A STUDY OF PERSONALITY TYPE PREFERENCES OF STUDENTS ENROLLED IN THE MILWAUKEE AREA TECHNICAL COLLEGE FIRE SCIENCE ASSOCIATE DEGREE PROGRAM

By

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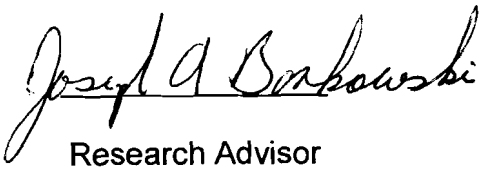

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ABSTRACT

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A STUDY OF PERSONALITY TYPE PREFERENCES OF STUDENTS ENROLLED IN THE MILWAUKEE AREA TECHNICAL COLLEGE FIRE SCIENCE ASSOCIATE DEGREE PROGRAM

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This study was an assessment of the personality types of students enrolled in the Milwaukee Area Technical College (MATC) Fire Science Associate Degree Program using the 16 personality types associated with the Myers-Briggs Type Indicator (MBTI).

According to MBTI theory, people develop patterns of behaviors, skills, and attitudes based on their psychological type. Type theory indicates that individuals also develop learning styles based upon their psychological type preference.

This study had three objectives. The first objective was to determine the personality types of students in the program. Results showed that the distribution of student personality types was similar to that of the adult population of the U. S.

The second objective was to compare the personality types of students in the program who are professional firefighters to those who are not firefighters. This comparison could not be adequately made due to the few (13) firefighters in the random sample.

The third objective was to determine whether there were significant differences in the academic performance between students in the program with different personality types. This was accomplished by comparing the mean grade point average (GPA) of students from each of the 16 personality types. The ESFJ and ENFJ types reported GPAs significantly higher than the mean (3.18), at 3.43 and 3.5. The INTP type reported a GPA significantly lower than the norm, at 2.72. More research would be needed to determine whether there is a correlation between these students academic performance and the MBTI personality types.

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CHAPTER 1

Research Problem and Objectives

Introduction

The focus of this study will be an analysis of the personality types of students enrolled in the Milwaukee Area Technical College (MATC) Fire Science Associate Degree Program.

The Milwaukee Area Technical College maintains a nationally accredited, State of Wisconsin recognized, fire service training facility. Available for prospective and current firefighters are a sixty-five credit, two-year Associate Degree in Fire Science and twelve State of Wisconsin Certification Programs. Research for this study will focus on the Fire Science Associate Degree Program which currently has a full time equivalent (FTE) enrollment of 104 students. Actual enrollment in this Program is 185 students. The study will be conducted using a sample of 130 students (based on National Education Association Standards).

The study will be based on the sixteen psychological type preferences associated with the Myers-Briggs Type Indicator (MBTI) personality inventory. The researcher will administer the MBTI personality inventory to the 130 randomly selected students mentioned above and arrive at each student's psychological type.

According to MBTI theory, people develop a pattern of behaviors, skills, and attitudes based on their psychological type. Psychological type affects many aspects of a person's life including career choice and satisfaction, and one's

learning style preference. Isabel Briggs Myers believes that people are more attracted to and are more satisfied in a job that allows them to express their psychological type preferences (Briggs Myers, 1998). Information gained from the MBTI personality inventories could therefore be used to council students with their career choices. It can be assumed that if you are naturally an introverted person who does not like to make rapid decisions, you may not be well suited for a career in the fire service.

Psychological type information can also be used by instructors in the classroom to create an environment more conducive to learning. Briggs Myers (1998) believed that "people learn most effectively, especially when approaching new or difficult topics, when they are given opportunities to use their most effective learning style" (p. 37). Although it is important to teach to, and be able to learn from, a variety of psychological types, it is also important to recognize how individuals learn best.

In the ensuing paragraphs in this chapter, the researcher will present the problem statement and discuss the research objectives. Included will also be a discussion of the study's significance, limitations and assumptions made. The chapter will conclude with a list of pertinent definitions.

Problem Statement

The purpose of this study is to identify and analyze the personality type preferences of students enrolled in the Milwaukee Area Technical College Fire Science Associate Degree Program using the 16 personality type preferences associated with the Myers-Briggs Type Indicator.

Research Objectives

The objectives of this study are to:

1. Determine the personality type preferences of students in the MATC Fire Science Associate Degree Program;
2. Compare the personality type preferences of students who are career firefighters to those students who are not career firefighters; and
3. Determine whether there are significant differences in the academic performance among students with differing personality type preferences.

Significance of the Study

This study has applications relating to both the instructional style used by Fire Science Instructors and career counseling of MATC's students.

Having knowledge of students' preferred personality types, and corresponding learning styles, will allow MATC's Fire Service Instructors to create a learning environment that will better address learning needs. The instructors can address any mismatches there may be between their instructional styles and their students' personality type preferences.

Another outcome of this study will be a comparison of the personality type preferences of students who are career firefighters with those who are not. Although personality type preference does not indicate that a person will be a good firefighter, a mismatch of job related activities to personality type preferences could lead to job dissatisfaction and increased stress. Career counseling related to personality type preference may assist students in that critical choice of selecting the career that is right for them.

Limitations

The results of this study are limited to the population of the MATC Fire Science program from the spring semester of 2005. Enrollment and the corresponding demographics within this program change each semester and results applied to other time periods may not be the same. Study results also cannot be assumed to be representative of the entire school population or the populations of other Fire Science degree programs.

Assumptions

The researcher assumes that the random sample is representative of the population of the MATC Fire Science program. The researcher does realize that the MBTI personality indicator is a direct self-report inventory and results are subject to each participant's perspective. Participants may answer questions in a way that places them into a psychological type they believe is more favorable. The researcher assumes, however, that subjects are answering the MBTI honestly and are providing accurate information.

Definitions

Career Firefighter – A career firefighter is a person whose primary occupation is firefighting. This individual is paid for his/her services. This definition does not include volunteer firefighters.

Theoretical Constructs – The concepts of a theory; in this case, related to Jung's Theory of Psychological Type (Cloninger, 1996).

Full Time Equivalent (FTE) – The equivalent of one student taking a 12 credit load in any one semester, considered a full time student. As an example, two

students each taking six credit loads would be the equivalent of one full time student.

Inventory – "An instrument that measures several theoretical constructs or traits"; as opposed to a questionnaire which measures only one theoretical construct or trait (Cloninger, 1996, p. 11).

CHAPTER 2

REVIEW OF LITERATURE

Introduction

This chapter will focus on the history and application of Psychological Type Theory. The review will begin with an overview of Carl Jung's theory of Psychological Type. The remainder of the chapter will focus on the Myers Briggs Type Indicator (MBTI) personality inventory. This self-report questionnaire, developed by Katharine Cook Briggs and Isabel Briggs Myers, is based on Jung's work with Psychological Type. The review of the MBTI will focus on the development and history of the questionnaire, and will provide a description of the 16 psychological types associated with the MBTI. The chapter will conclude with a discussion of the MBTI and learning styles.

History of Psychological Type Theory

Jung's Theory of Psychological Type

> C.G. Jung suggested that human behavior was not random but was in fact predictable and therefore classifiable....differences in behavior, which seem so obvious to the eye, are a result of preferences related to the basic functions our personalities perform throughout life....Such preferences become the core of our attractions and aversions to people, tasks and events all life long. (Kroeger et al., 2002, p.6)

From his observations of human behavior, Swiss psychiatrist Carl G. Jung developed his theory of Psychological Type which was published in 1921. In his theory, Jung surmised that behavior resulted from people's inborn preferences

to use their minds in different ways (Briggs Myers, 1995). Jung believed that these predisposed preferences create patterns of behavior that occur as people act on them. He asserted that these preferences and resulting behavioral tendencies are the foundations of our personalities (Kroeger et al., 2002). Jung found that there were just a few basic observable differences in the way people behave and set out to classify them (Jung, 1949; Razenberg, n.d.).

Components of Jung's Psychological Type Theory

Jung's theory of Psychological Type suggests that there are four functions of consciousness, or mental processes, that people use to experience reality: feeling (F), thinking (T), intuition (N) and sensational (S). He identified sensation and intuition as opposites (S-N) in the way people perceive, or take in information. He also identified thinking and feeling (T-F) as opposites, in the way that people judge, or organize information and reach conclusions. Jung believed that all of these functions are available to, and used by, all people in varying degrees. He asserted, however, that every person has a preference to, and can be classified in, one of these four basic types (Razenberg, n.d.).

Jung also addressed a person's relative interest (and preference) to the outer world of people, experience and activity, or their inner world of ideas, memories and emotions (Briggs Myers, 1998). He classified individuals in one of two opposite orientations: extraversion (E), acting in the outer world, and introversion (I), acting in the inner world. Just as with the four functions of consciousness above, Jung believed both of these orientations are available to each of us but we prefer to function in one of them.

By creating combinations of the four mental processes and the two different orientations to the world, Jung described eight "cognitive processes" or fundamental patterns of mental activity. Jung believed that each of us has an inborn preference among the components of these cognitive processes. He called this preference a person's dominant function. Jung proposed that there are personality traits and behaviors that are closely aligned to each of the processes. These patterns of traits and behaviors form eight distinct psychological types (Jung, 1949; Razenberg, n.d.; Berens, 1999).

Jung's Eight Psychological Types

Jung's eight psychological types, which are the foundation for the Myers-Briggs Type Indicator and many other psychological type instruments, will be described only briefly in this section. A more detailed explanation of psychological types will follow in this review of literature.

Extraverted Sensing (Se) types are said to prefer experiencing the world around them. They act on the physical world and scan for visible reactions and relevant data (Berens, 1999).

Introverted Sensing (Si) types are said to prefer recalling past experiences, clarifying information and remembering detailed data and with what it is linked (Berens, 1999).

Extraverted Intuition (Ne) types are said to prefer making inferences, scanning for what could be, and noticing threads of meaning (Berens, 1999).

Introverted Intuiting (Ni) types prefer foreseeing implications and conceptualizing their experiences (Berens, 1999).

Extraverted Thinking (Te) types prefer organizing, sorting and applying logic and criteria to process their experiences (Berens, 1999).

Introverted Thinking (Ti) types prefer to analyze and figure out how things work (Berens, 1999).

Extraverted Feeling (Fe) types consider others and improve relationships when experiencing the world (Berens, 1999).

Introverted Feeling (Fi) types prefer to evaluate the importance and to value of experiences (Berens, 1999).

Preference

A basic premise of Psychological Type theory is that preferences among the components of the cognitive processes (E versus I, S versus N, F versus T) lead to distinct personality patterns and fundamental differences between people. Isabel Briggs Myers explains the idea of preference most succinctly, creating an example of writing your name with your non-preferred hand. Briggs Myers (1998) states, "You can use either hand when you have to and you use both hands regularly, but for writing, one is natural and competent, while the other requires effort and feels awkward." (p.8) Similarly, we feel most comfortable and competent when we are able to function within our preferred psychological type.

Jung theorized about psychological type, but it appears that he did not attempt to measure or predict individual's psychological preferences or personality patterns (behaviors). He focused on the theory and explained the "why". Jung left it up to others to put the theory to practical use.

Myers-Briggs Type Indicator

History of the MBTI

According to Peter Briggs Myers, in the preface to the book *Gifts Differing*, there was virtually no practical application of Jung's theory until Isabel Briggs Myers and Katharine Briggs developed the Myers-Briggs Type Indicator (Briggs Myers, 1995). He believes that these women were the first to create a psychological test for measuring the functions set forth in Jung's model of Psychological Type.

