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# Personality as a Predictor of Reading Comprehension Skills

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*University of Tennessee - Knoxville*

To the Graduate Council:

I am submitting herewith a dissertation written by Victoria Jacobs-Gray entitled "Personality as a Predictor of Reading Comprehension Skills." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Education, with a major in Education.

Lester N. Night, Major Professor

We have read this dissertation and recommend its acceptance:

Charles H. Hargis, John W. Lounsbury, Theodore W. Hipple

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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We have read this dissertation
And recommend its acceptance:

Accepted for the Council:

Associate Vice Chancellor and
Dean of The Graduate School

# PERSONALITY AS A PREDICTOR OF READING COMPREHENSION SKILLS

A Dissertation

Presented for the

Doctor of Education

Degree

The University of Tennessee, Knoxville

Victoria Jacobs-Gray

December 1999

DEDICATION

This work is dedicated in loving memory to my role models:

Fannie Hermann Miller, Professor Emeritus

The University of Kentucky,

and to

Ethel Elizabeth Capps, Professor Emeritus

Berea College

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The entire dissertation process has proven to be an incredible learning experience. Without a doubt I have learned a great deal about the research and writing process, and about the utilization of the Myers-Briggs Type Indicator. I wish to thank Anne McIntosh Walker for introducing me to it. More importantly, though I have learned that to accomplish anything of merit in any arena of life it is important to be in the company of people who are intelligent, creative, and supportive. My graduate assistantship made that possible. I wish to thank Dr. Thomas N. Turner for offering this opportunity in the form of a graduate assistantship working with the Lyndhurst Program.

I am particularly grateful to my committee members for the confidence they showed by approving my topic. At the time I submitted my Prospectus there was no precedent found in the Dissertation Abstracts, or Psych-Lit Journals. I have the greatest respect for Dr. Lester N. Knight, the chairman of my committee, and the other members of my committee, Dr. Charles H. Hargis, Dr. Theodore W. Hipple, and Dr. John W. Lounsbury.

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## ABSTRACT

In an attempt to reduce the number of students who begin their college careers with a year of remedial and developmental reading courses. This study was designed to search for a method of early detection of possible reading comprehension skill problems. Early identification of students who may be predisposed to problems with particular reading comprehension skills could lead to earlier intervention.

To accomplish this the Myers-Briggs Type Indicator (MBTI) and the Tennessee Comprehensive Assessment Program (TCAP) score of 400 college bound high school students were paired and analyzed. The thirteen reading comprehension skills showed a statistical difference in the mastery level of seven of these skills, based upon personality types. For five of these skills a pattern of mastery was also established. For the six reading comprehension skills where there was no significant difference, the result was predictable. When the number of non-mastery students is less than 10 % of the total population, it is improbable that a pattern will be detected.

The homogeneous population was a planned limitation of the study. The variables of motivation and ability were eliminated, as was the range of performance. The researcher believes that a heterogeneous population will yield more definitive results and hopes to see this study extended to other populations, including other age groups.

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# CHAPTER I

## INTRODUCTION

## PRESENTATION OF THE PROBLEM

A recently identified trend in colleges is the increasing number of freshmen whose deficient ACT score indicate a need for remedial instruction because the quantitative scores do not meet admission requirements. As the democratic process and the Open Door admission policy are encouraging more people to seek a college education, people who have never considered the possibility of higher education are now applying to college. The lack of preparation among recent high school graduates and among many non-traditional students, while not surprising, is a source of concern.

This situation is viewed as problematic by students (and their parents), college administrators, and state legislators. Students are distressed about the amount of time and money required to take remedial, non-credit courses. College administrators are concerned not only by the responsibility and challenge of staffing this program with qualified and effective instructors, but also with the inordinate amount of paperwork required to document the program for funding and accountability purposes. Because many of these students qualify for tuition assistance, legislators must be concerned with the fact that their constituents are paying for reading instruction as many as three times:

(1) through public school instruction
(2) through state assisted funding for college programs, and
(3) through actual tuition or tuition assistance for these at-risk students.

In order to avoid the expense of repetitive costs, some legislators have advocated several possible solutions. One proposed arrangement is to lower the acceptable ACT

test scores from 21 to 18, and to thereby require remediation for fewer students. This means that the students who are least likely to benefit from the remedial programs are receiving help, while those who have traditionally benefited from these programs are not. Another proposal advocates removing the Remedial and Developmental Reading program from the community colleges and challenging the secondary schools to do a more effective job of meeting the needs of these students. To do this the secondary school would need additional staff and funding for these programs that would need to be different from those already in place. While this intervention may reduce the number of future students in need of remedial instruction, there is nothing that would be done for those who have previously graduated. This proposed solution assumes that the fault lies in the quality of both the curriculum and the instruction provided by the secondary schools. Before the secondary schools accept the challenge to identify and intervene, it would be prudent to assess the success of the students currently served by the existing programs. Are the students who choose to prepare for college being prepared for college? Did the preponderance of the at-risk students actually strive for a college preparatory curriculum or did they make a late decision to pursue post secondary education? If those students who are attempting to learn are failing to do so; then, establishing a pattern of mastery (or non-mastery) and affective learning style might be integral in solving the problem. Improved methods of identification and intervention at earlier levels would seem to be the most efficient and cost-effective solution.

One method of accomplishing this has been the rather expensive solution of professional consultants who present in-service instruction to classroom teachers. Because of the cost a general program is presented to the entire faculty rather than a

subject specific presentation to those within a particular discipline. A popular and promising topic has been the affective learning styles. This poses the question: will a match between learning style and teaching style guarantee academic success. In short, will a tutorial approach to reading instruction produce more literate citizens?

## PURPOSE OF THE STUDY

The purpose of this study is to determine whether there is a valid correlation pattern between affective learning style, determined by personality and measured by the Myers-Briggs Type Indicator (MBTI) and the acquisition of reading comprehension skills. To accomplish this it was necessary to match and compare MBTI test results with an established curriculum based assessment instrument, the Tennessee Comprehensive Assessment Program (TCAP) Competency Test—Language Arts Sub-test, to determine whether or not a pattern actually exists. Because the comparison of finite test results lends themselves to quantitative analysis the research format was quantitative accompanied by explanations based on previous research, some of which has been qualitative.

This study sought to substantiate, or to refute the claims of professional consultants that different personalities process information differently and will therefore acquire different information and skills. The Research was intended to answer the follow questions:

1. Does a relationship between reading skills and personality actually exist?

2. Are particular reading skills more readily mastered by certain personalities and mastered with more difficulty by others?

## OVERVIEW OF RELATED RESEARCH

Affective learning styles have attracted a great deal of attention, but the amount of contradictory and overlapping information has been less than productive. The dual consequences have been the creation of still more definitions of learning styles or the dismissal of learning styles as the answer to the problem. Nevertheless, a plethora a research about personality and learning style describing some observable patterns permeates the ERIC documents, Psych-Lit articles, and dissertation Abstracts. Most of this research that deals with literacy is descriptive and calls for additional quantitative research. Definite links between writing and personality have been discovered. Preferences for learning situations, subject mastery and career success are recognized as a given. Since it is accepted that reading and writing are modes of written expression, the decoding and encoding differences are worthy of exploration.

The use of the MBTI to establish patterns of academic accomplishment are not lacking as Dissertation Abstracts citing this instrument are anything but lacking and are consistent with the aforestated theory. The MBTI has been used in conjunction with criterion referenced math tests to predict final examination scores and course grades for college algebra students (Jamison). Another study attempted to establish a relationship between personality and academic achievement, college Grade Point Average (CGPA), and Mathematics and English Grade Point Average (MEGPA). Predictability of this study did not establish a relationship. The Math and English scores often show a negative correlation without the added variable of personality. When the same study was used to examine the relationship between learning styles and achievement in English and

Mathematics for high school vocational students, the results did not refute nor did they support the hypothesis (Shay). The author ascertains that her research questions remain valid and recommends further research. Although these studies did include language skills in their investigations, the major focus was not upon reading comprehension skills (Carrell & Monroe, Miller, Reigstad). The preponderance of those studies dealing with reading address the issues through modality rather than through affective learning style theories; therefore, this research is unprecedented.

## IMPORTANCE OR NEED FOR THE STUDY

The need for improved reading instruction has been established. The claims that learning style as determined by personality may provide the solution are producing volumes of descriptive research that generates lucrative earnings for consultants who do in-service training. If the theory is a valid answer to the need for better reading comprehension, then a quantitative study is in order. If the theory does nothing more than offer false hope to those who want a quick fix for reading disabilities, the lack of validity needs to be established. The time has come to investigate and to substantiate the role of learning style as determined by personality in the acquisition of reading comprehension skills.

## ASSUMPTIONS, LIMITATIONS, DELIMITATIONS

It has been assumed that all students who are pursuing the university diploma, or the combination (of university and technical graduation requirements) diploma had chosen to do so because they want to obtain a college education. It was further assumed

that all of these students were sufficiently motivated to attempt to master the skills required for their future academic goals. It was also assumed that students performed to the best of their ability on the designated sub-tests of the TCAP Competency Test. It was further assumed that all students accurately and honestly answered the questions on the MBTI.

No attempts were made to identify:

(1) the age or the grade level of any of the subjects,

(2) the academic ability, or placement in Honors or Standard English classes, or

(3) the confidential information that is not part of the designated tests.

Although gender identification is required to score one of the constructs of the MBTI, it is not included in the final determination. This information was not included in the data provided to the investigator.

