group	37.9%	5.7%	35.6%	20.7%	100.0%

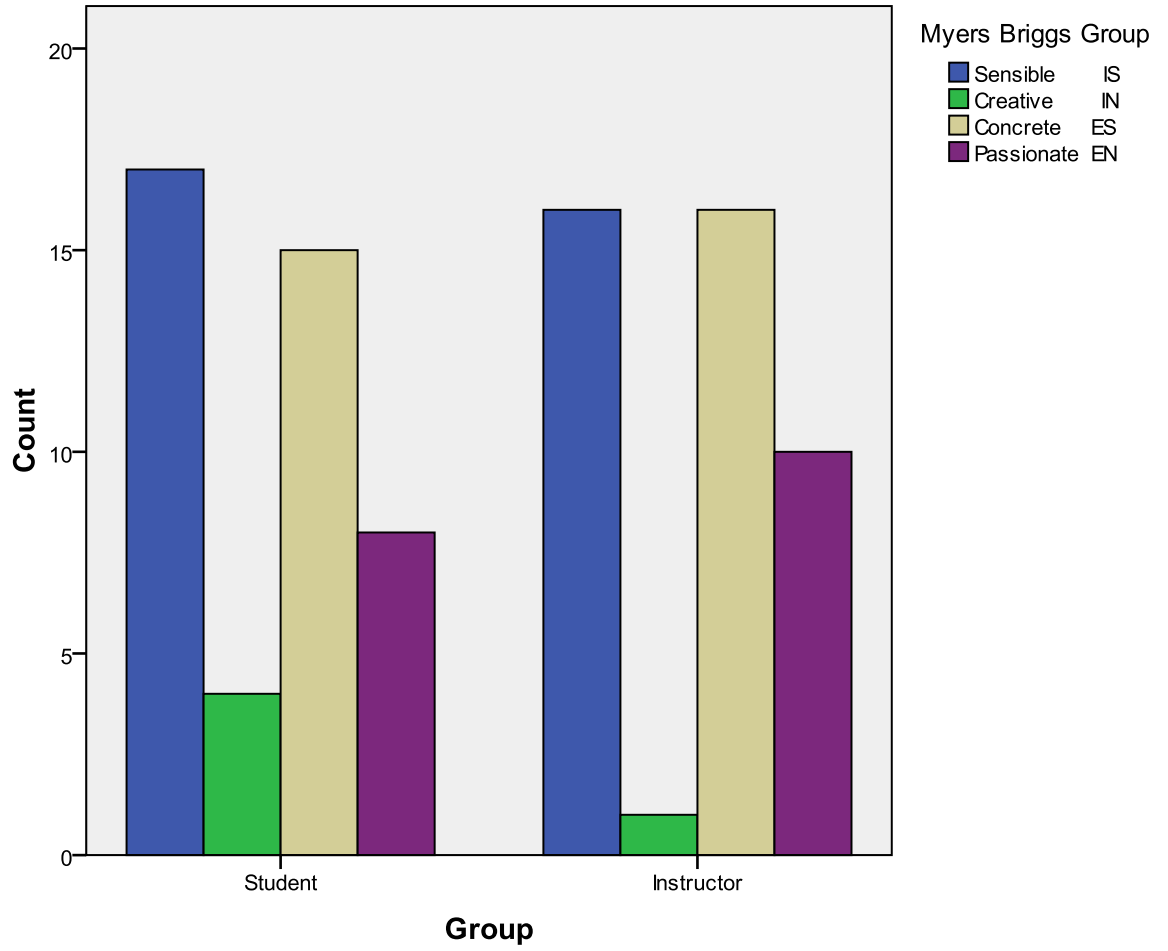


Figure 12. Distribution of four MBTI classifications for students and instructors.

Research Hypotheses

Two-way chi-square analyses were conducted to assess the relationship between the student and flight instructors personality preferences.

Hypothesis 1: Student pilots will give higher preference ratings to flight instructor personality traits that are similar to their own.

The relationship between preference rating of students and their MBTI type was not found to be significant, $\chi^2 (9, N = 44) = 5.28, p = .809, \text{Cramer's } V = .20$. Table 2 presents the personality preferences percentages for each type.

Table 2

Student Preferences for MBTI Personality Classifications

Myers Briggs Group * Personality Preference Crosstabulation

			Personality Preference				Total
			Sensible	Creative	Concrete	Passionate	
Myers Briggs Group	Sensible IS	Count	1	8	6	2	17
		% within Myers Briggs Group	5.9%	47.1%	35.3%	11.8%	100.0%
	Creative IN	Count	1	2	0	1	4
		% within Myers Briggs Group	25.0%	50.0%	.0%	25.0%	100.0%
Concrete ES	Count	1	6	5	3	15	
	% within Myers Briggs Group	6.7%	40.0%	33.3%	20.0%	100.0%	
Passionate EN	Count	0	3	4	1	8	
	% within Myers Briggs Group	.0%	37.5%	50.0%	12.5%	100.0%	
Total	Count	3	19	15	7	44	
	% within Myers Briggs Group	6.8%	43.2%	34.1%	15.9%	100.0%	

Hypothesis 2: Flight instructors will give higher preference ratings to student pilot personality traits that are similar to their own.

The relationship between preference rating of instructors and their MBTI type was not found to be significant, $\chi^2 (9, N = 43) = 8.56, p = .479, \text{Cramer's } V = .26$. Table 3 presents the personality preferences percentages for each type.

Table 3

Instructor Preferences for MBTI Personality Classifications

Myers Briggs Group * Personality Preference Crosstabulation

			Personality Preference				Total
			Sensible	Creative	Concrete	Passionate	
Myers Briggs Group	Sensible IS	Count	1	4	11	0	16
		% within Myers Briggs Group	6.3%	25.0%	68.8%	.0%	100.0%
	Creative IN	Count	0	0	1	0	1
		% within Myers Briggs Group	.0%	.0%	100.0%	.0%	100.0%
	Concrete ES	Count	1	3	9	3	16
		% within Myers Briggs Group	6.3%	18.8%	56.3%	18.8%	100.0%
	Passionate EN	Count	0	4	3	3	10
		% within Myers Briggs Group	.0%	40.0%	30.0%	30.0%	100.0%
Total	Count	2	11	24	6	43	
	% within Myers Briggs Group	4.7%	25.6%	55.8%	14.0%	100.0%	

Although there were no significant differences in the student and instructor preferences for the personality types, students overall preferred to work with instructors who fell into the creative classification. Instructors whose MBTI type fell into the sensible, creative, and concrete classifications preferred to work with students who fell into the concrete MBTI grouping, while instructors in the passionate MBTI classification rated the creative students as their preferred type. The two instances where there was a match between the types of students and instructors was for creative students, who preferred to work with creative instructors; and concrete instructors who preferred to work with concrete students. The latter finding is consistent with Sohn and Jo's (2003) finding that the ideal combination of students and instructors was when both were in the concrete classification.