After Briggs read Jung's theory of Psychological Type, she adopted Jung's Model of Psychological Types in her studies. In the 1940s, Briggs, along with her daughter Isabel Briggs Myers, created the MBTI, an instrument for determining psychological type. Throughout the years since this initial instrument was developed, the MBTI has undergone significant refinement but has always remained based on Jung's Model of Psychological Types (Tieger & Barron-Tieger, 2001).

Briggs Myers, in *Introduction to Type*, wrote that the MBTI was designed to "provide a rational structure for understanding normal everyday differences between people" (1998, p. 30). Briggs and Briggs Myers asserted that they were more interested in the application of Jung's theory than in further defining the processes described within the theory. They concentrated on the consequences of each functional preference rather than toward why a person gives priority to one function or another (Briggs Myers, 1995).

The MBTI Instrument

The MBTI instrument is a self-report inventory used to identify the personality types of normal healthy people (Briggs, 1995). It measures a person's preferences toward one or another of four paired opposites (functions) relating to his or her perception, judgment and orientation to the world around them. The inventory uses a forced-choice format that requires respondents to make choices between two opposite alternatives. Each question asks the respondent to choose the alternative which is more appealing to, or better describes them. The test yields scores that indicate a person's preference, not their competency, pertaining to each of the four paired functions.

The focus of the instrument is to separate people into one of 16 personality types postulated by the authors of the instrument, not to measure how much of a particular trait a person may have. The authors' claim that the MBTI is an indicator of personality type, not a test, therefore there are no right or wrong answers (Briggs Myers et al., 2003). Their philosophy is that each of the 16 personality type preferences is equally valuable.

The Dichotomies

The MBTI uses the four paired functions (sensing - intuition, thinking - feeling) and the two opposing orientations to the world (extraversion - introversion) as defined in Jung's theory, but also adds an additional paring of opposites the authors of the MBTI believe was implied in Jung's theory (judging – perceiving). Each of the eight functions in the opposing pairs mentioned above is referred to

as a personality type preference. The four parings of these eight opposites (or preferences) are referred to as the four dichotomies of the MBTI. (Briggs Myers et al., 2003).

The premise of the MBTI is that each person has a preference toward one end or the other in each of the four dichotomies. The combination of a person's preferences in each of the four dichotomies will give insight into why he or she thinks and behaves in a specific way. The authors of the MBTI do, however, realize that each of us uses both sides of the dichotomies, but believe that we are more comfortable on one side over the other (Briggs Myers et al., 2003; Kiersey & Bates, 1984)

Briggs and Briggs Myers, like Jung, believe that there are two opposite ways people gather energy and are oriented to the world around and within them (Kiersey & Bates, 1984). This is referred to as the Extraversion (E) – Introversion (I) dichotomy. Extraversion (E) refers to people who prefer to gather their energy from the world around them. Extraverts tend to be sociable and act on the people and things around them. Introversion (I), on the other hand, refers to people who gather their energy from within themselves. These individuals will likely prefer solitude to gain energy. They prefer to focus on feelings, ideas and to think things out before talking.

Tieger and Barron-Tieger (2001) pointed out some differences between extraverts and introverts in their book, *Do What You Are*. They believe extraverts "like being the center of attention"; "act, then think"; "are easier to read and know"; "talk more than listen"; "respond quickly"; and "prefer breadth to depth"

(p.17). Conversely, these authors believe introverts "avoid being the center of attention"; "listen more than talk"; "are more private"; "respond after taking the time to think things through"; and "prefer depth to breadth" (Tieger & Barron-Tieger, 2001, p.17). Kiersey and Bates (1984) found 75% of the U.S. population to be extraverted, while 25% is Introverted.

The authors of the MBTI, again like Jung, indicate that there are two opposite ways people perceive or gather information, by sensing (S) or by intuition (N) (Briggs Myers et al., 2003). They refer to this as the S – N dichotomy. Sensing relates to using one's senses to perceive what one experiences. If a person's orientation is toward sensing, they will most often focus on experiencing the present moment because senses only perceive what is currently happening. "Sensors" prefer to focus on what they can smell, feel, taste, hear or see. They tend to focus on details that can be confirmed by their senses, and their past and present experiences.

Whereas a sensing individual focuses on facts and details that can be verified through their senses and experiences, intuition (N) is preferred by those who focus their perception of information on "possibilities and relationships among ideas" (Hammer, 1993, p. 3). Intuitive individuals do not often concentrate on concrete facts but prefer to look at the meanings and relationships of the information they gather. These individuals often focus on the abstract and are oriented toward the future (Briggs Myers et al., 2003).

According to Tieger and Barron-Tieger (2001), when gathering information, sensors tend to "trust what is certain and concrete", "like new ideas only if they have practical applications", "value realism and common sense", and tend to be "specific and literal" (p. 21). These authors describe intuitives conversely as people who "trust inspiration and inference", "like new ideas and concepts", "value imagination and innovation", and tend to be "general and figurative" (p. 21). Kiersey and Bates (1984) found that 75% of the U.S. population favored sensing to intuition when gathering information.

Briggs and Briggs Myers also adopted Jung's belief that individuals have two opposing methods of making decisions or forming judgments on information they have gathered (perception), by thinking (T) or by feeling (F) (Kiersey & Bates, 1984; Briggs Myers et al., 2003). This is known as the T – F dichotomy.

People oriented toward the thinking function evaluate information they have gathered by focusing on applying logic and objectivity in their thought processes (Briggs Myers et al., 2003). Personal and group values and wishes tend not to be involved in a thinking type's decision making process. Thinking types tend to be concerned with justice and fairness.

Individuals oriented toward the feeling function of the T – F dichotomy tend to use personal and group values in their decision making. These individuals use a much more subjective decision making process than do thinking individuals. Feeling people tend to have more of a concern for the human aspects of a problem than the technical aspects (Briggs Myers et al., 2003).

Tieger and Barron Tieger (2001) describe thinkers as individuals who value logic, justice and fairness; and as those who are critical and see flaws. Thinkers believe it is "more important to be truthful than tactful" (p. 24). They are "motivated by a desire for achievement and accomplishment" (p. 24). In contrast to thinkers, individuals who prefer feeling value empathy and harmony; and seek to please others. Feelers consider it "important to be tactful as well as truthful" and "are motivated by a desire to be appreciated" (p. 24). Kiersey and Bates (1984) found that the population of the United States was equally split between thinking and feeling in their preference for decision making.

As was explained earlier in this chapter, Jung believed that each person had a dominant function (sensing versus intuition, thinking versus feeling) that complimented their view of the world (extraverted versus introverted). Jung also believed that there was an auxiliary function that supported a person's dominant function. Myers and Briggs Myers believed that this portion of Jung's theory was undeveloped (Briggs Myers et al., 2003). In creating the MBTI personality inventory, Myers and Briggs Myers included this auxiliary function by adding one additional dichotomy, the judging – perceiving dichotomy. The judging (J) – perceiving (P) dichotomy refers to people's attitudes toward the outer world, whether they prefer a more structured life or live in a more spontaneous way. Someone who prefers the judging function desires structure. They seek closure and will make decisions, plans and organize activities to bring that closure. A person favoring perceiving prefers spontaneity and flexibility in their life. They

avoid closure because they prefer to keep their options open (Tieger & Barron-Tieger, 2001; Briggs Myers et al., 2003).

Tieger and Barron-Tieger (2001) describe those who favor the judging attitude as people who "have the work ethic: work first, play later". Judgers "set goals and work toward achieving them on time", "are product oriented (emphasis is on completing the task)", "derive satisfaction from finishing projects" (p. 24). Judgers are serious about meeting deadlines and choose to view time as a "finite resource" (p. 24).

Tieger and Barron-Tieger describe people with a perceiving attitude as those who "have a play ethic: enjoy now, finish the job later". Perceivers "change goals as new information becomes available", "are process oriented (emphasis is on how the task is completed)", "derive satisfaction from starting projects", and "see time as a renewable resource and see deadlines as elastic" (p. 24). Kiersey and Bates (1984) found that approximately 50% of the population favored each end of the judging – perceiving dichotomy.

The 16 Psychological Types

A person's preferences in each of the four dichotomies mentioned above yield 16 possible combinations that Briggs referred to as psychological types. Both Jung and Myers defined psychological type as "an underlying personality pattern resulting from the dynamic interaction of our four preferences, environmental influences, and our own choices" (Briggs Myers, 1998, p. 8). Briggs' 16 psychological types are denoted by the letters which correspond with a person's preferences in the four dichotomies. For example, a person who prefers

introversion (I), sensing (S), thinking (T), and judging (J) in the dichotomies would be referred to as an ISTJ personality type.

Myers and Briggs Myers determined that there are general characteristics associated with each of the 16 personality types. Briggs Myers (1998) documented the characteristics associated with each personality in the book, *Introduction to Type*. Those characteristics will be detailed in the paragraphs below. This researcher chooses to quote Briggs Myers often because the phrases and statements the author constructed characterize each psychological type and were done so quite purposely to directly reflect the dynamics of type theory (Briggs Myers et al. 2003). This researcher does not want to stray far from these statements as to misrepresent type theory.

ISTJs are characterized as being quiet, serious, practical, matter-of-fact and responsible. They are regarded as individuals who "earn success by thoroughness and dependability", and who "decide logically what should be done and work toward it steadily, regardless of distractions" (Briggs Myers, 1998, p. 13). ISTJs like to bring order and organization to all aspects of their life (work, home, relationships). ISTJs have a strong sense of loyalty and tradition. These individuals, however, can be rigid about schedules and deadlines, and may be very "by-the-book" (Briggs Myers et al., 2003). They can be judgmental and critical of others. Some qualities that are valued in the fire service may not be "natural" or comfortable for the ISTJ personality. Teamwork, rapid adaptability to change and flexibility might be stressful to some ISTJ personality types (Briggs Myers et al., 2003).

ISFJs are characterized as dependable, quiet, friendly, responsible, conscientious, thorough, and painstakingly accurate (Briggs Myers, 1998). These individuals are regarded as "committed and steady in meeting their obligations" (p. 13). ISFJs are considered loyal and considerate of other's feelings. They "notice and remember specifics about people who are important to them" (p. 13). ISFJs "strive to create an orderly and harmonious environment at work and at home" (p. 13). They make decisions based on their values and their concern for others (Briggs Myers et al., 2003). At times, ISFJ types may not see the wider ramifications of their decisions, or may find it difficult to apply impersonal criteria to their decision making because of their focus on others needs (Briggs Myers et al., 2003).

INFJs are referred to as those who "seek meaning and connection in ideas, relationships, and material possessions" (Briggs Myers, 1998, p. 13). They are described as individuals who want to understand what motivates people. They are conscious, "insightful about others" and strive to "develop a clear vision about how best to serve the common good" (p. 13). INFJs are considered to have firm values and goals, and to be very committed to them. These individuals are very loyal to people and institutions that share their values but will assert themselves when their values are threatened (Briggs Myers et al., 2003). INFJ types are "organized and decisive in implementing their vision" (Briggs Myers, 1998, p. 13). They have little use for detail unless these details help their intuitive process (Briggs Myers et al., 2003).

INTJs are described as being clear, concise, skeptical, independent, private and reserved. They tend to set high competency and performance goals for themselves and others. Briggs Myers (1998) describes INTJ types as having "original minds and great drive for implementing their ideas and achieving their goals" (p. 13). INTJs "quickly see patterns in external events and develop long-range explanatory perspectives" (p. 13). When they have chosen to commit themselves to something, they can be counted upon to organize and carry it through. According to Briggs Myers et al. (2003), INTJ types scored lower than most other types on social qualities and relating to other people.