This study was delimited by the following: (1) to students whose academic track was preparing them for university admission, and who had taken both the TCAP and the MBTI. Because the MBTI is routinely administered to all $11^{th}$ grade Honors and Standard English classes, as well as to $10^{th}$ grade Honors English classes the population did not include those who have not taken the test. Twelfth grade students who had attended another school the previous year may not have been included if both sets of test scores are unavailable. Students who were enrolled in skills, remedial or resource English classes were not included for several reasons. To be enrolled in these classes, the students must have been diagnosed with a need for these programs and therefore were not pursuing the designated university or combination diplomas. Another reason for not

administering the MBTI to these classes is the questionable validity based upon the readability level of the test in relation to the tested reading level of these students. Only students who had demonstrated sustained motivation to prepare for a college education were considered as part of the population for analysis.

## DEFINITION OF TERMS

**ABSTRACT** referring to language and thought process associated with the intuitive personalities showing a preference for the analogical, categorical, fictional, figurative, general, schematic, symbolic, and theoretical terminology (Keirsey, 1998); the ability to use higher mental processes to identify and manipulate qualities and make generalizations more frequently preferred by the intuitive personalities (Mamchur, 1996).**Antonym: concrete**

**AFFECTIVE LEARNING STYLES** Learning and processing which is generally believed to be determined by personality which is the result of brain mapping and function; for the purposes of this paper the Myers-Briggs Type Indicator shall be the gauge for defining affective learning style.

**ATTITUDE** describes the way an individual elects to interact with the world. These traits become evident at an early age and do not appear to change. The two scales used to identify this preference are extraversion/introversion (E/I), and judging/perceiving (J/P). Possible combinations include EJ, EP, IJ, and IP. (Murphy) **Antonym: Function**

**BOTTOM-UP PROCESSING** computer analogies to the brain functions and mental processing often use this term to define inductive reasoning.**Antonym: Top-down processing; deductive reasoning.**

**BRAIN BASED LEARNING** a system of education based upon the concept that learning style and information processing are the result of brain structure and development. This theory uses the Myers-Briggs Type Indicator to identify learning style; however the divisions of type do not match the theory under investigation within this body of research. This theory classifies the groups into ST. SF, NT and NF rather than the SJ, SP. NT and NF divisions.

**COGNITION** the act or process of knowing, including both awareness and Judgment (Mish).

**CONCRETE** referring to language and thought process associated with the sensing

personalities showing a preference for the detailed, factual, elemental, empirical, indicative, literal, signal and specific terminology (Keirsey, 1998). **Antonym: Abstract**

**COOPERATIVES** two major personality groups originally paired by Eduard Spranger and later paired by David Keirsey. The Religious, Idealists, or NF personalities have been paired with the Economicals, Guardians, or SJ personalities based on the observation that these social types have a high regard for moral sanction. The other two groups are identified as Utilitarians (Keirsey, 1998).

**DEDUCTIVE** the process of logical reasoning from principles to specific instances; reasoning from whole to parts; usually associated as the preferred processing for the sensing personalities. **Antonym: Inductive**

**DOMINANT TYPES** a preferred function will be either a perception process, Sensing (S) or Intuition (N), or a judgment process, Thinking (T) or Feeling (F). The dominant function is the unifying process in a person's life.

Thinking Types [ESTJ—ENTJ—ISTP—INTP],
Intuitive Types [ENTP—ENFP—INFJ—INTJ],
Feeling Types [ESFJ—ENFJ—ISFP—INFP],
Sensory Types [ESTP—ESFP---ISFJ—ISTJ] (Keirsey, 1998)

**ENFJ** [Extrovert-Intuitive-Feeling-Judging] "Smooth-talking Persuader" Dominant function is Feeling –interpersonally based decisions. (Kroeger & Thuesen) **E**veryone **N**eeds **F**ulfillment & **J**oy (Hirsh & Kummerow) Pedagogue, 5% of the American population (Keirsey & Bates)

**ENFP** [Extrovert-Intuitive-Feeling-Perceiving] "Giving Life an Extra Squeeze" Dominant function is intuition—possibilities and abstract observations. (Kroeger & Thuesen) **E**veryday, **N**ew **F**antastic **P**ossibilities (Hirsh & Kummerow) 5% of the American population (Keirsey & Bates)

**ENTJ** [Extrovert-Intuitive-Thinking-Judging] "Life's Natural Leaders" Dominant function is Thinking (Kroeger & Thuesen) **E**xecutives **N**eed **T**ough **J**obs(Hirsh & Kummerow) Field Marshall,5% of the American population (Keirsey & Bates)

**ENTP** [Extrovert-Intuitive-Thinking-Perceiving] "One Exciting Challenge After Another" Dominant function is intuition—possibilities and abstract observations. (Kroeger & Thuesen) **E**ach **N**ew **T**hought **P**ropels (Hirsh & Kummerow) Inventor, 5% of the American population (Keirsey & Bates)

**ESFJ** [Extrovert-Sensing-Feeling-Judging] "Hosts and Hostesses of the World" Dominant function is Feeling –interpersonally based decisions. (Kroeger & Thuesen) **E**xtra **S**pecial **F**riendly **J**oiner (Hirsh & Kummerow) Seller, 13% of the American population (Keirsey & Bates)

**ESFP** [Extrovert-Sensing-Feeling-Perceiving] "You Only Go Around Once in Life" Dominant function is Sensing—factual and detailed perceptions. (Kroeger & Thuesen) **E**xtra **S**pecial **F**riendly **P**erson (Hirsh & Kummerow) Entertainer, 13% of the American population (Keirsey & Bates)

**ESTJ** [Extrovert-Sensing-Thinking-Judging] "Life's Administrators" Dominant function is Thinking –objective decisions and structure. (Kroeger & Thuesen) **E**xecution **S**aves **T**he **J**ob (Hirsh & Kummerow) Administrator, 13% of the American population (Keirsey & Bates).

**ESTP** [Extrovert-Sensing-Thinking-Perceiving] "The Ultimate Realist" Dominant function is Sensing—factual and detailed perceptions. (Kroeger & Thuesen) **E**veryone **S**eems **T**oo **P**roper (Hirsh & Kummerow) Promoter, 13% of the American population (Keirsey & Bates).

**EXTRAVERSION (E)** an external force of interest and energy. (Mamchur,1996). **Antonym: Introversion**

**FEELING (F)** a subjective, values-oriented approach to problem solving. (Mamchur, 1996) **Antonym: Thinking**

**FUNCTION** identifies the way a person process information. The sensing/intuitive (S/N) construct explains how the individual takes in information while the thinking/feeling (T/F) explains how the information is utilized. Possible combinations include SF, ST, NF, NT. Functions develop over time when people have the opportunity to practice using them (Murphy). **Antonym: Attitude**

**INFJ** [Introvert-Intuitive-Feeling-Judging] "A High Sense of Duty—An Inspiration to Others" Dominant function is intuition—inspirations and possibilities. (Kroeger & Thuesen) **I**nner **N**uances **F**oster **J**ourneys (Hirsh & Kummerow) Author, 1% of the American population (Keirsey & Bates)

**INFP** [Introvert-Intuitive-Feeling-Perceiving] "Performing Noble Service to Aid Society" Dominant function is Feeling –interpersonally based decisions and structure. (Kroeger & Thuesen) **I N**ever **F**ind **P**erfection (Hirsh & Kummerow) Questor, 1% of the American population (Keirsey & Bates)

**INTJ** [Introvert-Intuitive-Thinking-Judging] "Everything Has Room for Improvement" Dominant function is Intuition—inspirations and possibilities. (Kroeger & Thuesen) **I**t's **N**ot **T**horoughly **J**ustified (Hirsh & Kummerow) Scientist, 1% of the American population (Keirsey & Bates)

**INTP** [Introvert-Intuitive-Thinking-Perceiving] "A Love of Problem-solving" Dominant function is Thinking—objective decisions. (Kroeger &

Thuesen) **I**t's **N**ot **T**heoretically **P**ossible (Hirsh & Kummerow) Architect, 1% of the American population (Keirsey & Bates)

**ISFJ** [Introvert-Sensing-Feeling-Judging] "A High Sense of Duty" Dominant function is Sensing—factual and practical (Kroeger and Thuesen) **I S**erve **F**amily **J**oyfully (Hirsh & Kummerow) Conservator, 6% of the American population (Keirsey & Bates)

**ISFP** [Introvert-Sensing-Feeling-Perceiving] "Sees Much but Shares Little" Dominant function is Feeling –interpersonally based decisions and structure. (Kroeger & Thuesen) **I S**eek **F**un & **P**leasure (Hirsh & Kummerow) Artist, 6% of the American population (Keirsey & Bates)

**ISTJ** [Introvert-Sensing-Thinking-Judging] "Doing What Should Be Done" Dominant function is Sensing—factual and practical. (Kroeger & Thuesen) **I S**ave **T**hings **J**udiciously (Hirsh & Kummerow) Trustee, 6% of the American population (Keirsey & Bates)

**ISTP** [Introvert-Sensing-Thinking-Perceiving] "Ready to try anything Once" Dominant is Thinking –objective decisions (Kroeger & Thuesen) **I S**ee **T**he **P**roblem (Hirsh & Kummerow) Artisan, 6% of the American population (Keirsey & Bates)

**INDUCTIVE** the process of determining principles by logic or observation from data; reasoning from part to whole. **Antonym: Deductive**

**INTROVERSION (I)** an internal focus of interest and energy (Mamchur, 1996). **Antonym: Extraversion**

**INTUITION (N)** an indirect, future-oriented attention to broad issues through seeking patterns and relationships. (Mamchur, 1996) **Antonym: Sensing**

**JUDGING (J)** an organized, closure-driven way to deal with the world. (Mamchur, 1996) This term is used to contrast the term "perception"while this term is understood to include the process of drawing conclusion about that which has been perceived(Myers, 1962). **Antonym: Perceiving**

**JUNGIAN** of or pertaining to Carl Jung's theories of Psychological Types,Typology, or the Individuation Process which form the foundation of the research leading to the development of the Myers-Briggs Type Indicator.