Interestingly, the passionate MBTI group was not rated as being preferred by any of the student or instructor types and none of the participants in the passionate group selected the sensible group as their preferred type. The latter finding is supportive of Sohn and Jo's finding that when sensible instructors were paired with passionate students, the students had the highest mental workload in terms of heart rate and altitude deviation. Within the participants in the concrete classification, the sensible and passionate types were the least preferred by both students and instructors. This is also in line with Sohn and Jo's findings that the combination of concrete/sensible and concrete/passionate were the worst in terms of subjective multi-dimensional workload ratings and subjective degree of personality harmony. The preferences for the student and instructors are presented visually in Figures 13-16.

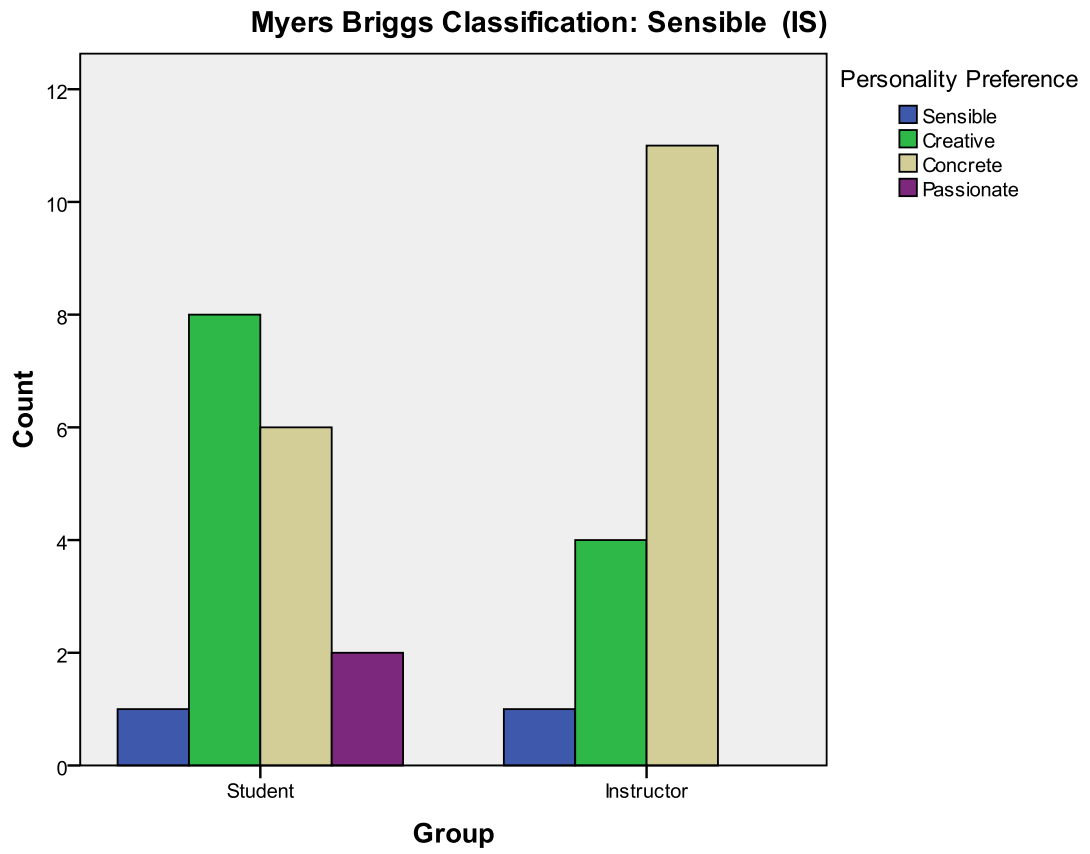


Figure 13. Personality preferences for students and instructors classified as sensible.