ISTPs are described as objective, analytical, and efficient. They are known to use logical principles to organize facts and tend to be "quiet observers until a problem appears, then act quickly to find workable solutions" (Briggs Myers, 1998, p. 13). ISTPs are interested in cause and effect relationships. They "analyze what makes things work and readily get through large amounts of data to isolate the core of practical problems" (p.13). ISTP types are often considered reserved, tolerant and flexible with others. When their logic or principles are questioned, however, they may express their viewpoint firmly and clearly (Briggs Myers et al., 2003). Briggs Myers et al. (2003) also postulated that when in very stressful situations, ISTP types may express themselves inappropriately through displays of emotion (volatile anger or tearfulness).

ISFPs can be described with words like quiet, sensitive, non-confrontational, friendly, kind and loyal. They choose not to force their opinions or values on others. These individuals tend to be "loyal and committed to their values and to

people who are important to them" (Briggs Myers, 1998, p. 13). They are said to "enjoy the present moment, what's going on around them" (p. 13). ISFPs "like to have their own space" and not to be bound by time constraints (p. 13). ISFP types are generally considered to have a desire to be part of low-key situations. (Briggs Myers et al., 2003). They were found to be the highest among types in coping with stress by trying to avoid it (Briggs Myers et al., 2003). This avoidance would be difficult in a career as a firefighter which is riddled with high stress emergency situations. In the learning environment, ISFP types were found to prefer "doing", rather than reading or listening to lecturers (Briggs Myers et al., 2003).

INFPs can be described in terms of their strong idealism and values. Like ISFPs, these individuals are very loyal to both their values and to people who are important to them. They wish to live a life that is consistent with these values (Briggs Myers, 1998). INFPs are considered "adaptable, flexible and accepting unless a value is threatened" (p. 13.) They are also considered to be creative, curious and "quick to see possibilities"; because of this they often serve as a catalyst for new ideas. INFPs also "seek to understand people and to help them fulfill their potential" (p. 13). These individuals will become bored or have difficulty with routine tasks that they cannot find meaning in (Briggs Myers et al., 2003). Briggs Myers et al. (2003) also suggested that INFP types became overly critical of their, and others, abilities when they were confronted with very stressful situations.

INTPs are characterized as being analytical, theoretical, abstract, flexible, adaptable, detached, quiet, and contained (Briggs Myers, 1998). The world of ideas tends to interest these individuals more than social interaction does. INTP types "seek to develop logical explanations for everything that interests them" (p. 13). They tend to have an "unusual ability to focus in depth to solve problems in their area of interest" (p. 13). They seek knowledge for its own sake. These individuals are often skeptical, sometimes to the point of being critical. Briggs Myers et al. (2003) surmised that INTPs had a high preference for occupations that would provide them with autonomy, freedom and independence. Their "ideal job" would favor creativity and originality, and would earn them a lot of money. A person will not become rich as a firefighter, nor is there much autonomy or independence. There are, however, opportunities to be creative and original in training and in problem solving at emergency incidents. As was the case with ISTP types, Briggs Myers et al. (2003) found that INTP types may express themselves inappropriately through displays of emotion (volatile anger or tearfulness) when confronted with very stressful situations.

ESTPs are said to be observant, spontaneous, and enjoy the here-and-now, especially when interacting with others. These individuals "enjoy material comforts and style" and are described as "flexible and tolerant" (Briggs Myers, 1998, p. 13). They take a straightforward, analytical approach to their problem solving (Briggs Myers et al., 2003). "Theories and conceptual explanations bore them – they want to act energetically to solve the problem" (Briggs Myers, 1998, p. 13). The traditional educational environment is not designed to meet their

learning style preferences. It is believed that ESTPs learn best through hands-on procedures (learn-by-doing) (Briggs Myers et al., 2003).

ESFPs are described as being observant, practical, persuasive, outgoing, friendly, and accepting. Briggs Myers (1998) considered these individuals "exuberant lovers of life, people, and material comforts" (p. 13). They are considered excellent team players who enjoy working with others (Briggs Myers et al., 2003). ESFP types are known for their realistic, common sense, yet fun loving approach to work and problem solving. Because these individuals are flexible and spontaneous, they easily adapt to new environments. ESFPs learn best by trying new skills (hands-on), and by interacting with their environment and those around them (Briggs Myers, 1998). Like ESTPs, they have difficulty with traditional educational environments that often stress theory and written explanations (Briggs Myers et al., 2003).

ENFPs are characterized as warm, friendly, cooperative, enthusiastic, spontaneous, imaginative and flexible. Briggs Myers (1998) believed that ENFP types viewed life as a "creative adventure" that is "full of possibilities" (p. 13). Briggs Myers et al. (2003) found that ENFPs were "stimulated by new people, ideas, and experiences" (p. 79). ENFP types tend to be very perceptive and insightful about the people around them. ENFPs see possibilities in others that the others may not even see in themselves. They readily give support to these others, but also seek a lot of affirmation. In their decision making, ENFPs quickly "make connections between events and information", and "confidently proceed based on the patterns they see" (Briggs Myers, 1998, p.13). These individuals

have a dislike for structure and routine, and attempt to avoid them whenever possible (Briggs Myers et al., 2003).

ENTPs are considered quick, ingenious, stimulating, alert, assertive and outspoken. Briggs Myers (1998) considered them to be "resourceful in solving new and challenging problems" and "adept at generating conceptual possibilities and then analyzing them strategically" (p. 13). ENTPs believe the world is full of interesting concepts and exciting challenges (Briggs Myers et al., 2003). Their problem solving response is one of adaptability and spontaneity. They are bored by routine and will rarely do something the same way twice. ENTP types dislike standard operating procedures and following schedules. ENTJs enjoy debating ideas, and are considered to be assertive and outspoken (sometimes overly so). Briggs Myers et al. (2003) stated that when handling stress, ENTPs were the type most likely to "confront the problem". This type also reported the highest level of stress coping skills.

ESTJs are often considered as outspoken, practical, realistic, objective, logical, conscientious and dependable. These individuals wish to organize the world around them to ensure that things get done. They are known for being decisive, organizing projects and setting high standards for competence for themselves and those around them (Briggs Myers et al., 2003). ESTJ types prefer to have knowledge of the problem and to be able to solve it with known, proven methods. They "take care of routine details", are decisive, and are often "forceful in implementing their plans" (Briggs Myers, 1998, p. 13). ESTJs do take

relationships seriously and are looked upon as conscientious; however, they are sometimes looked at as overbearing (Briggs Myers et al., 2003).

ESFJs are characterized as warmhearted, personable, tactful, conscientious, cooperative and sociable. These individuals are organized and orderly. They seek harmony and order in their environment and work diligently to create it (Briggs Myers, 1998). ESFJ types like to organize tasks and to work with others to accomplish these tasks in a timely fashion. These individuals are known for their enthusiasm and loyalty, but also want to be appreciated for what they bring to the workplace and their coworkers (Briggs Myers et al., 2003). ESFJs are sensitive to others needs and try to provide for them (Briggs Myers, 1998). When it comes to their decision making, ESFJs concentrate on the present, basing their decisions on experience and facts (Briggs Myers et al., 2003).

ENFJs are warm, supportive, enthusiastic, empathetic, responsive, and responsible. Briggs Myers (1998) found them to be "highly attuned to the emotions, needs, and motivations of others" and "may act as catalysts for individual and group growth" (p. 13). These individuals are able to find potential in others and want to help them reach their goals. ENFJ types are often considered consensus builders as well as loyal and inspiring leaders (and followers) (Briggs Myers et al., 2003). These individuals will most often place people's needs before the organization, if any conflict arises.

ENTJs are characteristically self-confident, frank, decisive, critical, analytical, and logical. Briggs Myers et al. (2003) consider these individuals to be "natural leaders" and "organization builders" (p. 90). They enjoy creating broad goals and

plans for themselves and their organizations. ENTJ types seek new ideas, like complex problems and use their intuition to create possible answers. Briggs Myers (1998) found these individuals to be "well informed", "well read" and enjoyed "expanding their knowledge and passing it on to others" (p. 13). Some ENTJs are energized by having stimulating conversations with others. In these conversations they often challenge other viewpoints. Briggs Myers et al. (2003) believe that ENTJs are sometimes viewed as being ambitious, forceful or egotistical.

The Type Table

Briggs and Briggs Myers placed the 16 personality types generated by the MBTI instrument into a table for viewing the types in relation to each other. Called the Type Table, this instrument arranges the types into specific positions in the table surrounded by other types that have common preferences (see Table 1). Briggs and Briggs Myers chose to place the types into the type table in this manner so as to highlight similarities and differences between them. Each type has three letters in common with all types beside it. This would mean that these adjacent types would share three preferences and the corresponding characteristics, attitudes and behaviors. People who share these similar types also often share the same occupations, college majors, management philosophy and learning style (Briggs Myers, 1995; Briggs Myers et al., 2003).

Table 1

The MBTI Type Table

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

There are many different ways of looking at and gathering information from the type table. The table is formatted such that each of the functions in the dichotomous pairs, and the corresponding personal characteristics, occupy opposing areas. Introverts (I) are placed in the top two rows, whereas extraverts (E) are placed into the bottom two rows. Sensing (S) types occupy the left side (first two columns) of the table, while intuitive (I) types occupy the right two columns. The two outer columns are comprised of thinking (T) individuals and the two inner columns are comprised of feeling (F) individuals. Judging (J) types are found in the top and bottom rows, whereas perceiving (P) types occupy the two inner rows.

The type dynamics within the type table can also be looked at in other ways. Sometimes characteristics common to pairs of functions are viewed. For example, one two-letter grouping is the SF (sensing – feeling) combination which relates to those individuals who prefer both sensing and feeling; the ESFJ, ESFP, ISFJ, and the ISFP personality types. "SF types" are then described by the characteristics that are common to all four of these personality types. Some

of the research performed using the MBTI has focused on various two-letter combinations of functions (Briggs Myers et al., 2003).

In setting up the table the way she did, Briggs Myers believed it would be easier to see the relationship among the various personality types (Briggs Myers, 1998). This also allows researchers and practitioners to focus more broadly than on just one of the 16 personality types.

Table 2 depicts the percentage of the adult population of the United States that favors each of the MBTI types (Briggs Myers et al., 2003). This Type distribution is based on a weighted sample designed to approximate the ethnicity and gender of the population. The sample, collected in 1996, consisted of 3009 adults.

Table 2

Type distribution of the adult population of the U. S. (Percentages)

%	ISTJ	ISFJ	INFJ	INTJ
Total Population	11.6	13.8	1.5	2.1
Male	16.4	8.1	1.2	3.3
Female	6.9	19.4	1.6	0.9
%	ISTP	ISFP	INFP	INTP
Total Population	5.4	8.8	4.4	3.3
Male	8.5	7.6	4.1	4.8
Female	2.3	9.9	4.6	1.7
%	ESTP	ESFP	ENFP	ENTP
Total Population	4.3	8.5	8.1	3.2
Male	5.6	6.9	6.4	4.0
Female	3.0	10.1	9.7	2.4
%	ESTJ	ESFJ	ENFJ	ENTJ
Total Population	8.7	12.3	2.5	1.8
Male	11.2	7.5	1.6	2.7
Female	6.3	16.9	3.3	0.9

The MBTI and Learning Styles

Introduction to Learning Style

Information pertaining to the MBTI type table and the 16 personality types has been used in a variety of research areas, one of those areas being the field of education and learning styles. Studies have shown that psychological type information can be used by instructors in the classroom to create an environment more conducive to learning.