**LEARNING STYLES** The Institute of Learning Styles Research (ILSR) generally classifies learning styles as Affective, Cognitive, and Modality

**LEFT-BRAINED** referring to Sperry's theory of hemisphericity—the left cerebral hemisphere, usually the controlling center for language and calculation functions as well as for neuromuscular activity on the right side of the body. **Antonym: Right-brained**

**LUDIC READER** those people who reader for pleasure and their own enjoyment in addition to their ability to read for information

**MASTERY** The TCAP score reflecting mastery verifies that the student correctly answered at least 75% of the questions for a specific objective.

**MYERS-BRIGGS TYPE INDICATOR (MBTI)** A 166-item forced-answer questionnaire used to determine type preferences. The 16 types are determined by four bi-polar constructs. These are frequently grouped into four categories: NF, NT, SJ and SP.

**NF** The Idealistic Change Agent, driven by a need for integrity and exploration. (Mamchur, 1996) Any of the Inductive, right brained personalities: ENFJ, ENFP, INFJ, or INFP. Abstract Cooperative (Keirsey, 1998). Some literature refers to this group as Blue, Dolphins, Appolonian (See Appendix)

**NT**. The Promethean (Keirsey & Bates) Achiever, driven by the need to be perfect, to seek ultimate knowledge and competency.(Mamchur, 1996) Any of the Inductive, Left-brained personalities: ENTJ, ENTP, INTJ, or INTP. Abstract Utilitarian (Keirsey, 1998).Some literature refers to this group as Green, Owls, (See Appendix)

**NON-MASTERY** The TCAP score reflecting non-mastery verifies that the student failed to correctly answer 75% of the questions for a specific objective.

**PERCEIVING (P)** a flexible, curiosity-driven way to deal with the world. (Mamchur, 1996) This term is the dichotomous component of "judging"and involves the process of becoming aware of things, people, events and ideas. Myers, (1962) **Antonym: Judging**

**RIGHT-BRAINED** the right cerebral hemisphere, usually the controlling center for spatial and nonverbal concepts as well as for neuromuscular activity on the opposite side of the body. **Antonym: Left-brained**

**SENSING (S)** a direct, practical, focused attention to detail using the five senses. (Mamchur, 1996) **Antonym: Intuitive**

**SJ**. The traditionalist, driven by a need to serve, to do one's duty well, to guard the system. (Mamchur, 1996) Any of the Deductive, Left-Brained personalities:

ESFJ, ESTJ, ISFJ, or ISTJ. Concrete Cooperator (Keirsey, 1998). Some literature refers to this group as Gold, Bears, Epimethian (See Appendix)

**SP**. The Dionysian (Keirsey & Bates, (1984) Free Spirit, driven by a need to be free to do whatever is immediately of value. (Mamchur, 1996) Any of the Deductive, Right-Brained personalities: ESFP, ESTP, ISFP, or ISTP. Concrete Utilitarian (Keirsey, 1998). Some literature refers to this group as Orange, Apes, (See Appendix)

**TCAP** Tennessee Comprehensive Assessment Plan is the state mandated proficiency test required for high school graduation.

**THINKING (T)** an objective, analytical approach to problem solving. (Mamchur, 1996) **Antonym: Feeling**

**TOP-DOWN PROCESSING** deductive reasoning **Antonym: Bottom-up Processing**

**UTILITARIANS** two major personality groups originally paired by Eduard Spranger and later paired by David Keirsey. The Theoretics, Rationals, or NT personalities have been paired with the Aesthetics, Artisans, or SP personalities based on the observation that these political types are concerned with functional utility. The other two groups are identified as Cooperatives(Keirsey, 1998).

## OVERVIEW OF PROCEDURES

Following the models of the annual statistical computations of The Conditions of Education, this study was designed to present statistical information in an accessible manner. This study was structured to follow the following format:

collecting the warehoused data consisting of paired MBTI and TCAP scores

1. analyzing and organizing the data
2. developing provisional constructs, categories and theories to correspond with the data
3. testing the data to determine the validity of the theories

All charts of data and computations are preceded by an introduction of the intents and purposes of the data and followed by a discussion of the significance. The purpose of

this presentation is to simplify the explanations of an excessive quantity of information in order to focus upon the findings and their implications.

## ORGANIZATION OF THE STUDY

Following the approval of the Prospectus and the acceptance of terms by the cooperating secondary school, the author sought and was granted authorization for Human Subjects Form A. The proffered data, which had been previously warehoused by the aforementioned school, was obtained, and organized into an Excel Text Tile for statistical analysis through SPSS. These findings and discussion are included in the following chapters as stated in the Table of Contents.

## SUMMARY

The quest to impart and to develop literacy has challenged educators and researchers for over a century. The fact that college bound students are reaching college with inadequate reading comprehension skills is a source of concern for students and parents as well as for educators. The search for a valid method of anticipating and correcting deficiencies in reading comprehension is even more important in the current complex information –centered society. The temptation to succumb to quick-fix schemes and panaceas often penalizes students rather than preparing them for the educational success, which is denied the marginally literate students. Recently theories have evolved that attempt to equate brain-based theories of learning and affective learning styles with literacy. Although the theories make sense, they have not been subjected to a quantitative investigation or analysis. This project description was based upon the presumption that

pairing and analyzing the affective personality delineations with the curriculum based assessment scores for the entire population of college bound students within a single 9-12 high school would determine the validity of the theories in question. If the affective and brain-based learning styles can be of benefit to educators and to their students, it would behoove them to adopt the appropriate methods and procedures. If, on the other-hand this theory can not be substantiated, it may be better to investigate other theories for an efficacious method of promoting literacy.

# CHAPTER TWO

## REVIEW OF LITERATURE

"Human beings are born with a biological necessity to make sense out of the cognitive messages they receive from the environment."
J. Piaget

## OVERVIEW OF THEORY AND HISTORY

Learning to read is both a goal and a milestone. Parents, teachers, and students initially share a common goal in this endeavor. Reading comprehension skills are both a cognitive message and a tool to discover other cognitive messages and mysteries. This logic is not disputed and yet the deficiency of reading comprehension skills among the best and the brightest is alarming. Every year college bound students are told that they must complete non-credit remedial reading courses before they may enroll in required credit courses.

Early detection of reading comprehension deficits would undeniably reduce the number of students who face an extra semester, or year of non-credit course work. Studies show that after a single year of school the range of reading level scores extends from Reading Readiness level to Grade Three. These studies also indicate that as the students mature, the range of reading level scores also increases (Hargis). Brain based research indicates that personality is a combination of two attitudes [extroversion or introversion, and judging or perceiving], and two functions [sensing or intuitive, and thinking or feeling] that predispose an individual to certain performances and learning style preferences (Mamchur), (Miller), (Murphy). If personality can be used to predict performance in the disciplines that depend upon reading comprehension skills; then, these

same personality constructs may be valid predictors of reading comprehension skill mastery.

The literature reviewed in this chapter indicated that personality, as defined by the Myers-Briggs Type Indicator (MBTI) does predict performance in a number of disciplines. Some of these studies while not specifically focused upon reading comprehension skills are contingent upon mastery of these skills.

Sedulous searches through ERIC documents, Psych-Lit articles, and dissertation abstracts seem to determine that this quantitative study is virtually unprecedented. No previous research has investigated the distribution of mastery vs. non-mastery of reading comprehension skills by personality. The rationale for doing so has been presented within this chapter:

1. to examine the universality of the four primary personality groups
2. to clarify the choice of the MBTI; and
3. to identify comparable studies involving the MBTI.

These primary personality groups have been identified as Intuitive Feeling (NF). Intuitive Thinking (NT), Sensing Judging (SJ), and Sensing Perceiving (SP). Related research includes a different set of divisions of the MBTI personality types. As early as 1988, some researchers were arguing that more applicable divisions would be to change the SJ and SP divisions to ST and SF (Frisbe). More recently brain based studies have tried to substantiate these claims relying on brain anatomy research calling their theories brain based education. More recently the BrainStyles [*sic*] System has been advocated as an antidote for learning problems. Although this system is based upon the theories of Jung, and Sperry, it employs a different system of defining the four primary personality types.

These two authors define the primary learning style groups as NF, NT, SF, and ST. Despite claims of exceptional success the research complied by Marlane Miller, the author of BrainStyles [*sic*], involving 118 subjects shows an association between her definitions of learning styles. As these systems have not been presented in the Tennessee School systems, and are not currently used for wide scale educational research, they have been excluded from any further discussion or consideration. The preponderance of previous research relating reading and affective personality styles does not support these recent theories and the published materials, which have been investigated, do not address literacy issues. Furthermore, the consulting companies which employ the color terms claim that their colors correlate with the traditional combinations of personality traits: NF = True Blue, NT = Curious Green, SJ = Solid Gold, and SP = Action Orange (NCTI).