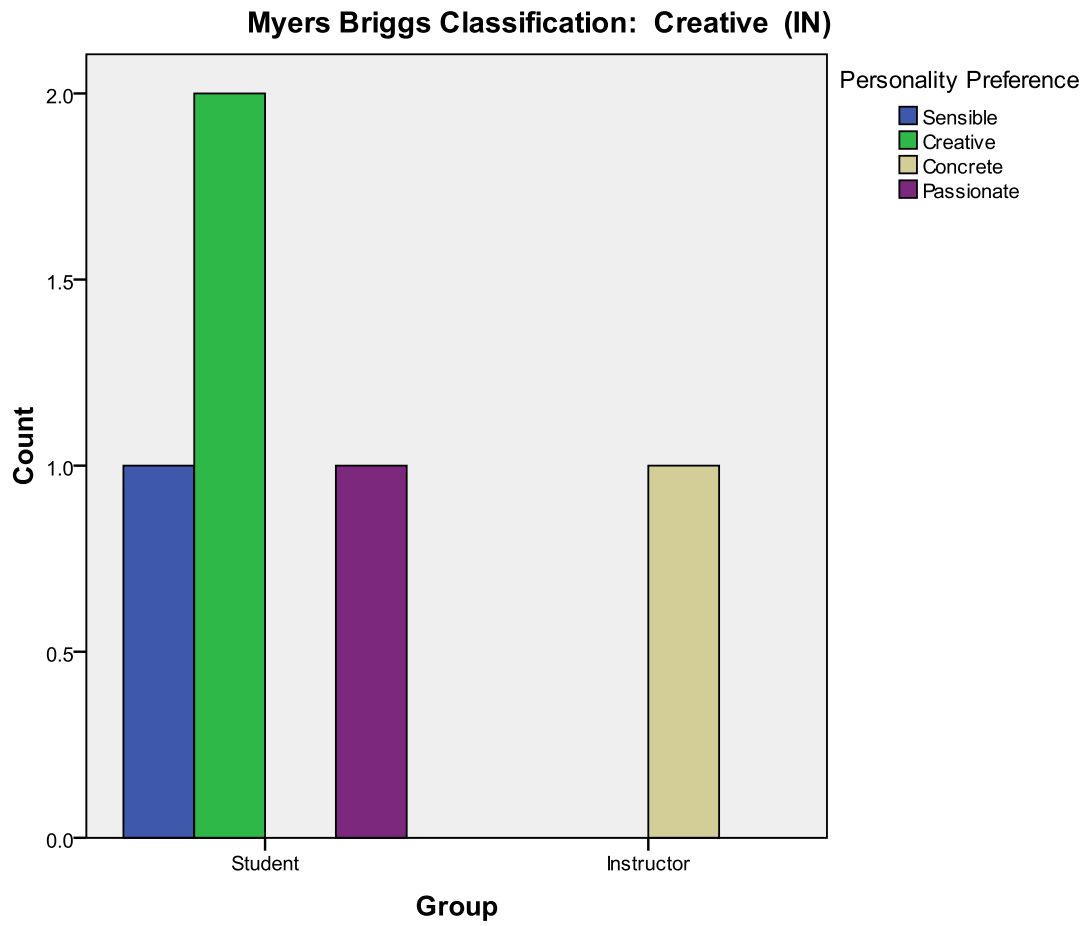


Figure 14. Personality preferences for students and instructors classified as creative.

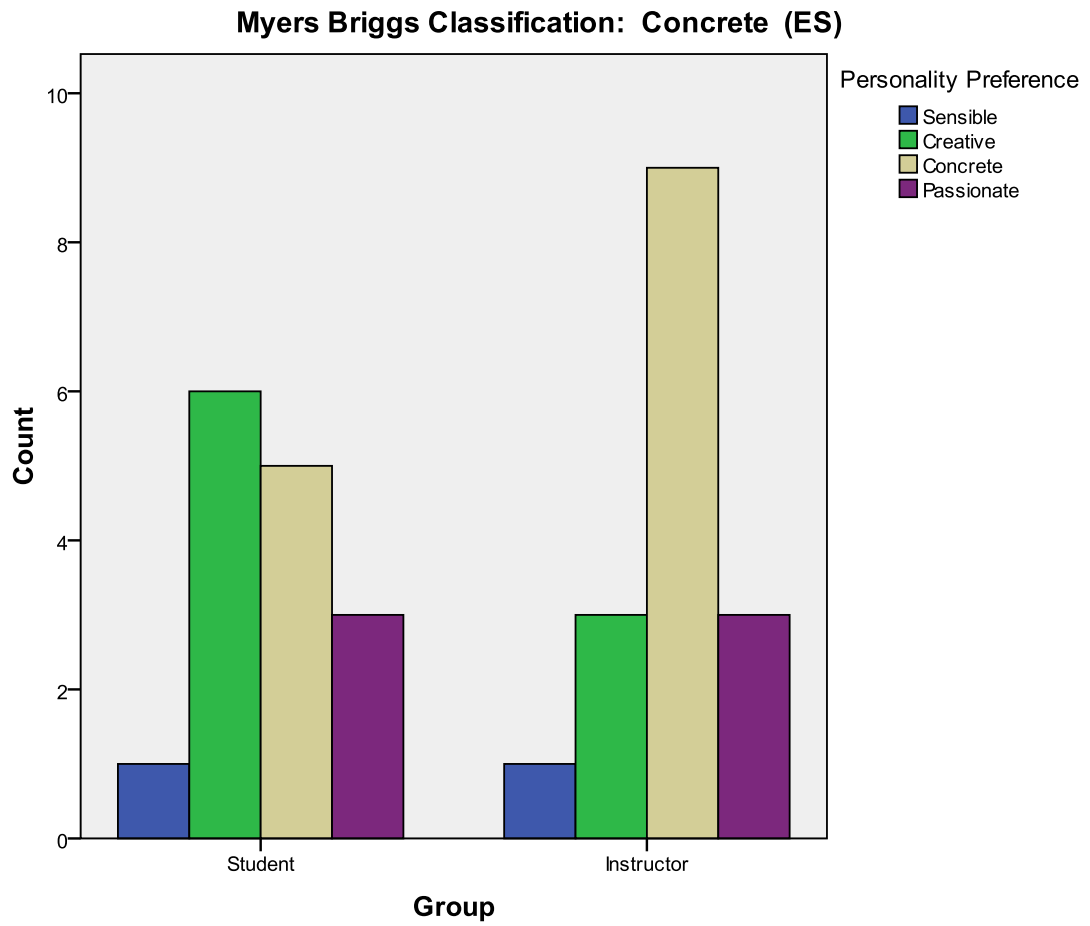


Figure 15. Personality preferences for students and instructors classified as concrete.