> Students whose learning styles are compatible with the teaching style of a course instructor tend to retain information longer, apply it more effectively, and have more positive post-course attitudes toward the subject than do their counterparts who experience learning/teaching style mismatches. (Felder, 1993, p. 286)

Briggs Myers (1998) believed that "people learn most effectively, especially when approaching new or difficult topics, when they are given opportunities to use their most effective learning style" (p. 37). Other studies also have found a correlation between instructional methods, learning style based on the MBTI, and academic performance. R. Felder, G. Felder and Dietz (2002) determined that engineering courses were taught in such a manner as to benefit specific MBTI types. Extraverts, sensors and feelers were disadvantaged by the instructional methods used to present material to students. Lynch and Sellers (1996) found that adult learners and traditional aged college students had a preference for instructional environments that matched their own learning (MBTI) preferences.

Learning Style and the Four Dichotomies

Most of the research surrounding learning styles and the MBTI relates to viewing the four dichotomies independently (Briggs Myers et al., 2003). This researcher will examine the dichotomies and the corresponding preferences for learning (learning styles) in the ensuing paragraphs.

According to both McCaulley (1990) and Briggs Myers (1998), the most important preferences (dichotomy) related to learning styles are sensing and intuition. This refers to how an individual prefers to perceive or gather information. Felder (1989; 1996) believes that learners who favor sensing prefer instruction that is practical and detail oriented. These individuals tend to focus on facts, details and procedures. They like well defined problems that can be solved by well established methods.

Felder (1989) held that the instructional style that would best match sensing students would include the use of demonstrations, diagrams, facts, and well defined procedures. Sensing students also prefer instructors who use practical application of theories presented.

Intuitive learners, in contrast to sensors, are considered imaginative and concept-oriented (Briggs Myers et al., 2003; Felder, 1996). These individuals focus not on the facts but on meaning and possibilities. They learn best when given abstract concepts and theories to work with. The instructional style that might be the best fit for an intuitive individual would emphasize basic principles and thoughts, and create problems that call for innovative answers (Felder, 1989).

In his study of how teacher personality type impacts the learning environment, Barrett (1989) found that both instructors and students in vocational schools recorded sensing as their most favored preference. This might be due to the fact that much instruction in the vocational field favors sensors. It is generally fact-based and teaches established procedures. Sensors might naturally be drawn to such instruction.

Felder (1993) looked at the relationship between sensors, intuitives and achievement in lecture based science courses. He found that because these courses tend to be based on abstract concepts and theories, sensing individuals tend to get lower grades than intuitives. Schurr and Ruble (1988) echoed these results when they found that intuitive types received better grades than sensors in abstract and theoretical courses. They also found that the converse to be true in courses involving practical and applied concepts.

When looking at learning styles and the Extraversion – Introversion dichotomy, the focus is on the mode of instruction and how the learner finds his or her energy related to the mode of instruction. In general introverted students prefer to focus on the world of ideas (their inner world) and to take time to think things through before deciding on a course of action or answer (Felder, 1996). On the contrary, extraverted students prefer to focus on the world of people (the outer world). Extraverts like to try things out and to discuss their ideas with others in order to better understand a concept.

A traditional teaching mode, straight lecturing with little or no hands-on experience, followed by homework done individually, would fit an introverted student's learning style (Felder, 1994). Felder et al. (2002) found that an instructional style that favors individual effort and competition (for grades) among students puts an introverted student at an advantage over extraverted students. This type of instruction is a better match for the introverts learning style. They postulated that in keeping with Type Theory, an introverted student taught with traditional methods could be expected to outperform an extravert.

Schurr and Ruble (1988) found that introverted students had better grades than their extraverted counterparts in courses involving abstract and theoretical concepts. Courses with this type of content would most likely favor the learning style preference of an introverted student. Concepts would likely be presented in a lecture format and would allow students to focus inward, encouraging them to reflect on the information gathered.

Elliot and Sapp (1988) found that extraverted students prefer collaborative approaches to learning. Extraverted students have a preference for working in groups and favor activity based learning (Felder et al., 2002). To better fit an extravert's learning style preferences, lectures could be augmented by more hands-on instruction, such as experimental demonstrations and simulations (Felder, 1994). At times, homework could be assigned to small groups rather than completed individually, thus catering to an extravert's preference for group interaction. Briggs Myers, McCaulley, Quenk and Hammer (2003) believe that extraverts prefer action-oriented learning; in active groups and through practical

application of the concepts they are learning. Felder et al. (2002) postulated that cooperative teaching/learning methods, such as those mentioned above, give extraverted students an advantage over introverted students. Schurr and Ruble (1988) discovered that extraverts received higher grades in practical and applied courses. These courses would allow the extraverted students opportunity to apply their preferred learning style.

As was mentioned earlier in this paper, the Judging – Perceiving dichotomy relates to how a person approaches the world around them. A person who has a preference toward the judging attitude seeks structure and wishes to bring closure to their activities. Perceiving types prefer spontaneity and flexibility in their activities. Fourqurean, Meisgeier, and Swank (1990) found that students who preferred a judging attitude were more comfortable in a teaching atmosphere that included a clear structure. These students prefer instructors who present and adhere to their teaching plan (Briggs Myers et al., 2003). Felder (1991) found that judging type students had specific expectations of their instructors, such as having well defined expectations and assignments; making students aware of the grading criteria in advance; and presenting lectures in a manner that gets right to the point.

Felder et al. (2002) believed that judging type students were better than perceiving types at staying on task and managing their time. They believed this was due to judgers preferences for a structured learning environment and their tendency to plan out activities. Their study also found that more judging than perceiving students believed that lectures were extremely helpful to their

learning. Because lectures tend to be presented in a highly structured manner, it would be consistent with type theory that more judgers than perceivers prefer a lecture format in their learning. Felder (1991) arrived at the conclusion that because judgers are often organized, decisive, budget their time, and adhere to their goals, they can be prone to making premature decisions or jumping to conclusions.

Whereas judging students want structure and an orderly schedule, perceivers prefer flexibility in their assignments and to have more flexible timelines (Felder et al., 2002). Perceiving types prefer flexibility and opportunity to explore information that interests them as opportunities arise (Briggs Myers, 1995).

Felder (1991) described perceiving students as spontaneous, open minded and having a preference for doing as little planning as possible. Perceiving students are sometimes looked at as procrastinators. If they do not fully understand a topic, they may continue gathering information and not make decisions in a timely fashion. This can put them in danger of missing goals or assignment deadlines.

Perceiving type students tend to be curious and prefer a classroom environment where they are allowed to use and explore this curiosity (Briggs Myers et al., 2003). An instructor could give these students opportunities to experiment, and allow them to choose their own tasks and methodology. Instructors might also choose to lighten time constraints, or to show these students ways to organize and bring closure to projects.

Documentation found by this researcher concluded that judgers tend to receive higher grades than their perceiving counterparts. In their study of college engineering students, Felder et al. (2002) found that judgers earned higher grades than perceivers. They believed that judgers, with their preference for time management and goal setting, were better suited for the high credit hour requirements and heavy homework loads of the engineering curriculum. Anchors, Robbins and Gershman (1989) also found that at the collegiate level, judging type students had higher grades than perceiving types. Briggs Myers et al. (2003) also arrived at a similar conclusion. They found that, at all ages, students who had a preference for judging received higher grades than those who preferred perceiving. They attributed this to judging types more organized approach to learning and their need for closure (drive to reach goals).

The Thinking – Feeling dichotomy refers to the judgment process a person takes in making decisions. Thinking type students prefer to use logic and will weigh all facts objectively (Lawrence, 1993). Thinkers will often give more of their attention to ideas than to human relationships. They will attempt to arrive at decisions that are impersonal and just. Feelers, on the other hand, will make their decisions based on personal values and feelings. They will analyze how their decision will affect others and will weigh the value of each potential solution before arriving at a decision.

Briggs Myers et al. (2003) believed that the preferred method to instruct thinking type students was by presenting material as facts and logical arguments.

It was also suggested that instructors provide concrete reasons for any assignments given to students.

Felder (1995) believed that the impersonal nature of technical instruction is a poor fit for a feeling type student's learning style. He did, however, believe that there are ways to assist feeling students with this type of course. He asserted that instructors must demonstrate the social importance of topics presented, and must afford students more opportunities for interpersonal contact (Felder et al., 2002). Felder (1995) believed that in order to engage feeling type students, instructors should include some student-centered instruction, such as cooperative learning assignments. Lawrence (1993) also asserted that feelers were most motivated when there was a personal connection between the learner and the subject matter. Felder (1995) also believed that these students can be strongly motivated to higher performance when an instructor establishes personal rapport with the students.

This researcher did not find much research regarding the thinking – feeling dichotomy and student achievement (grades). In their study of undergraduate engineering students, Felder et al. (2002) found that thinkers had higher grade point averages than feelers throughout their college years. They attributed this gap in part to the impersonal nature of technical courses. The authors of the study believed that the grade point average differential may be narrowed if the curriculum of technical courses included more interpersonal contact between instructors and students. They also stressed that the social importance of the

instructional topics should be communicated within course lectures and assignments.

Learning Styles and Individual MBTI Types

As was stated earlier, most studies related to type and learning styles look into individual dichotomies, not at specific MBTI types. Although less in number, there have been studies that have reached significant findings regarding learning and MBTI types. In their study following students throughout their college years, Anchors et al. (1989) reported that ENTJ type students received the highest grades in their courses. Schurr and Ruble (1986) (as cited in Briggs Myers et al., 2003) reported that ESTJ, ENTJ, ISTJ and INFJ students had the highest overall undergraduate grades in their study.

Woodruff and Clarke's study (as cited in Briggs Myers et al., 2003) reported INFJ and INTJ types (introversion, intuition and judgment in common) received the highest overall college grades. Briggs Myers et al. backed these results with their statement that INTJ and INFJ types "consistently appear among college students with high grades" (2003, p. 260). Woodruff and Clarke also reported that ESTP and ESFP types received the lowest overall grades in college. Interestingly, the ESTP and ESFP types reflect exact opposite preferences than the INTJ and INFJs on all four dichotomies. Briggs Myers et al. (2003) cited that one potential reason for these findings might be the INFJ and INTJ types' attention to theory and concepts (looking at possibilities), giving them an advantage over their opposites in higher education. The INFJ and INTJs were described as learners who like to go to class, are imaginative, and want to learn.

On the contrary, the ESTP and ESFP students were described as being impatient with traditional academic life. These students are more likely to be stimulated by experiencing the world around them (done best with the assistance of their instructors and peers) and drawing concrete conclusions based on these experiences. They are less likely to look at various alternatives and possibilities than their INFJ and INTJ opposites.

Briggs Myers et al. (2003) called the INFP and ISFP students the "gentlest" of all of the types. They found these types to be reserved learners who invest deeply and personally into their academic work. These authors predict that ISFPs are the least confident in their abilities and will be the most in need of encouragement.