The universality of this concept cannot be ignored. Throughout recorded history mankind has attempted to understand, to explain, and to anticipate human behavior. A multiplicity of explanations has been offered and abandoned, only to be rediscovered and renamed. These personality theories have been used to account for behaviors, including careers, compatibility, decision making and now learning. One of the prevalent reasons that these ideas have been discarded is the previously inadequate. Means of applying them to specific individuals with any degree of reliability. The ability to classify and to describe without the ability to identify has curtailed the possibility of making predictions and anticipating future behaviors.

Historically, Hippocrates (circa 450 BC) separated the human race by temperaments the he attributed to an imbalance of "humours" or bodily secretions.

The four Humours theory identified the personalities as choleric (NF), phlegmatic (NT), melancholic (SJ), and sanguine (SP) (Michael) (Keirsey). In the second century AD, the Greek physician Claudius Galen expanded the four humours theory with explanations about bodily organs: liver, lungs, kidneys, and heart that were associated with the production of the secretions that caused the differences in temperament (Jung) (Keirsey). It is also interest to learn that nearly six hundred years before Galen, Plato's Republic discussed four types of character that corresponded with the four temperaments of Hippocrates. Since Plato was more interested in the role a person played in the social order, his terms of identification were noetic [idealist] = NF, dianoetic [rational] = NT, pistic [guardian] = SJ, and iconic [artisan] = SP. Later Aristotle expanded upon his mentor's theory and defined humans in terms of happiness rather than virtue. He claimed that while a few men found pleasure in exercising their moral virtue, "ethikos" (NF) or by concluding logical investigation, "dialogike: (NT), most people prefer to either acquire assets "propraietari" (SJ) or sensual pleasure, "hedone" (SP) (Keirsey & Bates). Ironically, none of these parallel theories was practical in terms of application due to the lack of a diagnostic instrument. Observation and conjecture were something less that consistent and reliable.

Another early explanation for these dispositions alludes to classical mythology. Zeus was said to have assigned four of the lesser gods, known as titans, the task of teaching the mortals to be more god-like. Apollo was commissioned to guide man to find a soul (NF). Prometheus was to impart a quest for science, or knowledge (NT). Epimetheus, the husband of Pandora, was to instill a sense of duty (SJ). Dionysus was to teach the joy of living (SP) (Keirsey & Bates). Individuals who showed a strong

preference for a particular behavior were said to be the metaphorical children of that particular god.

The universality of these four types is further evidenced in the sixteenth century when a Swiss physician identified the same temperaments by the four elements: fire (NF), water (NT), earth (SJ), and air (SP) (Michael). The Viennese physician Paracelsus described human beings as inspired and passionate "Nymphs" (NF), curious and calm "Sylphs" (NT), industrious and guarded "Gnomes" (SJ), and impulsive and changeable "Salamanders" (Keirsey). At approximately the same time, the American plains Indians attributed individual differences of their tribe members to the influence of the four winds. The restless western wind caused some to search for meaning in life (NF). The rare eastern wind was responsible for the medicine men and mentors (NT). The gentle southern winds endowed a realization that stability and order were essential (SJ). The reckless, often-destructive northern wind was like the child, forever young, heedless of the lessons that should have been learned from yesterday's experiences (SP). In Europe, the seasons were thought to affect personality and behavior. The highest compliment was to be the rare individual who could transcend natural inclinations and be the "man for all seasons". The impact of these theories pervades the literature. Chaucer refers to the physician who was schooled in "the cause of every malady, and where they were from and of what humour". D.H. Lawrence metaphorically refers to a character in Sons and Lovers as "Paracelsus' Salamander". The lack of any reliable means of diagnosis and application caused these theories to be abandoned. In attempts to simplify the complexity of the piece of work known as man[kind] Sigmund Freud diminished the species to an

animal driven by instincts, while Pavlov compressed human beings to machines that were simply mechanical responses to environmental stimulation.

Some of the early twentieth century European theorists revived the four-temperament concept. In 1905, Adickes attributed four "world views" to the human personalities calling them dogmatic (NF), agnostic (NT), traditional (SJ), and innovative (SP). In 1914, Spranger wrote that the four personalities were defined by "value attitudes." He paired "theoretics"(NT) with "aesthetics" (SP) claiming that both were political types concerned with functional utility. He paired his "religious"(NF) with "economicals" (SJ) stating that they were both social types concerned with moral sanction. In 1920, Kretchner theorized that all behaviors, normal as well as abnormal, could be explained in terms of the individual's body build and personality and proposed the terms: "hyperesthetic", too sensitive, (NF); "anesthetic", too insensitive, (NT); "melancholic", too serious, (SJ); and "hypomanic", too excitable (SP). In 1947, Rudolph Dreikers, a protégé of Alfred Adler, described the "mistaken goals that different people pursue when their self-esteem is less than adequate": recognition (NF), power (NT), service (SJ), and revenge (SP). In that same year Eric Fromm attempted to explain personality in terms of "orientations" which he identified as "receptive" (NF), "marketing" (NT), "hoarding" (SJ), and "exploitative" (SP) (Keirsey).

The descriptors remain consistent and constant although not identical. Reviewing their work may give the reader a nostalgic sense of "The Blind Men and the Elephant." Each man was correct about the part of the elephant he examined but without the whole picture was unable to integrate his information with the findings of others. In this case the lack of a diagnostic instrument made it difficult to establish any sense of validity

about the author's theory. In addition, the orientation of each of these men was different; therefore, the use of terms would be representative of the context of thought origination. Each time the wheel was rediscovered; it was re-christened accordingly.

> "The names and concepts by which the mechanisms have been grasped are extremely varied, and each of them is adapted to the standpoint of the observer in question. But despite the diversity of the formulations the fundamental idea common to them all constantly shines through."
>
> C. G. Jung (Jung)

The descriptions remained consistent, as did the problem of how exactly to utilize this knowledge.

Attempts to diagnose the personality, by whatever name were difficult if not impossible. Astrological associations with the primal elements did not provide sufficient reliability. The fickleness of the gods and the unpredictability of the winds did not lend themselves to any significant degree of identifying the personality. Laboratory procedures to render a diagnosis were not available. Hence, the possibility of predicting behaviors was a moot point. A chart of these and other terms that have been applied to the universal personality types is found in the Appendix.

The most significant advance in organizing this body of knowledge was the result of a serendipitous occurrence. The split between Sigmund Freud and colleague Alfred Adler was more than disturbing to Carl G. Jung. The translation of his Psychological Types explains his research as an attempt to help his colleagues resolve their philosophical differences. Initially he resisted the concepts he later defined and wrote:

> "The differentiation of the four temperaments which we took from the ancients hardly rates as a psychological typology since the temperaments are scarcely more than psychological colourings [*sic*]. But this lack of information does not mean that we can find no trace in the classical literature of the effects of the psychological pairs of opposites we are discussing. (Jung)

As his work with opposite personality traits developed he not only rediscovered the original patterns of his predecessors, but also laid the foundation for the diagnostic tools and research that comprise the focus of this research.

Jung observed four pairs of traits: extroversion and introversion, sensing and intuition, thinking and feeling; and judgmental and perceptual. The dominance of each of these pairs serves to identify one quadrant for each of the individual personalities.Each individual personality is then composed of four components. The sixteen possible combinations form the basis of identifying and classifying the different personality groups into four multiples of four. Not surprisingly, each group conforms to one set of universal descriptors provided from ancient times to the present.

Although his theory did resolve one conflict, it created another. Jung was satisfied that both Freud and Adler were correct in assessing the motivations of their respective patients. For one group of personalities (SP), the quest for pleasure [including sexual gratification] was correct, as Freud had claimed. Adler had also been correct when he projected that the quest for competence and power was the prime motivator for the population [of NT's]. Later studies associated Harry Sullivan's theories of social solidarity with the SJ's, and the self-actualization theory of Maslow with NF's. The problem then was how to categorize this information in an accurate and efficient manner. Jung identified four integral polarities for classification, but his tools for identification were the questionable accuracy of observation, which could not reveal motivation, and the time consuming process of psychoanalysis. Previous discoveries had been faced with the same problem, no diagnostic tool.

The universality of this concept seems to be recognized in the character development by contemporary authors in several of the literary genres. The primary characters of The Wizard of Oz are readily recognizable as representatives of the four types. The spontaneous Cowardly Lion [SP] plunges into situations without thinking and wishes for the courage to continue. The tenderhearted Tin Woodsman [NF] who cried when he inadvertently stepped upon an ant desires a heart. The pensive Scarecrow, who points out to Dorothy that it doesn't matter which road she chooses if she doesn't care where she goes, wants a brain. The security seeking Dorothy [SJ] desires nothing more than to return to her home. Most long running sitcoms have a nucleus of four characters each of whom add balance to the plot and the dialogue as members of a different personality group. In the event that one of these characters leaves the sitcom ratings drop unless replaced by a character within the same personality group. Several examples of this pattern are included in the Appendix.

Still another contemporary observation and usage is found in the practice and study of the Christian religion. The expression of prayer and spirituality take their verbal and written forms to coincide with the needs of the respective personalities (Keating, Michaels). A review of the early Christian orders shows four distinct movements that communicate with specific personalities: Augstinian (NF), Thomasitic (NT), Ignatian (SJ), and Franciscan (SP) (Michaels). The intercommunication patterns of each of these seem to deliver comparable messages to each of the major personality groups. Each of the gospels is reputed to be the preference of a different personality group. The pathos and emotion of the gospel of St. Luke is believed to be the choice of NF's. The abstract philosophy of St. John communicates best with NT's. The orderly chronological account

of St. Matthew is preferred by SJ's. The brief but fiery voice crying in the wilderness work of St. Mark catches the fleeting attention of the SP's. The difference in the presentation of scripture and reading matter combined with the verbal patterns which seem most satisfactorily express inner spiritual needs support the concept that different brain formations respond to different forms of language. While it has been recorded that particular monastic orders preferred particular gospels there was no diagnostic instrument to refute the claim that this was actually a tradition (Michaels).