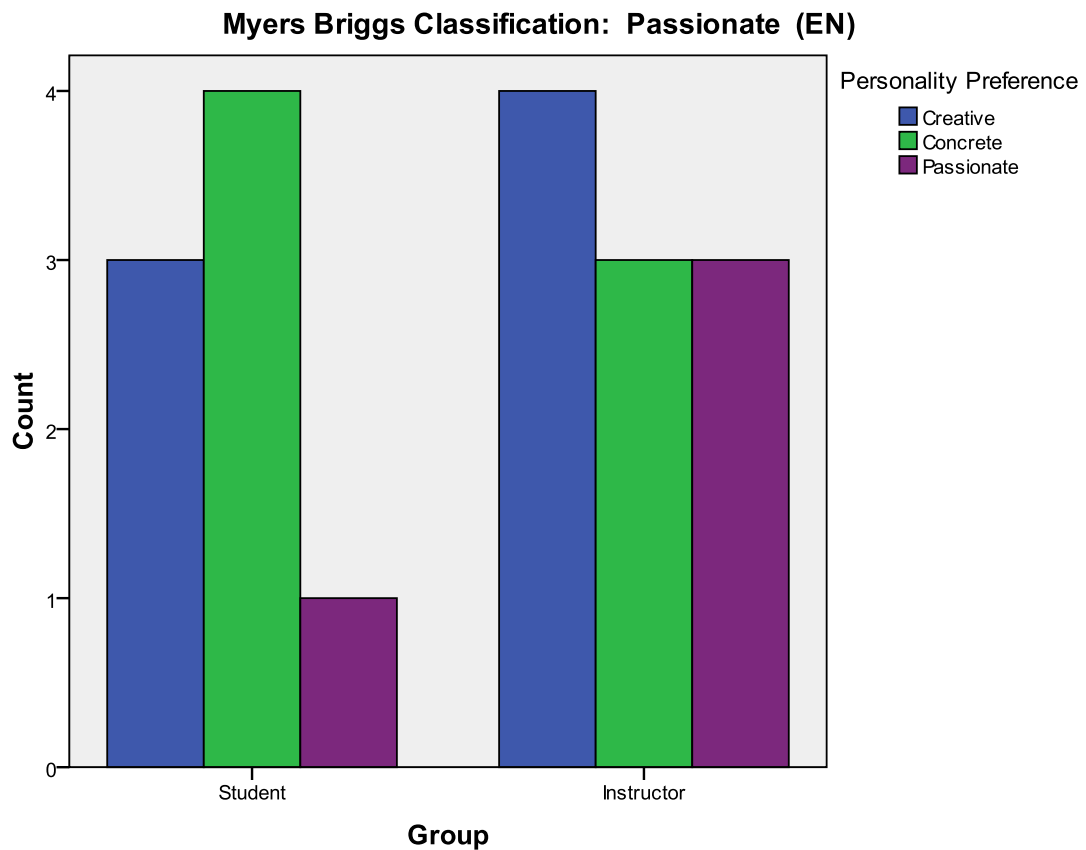


Figure 16. Personality preferences for students and instructors classified as passionate.

Summary

Although there were no significant differences in the student and instructor preferences for the personality types, some useful patterns in the data did emerge.

- 1) Students overall preferred to work with instructors who fell into the creative classification.
- 2) Instructors whose MBTI type fell into the sensible, creative, and concrete classifications preferred to work with students who fell into the concrete MBTI grouping.

- 3) Instructors in the passionate MBTI classification rated the creative students as their preferred type.
- 4) The two instances where there was a match between the types of students and instructors was for creative students, who preferred to work with creative instructors; and concrete instructors who preferred to work with concrete students.

Chapter V provides an explanation and summary of the findings, implications regarding the results of the study, recommendations for practice and further research.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

A great deal of training efforts within the aviation community have focused on ensuring technical expertise, however, personality factors have been relatively unexplored. The personality makeup of a flight crew, as well as their individual backgrounds, could play a large role in determining how instructors and student pilots interact with each other and negotiate various flight situations. Personality traits such as communication style, leadership style, and motivation could all potentially impact the student-instructor relationship.

Many flight training programs have sought to address interpersonal issues associated with crew coordination (Funk, 1991). Funk suggested that accidents resulting from a lack of knowledge or technical skill are extremely rare. Instead, it appears that breakdowns in communication and workload distribution are typically cited as causal factors in accidents. Furthermore, Funk stated that personality characteristics and communication patterns could potentially affect the effectiveness of a flight crew.

The relationship between student pilot and instructor is similar in training aspects to that of first officer and captain. Tjosvold (1990) stated that airplane management is moving from a heavy reliance on hierarchy to one that also encourages interactional processes among flight crew members. Traditionally, a highly centralized chain of command and rigid role prescriptions were considered the essential cornerstones of effective airplane management and safety. This still remains true for the flight instructor-student pilot relationship; however, personality differences appear to also affect the

dynamics of a training situation. Tjosvold found that crews who communicated extensively, acknowledged each other's communication attempts, made commands, disagreed, and felt less angry and embarrassed, made fewer errors and crashes in simulated flights.

The purpose of this study was to examine the relationship of personality characteristics of student pilots and instructors on the level of student and instructor personality preferences with flight training partners, using the Myers Briggs Type Indicator.

Restatement of the Methodology

Participants in this study attended either a local aeronautical university or flight academy. Flight instructors were employed at either school. Student pilots had, or were working towards, completion of private pilot or instrument ratings. Participation in the research study was voluntary. A notice was posted which described the details of the study and asked for voluntary participation. After reading the notice instructors or students interested in participating in the study went to a URL for SurveyMonkeyTM, read the Cover letter (Appendix C), and decided if they wanted to participate.

The participants were asked to complete a preferences questionnaire specific to flight training (Appendix D) or flight instruction (Appendix E). They were also asked to complete a role specific demographic survey (Appendices G & H). This data was used to describe the participants as a group. The participants were then asked to complete the MBTI which took approximately 15 - 20 minutes. A chi-square analysis was conducted to evaluate if students and instructors differed on the MBTI types according to Sohn and Jo's (2003) classifications.

Conclusion

The primary research question guiding this study was whether or not certain personality types of both student pilots and their flight instructors were related to personality preferences for flight training partners. The specific question investigated was: Would the combination of certain personality types of both student pilot and instructor be associated with personality preferences for flight training partners for student pilots, and their instructors?

There were no significant differences between the students and instructors in relation to their MBTI types. For both groups, the sensible and concrete types were the most common (38.6% and 34.1% for students, and 37.2% and 37.2% for instructors). These results are similar to Sohn and Jo's sample in which students were predominantly concrete, and instructors were predominantly sensible. The ratio of introverts to extroverts was 38 : 49, which was also similar to Sohn and Jo's (2003) sample.

Two way chi-square analyses were conducted to assess the research hypotheses.

Hypothesis 1: Student pilots will give higher preference ratings to flight instructor personality traits that are similar to their own. The relationship between preference rating of students and their MBTI type was not found to be significant.

Hypothesis 2: Flight instructors will give higher preference ratings to student pilot personality traits that are similar to their own. The relationship between preference rating of instructors and their MBTI type was not found to be significant; however, students overall preferred to work with instructors who fell into the creative classification. Instructors whose MBTI type fell into the sensible, creative, and concrete classifications preferred to work with students who fell into the concrete MBTI grouping,

while instructors in the passionate MBTI classification rated the creative students as their preferred type. The two instances where there was a match between the types of students and instructors was for creative students, who preferred to work with creative instructors; and concrete instructors who preferred to work with concrete students. The latter finding is consistent with Sohn and Jo's (2003) finding that the ideal combination of students and instructors was when both were in the concrete classification.

Interestingly, the passionate MBTI group was not rated as being preferred by any of the student or instructor types and none of the participants in the passionate group selected the sensible group as their preferred type. The latter finding is supportive of Sohn and Jo's finding that when sensible instructors were paired with passionate students, the students had the highest mental workload in terms of heart rate and altitude deviation. Within the participants in the concrete classification, the sensible and passionate types were the least preferred by both students and instructors. This is also in line with Sohn and Jo's findings that the combination of concrete/sensible and concrete/passionate were the worst in terms of subjective multi-dimensional workload ratings and subjective degree of personality harmony.