Learning Styles – Conclusions

As has been cited previously in this paper, studies propose that a learning environment that is consistent with students' psychological type and corresponding learning styles will lead to greater learner satisfaction and higher achievement. In their study comparing learning environment preferences of both traditional college students and adult learners, Lynch and Sellers (1996) found that both the traditional aged students and adult students preferred learning environments that catered to their type preference. Felder et al. (2002) did find, however, that some students who were forced to perform in a non-preferred learning style in time accepted and found it helpful to their learning. As sophomores, only three percent of introverted students in their study found in class group work to be "very helpful" to their learning experience. By their senior

year, this number rose to 33%. In contrast, 16% of extraverted sophomores found the group work "very helpful". This number rose only to 21% by the participants' senior year. The researchers speculated that the answer to this may, in part, be that introverted students became more comfortable with this non-preferred type of instruction and actually came to embrace the benefits of group learning.

It appears that instructors should be aware of the various personality types and should present information in a variety of formats that appeal to all types. This will allow students to function within their preferred type (learning style) at times, and would force them to adapt and build their skills in less preferred learning styles at other times (Felder, 1996; Felder et al., 2002).

Chapter 3

Research Methods

Introduction

The Myers-Briggs Type Indicator (MBTI) personality inventory will be administered to students within the Milwaukee Area Technical College (MATC) Fire Science Associate Degree program to identify their psychological type.

The researcher's objective in this study is to analyze the students' psychological type profiles to determine whether there is one or more dominant type. An assessment will also be made as to whether there are significant differences in the academic performance among students with differing psychological types. The researcher will also compare the psychological types of students who are career firefighters to those students who are not.

Chapter three will open with a description of this study's population and sample. The researcher will then turn to a discussion of the MBTI, the instrument used to collect the psychological type data. Information included will be a description of the instrument, and an explanation of the data collection and presentation methods. An assessment of the reliability and validity of the MBTI will follow. The researcher will then address the research methodology used in the study. The chapter will conclude with a presentation of the limitations and assumptions of the study.

The Population and Sample

The Population

The Milwaukee Area Technical College maintains a nationally accredited, State of Wisconsin recognized fire service training facility. In addition to the twelve State of Wisconsin certification programs, MATC offers a 65 credit, two-year Associate Degree in Fire Science. The study will focus on individuals enrolled in this associate degree program in the Spring 2005 semester. The associate degree program has a current enrollment of 185 students. The full time equivalent (FTE) for the program is 104 students.

Demographic information for this Associate Degree population follows. Student ages range from 18 to 45 years old. The majority of the students enrolled in the program are traditional aged associate degree students (recent high school graduates). Approximately 10%, however, are adult learners seeking new careers. Nineteen students are actually career firefighters seeking associate degrees with the intention of furthering their careers. The population is not very diverse in terms of gender or race. The vast majority are white males. There are only 15 females and 11 minority students enrolled in the program. This researcher will not segregate his research by race because of the small minority enrollment in this associate degree program.

The Sample

The study will be conducted using a randomly drawn sample from the MATC Fire Science Associate Degree population. This researcher has chosen to select a sample rather than to use the entire population because of the large size of the

population, and the expense of the MBTI type indicator question booklets and answer sheets. The study will be conducted using a sample of 130 students (based on National Education Association Standards). Students will be selected to participate by a random drawing of their names. Both the study and the MBTI type indicator will be explained to all potential participants. Only after a thorough explanation of the study will students be asked to fill out the Myers Briggs Type Indicator. Only those who still wish to participate will be asked to do so.

Instrumentation - The Myers-Briggs Type Indicator Instrument

The Instrument

The MBTI instrument is a self-report inventory used to identify the personality types of normal healthy people (Briggs Myers, 1995). The MBTI was created in the 1940's by Katharine Briggs, along with her daughter Isabel Briggs Myers. It measures a person's preferences toward one or another of four paired opposites (functions) relating to his or her perception, judgment and orientation to the world around them. Briggs called the paired opposites the four dichotomies. The four dichotomies are extraversion (E) versus introversion (I); sensing (S) versus intuition (N); thinking (T) versus feeling (F) and; judging (J) versus perceiving (P).

Briggs and Briggs Myers arrived at 16 possible psychological types that correspond with peoples' preferences in each the four dichotomies. For example, a person who prefers introversion (I), sensing (S), thinking (T), and judging (J) in the dichotomies would be referred to as an ISTJ personality type. Briggs and Briggs Myers outlined general characteristics associated with each of the 16 personality types.

The focus of the MBTI instrument is to separate people into one of the 16 personality types, not to measure how much of a particular trait a person may have. The authors' of the instrument claim that the MBTI is an indicator of personality type, not a test, therefore there are no right or wrong answers (Briggs Myers et al., 2003). Their philosophy is that each of the 16 personality type preferences is equally valuable. The authors of the MBTI do realize that each of us uses both sides of the dichotomies, but believe, however, that we are more comfortable functioning on one side over the other.

Data Collection

The MBTI instrument is considered an inventory and not a questionnaire because it measures several theoretical constructs (the four dichotomies). Questionnaires measure only one theoretical construct. The MBTI uses a forced-choice format that requires respondents to make choices between two alternatives. Each question asks the respondent to choose the alternative which is more appealing to, or better describes them. The test yields scores that indicate a person's preference, not their competency, to each of the four paired functions.

Students will be presented with the Myers-Briggs Type Indicator Form M which contains 93 questions. A copy of the Form M question booklet and answer sheet could not be included because this material is copyrighted. Permission to reproduce them was not granted. Student answer sheets will be scored by this researcher using a scoring template provided by the authors of the instrument. A cover sheet will be attached to each of the 130 answer sheets. Included on this

cover sheet is a brief explanation of the study, including a confidentiality statement. The cover sheet will ask each participant for demographic information. They will be asked for their gender, career status (professional firefighter or student), and grade point average. A copy of the cover sheet is provided in Appendix A.

Research Design and Data Presentation

Research Design

This researcher will employ a descriptive quantative research design for this study. Leedy and Ormrod (2001) describe quantative research as examining a situation "as it is". This researcher will be doing just that. In the study, the researcher will be surveying students during the Spring 2005 semester. The survey instrument will take the form of the MBTI inventory and a cover sheet (used to gather demographic information). Because this researcher will be using sampling, inferential statistics will be used. Estimates regarding the characteristics of the larger population will be made based on the random sample chosen.

There are three main objectives related to this study:

1. Determine the personality type preferences of students in the MATC Fire Science Associate Degree Program;
2. Compare the personality type preferences of students who are career firefighters to those students who are not career firefighters; and
3. Determine whether there are significant differences in the academic performance among students with differing personality type preferences.

Data Presentation

The majority of personality type information gathered from the students within the MATC Fire Science Associate Degree was presented in a "Type Table" format. A Type Table arranges the 16 MBTI psychological types into specific positions in a four column wide by four row long table. Each of the 16 psychological types in this table is surrounded by other types that have preferences in common with it (see Table 1). Briggs and Briggs Myers chose to place the psychological types into the type table in this manner so as to highlight similarities and differences between them. Each type has three letters in common with all types beside it. This would mean that these adjacent types would share three preferences and the corresponding characteristics, attitudes and behaviors. People who share these similar types also often share the same occupations, college majors, management philosophy, learning styles (Briggs Myers, 1995; Briggs Myers et al., 2003).

Type tables presented will reflect the objectives of this study. Results in each table presented will be documented as both a quantity of students and a percentage of the total sample size. Data will be presented reflecting preferences in both single dichotomies and in whole types (all four letters). Type tables will include the psychological type preferences of the entire sample. Additional type tables will present data related to career firefighters and type preferences. Non-firefighter students' type preferences will also be indicated in tables. Data will also be presented that will reflect grade point averages (academic performance) related to the specific dichotomies and to the 16 psychological types.

Reliability of the MBTI

A reliable instrument is one that measures consistently. According to Aikens (1997), there are three methods of evaluating the reliability of a psychometric instrument; method of stability (test-retest method), method of equivalence (parallel forms method), and the method of internal consistency (split-half method). Aikens believes that the method of internal consistency, employing the split-half method provides information about reliability that is consistent with that yielded by the parallel-forms procedure. Because of this consistency, this researcher assessed the MBTI instrument in terms of its test-retest and split –half (internal reliability) reliabilities using the limited amount of information that was available on this topic. According to Lanyon and Goodstein (1997), there are relatively few published studies on the reliability of the MBTI instrument.

Internal Consistency Reliability

Aikens (1997) defined internal consistency reliability as "providing information on the extent to which items constituting a test measure the same variable" (p. 42) Referring to the MBTI instrument, internal consistency reliability addresses the degree to which a subject answers questions consistently on any of the four dichotomies. A method of measuring of internal consistency is by using split-half reliability (Cloninger, 1996). Using split-half reliability, subjects need only be tested once. The questionnaire (or inventory) is divided into two similar sections that will be given sub-scores. A correlation, called the split-half reliability, is computed between the two sub-scores. This refers to estimating reliability based on calculating sub-scores on two halves of a questionnaire (or inventory).

Carlson (1989) citing his previous research (1985) and that of Carlyn (1977), supported the internal reliability of the MBTI. He concluded that the MBTI yielded "generally satisfactory" split-half reliability results. Carlson also referred to the results of a study administered by Incan (1986) that resulted in sufficient split-half reliability coefficients of .77 to .97. Carlson reported that these results are consistent with his 1985 study and those of Carlyn (1977) (as cited in Carlson, 1989).

Test-Retest Reliability

Test-retest reliability is determined by testing the same person on two separate occasions and determining the extent to which the results are similar (Cloninger, 1996). Referring to the MBTI instrument and test-retest reliability, if a subject takes the MBTI inventory a second time, researchers would like to see the individual arrive at the same (or a similar) psychological type in both instances. Lanyon and Goodstein (1997) found "satisfactory" results in time periods of up to several months. Myers and McCaulley (1985) (as cited in Lanyon & Goodstein, 1997) reported reliability coefficients of .76 to .84 for the four MBTI dichotomies with a large sample. In a much smaller sample, Myers and McCaulley reported reliability coefficients of .60 to .89 (as cited in Lanyon & Goodstein, 1997).

Lawrence and Martin (2001) related some of their conclusions regarding the reliability of the MBTI instrument in their book, *Building People, Building Programs*. They believed that the reliabilities of the MBTI are as good as or better than other personality instruments. When assessing the test-retest

reliability of the MBTI, they found that people arrive at similar type preferences (three to four of the same) 75% to 90% of the time. Lawrence and Martin found that most people who change their type on retest do so on just one of the four dichotomies (usually where preference is low).

Validity of the MBTI

Validity of the Four Dichotomies

Validity refers to the degree to which an instrument measures what it was designed to measure. Briggs Myers, et al. (2003) believe that there are two categories of validity related to the MBTI; validity of the four separate dichotomies (and accompanying preferences), and the validity of whole types (the combination of four preferences).

Jung's theory of psychological type postulated the existence of the dichotomies used in the MBTI instrument. In order to be a valid instrument, the MBTI must accurately separate people toward their preferred pole on each of the four dichotomies. Lanyon and Goodstein (1997) cited a 1991 study by Thorne and Gough that found substantial correlation between observed psychological preferences and reported MBTI scores in each of the four dichotomies. Thorne and Gough measured 614 individuals' type preferences using the MBTI instrument. These researchers then had the subjects interacting with one another in a series of exercises. These interactions were observed by a group of psychologists who rated the subjects' type preferences. "Significant" correlation was found between the observer's ratings and the subjects' MBTI scores on each of the four dichotomies.