Another example of the universality of this concept was a serendipitous discovery of Minnesota Viking coach Bud Grant. He found that by instructing his rookie players not to run across the damp section of newly seeded grass as they left the locker room and entered the field, he could film them entering the playing area and assess their personality types. NF's tended to over run the area, back up and go around it. NT's who overran the area would stop, determine whether it was closer to continue or to back up and then react accordingly. SJ's did not have this dilemma; they left the tunnel looking for the designated area and went around it. SP's left the locker room ready for action and ran onto the field seemingly oblivious to the grass, ready for action (McGrane). From this initial observation he was prepared to coach and interact with his players. Although there is no mention of the MBTI in his book, the descriptors for each observed type are consistent with the descriptors of other writers. While this system was effective for his coaching purposes, it was not a universal instrument.

It was not until the mother and daughter team of Katherine Briggs and Isabel Briggs Myers set about to develop an instrument that could solve the diagnostic dilemma that the usefulness of this theory was established (Kroeger and Thuesen). The Myers-

Briggs Type Indicator (MBTI) created international interest in the idea of "types" and revived interest in Jung's personality theories. It also revived interest in the ancient theories of four temperaments as the MBTI correlated with the theories of Hippocrates, Adickes, Kretchner, Spranger, and Adler (Keirsey & Bates). This laid the foundation for the pedagogical theories that are predecessors of this research.

This research has been designed to investigate the following hypotheses:

Null Hypothesis: There is no significant difference between the TCAP sub-test scores of any of the different affective learning styles as determined by the personality scores from the MBTI.

[*e.g.* Sequencing Events score of $P_1 = P_2 = P_3 = P_4$]

Alternative Hypothesis: There is a significant difference between TCAP sub-test scores of affective learning styles as determined by the personality scores of the MBTI.

[*e.g.* Sequencing Events score of $P_1 \neq P_2 \neq P_3 \neq P_4$].

## THE MYERS-BRIGGS TYPE INDICATOR

The Myers-Briggs Type Indicator (MBTI) has been widely used to identify the various MBTI types and type preferences. Distinct attitudes, interests, actions and behaviors are established through a forced-answer test that established predilections for four dichotomous constructs. These four bipolar scales determine two attitudes: Extroversion (E) – Introversion (I), and Judging (J) – Perceiving (P) as well as two functions: Sensing (S) –Intuition (N), and Thinking (T) –Feeling (F). These results are invariably substantiated through observation and anecdotal evidence, thereby strengthening the credibility of the instrument.

The MBTI is an instrument that was developed from Jung's theory of psychological types. Jung's theory that inborn personality types can identify individuals is receiving more credibility as the brain-based theories are being developed. Each of the types is predisposed to the use of certain mental attitudes and functions. These terms are used to define particular processes. Attitudes are used to relate to and interact with the world while functions are used to process information (Murphy). In solving the identified problem it was necessary to select valid age appropriate instruments that would identify the various research components. The Tennessee Comprehensive Assessment Program (TCAP) test has been uniformly administered to Tennessee high school students to measure proficiency in both math and language arts. The Language Arts test includes thirteen sub-tests that measure proficiency in each of thirteen reading comprehension skills.

The appropriate instrument to determine the affective learning style of this population was a simple choice. Tennessee teachers had participated in in-service training using a "simplified form of the Myers-Briggs" to determine the primary personality group that are identified as color types. Both the NCTI color Matrixx [*sic*] and True Colors include a simple diagnostic instrument of less than 20 questions. As a part of a retest reliability assignment for Psychology 445: Measurements and Testing, this researcher compared the test results of 52 secondary teachers and principals who had taken the NCTI Color Matrixx test and volunteered to take the MBTI as part of this cooperative study. Less than 40% of these adults had comparable results on the two tests. As no psychometrics were available, despite this researcher's request to the company president, these results were not surprising and this choice was eliminated.

The success of the MBTI has led to several notable variations of this instrument. The authors of the Keirsey Temperament Sorter (Keirsey & Bates), and the Learning Pattern Assessment (Golay) recommend their tests as a stopgap until the MBTI can be administered. The Gregorc Style Delineator (Roebeck) is designed to identify four learning styles that are synonymous with those described by Golay, Hirsch, Keirsey & Bates, Kroeger, and NCTI; however, the correlations between the Gregorc test and the MBTI are reputed to be questionable and warrant further investigation (Drummond). The instrument developed by Dr. Carolyn Mamchur, Option: Determining Type preference for Adolescents was not published until 1996 and was not known to this researcher until 1997; psychometrics were not requested. The Adolescent Learning Styles Inventory (ALSI), which is being developed by this researcher, has not undergone the norming process; this inchoate instrument was not considered for this research. Despite the variations of the MBTI that have been developed, the preponderance of the literature indicates that it remains the most widely used instrument of its kind currently available. Likewise the validity of the instrument is supported by alpha coefficients which equal or exceed .87 (Myers, 1962; Myers and McCaulley, 1985).

## PERSONALITY AND LEARNING

Although there may be some question about the reliability of some of the diagnostic instruments, the relationship among the four universal personality types and learning does not seem to be questioned in any of the literature. The literature indicates that the authors of typology studies are in agreement about the relationship between

personality and learning; they all seem to be searching for more effective ways to utilize their theories rather than dispute the basic premises.

Following the 1987 publication of the legislative task force on literacy report, Tennessee's state department of education initiated a concerted effort to address the literacy levels, language acquisition, reading scores and the nation's third dropout rate. The Cooper report, Literacy 2000 has been partially responsible for the establishment of a state proficiency test, the development of Tennessee Comprehensive Assessment Program (TCAP), revision of the existing reading skills programs, and the addition of the Remedial and Developmental Program to the Community College System. In addition to these programs, a Data-Based School Improvement program has led to the Positive Attitudes in Tennessee Schools (PATS) program which was created in 1989. In 1991, PATS was the winner of the National Dropout Prevention Award and Council for the States of IN-service Education (Lowry). Part of this program included statewide in-services and workshops for administrators and teachers presented by NCTI and True Colors. The rationale for these workshops was to remind teachers of individual differences and to provide them with an efficient means of determining learning preference so that they can effectively utilize their professional training.

As a result of the NCTI and True Colors workshops many teachers identify the four learning styles by colors, but any of the terms provided in the Appendix are interchangeable within the same group. The learning styles of the four types are distinct and different, but do have some over-lapping characteristics (Golay, Keirsey & Bates, Kirby, Rigley).

Personalities categorized as Blue (NCTI, True Colors) include those students who score higher in the Intuitive and Feeling (NF) traits. The are inductive processors; being right-brained they prefer to deal with possibilities and abstract observations. They are conceptual global (Golay), or Abstract Random (Gregorc) learners who strive for authenticity. They prefer to be complimented upon the uniqueness of their creations while they continue the process of personal growth (Golay).

Personalities distinguished as Green (NCTI, True Colors) include those students who score higher in Intuitive Thinking (NT) traits. They process information inductively, or bottom-up, and use this information to analyze and solve problems as the left-brained people they are. They are conceptual specific (Golay), or abstract sequential (Gregorc) learners who prefer to be evaluated upon their competence after their knowledge has been applied. Their careers must provide them with autonomy, systematic thinking and one mental challenge after another.

Personalities classified as Gold (NCTI, True Colors) include those students who score higher in Sensing and Judging (SJ) traits also process information deductively, but being left-brained prefer to classify and organize this information in a logical, orderly manner. They are actual routinized (Golay), or concrete sequential (Gregorc) learners who enjoy a predictable routine. Evaluation, which confirms that they have correctly mastered the facts and concepts, generates continued success. Understandably, they choose careers that require their factual and practical minds.

Personalities identified as Orange (NCTI, True Colors) include those students who score higher in Sensing and Perceiving (SP) traits. They process information deductively, or top-down and will utilize this information in the creative fashion of a

right-brained person. They are actual spontaneous (Golay), or concrete random (Gregorc) learners who prefer to be evaluated upon their performance, and predictably select careers that provide them with challenges and variety. Unfortunately, they are the least successful in the current education system and the most likely to drop out. A biographical account of her daughter's school experience, "Don't Let the Moon Break Your Heart" (Mamchur) gives a painfully accurate and ubiquitous portrayal of the SP school experience.

Simply stated, people prefer to over emphasize their strengths and under emphasize their weaknesses (Rosenblatt). Strengths are exclusively the result of skills and success, nor are weaknesses the exclusive result of skill deficiency and an absence of success. The theories emanating from Jung's research indicate that there are some innate abilities which cause some skills to be more spontaneously acquired by some people, while other skills are more easily mastered by other people. The preponderance of the literature consulted indicated that these patterns, although not yet fully researched, are predictable. Studies suggest that the reason certain personalities pursue the vocations that they routinely choose is because they prefer to work to their strengths. The reason that those who deviate from the theoretical pattern soon "burn out" is the result of their continual struggle caused by working through and with their weaknesses.

## RESEARCH RELATED TO THE RESEARCH QUESTIONS

According to Roebeck & Wallace, deliberate pairings of teaching and learning styles may prove to be valuable for educating learning disabled students or for individuals who are recovering from clinical or medical trauma. As a means of remediation, matching has

been shown to be successful and may have a place, but holistic teaching theories do not support or advocate its widespread use. Although some individuals do have stronger preferences or needs for certain types of instruction, research continues to indicate that the [test score] extremes are not as common as the comparable means. Teachers need to have the resources to address special needs, but even students with special needs require the opportunity to expand their mental attitudes.