Recommendations for Practice

It is important to keep in mind the work of Brown, Carmichael, Kutz, and Shandiz (2004) who studied effective instructional strategy for flight students, as they felt it was often essential to learning retention, especially in the aviation classroom. The authors saw student learning in the aviation environment with its numerous subspecialties and associated complexities as being affected by not only the unique personal preferences and attitudes of students, but also their individual responsiveness to instruction which

could be related to the preferences and style of the instructor. They felt that it was possible for MBTI preferences to serve as the scaffolding for a slowly evolving mosaic of the aviation student. The motivation to teach for flight instructors, and the motivation to learn on the students' behalf, play an important role in safety and completion of flight training. Frederick-Recascino and Hall (2003) studied the relationship between pilot motivation and flight performance in student pilots attending an aviation university. They theorized that motivation will be directly related to issues of performance in flight training. They felt self-determination is up to the flight student. Further, a student pilot must choose to attend courses, schedule flight times, practice specific skill sets, and study for written exams. Thus, the greater amount of self-determination the student has, reflective of identified or intrinsic motivation, the more persistent they will be in their training. The authors also suggest that many "smart" students flunk out of college each year because they fail to attend class, fail to study, or simply became too distracted to perform their school duties.

Recommendations for Future Research

The data obtained from this study continue to substantiate some of the results of the Sohn and Jo study. The results are compelling enough to warrant further investigation of the personality characteristics that make up the preferred pairing of flight instructor and student pilot. If this research study were to be repeated, a valid recommendation would be to utilize a larger sample population that would include general aviation and commercial pilots in order to improve the generalizability of the results. A study could be conducted to investigate the satisfaction of actual current pairings of flight instructor and student pilot. Such a study could yield real life data that does not speculate as to what an

individual prefers; rather it would give an actual rating of a current pairing of flight instructor and student pilot, or captain and first officer. With that said, it would be interesting to see if a pretest satisfaction scale combined with a workshop for student pilot and instructors, followed by a posttest satisfaction scale, would yield increased satisfaction scores after a period of time. The education component would attempt to give both instructors and students education on the personality types they could be potentially paired with in an effort to give greater understanding of personality dynamics that could arise in the cockpit.

Lastly, further research is needed concerning the actual rate of dropouts in flight instruction programs and the personality types of those who succeed. It could be possible certain types of personalities prone to successful completion of flight training programs. Conversely certain personality types may be more apt to drop out of this field of work. Early intervention and education might increase the chances for completion of flight training programs for those personality types that may be prone to dropping out. Should personality type assessments be required for all at the outset of a flight training program to link individuals with the resources and education they need to complete flight training safely and expeditiously? Many questions have yet to be answered and would benefit the aviation industry. It would be beneficial for any flight school to support this type of research not only for financial reasons but also safety concerns.

Summary

This research must continue in order to improve overall safety not only for flight students, flight instructors, first officers and captains, but also for the millions of people who fly every year. The industry continues to modernize thru technology, however the

research on the personalities operating these sophisticated machines still lags behind.

Those of us who have a passion for this ever changing and expanding field have a responsibility to make sure we expand our knowledge of interpersonal exchange in the cockpit.

REFERENCES

- Ackerman, P. L., & Heggestad, E. D. (1997). Intelligence, personality, and interests: Evidence for overlapping traits. *Psychological Bulletin, 121*, 219-245.
- Ayman, R., Chemers, M. M., & Fiedler, F. (1995). Leadership: The multiple-level approaches. *Leadership Quarterly, Special Issue 6(2)*, (Part I), 147-167.
- Baltes, P. B., Staudinger, U. M., & Lindenberger, U. (1999). Lifespan psychology: Theory and application to intellectual functioning. *Annual Review of Psychology, 50*, 471-507.
- Barrick, M. R., Mount, M. K., & Gupta, R. (2003). Meta-analysis of the relationship between the five-factor model of personality and Holland's occupational types. *Personnel Psychology, 56*, 45-74
- Beall, L. & Bordin, E. S. (1964). The development and personality of engineers. *Personnel and Guidance Journal, 43*, 23-32.
- Bell, E. L., & Nkomo, S. M. (2001). *Our separate ways: Black and White women and the struggle for professional identity*. Boston: Harvard Business School Press.
- Benson, R., Foushee, C., Helmreich, R. L., & Russini, W. (1986). Cockpit resource management: Exploring the attitude performance linkage. *Aviation Space and Environmental Medicine, 11*(12 sect. 1), 1198-1200.
- Bilimoria, Hopkins, O'Neil & Passarelli (2008). Women's leadership development strategic practices for women and organizations. *Consulting Psychology Journal: Practice and Research, 60*(4), 348-365.
- Blustein, D. L. (2006). *The psychology of working: A new perspective for career development, counseling, and public policy*. Mahwah, NJ: Erlbaum.

- Brightman, H. J. (2003). *GSU master teacher program: on learning styles*. Atlanta, GA: Georgia State University. Retrieved from <http://www.gsu.edu/~dschjb/wwwmbti.html>
- Brown, D. M., Carmichael, D. B., Kutz, M. N., & Shandiz, M. (2004). Preliminary implications for academic professionals of aviation student Myers-Briggs Type Indicator (MBTI) preferences. *International Journal of Applied Aviation Studies*, 4(2), 221-228.
- Burleson, J. A., Stilwel N. A., Thal, S. E., & Wallick, M. M. (2000). Myers-Briggs type and medical specialty choice: A new look at an old question. *Teaching and Learning in Medicine*, 12(1), 14-20.
- Bowers, C. A., Braun, C. C., Jentsch, F., & Salas, E. (1988). Analyzing Communication Sequences for Team Training Needs Assessment. *Human Factors*, 40(4), 672-679.
- Campbell, D. P., & Holland, J. L. (1972). A merger in vocational interest research: Applying Holland's theory to Strong's data. *Journal of Vocational Behavior*, 2, 353-376.
- Carli, L. L., & Eagly, A. H. (1999). Gender effects on social influence and emergent leadership. In G. N. Powell (Ed.), *Handbook of gender and work* (pp. 203-222). Thousand Oaks, CA: Sage.
- Chou, C., Madhavan, D., & Funk, K. (1996). Studies of Cockpit Task Management Errors. *The International Journal of Aviation Psychology*, 6(4), 307-320.
- Cummings, T. G., & Worley, C. G. (2005). *Organization development and change* (8th ed.). Florence, KY: Thompson South-Western.