Validity of Whole Type

Validity of whole type demonstrates that the four dichotomies combine in such a way as to create the 16 distinct personality types hypnotized by the MBTI. One method used to validate the MBTI and whole types was by comparing the 16 MBTI types with subjects own estimates of their type. In studies of this nature, subjects were asked to view descriptions of the 16 MBTI types and select which best fits them. The subjects type results were then recorded using the MBTI inventory. The hypothetical odds of randomly picking the same type are one in 16, or 6.25%.

Hammer and Yeakley (1987) (as cited in Briggs Myers et al., 2003) reported that 85% of their sample of 120 adults indicated a type match between their self assessment and the MBTI results. Ninety-nine percent of these individuals reported a match in three of the four dichotomies. All subjects whose self results did not match the MBTI results were found to have a weak preference for the mismatched scale. Kummerow (1988), Carskadon (1982), Ware and Yokomoto (1985) and Walck (1992) (as cited in Briggs Myers et al., 2003) also had similar favorable results in their studies.

Construct Validity

Construct validity details whether an instrument measures the psychological construct it was designed to measure. Cloninger (1996) supported the construct validity of the MBTI related to learning styles and the learning environment. She concluded that type theory and the MBTI instrument can be used to help researchers and educators better understand the ways students of differing types

experience their learning environment. Cloninger cited a number of studies that supported her assumption (Crockett & Crawford, 1989; Martin, 1989; Ehrman & Oxford, 1989; and Fourqurean et al. 1990).

Limitations and Assumptions

Limitations

The results of this study are limited to the population of the MATC Fire Science program from the spring semester of 2005. Enrollment and the corresponding demographics within this program change each semester. Results applied to other time periods may not be the same. Study results also cannot be assumed to be representative of the entire school population or the populations of other Fire Science degree programs.

Assumptions

The researcher assumes that the random sample is representative of the population of the MATC Fire Science program. Because the MBTI is a direct self-report instrument, results are subject to each participant's perspective. Participants may give false responses. Subjects may lack interest in the study and choose to answer questions without much thought, or they may answer questions in a way that places them into a psychological type they believe is more favorable. The researcher assumes, however, that subjects are answering the MBTI honestly and are providing accurate information.

Chapter Four

Results

Introduction

This study is an analysis of the personality types of students enrolled in the Milwaukee Area Technical College (MATC) Fire Science Associate Degree Program. The researcher used the Myers-Briggs Type Indicator to arrive at the psychological types of a sample of 130 students enrolled in the Program. The study will involve comparing the psychological type information of these students along a variety of measures including gender, career status (firefighter or student), and academic performance (grade point average).

Chapter four will open with a review of the population and sample. The researcher will then review the purpose of the study, providing the reader with the problem statement and research objectives. The balance of the chapter will be devoted to presenting the results of this study in relation to the stated objectives.

Population

This study involved students enrolled in the MATC Fire Science Associate Degree Program during the spring of 2005. Enrollment in the program for the spring semester is 185 students. The full time equivalent (FTE) is 104 students.

Demographic information for the Associate Degree population for the spring of 2005 follows. Students range from 18 to 45 years of age. The majority of individuals enrolled in the program are traditional aged associate degree students (recent high school graduates). Approximately 10%, however, are adult

learners seeking new careers. Nineteen students are career firefighters. Most of the firefighters are seeking this associate degree to further their careers (promotional opportunities). The population is not very diverse in terms of gender or race. The vast majority are white males. There are only 15 females and 11 minority students enrolled in the program.

Sample

The study was conducted using a sample of 130 students (based on National Education Association Standards) from MATC's Fire Science Associate Degree Program. The participants were selected by a random drawing of their names. The objectives of the study, and the MBTI type indicator, were thoroughly explained to all potential participants prior to their being asked to fill out the MBTI instrument. All of the 130 students selected in the random sample chose to participate.

The random sample was very reflective of the total population of the associate degree program. Of the 130 individuals selected to participate, 13 (10%) were female and 117 (90%) were male. This closely reflected the gender percentages for the population (8% female, 92% male). The sample also contained 13 (10%) students who are career firefighters and 117 (90%) students who were not firefighters. The sample also resembled the population in this regard (10% career firefighters, 90% non-firefighters).

Problem Statement and Objectives

The purpose of this study is to identify and analyze the personality type preferences of students enrolled in the Milwaukee Area Technical College Fire

Science Associate Degree Program using the 16 personality type preferences associated with the Myers-Briggs Type Indicator.

The objectives of this study are to:

1. Determine the personality type preferences of students in the MATC Fire Science Associate Degree Program;
2. Compare the personality type preferences of students who are career firefighters to those students who are not career firefighters; and
3. Determine whether there are significant differences in the academic performance among students with differing personality type preferences.

Results

Objective One

The first objective of this study was to determine the personality type preferences of the students in the program using the MBTI instrument. Table 3 indicates the distribution of the MBTI type preferences of the 130 students in the sample. This table also breaks down the type preferences of the individuals in the sample by gender. Results in Table 3 are presented in both the number of students and the percentage favoring each type.

Due to the small number of females in the sample, this researcher feels that no reliable inferences can be drawn from the data gained in this area. It is interesting to note, however, that eight of the thirteen females in the sample (approximately 62%) chose the ENFP and adjacent ENTP psychological types. Eighty-five percent (11 of the 13) of the females in the sample chose one of three

psychological types (ENFP, ENTP or ESTP). These individuals would then share preferences for perceiving over judging, and extraversion over introversion.

Table 3

Type Distribution – Total Sample, Male and Female
Presented in percentages and number of students (in parenthesis)

% (#)	ISTJ	ISFJ	INFJ	INTJ
Total Sample	6.15% (8)	1.54% (2)	0.77% (1)	3.85% (5)
Male	6.84% (8)	1.71% (2)	0.85% (1)	4.27% (5)
Female	0% (0)	0% (0)	0% (0)	0% (0)
% (#)	ISTP	ISFP	INFP	INTP
Total Sample	4.61% (6)	3.08% (4)	6.15% (8)	4.61% (6)
Male	5.13% (6)	3.42% (4)	5.98% (7)	5.13% (6)
Female	0% (0)	0% (0)	7.69% (1)	0% (0)
% (#)	ESTP	ESFP	ENFP	ENTP
Total Sample	10.77% (14)	10.00% (13)	11.54% (15)	10.77% (14)
Male	9.40% (11)	11.11% (13)	9.40% (11)	8.55% (10)
Female	23.08% (3)	0% (0)	30.77% (4)	30.77% (4)
% (#)	ESTJ	ESFJ	ENFJ	ENTJ
Total Sample	13.08% (17)	7.69% (10)	3.08% (4)	2.31% (3)
Male	14.53% (17)	7.69% (10)	3.42% (4)	2.56% (3)
Female	0% (0)	7.69% (1)	0% (0)	0% (0)

The distribution of males in the sample does not differ greatly from that of the adult population of the United States (as shown in Table 2). All but two of the 16 psychological types were within five percentage points of the national average. The two types that had a greater differential were ISTJ and ISFJ. In the

nationwide sample, the ISTJ type was preferred by 16.4% of the male participants. In the student sample only 6.84% of male students chose this type. The ISFJ type was chosen by 8.1% of the national sample, but only 1.71% of the student sample.

There were no dominant psychological types among the male students in this study. Of the 16 psychological types, ESTJ was preferred by the most students. At 14.53%, this type was far from dominant, but was chosen by over three percent more students than the second most preferred type (ESFP at 11.11%).

Objective Two

The second objective of this study was to compare the psychological types of the students who are career firefighters to those who are not yet firefighters. Table 4 provides a comparison of the MBTI preferences of students who are firefighters with those who are not. Results in Table 4 are presented in both the number of students and as a percentage of the total sample.

As was the case with the females in this study, the number of firefighters was too small for this researcher to make any reliable inferences from the information gathered. Even though this researcher believes the information gained regarding students who are firefighters cannot be used to arrive at reliable conclusions, some information will be highlighted. Of the nine psychological types chosen by the 13 firefighters, only one was chosen by more than two individuals. The ENFP type was chosen by three (23.08%) of the firefighters. Nearly 54% of the firefighters in the sample chose one of three types. As mentioned, three firefighters chose ENTP. ISTJ and ISTP were each preferred by two (15.39%)

firefighters. According to type theory, the ENFP students would have nearly the opposite learning style preferences as the ISTJ and ISTP students.

Table 4

Type Distribution – Students who are Career Firefighters versus Non-Firefighter Students
Presented in percentages and number of students (in parenthesis)

% (#)	ISTJ	ISFJ	INFJ	INTJ
Total Sample	6.15% (8)	1.54% (2)	0.77% (1)	3.85% (5)
Firefighter	15.39% (2)	7.69% (1)	0% (0)	7.69% (1)
Non-Firefighter	5.13% (6)	0.85% (1)	0.85% (1)	3.42% (4)
% (#)	ISTP	ISFP	INFP	INTP
Total Sample	4.61% (6)	3.08% (4)	6.15% (8)	4.61% (6)
Firefighter	15.39% (2)	0% (0)	0% (0)	0% (0)
Non-Firefighter	3.42% (4)	3.42% (4)	6.84% (8)	5.13% (6)
% (#)	ESTP	ESFP	ENFP	ENTP
Total Sample	10.77% (14)	10.00% (13)	11.54% (15)	10.77% (14)
Firefighter	7.69% (1)	0% (0)	23.08% (3)	7.69% (1)
Non-Firefighter	11.11% (13)	11.11% (13)	10.26% (12)	11.11% (13)
% (#)	ESTJ	ESFJ	ENFJ	ENTJ
Total Sample	13.08% (17)	7.69% (10)	3.08% (4)	2.31% (3)
Firefighter	7.69% (1)	7.69% (1)	0% (0)	0% (0)
Non-Firefighter	13.68% (16)	7.69% (9)	3.42% (4)	2.56% (3)

Even though firefighters are too under represented to make adequate comparisons between firefighters and non-firefighters in the sample, information in Table 4 can still be used to assess non-firefighter students' type preferences.

There was no one dominant type preference among the non-firefighter students. Five of the 16 types, however, were preferred by the majority (57.27%) of the non-firefighters. At 13.68%, ESTJ was the most preferred type among the non-firefighters. The other four types (ESTP, ESFP, ENFP, and ENTP) that rounded out the top five were each preferred by 10% to 11% of the non-firefighters. These four types share a preference in two of the four MBTI dichotomies. They share a preference for extraversion over introversion and perception over judgment.

Objective Three

The third objective of this study was to determine whether there were significant differences in the academic performance among students with differing personality type preferences. Table 5 presents the grade point average (GPA) data for students within the MATC sample. The GPA information is also broken down further into a comparison of firefighter versus non-firefighter GPAs. This information, however, will not be assessed due to the few firefighters in the sample.

In assessing the grade point averages presented in Table 5, the academic performance of the INFJ type individuals would appear to stand out. Because there was only one student who chose this type, this researcher cautions the reader not to make this assumption. After the INFJ individual, the ESFJ and the ENFJ types received the highest GPAs at 3.43 (4.0 = A scale) and 3.5 respectively. The INTP types, with an average GPA of 2.72, recorded the lowest

academic performance among the 16 types. ESTPs, with an average GPA of 2.98, were the only other type reporting less than a "B" average (3.0).