Contrary to this opinion, one school district in Georgia routinely screens and identifies each member of the student body. Teachers, counselors and students are aware of this classification and its implications. According to the NCTI color Matrixx [*sic*] consulting firm, this has resulted in more time spent in learning activities and less time spent in correcting counterproductive behaviors. No statistics or test scores were made available upon multiple requests of this researcher to refute or to substantiate the results.

## BIOLOGICAL CONSIDERATIONS

Some researcher s claim that careful observation of children's speech patterns and social interactions can give an accurate assessment of the personality type of most children

(Keirsey & Bates). This researcher has noted a discernible pattern among developing speakers at the telegraphic state that confirms speculation. Top-down or holistic personalities (76 + % of the population) tend to produce two sounds that are, in fact, a holistic compression of sounds. Bottom-up or analytical personalities have been observed to produce only two distinct words.

[*e.g.* deep meaning: "I want to brush my teeth."

top-down surface meaning: " buhsh uh teef. buhsh uh teef"
bottom-up surface meaning: "brush teef. I (my) teef].

Language studies reflect the behavior of the preponderance of the population, which is, according to the statistics (Myers, Keirsey & Bates, Mamchur) top-down. Likewise, top-down speakers tend to repeat patterns and later seem to regress as speech patterns indicate "two foots" and other patterns that reflect an inchoate awareness of syntax. Bottom-up processors tend to be aware of syntax much earlier as they construct their communication in small units rather than in whole pattern duplication. Studies of children's speech are limited to conjecture and to personal observation.

The most reliable studies of personality and children have been the work of Elisabeth Murphy who developed the Myers-Briggs for children instrument. Her observations, documentations and longitudinal studies have shown an emergent pattern of personality discover which seems to coincide with the post natal brain development research (Ornstein & Thompson). The research shows that the earliest observable personality trait is defined by the Extrovert (E) – Introvert (I) construct. Type watchers claim that this preference is distinctly observable by the time a child is only six months old (Murphy). The differences between "E" and "I" learners can be enhanced by respecting the "I" learner's need for solitude and the "E" learner's need for continual feedback and reinforcement (Mamchur). The prevailing theory is that the differences are neurologically explained by the fact that "I" learners go on sensory overload due to a sensitivity to light sound and motion (Hutchinson and Alessio).

The differences between Sensing (S) and Intuitive (N) learners, although readily observable have only recently been substantiated by medical evidence. The "S" learner prefers deductive instruction and is frequently identified as a "top-down" processor by

those theorists who prefer the computer or artificial intelligence analogies. These equate intelligence or the ability to learn to the hard drive of a computer. The Sensing (S) or Intuitive (N) processing would be equated to the software which empowers a computer to perform specific functions. Likewise the "N" learner prefers inductive instruction and is frequently identified as a bottom-up processor by the computer analogy theorists, or an abstract learner (Golay, Gregorc, Keirsey & Bates, Keirsey). Recent Positron Emission Tomography (PET Scan) studies have consistently revealed a significantly different pattern of brain activity for both groups. Previous studies substantiate that neuron activity increases in the part of the brain that dominates a particular activity or thought process, particularly when environmental stimuli are present. Studies of these same subjects, while they are deprived of stimulation, reveal that the neuron activity pattern is undeniably different. The "S" personalities consistently show that the neurons scan the sensory input centers of the brain as if they are searching for sensory input. It is as if the brain is searching for what is not being picked up while asking, "What am I not hearing, seeing, smelling, tasting, or touching?" Contrariwise, the "N" personalities invariably demonstrate a different pattern of neuron activity as the neurons concentrate in the cognitive centers of the brain where the "N" or abstract learner is better able to ponder "what if?" and to consider a multiplicity of possibilities. Researchers disagree as to when this trait can be consistently and accurately observed. Based upon the teaching styles children are exposed to within the classroom setting, modeling may be misinterpreted as a preference (Murphy).

The differences in the structure of the limbic system have been observed for some time. Based upon brain studies, it is generally believed that the Thinking (T)

personalities have proportionately larger thalamus than their Feeling (F) counterparts who have been observed to have larger hypothalamuses. Generally this can be detected through informed observations by the time a child starts school (Murphy).

While the discovery time for the functions seems to differ among individuals, the preference pattern for the attitudes is more predictable. While it is generally believed that the preference for Extroversion or Introversion is evident by age six months, it is likewise believed that the preference for Judging (J) or Perceiving (P) is obvious by 12 - 15 months of age. Judging children prefer schedules and routines, Perceiving children do not seem to conform as readily to a schedule, nor do they seem to have any difficulty adjusting to a change in routine as Judging children frequently do (Murphy). These findings substantiate the Jungian theory and have added credibility to theories that have been previously viewed with skepticism and dubiously regarded as "one step above astrology".

## PSYCHOLINGUISTIC CONSIDERATIONS

Psycholinguistic theories suggest that the mind is not unlike a computer having top-down, bottom-up, or interactive processing. Long before the artificial intelligence and computer analogies, the writings of Piaget and Vygotsky addressed different perspectives of the inductive vs. deductive processing issue. Which came first? Was there first a thought that needed language for expression as Piaget maintained? (Roebeck & Wallace). Vygotsky believed that language, stored for this purpose, preceded thought (Roebeck & Wallace) the deductive vs. inductive debate regarding the acquisition of language, speech, reading and writing continues among some linguists, although psycho-

linguistic literature is favoring a modified explanation. Recent studies indicate that both may be correct in assessing the learning styles of different personalities. The ability to encode and to retrieve information from memory seems to show greater success for the inductive processors. Sensing (S) personalities do not perform as well because they lack basic memory encoding and decoding strategies which occur naturally for Intuitives (N). Since the preponderance of the population at large have the S trait, research often reflects to the performance of the deductive thinkers (Dunn & McConkie, 1972; Dunn, 1985).

Based upon her research at the University of Illinois and the University of Utah, Barbara Hinacin-Bhatt described computer-assisted research that records student responses in milliseconds. The observable patterns demonstrate that some subjects consistently respond more readily to inductive tasks and less quickly to deductive tasks. Still other subjects demonstrate the opposite pattern. These findings indicate support for Jung's theory of differentiation of primary and secondary functions, especially the Sensing-Intuitive dichotomy. Does the individual prefer to begin with a concept that is then applied? Does the individual start with an item that is mapped or linked to other items until a concept is formed or discovered. There is a growing body of evidence that indicates that both processes are involved in all levels of language acquisition; however, the dominant function, according to Jung, generally supersedes the inferior function.

Evidence that Jung's theory of mental processes is gaining more acceptances can be gleaned from the revisions within the literature. Rosenblatt's 1994 model includes both constructs. In the same year, the work of Ruddell and Unrau reflected the psycholinguistic research conclusions, as did the work of Samuels.

The literature that establishes learning patterns, styles and preferences of right brain and left brain dominant personalities supports the personality-learning theory concept (Conner, Euto, Fleetwood, Glaser, Golay, Gregorc 1984, Jamison, Lawrence, Miller, Nelson, and Tillman). Studies that examine writing style indicated a preference mode of processing (Reigstad). A homogeneous population of college seniors who had majored in English Education was asked to read and review a particular literary selection. The final products were comparable in quality and in content. The students were then asked to complete the MBTI that showed that all four major personality groups were represented in the group. Finally, the students were asked to describe the procedure and steps used to complete the writing assignment. Despite the similarity of the final product, the descriptive papers showed four different approaches for accomplishing the same task. NF and NT groups approached the task inductively, while the SJ and SP groups had used a deductive approach. Typical of their left-brain orientation, the NT and SJ groups had outlined their papers and delineated steps while the right-brained NF and SP groups had written summaries of the steps. These same patterns of differences have been observed in studies of fifth grade students (Ferdman) .Likewise, teachers grading styles seem to favor the writing styles of students whose T or F personality component is identical to their own (Bowman).

The relationship of reading and writing has been addressed through the years. Rosenblatt and Goodman are two strong advocates of the relationship between the to skills. The essence of holistic teaching is based upon the concept of integrated rather than isolated skills.

## LEARNING AND READING

To what extent learning style influences or determines success in reading is not yet clear. Reading, specifically comprehension, is integral to learning. Generally, poor readers do not experience as much academic success as those with stronger reading skills. Those who experience academic success have strong reading comprehension skills (Dunn). The literature of books, magazines, textbooks, journals, dissertations, ERIC documents and PSYCH-Lit document four personality types, which are identified by a multiplicity of names. The literature offers no disagreement regarding the learning styles, but what it does not offer is a comprehensive investigation. The literature does show that personality is related to learning style. Learning is often contingent upon reading skills; therefore, it is reasonable to presume a relationship between personality and reading comprehension. Research in this area is not as comprehensive as it needs to be if a definite relationship is to be either established or refuted. In the event that a definite relationship is established, teachers will be better prepared to anticipate difficulties in reading comprehension skills. This awareness will enable them to address weaknesses before they become major problems. If it is established that the projections and suppositions are destructive but not related through cause, this chapter of investigation can be closed. Clearly, the issue warrants further investigation.

## FUTURE IMPLICATIONS

The question is not whether or not there is a relationship between personality type and learning style, but what is going to be done with this information. Should students be aware of their respective types? How will this information be used? Will this become an

alibi for failure? Should teachers and/or counselors administer this test? What should be done with this information? What are the dangers of misuse? In short, what are the potential benefits of this information and of future studies upon the American classroom teachers and students?