- Cohn, J. M., Khurana, R., & Reeves, L. (2005). Growing talent as if your business depended on it. *Harvard Business Review*, 83, 62-70.
- Chayette, C. (1949). Personality traits of professional actors. *Occupations*, 27, 245-250.
- Dolgin, D. L., Lambirth, L. T., Moore, J. T., & Rentmeister-Bryant, H. K. (2003). Selected Personality Characteristics of Student Naval Aviators and student Naval Flight Officers. *The International Journal of Aviation Psychology*, 13(4), 415-427.
- Eagly, A. H., & Johnson, B. T. (1990). Gender and leadership style: A meta-analysis. *Psychological Bulletin*, 108, 233-256.
- Eagly, A. H., Karau, S. J., & Makhijani, M. G. (1995). Gender and the effectiveness of leaders: A meta-analysis. *Psychological Bulletin*, 117, 125-145.
- Elder, G. H., Jr. (1998). The life course and human development. In W. Damon & R. M. Lerner (Eds.), *Handbook of child psychology: Vol. 1. Theoretical models of human development*, (5th ed., pp. 939-991). Hoboken, NJ: John Wiley & Sons Inc.
- Feldman, D. (1989, August). Women of color build a rainbow of opportunity. *Management Review*, 18-21.
- Fisher, S. & Fisher, R. L. (1981). Pretend the World Is Funny and Forever. A *Psychological Analysis of Comedians, Clowns, and Actors*. Hillsdale, N.J.: Lawrence Erlbaum.
- Fleenor, J. W., (2004) Review of Myers Briggs Type Indicator Form M. In Centers for creative Leadership (Eds.). Retrieved from

<http://search.ebscohost.com.ezproxy.barry.edu>

- Fouad, N. A. (2007). Work and vocational psychology: Theory, research, And applications. *Annual Review of Psychology*, 58, 543-564.
- Funk, K., (1991). Cockpit task management: Preliminary definitions, normative theory, error taxonomy, and design recommendations. *The International Journal of Aviation Psychology*, 1(4), 271-285.
- Ginzberg, E., Ginsburg, S., Axelrad, S., & Herma, J. (1951). *Occupational choice: An approach to a general theory*. New York: Columbia University Press.
- Goleman, D. (1998). *Working with emotional intelligence*. New York: Bantam Books.
- Grolnick, W. S., & Ryan, R. M. (1987). Autonomy in children's learning: An experimental and individual difference investigation. *Journal of Personality and Social Psychology*, 52, 890-898.
- Hartung, P.J., Porfeli, E.J., & Vondracek, F.W. (2008). Career Adaptability in Childhood. *The Career Development Quarterly* (57), 63-74.
- Helmreich, R. L., Merritt, A. C., & Wilhelm, J. A. (1999). The evolution of crew resource management training in commercial aviation. *The International Journal of Aviation Psychology*, 2(1), 19-32.
- Holland, J. L. (1958). A personality inventory employing occupational titles. *Journal of Applied Psychology*, 42, 336-342.
- Holland, J. L. (1959). A theory of vocational choice. *Journal of Counseling Psychology*, 6, 35- 45.
- Holland, J. L. (1987). *1987 Manual Supplement for the Self Directed Search*. Odessa, Fla.: Psychological Assessment Resources.

- Holland, J. L. (1997). *Making vocational choices: A theory of vocational personalities and work environments* (3rd ed.). Odessa, FL: Psychological Assessment Resources.
- Holland, J. L. (1999). Why interest inventories are also personality inventories. In M. L. Savickas & A. R. Spokane (Eds.), *Vocational interests: Meaning, measurement, and counseling use* (pp. 87-101). Palo Alto, CA: Davies-Black Publishing.
- Holton, E. (1996). The flawed four-level evaluation model. *Human Resource Development Quarterly*, 7, 5-21.
- Kilburg, R. R. (1996). Toward a conceptual understanding and definition of executive coaching. *Consulting Psychology Journal: Practice and Research*, 48, 134-144.
- Larson, L. M., Rottinghaus, P. J., & Borgen, F. H. (2002). Meta-analyses of Big Six interests and Big Five personality factors. *Journal of Vocational Behavior*, 61, 217-239.
- Leonard, H. S., & Goff, M. (2003). Leadership development as an intervention for organizational transformation: A case study. *Consulting Psychology Journal: Practice and Research*, 55, 58-67.
- Lowman, R.L., (1987). Occupational choice as a moderator of psychotherapeutic approach. *Psychotherapy*, 24, 801-808.
- McCall, M. W. (2004). Leadership development through experience. *Academy of Management Executive*, 18, 127-130.
- Mahar, D., Cologon, J. & Duck, J. (1995). Response strategies when faking personality questionnaires in a vocational selection setting, *Personality and Individual*

Differences, 18, 605-609.

- Maurino, D. E. (1994). Crosscultural Perspectives in Human Factors Training: Lessons from the ICAO Human Factors Program. *The International Journal Of Aviation Psychology, 4*(2), 173-181.
- McCaulley, M. (2000). Myers-Briggs Type Indicator: A bridge between counseling and consulting. *Consulting Psychology Journal: Practice and Research, 52*(2), 117-132. doi:10.1037/1061-4087.52.2.117.
- Mead, G. H. (1932). *Mind, self; and society*. Chicago: University of Chicago Press.
- Miserandino, M. (1996). Children who do well in school: Individual differences in perceived competence and autonomy in above-average children. *Journal of Educational Psychology, 88*, 203-214.
- Nauta, M. M. (2010). The Development, Evolution, and Status of Holland's Theory of Vocational Personalities: Reflections and Future Directions for Counseling Psychology. *Journal of Counseling Psychology, 57*(1), 11-22.
- Randahl, G. J. (1991). A typological analysis of the relations between measured vocational interests and abilities. *Journal of Vocational Behavior, 38*, 333-350.
- Ready, D. A., & Conger, J. A. (2003). Why leadership development efforts fail. *MIT Sloan Management Review, 44*, 83- 88.
- Prediger, D. J. (1982). Dimensions underlying Holland's hexagon: Missing link between interests and occupations. *Journal of Vocational Behavior, 48*, 59-67.
- Porfeli, E. J., & Vondracek, F. W. (2002). Career development, work, and occupational success. In M. C. Smith & T. G. Reio (Eds.), *Handbook of research on adult*

development and learning. Mahwah, NJ: Erlbaum.