Table 5

Type Distribution and Grade Point Average
Presented in percentages and number of students (in parenthesis)

GPA (#)	ISTJ	ISFJ	INFJ	INTJ
Total Sample	3.34 (8)	3.0 (2)	4.0 (1)	3.33 (5)
Firefighter	3.34 (2)	3.0 (1)	- (0)	3.0 (1)
Non-Firefighter	3.34 (6)	3.0 (1)	4.0 (1)	3.42 (4)
GPA (#)	ISTP	ISFP	INFP	INTP
Total Sample	3.22 (6)	3.0 (4)	3.13 (8)	2.72 (6)
Firefighter	3.5 (2)	- (0)	- (0)	- (0)
Non-Firefighter	3.09 (4)	3.0 (4)	3.13 (8)	2.72 (6)
GPA (#)	ESTP	ESFP	ENFP	ENTP
Total Sample	2.98 (14)	3.21 (13)	3.07 (15)	3.19 (14)
Firefighter	3.0 (1)	- (0)	3.11 (3)	3.33 (1)
Non-Firefighter	2.97 (13)	3.21 (13)	3.06 (12)	3.18 (13)
GPA (#)	ESTJ	ESFJ	ENFJ	ENTJ
Total Sample	3.27 (17)	3.43 (10)	3.5 (4)	3.0 (3)
Firefighter	3.33 (1)	4.0 (1)	- (0)	- (0)
Non-Firefighter	3.27 (16)	3.37 (9)	3.5 (4)	3.0 (3)

Grade Point Averages: Sample – 3.18 Firefighters – 3.28 Students – 3.16

MBTI Results and the Four Dichotomies

Because many of the studies related to the MBTI and learning styles address student preferences in the four individual dichotomies, the objectives of this study

will also be addressed in relation to the four individual dichotomies. The four tables in Appendix B provide a comparison of the MBTI results from the student sample (including the sample total, firefighters and non-firefighters) to the distribution of the adult population of the United States along the four dichotomies of the MBTI. Although most of the results are in line with those of the general adult population of the U.S., there were some variations worthy of note.

In the adult population of the U.S., 75% prefer sensing to intuition. As is shown in the tables in Appendix B, only 56.92% of the MATC sample preferred sensing and 43.08% favored intuition. In the judging – perceiving dichotomy, 50% of the adult U.S. population preferred judging and 50% preferred perceiving. In the sample these percentages were 38.46% favoring judging and 61.50% preferring perceiving.

The four tables in Appendix C relate to the four MBTI dichotomies and the grade point averages of students in the sample. These tables provide a comparison of the GPAs of students in the sample along with each the four MBTI dichotomies. Results are presented as a percentage of the total sample and as the number of students favoring a specific function in each dichotomy. The tables are unremarkable, in that the grade point averages do not vary more than hundredths-of-a-percent between the two functions in each dichotomy. The greatest difference in GPA between opposing functions in a dichotomy occurs when looking at the judging verses perceiving dichotomy. Students who prefer judging had an average GPA of 3.33, while those favoring perceiving reported a GPA of 3.09.

Summary

In relation to the first objective of this study, the psychological types of the students in the MATC Fire Science Associate Degree program were determined using the MBTI instrument. This researcher found that there was no dominant psychological type among the students in the sample.

The second objective, comparing the psychological types of firefighter students to non-firefighter students, could not be met due to an under representation of firefighters in the sample. Results indicated that there was also no dominant type among the non-firefighter students in the program.

The third objective related to comparing the GPAs of students to determine whether there are any significant academic differences among the psychological types. The average GPA among students in the sample was 3.18. The ESFJ and ENFJ types, with extraversion, feeling, and judging in common, reported higher GPAs of 3.43 and 3.5. The INTP type reported the lowest GPA at 2.72. Interestingly, the INTPs preferences in the extraversion – introversion, thinking – feeling, and judging – perceiving dichotomies are exactly opposite of the ESFJ and ENFJ types (those reporting the highest GPAs). Type theory would presume that the learning style of the INTP students would also be opposite of the ESFJ and ENFJ students. Enough information has not been presented to infer that the instructional style within the MATC Fire Science program might currently favor students who prefer extraversion, feeling and judging over introversion, thinking and perceiving.

Chapter Five

Summary, Conclusions and Recommendations

Introduction

The focus of this study was an analysis of the personality type preferences of the students in the Milwaukee Area Technical College Fire Science Associate Degree Program using the Myers-Briggs Type Indicator. According to MBTI theory, people develop patterns of behaviors, skills, and attitudes based on their psychological type.

Type theory indicates that individuals also develop learning styles based upon their psychological type preference. As an example, a person favoring one psychological type may prefer a learning environment that allows them to focus on facts and defined procedures (Sensing types). These individuals may flounder in another learning environment. A second individual may become quite bored with the environment mentioned above. He or she may flourish in a learning environment that allows them to focus not on facts, but on abstract concepts and theories (Intuitive types).

Instructors in the MATC Fire Science Program can use the psychological type information gained in this study to assess the learning environments they are creating for their students. Although it is important to be able to teach to, and be able to learn from, a variety of instructional styles, it is also important to understand how people learn best. The MATC Fire Science instructors can read this material and ask themselves if they are providing an instructional environment that lends itself to all students' learning styles.

This chapter will open with a restatement of the problem and objectives of the study. I will then provide the reader with a summary of the study, including a review of the sample, procedures, and the MBTI instrument. This will be followed by a presentation of conclusions and implications drawn from the results of the study. The chapter will close with a presentation of recommendations for future research in this area.

Problem Statement

The purpose of this study was to identify and analyze the personality type preferences of students enrolled in the MATC Fire Science Associate Degree Program using the 16 personality type preferences associated with the Myers-Briggs Type Indicator. The first objective of this study was to determine the psychological type preferences of students in program. The second objective was to compare the psychological type preferences of students in the program who are career firefighters to those students who are not career firefighters. The third objective was to determine whether there are significant differences in the academic performance between students with different personality type preferences.

Summary of Study Procedures

The population of the MATC Fire Science Program during the Spring 2005 semester included 185 students. A sample of 130 students (based on National Education Association Standards) was randomly chosen to participate in this study. Students in the sample were asked to complete the psychological

inventory (MBTI) only after receiving a thorough explanation of the study and the psychological assessment tool. All 130 students chose to participate.

The Myers-Briggs Type Indicator Form M was used to assess the students' personality types. This instrument measures a person's preference toward one or another of four paired opposites, or dichotomies. The four dichotomies relate to a person's orientation to the world [extraversion (E) versus introversion (I)]; information gathering [sensing (S) versus intuition (N)]; decision making [thinking (T) versus feeling (F)]; and attitude toward the outer world [judging(J) versus perceiving (P)].

The MBTI uses a forced-choice format, where participants are required to make choices between each of the two opposing alternatives mentioned above. A four-letter personality type, corresponding to their preferences in each dichotomy, is given to the individual. For example, a person who prefers introversion (I), sensing (S), thinking (T), and judging (J) in the dichotomies would be referred to as an ISTJ personality type. The MBTI places individuals into one of 16 psychological types based on the16 possible four-letter combinations.

The answer sheet, containing 93 responses, was scored by this researcher using a scoring template provided by the authors of the MBTI instrument. Gender, career status (professional firefighter or non-firefighter student), and grade point average information was also collected from each student.

The majority of the information gathered was presented in "type tables" (see Tables 1 – 5). A type table arranges the psychological types in a manner that highlights the similarities and differences between the 16 MBTI personality types.

Each personality type in the type table is bordered by other types that have many characteristics, attitudes and behaviors in common with it. Type theory postulates that people who share similar psychological types also often share similar occupations, college majors and learning styles.

Conclusions and Implications

The first objective of the study was to determine the personality types of the 185 students in the program. Using a sample of 130 students I was able to estimate the personality type preferences of these students. I found that there was no dominant personality type among the students.

The second objective involved comparing the personality types of students who are professional firefighters to those students who are not. The number of firefighters present in this sample (13) was too small for me to reach any reliable conclusions.

Using the information from objective two, it is interesting to note that nearly 54% of the firefighters chose one of three psychological types (ENFP-23%, ISTJ-15% and ISTP-15%). According to type theory the ENFP students would have nearly the opposite learning style as the ISTJ and ISTP students. The ENFP students would prefer a learning environment that provides them with abstract concepts and theories, and demonstrates the social importance of the subject matter. These students would also prefer to have opportunities for trying things out, discussing ideas with others, less structure in the classroom, and more flexibility in assignments. The ISTJ and ISTP students prefer to be provided with the facts, well defined procedures and theories, logical arguments, and a

structured environment. These students favor gaining their information (via lecture) and being able to take time to think ideas out on their own.

When assessing the non-firefighter students, the researcher found that five of the 16 MBTI types (ESTJ-13%, ESTP-11%, ESFP-10%, ENFP-12% and ENTP-11%) were preferred by the majority (57%) of these students. Four of these types (ESTP, ESFP, ENFP, and ENTP) share a preference in two of the four MBTI dichotomies. They each prefer extraversion to introversion, and perception over judgment. Type theory indicates that these individuals would share extraverted learning style preferences such as working in groups and hands-on instruction. They would also share preferences for perceiving characteristics such as flexibility in their activities, and opportunities to explore and experiment with newly acquired concepts. These preferences are not often addressed in many of the courses within this Fire Science program. Most courses are presented in a lecture format.

The third objective entailed determining whether there were significant differences in the academic performance among the students of differing types. To meet this objective, the researcher compared the mean grade point average of the students favoring each of the 16 psychological types. The researcher found that the majority of types had mean grade point averages close to that of the entire sample (3.18). The ESFJ and ENFJ types, however, reported GPAs that were higher than the norm, at 3.43 and 3.5. The INTP type reported the lowest GPA at 2.72. The lower achieving INTPs preferences along three of the four dichotomies are opposite of those of the higher achieving ESFJ and ENFJ

students (E - I, T – F and J – P). Type theory would presume that these individuals would also have learning styles that would be nearly opposite.

Given the above type and GPA information, one might believe that the instructors in the program are better addressing the learning styles of the ENFJ and ESFJ students than the INTP students. This researcher does not believe this to be the case at all. Looking at the three dichotomies where these personality types differ will give us further insight.

According to type theory, the INTP student prefers a learning environment that involves introverted preferences such as a lecture format and individual learning; and a thinking preference of focusing on ideas over human relationships. The majority of instruction in the program actually favors these preferences over their extroverted and feeling counterparts.

INTPs also preferred perceiving over judging. Perceivers desire instruction that allows flexibility and opportunities to explore and experiment. These features tend not to be characteristic of the instruction received in the fire science program. Could the preference for perceiving over judging be the root of the poor academic? The mean GPA of perceivers (3.09) was lower than that of judgers (3.33) for the entire sample (see Appendix C). One could speculate that the root of less than average performance stems from a preference for perception, but this researcher does not believe that there is enough information to support this.

Recommendations

The study indicated that there were no dominant personality types or corresponding learning styles among the students in the MATC Fire Science

Program. The study also demonstrated that there was not a significant difference in academic performance between the majority of students with differing personality types. The researcher believes that it would be impossible and impractical for teachers to tailor instruction to the variety of student psychological types in this program. Instructors can and should, however, create a learning environment that caters to all types. Students will then, at times, be learning in their most preferred style and at other times be forced to adapt to other less preferred learning styles, allowing students to become more comfortable with these less preferred learning styles

Recommendations for Further Research

In looking back at this study, the researcher regrets not having enough firefighter participation to be able to make reliable comparisons between the firefighter and non-firefighter students. Conducting a similar study using firefighters who are graduates of this program might be a way of getting an adequate number of firefighters.

An interesting study related to this work might be to determine the psychological types of firefighters in Milwaukee area fire departments. A researcher could determine whether there are any dominant psychological types among these firefighters. Comparisons could be made between firefighters and the promoted ranks. These results could also be compared to those of students in the fire science program.