Although some studies indicate that college students benefit from knowing their MBTI types, the purpose of this disclosure should be noted. In the studies cited, the students were enrolled in special classes that addressed study skills and attempted to make students aware of their cognitive strengths and weaknesses. In another study (Anderson & Lauderdale), the high school students used this information to learn more about the literary characters as well as about themselves. Care was taken to teach the students to respect themselves and others. Although not directly stated, the implied objective in this learning situation was to incite students to develop a sense of self-objectification (Monte). Students in study skills classes have been taught to capitalize upon their strengths and to compensate for their weaknesses by addressing them differently. When these objectives have prevailed, as in the studies cited, the results have been positive. It must be noted that college students and upper level high school students are not young children. There is justifiable concern that misuse of the test can lead to pigeonholing, stereotyping and other academically crippling practices (Lawrence). Whether students should be taught to their learning preferences is an ethical question that must be addressed.

Group instruction is economical and efficient, but it is not always as successful as it might be. If group instruction is not working and individual instruction is not economically possible; then, the obvious alternative is to individualize group instruction.

For some special-needs students this is federally mandated and specifically delineated through an Individual Educational Plan (IEP). Other students are not eligible for abbreviated lessons or modified grading, but are less successful than their IQ scores indicate that they should be. Many "dedicated teachers" make teaching a Herculean undertaking as they attempt to make every lesson a work of entertainment, only to learn two important reality lessons:

1. Anything, no matter how entertaining, gets old; and,
2. "One student's piece of cake can be another's 'Maalox Moment'"(Conner).

If all of the students cannot be pleased all of the time, and they cannot, then teachers must learn to identify and to address individual differences. Before individual student needs can be addressed, teachers must understand individuality (Gregorc). This means that lesson plans should be structured so that some portion of the daily agenda will address each of the four learning preferences. The goal of this practice is to guarantee that each student will enjoy some regular academic success in each subject. Such impractical platitudes have perpetually plagued educators.

It is neither possible nor desirable to match every lesson top every student, despite the studies (Wepman, Worden & Franklin) which report that their students have been able to overcome their reading difficulties when learning style was matched with teaching style. There are problems that are created, not solved, by this approach. Even if diagnostic accuracy was possible, Guilford's Structure of Intellect model (Roebeck) does not support the matched approach, but proposes that multiple intellectual functions are responsible for all learning. Ruggler's holistic model advocates an integrated approach because most students are not limited to a single set of cognitive functions. More recent

brain studies indicate that unless various areas of the brain are stimulated and thereby encouraged to develop at an early age, the window of opportunity for this part of the brain to develop may be closed forever (Ornstein & Thompson ). Restricted instruction can limit the opportunity for growth and mental flexibility.

According to Roebeck & Wallace, deliberate pairings of learning and teaching styles may prove to be valuable for educating learning disabled students or for individuals who are recovering from clinical or medical trauma. As a means of remediation, matching has been shown to be successful and may have a place, but holistic teaching theories do not support or advocate its widespread use. Although some individuals do have stronger preferences or needs for certain types of instruction, research continues to indicate that the majority of the students need to be exposed to instruction from all of the major learning style groups.

## SUMMARY

The literature positively supports the alternative Hypothesis that a significant difference exists between the performance of different personality types, but the exact nature of this relationship is subject to both debate and further investigation. Theories of hemisphericity, processing, and function group personalities differently. The researchers who have developed these theories have likewise developed different visual representations to illustrate the relationship of the different personalities.

For the purpose of clarifying relationship, function, and similarity this researcher has developed the following visual model.

1. Top-down, deductive processing, or Sensing (S) personalities are placed in

the upper quadrants of the chart.

| SJ | SP |
|---|---|
| | |

2. Bottom-up, inductive processing, or Intuitive (N) personalities are placed in the lower quadrants of this chart.

| | |
|---|---|
| NT | NF |

3. Right-brained personalities are placed in the right hand quadrants.

| | SP |
|---|---|
| | NF |

4. Left-brained personalities are placed in the left-hand quadrants.

| SJ | |
|---|---|
| NT | |

5. To identify function types as Keirsey and Spranger do, it is only necessary to identify opposite quadrants.

COOPERATIVES:

| SJ | |
|---|---|
| | NF |

UTILITARIANS:

| | **SP** |
|---|---|
| **NT** | |

Although this visual model has not been found in the literature, this researcher has found it particularly successful when giving in-services and other learning style presentations because it serves as a visual reminder of the attributes of each personality type. References to a particular quadrant within this paper will refer to the ones described and developed by the researcher.

TOP-DOWN
DEDUCTIVE
CONCRETE

| LEFT BRAIN | | RIGHT BRAIN |
|---|---|---|
| | **SJ** **SP** | |
| | **NT** **NF** | |

ABSTRACT
INDUCTIVE
BOTTOM-UP

# Chapter 3
# METHODS AND PROCEDURES

## INTRODUCTION

Some researchers conceptualize reading as a uni-dimensional mechanistic process and expect uniform results from whatever teaching methods are employed. The results, as evidenced in performance and test scores, indicate otherwise. With the recent interest in brain based influences upon personality, and upon learning many educators have pondered the possibility of utilizing this information to increase reading comprehension scores and literacy in general. The purpose of this study was to evaluate the performance of the four personality types, as measured by the Myers-Briggs Type Indicator (MBTI), in each of the thirteen reading comprehension objectives of a state mandated curriculum based assessment. The research questions were:

1. Does a relationship between reading skills and personality actually exist?
2. Are particular reading comprehension skills more readily mastered by certain personalities and mastered with more difficulty by others?

This would determine whether uniform teaching methods have produced uniform results.

The preponderance of literature supports the previously established alternative hypothesis which states that a significant difference between curriculum bases assessment scores, as determined by the Tennessee Comprehensive Assessment Program (TCAP) scores, and affective learning styles, as designated by the MBTI exists. No quantitative study has been previously conducted. Although the literature reflects qualitative studies or single subject evaluations, consultant corporations allege that the determination of affective learning styles can predict academic strengths and weaknesses, specifically reading comprehension. While some school systems have employed these consultants,

many other systems have skeptically declined to do so. Before this theory can be validated it must be tested using the ensuing methods.

## POPULATION

A four-year high school located in a semi-agrarian Appalachian community within an hour of a larger city agreed to host this research. The Assistant Principal in charge of Curriculum and Instruction identified the 400 college bound students as those who had declared their intentions and were enrolled in Advanced Placement (AP) English, Honors English 10, 11, or 12; or English(standard) 11 or 12. All of the students enrolled in these 29 classes, who had declared their intention to pursue a college education, were included in this study. The enrollment distribution of the 400 students by grade level and by academic endeavor is documented in Table 3.1 displayed below.

**Table 3.1**
Distribution of Population

| | 10th grade English classes | 11th grade English classes | 12th grade English classes |
|---|---|---|---|
| Standard Classes* | 0 | 10 | 8 |
| Honors Classes | 3 | 4 | 2 |
| Advanced Placement (AP) Classes | 0 | 0 | 2 |
| Total Classes | 3 | 14 | 12 |

*Estimated that 50% are earning the Technical or Vocational diploma

Many of these high school students are striving to become first generation college students. For those students pursuing the college bound diploma track, the motivation to attain a better education, or the family expectations of post secondary education may be logically assumed. Because it was reported that all of these students had passed the TCAP Language Arts test, it is equally logical to assume that these students do not have

serious reading difficulties. In terms of reading proficiency and motivation, this is a homogeneous population and may not show the diversity that a heterogeneous population might have shown.

The decision to conduct this study using a homogeneous population was based upon several factors:

1. The existing data required for this study included only the college bound population.

2. The validity of the MBTI, if administered to the remainder of the student body, may have been questionable due to the reading and vocabulary levels of the test.

3. The variables of motivation and ability were eliminated.

The distribution of the 400 students in terms of personality is displayed in the following chart. The format of Table 3.2., Type Distribution of Total Population, is consistently and continuously used for MBTI data analysis in the Journal of Psychological Type. It may be readily observed that the population distribution is not equal to the population of the American population at large (Keirsey & Bates), nor is it equal to the American high school population (Mamchur). These findings were substantiated by Chi-Square Goodness of Fit as verified below. This finding is noted, but does not deter from the intent of the study because the American college population is dissimilar to both the American population at large, and to the American high school population (Roberts; Anderson, Rosen & Huston; Schurr, Ruble, Palomba, Pickerill, & Moore; Provost)

TABLE 3.2.