- Rajagopal, N. (2008). Myers-Briggs Type Indicator (MBTI): Examining behavioral aspects of executives in IT. *Abhigyan*, 26(1), 20-29
- Riverin-Simard, D. (2000). Career development in a changing context of the second part of working life. In A. Collin & R. A. Young (Eds.), *The future of career* (pp. 115-130). Cambridge, MA: Cambridge University Press.
- Satava, D. 1996, Personality types of CAPs: national vs. local firms *Journal of Psychological Types*, 36, 36-41.
- Savickas, M. L. 1991, Improving career time perspective. In D. Brown & L. Brooks, (Eds.), *Techniques of career counseling*, (pp. 236-249,), Boston, Allyn & Bacon.
- Savickas, M. L. (1997). Career adaptability: An integrative construct for life-span, life-space theory. *The Career Development Quarterly*, 45, 247-259.
- Savickas, M. L. (2002). Career construction: A developmental theory of vocational behavior. In D. Brown (Ed.), *Career choice and development (4th ed.)* (pp. 149-205). San Francisco: Jossey-Bass.
- Savickas, M. L. (2005). Career construction theory and practice. *Paper presented at the annual conference of the American Counseling Association*, Atlanta, GA.
- Sohn, S. Y. , & Jo, Y. K. (2003). A study on the student pilot's mental workload due to personality types of both instructor and student. *Ergonomics*, 46(15), 1566-1577.
- Sukenik, N. (1998). Coordination in the cockpit: A game theory view of standard. *International Journal of Aviation Psychology*, 8(4), 405-412.
- Super, D. E. (1990). A life-span, life-space approach to career development. In D.

- Brown, L. Brooks, & Associates (Eds.), *Career choice and development: Applying contemporary theories to practice* (2nd ed., pp. 197-261). San Francisco: Jossey-Bass.
- Swanson, J. L. (1999). Stability and change in vocational interests. In M. L. Savickas & A. R. Spokane (Eds.), *Vocational interests: Meaning, measurement, and counseling use* (pp. 135-158). Palo Alto, CA: Davies-Black Publishing.
- Tjosvold, D. (1990). Flight crew collaboration to manage safety risks. *Group & Organization Studies*, 15(2), 177-191
- Weinrach, S. G. (1996). The psychological and vocational interest patterns of Donald Super and John Holland. *Journal of Counseling & Development*, 75, 5-16.
- Zinnecker, J. (1995). The cultural modernization of childhood. In L. Chisholm, P. Buchner, H. H. Kruger, & M. du Bois-Reymond (Eds.), *Growing up in Europe: Contemporary horizons in childhood and youth studies* (pp. 85-94). Walter de New York: Aldine de Gruyter.

APPENDIX A-1

From: Vigneau, Teri A
Sent: Friday, October 01, 2010 9:22 AM
To: Conrad Beckles
Cc: Sowers, Teana Marie; Vigneau, Teri A; Boquet, Albert J.
Subject: IRB #10-119 Flight Instructor & Student Pilot Training Preferences

Dear Mr. Beckles,

The Chair of the Institutional Review Board for the Protection of Human Subjects at Embry-Riddle Aeronautical University has determined that your study titled, "Flight Instructor and Student Pilot Training Preferences in Relation to Myers-Briggs Types" is exempt. You may proceed with your research.

Attached is the Determination Form for your records.

Best of luck in your research.

Teri Vigneau (va new), CRA, MPA
Manager, Pre-Award Office
Sponsored Programs
Human Protections Administrator
Embry-Riddle Aeronautical University
600 S. Clyde Morris Blvd.
Daytona Beach, FL 32114-3900
(386) 226-7179 Telephone
(386) 323-5094 Fax

APPENDIX A-2

(EMAILED 7/23/2010)

Hi Conrad,

We are a go for your research project. We would like to see the results before you publish them. Do you have a flyer with the details of the process (when, what, how, etc) that we could post?

Thanks,

Bob Joyce
Director of Flight Operations
Delta Connection Academy
<http://www.deltaconnectionacademy.com>
407-430-4191 office
407-489-9245 cell

WANTED!

Flight Instructors & Student Pilots to volunteer to participate in a study on the Flight Instructor & Student Pilot relationship.



A doctoral research study is being conducted by Conrad Beckles, M.S., L.M.H.C, a doctoral candidate at Barry University in the Adrian Dominican School of Education, exploring the flight instructor and student pilot relationship.

Study Requirements - Participants complete online a consent form (2 minutes), demographic survey (5 minutes) a flight instructor or student pilot questionnaire (2 minutes) and 15 - 20 minute personality test (The Myers-Briggs Type Indicator).

Participants meeting eligibility requirements - will be paid \$15 upon completion!

Eligibility Requirements - Male and female adults who are at least 18 years of age and currently in a flight training program. Both flight instructors and student pilots are needed. **A maximum of 40 student pilots & 40 flight instructors are needed.**

This is a research study and is not considered a therapeutic session. Confidentiality will be carefully protected. Participation is entirely voluntary. You can decline to participate and drop out at any time without any negative consequences.

**Barry University Contacts | Sponsor: Dr. Catharina Eeltink - 321.235.8401
IRB Secretary: Barbara Cook - 305.899.3026**

**For more info: Call Conrad Beckles @ 407.617.4934
or email Conrad at: COB123@aol.com**

TEAR AWAY CONTACT INFO - TAKE ONE!!

Flight Study: Call Conrad @ 407.617.4934, or email cob123@aol.com.

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APPENDIX C

Barry University

Cover Letter

This research is being conducted by Conrad Beckles, I am a PhD candidate at Barry University Orlando. The purpose of this research is to examine the relationship of personality characteristics of student pilots and instructors, based on the Myers Briggs Type Indicator, on the level of student and instructor personality preferences with flight training partners. Participation is entirely voluntary and you may at any time withdraw from participation without negative consequences. I am asking you to complete the attached electronic survey. More specifically, you will be asked to complete a 2 minute questionnaire, a 5 minute demographic survey, and take the Meyers Briggs Type Indicator, which is a personality test. After you have completed the survey, consent and questionnaire, SurveyMonkey™ will give you a link to begin the Myers Briggs. It takes 15 - 20 minutes to complete the Myers Briggs Type Indicator. When you are linked to begin the Myers Briggs, you will be given your own password and id number. No test results can be linked back to you. Should you wish to have the \$15 payment mailed to you I will need to obtain some personal information. There is no way for anyone to associate your test results with you personally.

The research may benefit the leadership and education fields by adding information to the literature available, and may contribute to the development of improved flight training programs.

There are no known potential risks of participating this study. However, there can be no guarantee of absolute anonymity due to the medium of this second party - SurveyMonkey™. Nevertheless, SurveyMonkey™ emphatically declares "Our privacy policy states that we will not use your data for our own purposes." In addition, I will request that SurveyMonkey™ "disable the SSL" before data collection thereby assuring the fact that the results I will receive will be truly anonymous and there will be no record kept of your IP address nor linkages I could utilize to identify you.