Further studies could also focus on the psychological type preferences and instructional styles of the educators in the MATC Fire Science Program. A

researcher could assess whether there are any dominant psychological types among the instructors. The researcher could also evaluate whether instructors' psychological type influences their instructional style.

Regardless of the studies that can or will be conducted, it is this researchers hope that any information gained from this or future studies will help instructors to better meet the learning needs of the students in the MATC Fire Science Program.

References

Aikens, L. R. (1997). *Assessment of adult personality*. New York: Springer Publishing Inc.

Anchors, S., Robbins, M., & Gershman, E. (1989). The relationship between Jungian type and persistence to graduation among college students. *Journal of Psychological Type, 17*, 20-25.

Barrett, L. (1989). Impact of teacher personality on classroom environment. *Journal of Psychological Type, 18*, 50-56.

Berens, L. V. (1999). *Dynamics of personality: Understanding and applying Jung's cognitive processes*. Huntington Beach, CA: Telos Publications.

Briggs Myers, I. (1995). *Gifts differing: Understanding personality type*. Palo Alto, CA: Davies-Black.

Briggs Myers, I. (1998). *Introduction to type* (6th ed.). Palo Alto, CA: Consulting Psychologists Press.

Briggs Myers, I., McCaulley, M., Quenk, N., & Hammer, A. (2003). *MBTI manual* (3rd ed.). Palo Alto, CA: Consulting Psychologists Press.

Carlson J. G. (1989). Affirmative: In support of researching the Myers-Briggs Type Indicator. *Journal of Counseling and Development*, 67, 484-486.

Cloninger, S. C. (1996). *Theories of personality: Understanding persons* (2nd ed.). Upper Saddle River, NJ: Prentice Hall.

Elliott, G., & Sapp, G. (1988). The relationship between the Myers-Briggs Type Indicator and the Grasha-Riechmann Student Learning Styles Questionaire. *Journal of Psychological Type, 14*, 46-50.

Felder, R.M. (1989, Spring). Meet your students: 1. Stan and Nathan. *Chemical Engineering Education, 23*(2), 68-69.

Felder, R.M. (1991, Fall). Meet your students: 4. Jill and Perry. *Chemical Engineering Education, 25*(4), 196-197.

Felder, R.M. (1993). Reaching the second tier, learning and teaching styles in college science education. *Journal of College Science Teaching, 23*(5), 286-290.

Felder, R.M. (1994, Winter). Meet your students: 5. Edward and Irving. *Chemical Engineering Education, 28*(1), 36-37.

Felder, R.M. (1995, Fall). Meet your students: 6. Tony and Frank. *Chemical Engineering Education, 29*(4), 244-245.

Felder, R.M. (1996). Matters of style. *ASEE Prism, 6*(4), 18-23.

Felder, R.M., Felder G.N., & Dietz, E.J. (2002). The effects of personality type on engineering student performance and attitudes. *Journal of Engineering Education, 91*(1), 3-17.

Fourqurean, J., Meisgeier, C., & Swank, P. (1990). The link between learning style and Jungian psychological type preferences of children and academic achievement. *Journal of Psychological Type, 16*, 42-46.

Hammer, A. (1993). *Introduction to type and careers*. Palo Alto, CA: Consulting Psychologists Press.

Jung, C. G. (1949). *Psychological types* (H. G. Baynes, Trans.). New York: Harcourt Brace. (Original work published 1921).

Kiersey, D., & Bates, M. (1984). *Please understand me: Character & temperament types.* Del Mar, CA: Prometheus Nemesis Book Company.

Kroeger, O.,Thuesen, J., & Rutledge, H. (2002). *Type talk at work: How the 16 personality types determine your success on the job.* New York: Dell.

Lanyon, R. & Goodstein, L. (1997). *Personality assessment* (3rd ed.). New York: John Wiley & Sons

Lawrence, G. (1993). *People types and tiger stripes: A practical guide to learning styles.* Gainesville, FL: Center for Applications of Psychological Type.

Lawrence, G. & Martin, C. (2001). *Building people, building programs.* Gainesville, FL: Center for Applications of Psychological Type.

Leedy, P. D. & Ormrod J. E. (2001). *Practical research: Planning and design* (7th ed.). Upper Saddle River, NJ: Prentice Hall.

Lynch, A.Q. & Sellers, P.A. (1996). Preferences for different education environments and psychological type: A comparison of adult learners and traditional age college students. *Journal of Psychological Type, 39,* 18-29.

McCaulley, M.H. (1990). The MBTI and individual pathways in engineering design. *Engineering Education,* (80), 537-542.

Razenberg, K. (n.d.). The typology of Carl Gustav Jung. Retrieved May 5, 2003, from http://www.cgjungpage.org/articles/razenberg.html.

Schurr, K., & Ruble, V. (1988). Psychological type and the second year of college achievement: Survival and the gravitation toward appropriate and manageable major fields. *Journal of Psychological Type, 14,* 57-59.

Tieger, P., & Barron-Tieger, B. (2001). *Do what you are*. New York: Little, Brown and Company.

APPENDIX A

Consent Form / Cover Sheet

Consent to Participate In UW-Stout Approved Research

Title: A STUDY OF PERSONALITY TYPE PREFERENCES OF STUDENTS ENROLLED IN THE MILWAUKEE AREA TECHNICAL COLLEGE FIRE SCIENCE ASSOCIATE DEGREE PROGRAM

Investigator:
Rick Mueller
(414) 282-3040

Research Sponsor:
Dr. Joseph Benkowski
(715) 232-5266

Description:

My paper is a study of personality type preferences of students within the MATC Fire Science Program. I will be using the Myers-Briggs Type Indicator (MBTI) inventory to determine student volunteers' psychological type preference.

The MBTI is a questionnaire that solicits your preferences between two opposites regarding how you feel or act *(for example: Does following a schedule (A) appeal to you (B) cramp you)*. The answers you provide for each of the MBTI's 93 questions will indicate your preference toward one of the 16 equally desirable psychological types.

Demographic (gender), employment (student, volunteer firefighter, professional firefighter) and academic (grade point average) information will be collected from each volunteer participant. This information will be compared to volunteers' psychological type preferences.

The objectives of the study will be to:

1. Determine the personality type preferences of students in the MATC Fire Science Associate Degree Program
2. Compare the personality type preferences of students who are career firefighters to those students who are not career firefighters
3. Determine whether there are significant differences in the academic performance among students with differing personality type preferences

Risks and Benefits:

Risks - There are no risks associated with this study or the Myers-Briggs Type Indicator.

Benefits - Instructors in the MATC Fire Science Program will gain a better understanding of the personality types and learning styles of students in this program. Instructors can use this information to adjust their instructional style to better meet students' needs.

Time Commitment and Payment:

The 93 question MBTI will take approximately 30 minutes to complete. Participation is strictly voluntary, no compensation will be provided for participation.

Confidentiality:

All information will remain anonymous, no names or identifiers will be used. I do not believe that you can be identified from the information you provide.

Right to Withdraw:

Your participation in this study is entirely voluntary. You may choose not to participate without any adverse consequences to you. However, should you choose to participate and later wish to withdraw from the study, there is no way to identify your anonymous document after it has been turned into the investigator.

IRB Approval:

This study has been reviewed and approved by The University of Wisconsin-Stout's Institutional Review Board (IRB). The IRB has determined that this study meets the ethical obligations required by federal law and University policies. If you have questions or concerns regarding this study please contact the Investigator or Advisor. If you have any questions, concerns, or reports regarding your rights as a research subject, please contact the IRB Administrator.

Statement of Consent:

By completing the following MBTI inventory, you agree to participate in the project entitled,

A STUDY OF PERSONALITY TYPE PREFERENCES OF STUDENTS ENROLLED IN THE MILWAUKEE AREA TECHNICAL COLLEGE FIRE SCIENCE ASSOCIATE DEGREE PROGRAM

Investigator:
Rick Mueller
(414) 282-3040

Advisor:
Dr. Joseph Benkowski
(715) 232-5266

IRB Administrator

Sue Foxwell, Director, Research Services
152 Vocational Rehabilitation Bldg.
UW-Stout
Menomonie, WI 54751
(715) 232-2477
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Please answer the questions listed below and move on to the MBTI questions. **All results will be kept confidential.**

Thank you again for your assistance.

Rick Mueller

Gender (circle): Male Female

Career Status (circle): Professional Firefighter | Paid-on-call -or- Volunteer FF | Student

Grade Point Average (circle the GPA that most closely applies):

A	4.00	C	2.00
A-	3.67	C-	1.67
B+	3.33	D+	1.33
B	3.00	D	1.00
B-	2.67	D-	0.67
C+	2.33	F	0.00

APPENDIX B

MBTI Results and the Four Dichotomies –

Distribution of Student Types

Extraverted versus Introverted Dichotomy - Distribution of Student Sample

% (#)	Extraverted (E)	Introverted (I)
U.S. Population (1)	75%	25%
Total Sample	69.23% (90)	30.77% (40)
Firefighters	53.85% (7)	46.15% (6)
Non-Firefighters	70.95% (83)	29.06% (34)

Sensing versus Intuitive Dichotomy - Distribution of Student Sample

% (#)	Sensing (S)	Intuitive (N)
U.S. Population (1)	75%	25%
Total Sample	56.92% (74)	43.08% (56)
Firefighters	61.54% (8)	38.46% (5)
Non-Firefighters	56.41% (66)	43.59% (51)

Thinking versus Feeling Dichotomy - Distribution of Student Sample

% (#)	Thinking (T)	Feeling (F)
U.S. Population (1)	50%	50%
Total Sample	54.62% (71)	45.38% (59)
Firefighters	46.15% (6)	53.85% (7)
Non-Firefighters	55.56% (65)	44.44% (52)

Judging versus Perceiving Dichotomy - Distribution of Student Sample

% (#)	Judging (J)	Perceiving (P)
U.S. Population (1)	50%	50%
Total Sample	38.46% (50)	61.54% (80)
Firefighters	53.85% (7)	46.15% (6)
Non-Firefighters	37.61% (44)	62.39% (73)

(1) according to Kiersey & Bates (1984)

APPENDIX C

MBTI Results and the Four Dichotomies –

Grade Point Averages

Extraverted versus Introverted Dichotomy - Grade Point Averages (GPA)

GPA (#)	Extraverted (E)	Introverted (I)
Total Sample	3.19 (90)	3.15 (40)
Firefighters	3.28 (7)	3.28 (6)
Non-Firefighters	3.18 (83)	3.13 (34)

Sensing versus Intuitive Dichotomy - Grade Point Averages (GPA)

GPA (#)	Sensing (S)	Intuitive (N)
Total Sample	3.19 (90)	3.15 (40)
Firefighters	3.28 (7)	3.28 (6)
Non-Firefighters	3.18 (83)	3.13 (34)

Thinking versus Feeling Dichotomy - Grade Point Averages (GPA)

GPA (#)	Thinking (T)	Feeling (F)
Total Sample	3.14 (71)	3.21 (59)
Firefighters	3.34 (6)	3.23 (7)
Non-Firefighters	3.13 (65)	3.21 (52)

Judging versus Perceiving Dichotomy - Grade Point Averages (GPA)

GPA (#)	Judging (J)	Perceiving (P)
Total Sample	3.33 (50)	3.09 (80)
Firefighters	3.34 (6)	3.24 (7)
Non-Firefighters	3.32 (44)	3.07 (73)