If you would like to receive \$15.00 for participating in this study, I will need to be able to contact you by email. If you would like to receive the \$15.00, please send me an email at cob123@aol.com and put PILOT in the subject line. I will send you an email and we can arrange to have the reward mailed to you. Your identifying information will not be associated with any of the data collected.

Your responses will be automatically compiled in a spreadsheet format and cannot be directly linked to you. All data will be stored in a password protected electronic format. In addition, SurveyMonkey™ employs multiple layers of security to ensure that my account and the data associated with the account are private and secure. In addition, a third-party security firm is consistently utilized by the survey tool administration (SurveyMonkey™) to conduct audits of security. The company asserts that the latest in firewall and intrusion prevention technology is employed. Hence, any concerns regarding

potential invasion of your privacy and access to your responses other than I, the investigator should be allayed due to these protections. I trust you feel confident to answer the attached survey questions as honestly as you can. Data will be stored on a secure hard drive.

“By clicking on the “I agree” button below and by submitting a completed survey, you are giving permission to use your data record in this study. Participant must click on either the “I agree” button or “I do not agree” button to confirm consent or refusal. Once the “I agree” button is clicked, participant is directly linked to the Survey. If you click on the “I do not agree” button, you will immediately exit this site.

The Director of Flight Operations is aware of this study and has provided written approval. Due to the confidential nature of the study your University officials will not be informed who consented and who refused to participate in this project.

Again, you are free to withdraw your participation at any time without penalty. Thank you for your participation in advance. If you have any questions, feel free to contact me at cob123@aol.com, Dr. Catharina Eeltink, at (321) 235-8401, or the Institutional Review Board point of contact, Barbara Cook, at (305) 899-3020 or bcook@mail.barry.edu .

I Do AGREE

I Do Not AGREE

APPENDIX D

Student Questionnaire

Please read each of the four descriptions of flight instructors' characteristics. Then rank the four descriptions as 1, 2, 3, or 4. Put a 1 by the instructor characteristics you most prefer to work with as a flight student, a 2 by the type of instructor you next prefer to work with, a 3 by the next preferred set of characteristics, and a 4 by the description of instructors you least prefer to work with.

Ranking

- _____ Sensible, Quiet, and has High Concentration.
- _____ Creative, Self Supportive and Persistent
- _____ Concrete, Realistic, and has Mechanical Skills
- _____ Passionate with a strong sense of responsibility, but tends to overlook details.

APPENDIX E

Instructor Questionnaire

Please read each of the four descriptions of flight students' characteristics. Then rank the four descriptions as 1, 2, 3, or 4. Put a 1 by the student characteristics you most prefer to work with as a flight instructor, a 2 by the type of student you next prefer to work with, a 3 by the next preferred set of characteristics, and a 4 by the description of students you least prefer to work with.

Ranking

- _____ Sensible, Quiet, and has High Concentration.
- _____ Creative, Self Supportive and Persistent
- _____ Concrete, Realistic, and has Mechanical Skills
- _____ Passionate with a strong sense of responsibility, but tends to overlook details.

APPENDIX F

DEMOGRAPHIC SURVEY FOR INSTRUCTORS

Please fill out this demographic survey so that we may obtain some general information about you. Your responses are confidential.

Please write in (where appropriate) or circle the number of your response.

1. Your age: _____
2. Gender:
 1. Female
 2. Male
3. Marital status:
 1. Single, never married
 2. Married
 3. Separated
 4. Divorced
 5. Widowed
4. What is your race /ethnicity?
 1. Caucasian, non Hispanic
 2. Black, African-American
 3. Caucasian, Hispanic/Latino
 4. Black, Hispanic/Latino
 5. Asian
 6. Black, Caribbean
 7. Pacific Islander
 8. Native American
 9. Eskimo
 10. Other: _____
5. Educational level:
 1. Less than high school diploma
 2. High school diploma
 3. Some college
 4. Undergraduate college degree
 5. Graduate degree (Master's Degree, Ph.D., J.D., M.D., etc.)

6. Current work status:
 1. Employed/self employed full time
 2. Employed/self employed part time
 3. Retired
 4. Unemployed
 5. Never employed
 6. Other: _____

7. Current school status:
 1. Not attending school
 2. Attending school part time
 3. Attending school full time

8. Current Pilot rating:
 1. Student
 2. Private
 3. Instrument
 4. Commercial
 5. Instructor and /or Advanced Ratings

9. Current year in school:
 1. Freshman
 2. Sophomore
 3. Junior
 4. Senior

10. If you are a faculty member, are you a
 1. Full time instructor
 2. Part time instructor
 3. Adjunct
 4. Other _____

11. If you are a faculty member, how many years of teaching experience do you have: _____

APPENDIX G

DEMOGRAPHIC SURVEY FOR STUDENTS

Please fill out this demographic survey so that we may obtain some general information about you. Your responses are confidential.

Please write in (where appropriate) or circle the number of your response.

1. Your age: _____
2. Gender: 1. Female
 2. Male
3. Marital status:
 1. Single, never married
 2. Married
 3. Separated
 4. Divorced
 5. Widowed
4. What is your race /ethnicity?
 1. Caucasian, non Hispanic
 2. Black, African-American
 3. Caucasian, Hispanic/Latino
 4. Black, Hispanic/Latino
 5. Asian
 6. Black, Caribbean
 7. Pacific Islander
 8. Native American
 9. Eskimo
 10. Other: _____
5. Educational level:
 1. Less than high school diploma
 2. High school diploma
 3. Some college
 4. Undergraduate college degree
 5. Graduate degree (Master's Degree, Ph.D., J.D., M.D., etc.)

6. Current work status:
1. Employed/self employed full time
 2. Employed/self employed part time
 3. Retired
 4. Unemployed
 5. Never employed
 6. Other: _____
7. Current Pilot rating:
1. Student
 2. Private
 3. Instrument
 4. Commercial
 5. Instructor and /or Advanced Ratings
8. Are you a:
1. Full time instructor
 2. Part time instructor
 3. Adjunct
 4. Other _____
11. How many years of teaching experience do you have: _____
12. Are you currently a student in a degree program?
1. No
 2. Yes
13. If you are a student in a degree program, is it:
1. Bachelor's degree
 2. Master's degree
 3. PhD degree
 4. Other _____