Type Distribution of Participants

Total Population N=400 100%

## The Sixteen Complete Types

| | | | |
|---|---|---|---|
| **ISTJ**<br>N= 21<br>5.25 % | **ISFJ**<br>n= 16<br>4.00 % | **INFJ**<br>n= 13<br>3.25 % | **INTJ**<br>n= 8<br>2.00 % |
| **ISTP**<br>N= 16<br>4.00 % | **ISFP**<br>n= 17<br>4.25 % | **INFP**<br>n= 32<br>8 % | **INTP**<br>n= 22<br>5.50 % |
| **ESTP**<br>N= 36<br>9.00 % | **ESFP**<br>n= 48<br>12.00 % | **ENFP**<br>n= 35<br>8.75 % | **ENTP**<br>n= 33<br>8.25 % |
| **ESTJ**<br>n=44<br>11.00% | **ESFJ**<br>n= 31<br>7.75% | **ENFJ**<br>n= 13<br>3.25 % | **ENTJ**<br>n= 15<br>3.75 % |

Dichotomous Preferences

| | n | % |
|---|---|---|
| **E** | 255 | 63.75 |
| **I** | 145 | 36.25 |
| | | |
| **S** | 229 | 57.25 |
| **N** | 171 | 42.75 |
| | | |
| **T** | 195 | 48.75 |
| **F** | 205 | 51.25 |
| | | |
| **J** | 161 | 40.25 |
| **P** | 239 | 59.75 |

Pairs and Temperaments

| | n | % |
|---|---|---|
| **IJ** | 58 | 14.5 |
| **IP** | 87 | 21.75 |
| **EP** | 127 | 31.75 |
| **EJ** | 128 | 32 |
| | | |
| **ST** | 117 | 29.25 |
| **SF** | 112 | 28 |
| **NF** | **93** | **23.25** |
| **NT** | **78** | **19.5** |
| | | |
| **SJ** | **112** | **28** |
| **SP** | **117** | **29.25** |
| **NP** | 122 | 29.25 |
| **NJ** | 49 | 12.25 |

| | n | % |
|---|---|---|
| **TJ** | 88 | 22 |
| **TP** | 107 | 26.75 |
| **FP** | 132 | 33 |
| **FJ** | 73 | 18.25 |
| | | |
| **IN** | 75 | 18.75 |
| **EN** | 96 | 24 |
| **IS** | 70 | 17.5 |
| **ES** | 159 | 39.75 |
| | | |
| **ET** | 128 | 32 |
| **EF** | 127 | 31.75 |
| **IF** | 78 | 19.5 |
| **IT** | 67 | 16.75 |

**Jungian Types (E)**

| | n | % |
|---|---|---|
| E-TJ | 59 | 14.75 |
| E-FJ | 44 | 11.00 |
| ES-P | 84 | 21.00 |
| EN-P | 68 | 17.00 |

**Jungian Types (I)**

| | n | % |
|---|---|---|
| I-TP | 38 | 9.50 |
| I-FP | 49 | 12.25 |
| IS-J | 37 | 9.25 |
| IN-J | 21 | 5.25 |

**Dominant Types**

| | n | % |
|---|---|---|
| Dt. T | 97 | 24.25 |
| Dt. F | 93 | 23.25 |
| Dt. S | 121 | 30.25 |
| Dt. N | 89 | 22.25 |

N: denotes the total number of participants in this study

n: reflects the number of participants within each sub-population

%: indicates the percentage of the total population found within the particular subgroup

**E** Extrovert **S** Sensing **T** Thinking **J** Judging

**I** Introvert **N** Intuitive **F** Feeling **P** Perceiving

Both sets of demographic data project Extroverts (E) at 75% and Introverts (I) at 25%(Keirsey & Bates, and Mamchur). The usual expectancy would include 100 Introverts and 300 Extroverts; however, the actual numbers were significantly different at the .001 level as displayed in Table 3.3.

## Table 3.3 Extrovert-Introvert Construct

| | Observed N | Expected N | Residual |
|---|---|---|---|
| I | 145 | 100.0 | 45.0 |
| E | 255 | 300.0 | -45.0 |
| Total | 400 | | |

Chi-Square=27.000, df=1, p<.001

This outcome was anticipated as studies have indicated that extroverted students are more active in extracurricular activities and often choose a less demanding course of study to avoid compromising their eligibility to participate in these diversions.

The demographics for the Sensing (S) – Intuitive (N) construct are different for different age groups. The developmental personality studies from the Meisgeier Institute indicate that some N personalities are neither observable nor testable until the individual matures. Often a highly structured environment or an overly didactic learning environment which employs an excess of deductive learning experiences delays the development of inductive processes and subsequently the realization of a preference (Murphy). The learner who has limited opportunity may be a frustrated student or may have had natural enthusiasm for abstract thinking squelched by teachers who prefer to deal with definitive answers rather than encourage investigative and Socratic learning experiences. For this reason the Keirsey and Bates study of the American population at large (Table 3.4) projects different expectancies from the Mamchur study (Table 3.5) of the American population at large.

Table 3.4 Sensing-Intuitive Construct
for the American population at large.
Keirsey & Bates expectancies

| | Observed N | Expected N | Residual |
|---|---|---|---|
| N | 171 | 100.0 | 71.0 |
| S | 229 | 300.0 | -71.0 |
| Total | 400 | | |

Chi-Square=67.213, df=1, p<.001

## Table 3.5 Sensing-Intuitive Construct

for the American high school population
Mamchur expectancies

| | Observed N | Expected N | Residual |
|---|---|---|---|
| N | 171 | 80.0 | 91.0 |
| S | 229 | 320.0 | -91.0 |
| Total | 400 | | |

Chi-Square=129.391, df=1, p<.001

The Thinking (T) - Feeling (F) construct, which reflects decision making procedure of the individual, determines how the information taken processed through the S-N construct is used to make decisions. Because both sources of demographic information project that their respective populations consist of equal proportions of T's and F's only one statistical procedure was necessary. It should be noted that both Keirsey & Bates and Mamchur have found that for males the T's equal 60% and the F's equal 40%; and that the female population shows that the T's equal 40% and the F's equal 60%. Because the data, which was supplied for this research, did not denote gender of the individual subjects, it was impossible to determine whether these proportions were accurate for this population. The results of the Chi-square Goodness of Fit displayed in Table 3.6 show no significant difference at any level.

Table 3.6 Thinking- Feeling Construct

| | Observed N | Expected N | Residual |
|---|---|---|---|
| F | 205 | 200.0 | 5.0 |
| T | 195 | 200.0 | -5.0 |
| Total | 400 | | |

Chi-Square=.250, df=1, p=.617

The demographics for the Judging (J) - Perceiving (P) construct differ by populations according to the cited researchers. The expectations for the American high school population, indicated a slightly higher proportion of J's than P's (Mamchur). This is understandable since many P's who live in structured and disciplined environments have not yet realized their own preferences for organization and life style. The demographics for the American population at large substantiate equal proportions of J's and P's. The Chi-square results testing this population against both the American high school population and at the American population at large are disclosed in Tables 3.7 and 3.8, respectively. Both sets of data (Keirsey & Bates, and Mamchur) reflect a significant difference at the .001 level.

Table 3.7 J-P Construct
for the American high school population
Mamchur expectancies

| | Observed N | Expected N | Residual |
|---|---|---|---|
| P | 239 | 180.0 | 59.0 |
| J | 161 | 220.0 | -59.0 |
| Total | 400 | | |

Chi-Square=35.162, df=1, p<.001

Table 3.8 J - P Construct
for the American population at large
Keirsey & Bates expectancies

| | Observed N | Expected N | Residual |
|---|---|---|---|
| P | 239 | 200.0 | 39.0 |
| J | 161 | 200.0 | -39.0 |
| Total | 400 | | |

Chi-Square=15.210, df=1, p<.001

## TESTS

The following tests have been traditionally administered as part of the curriculum to ascertain proficiency in language arts, and to provide comprehensive career information for students, respectively.

1. The TCAP competency Test Student Report of the Language Arts Sub-tests

   Objective 36: Recognizing Multiple Meanings of Words
   Objective 37: Using Context Clues
   Objective 38: Recognizing Propaganda Techniques
   Objective 39: Identifying Main Idea
   Objective 40: Sequencing Events
   Objective 41: Making Inferences and Drawing Conclusions
   Objective 42: Identifying Cause and Event
   Objective 43: Identifying Fact and Opinion
   Objective 44: Identifying Details
   Objective 45: Identifying Author's Purpose
   Objective 46: Interpreting Figurative Language
   Objective 47: Recognizing Author's Point of View
   Objective 49: Following Written or Graphic Directions

2. The Myers-Briggs Type Indicator (MBTI) Form G

The information provided from these tests was used to identify any subjects who have

not mastered any of the thirteen designated reading comprehension objectives at the established minimum score of 75%. Likewise, this data was analyzed to determine the existence of correlations between Tennessee Comprehensive Assessment Program (TCAP) deficiencies and affective learning style.

Because of the versatility of the instrument, the Myers-Briggs type Indicator (MBTI) was administered to all $11^{th}$ standard and honors English classes, and to $10^{th}$ honors English classes. Due to previous testing, the scores are also available for the $12^{th}$ standard, honors and Advanced Placement (AP) English classes. Likewise, the TCAP Competency Test was administered to all Tennessee students as a requirement for graduation. These tests had been administered prior and independently from this study; therefore, Human Subjects Form A was sufficient to obtain the required data. The scores from these tests were paired, without any identifying information, prior to being released for analysis by the Assistant Principal.

The MBTI analysis form which is frequently used to identify and analyze the frequency of characteristics and patterns of personality traits was used to denote the type distribution of participants for total population, and for the participants who demonstrated mastery in each of the reading comprehension objectives. Table 3.2, which identifies the type distribution of the total population, is found on page 48. The charts, which categorize the type distribution of participants who mastered each of the individual objectives, as well as those who mastered all of the objectives, are included in Chapter 4.

This chart format is an efficient visual representation of the sixteen complete types, the four primary personality groups: Intuitive Feeling (NF), Intuitive Thinking (NT), Sensing Judging (SJ), and Sensing Perceiving (SP) discussed in Chapters 1 & 2.

It also includes data concerning dichotomous preferences, pairs and temperaments, Jungian types, and dominant types. Each of the charts includes the number of participants (n) and the percentage of each sub-population meeting the mastery level of each delineation. This format organized the data for further analysis.

## EXPLANATION OF STATISTICAL PROCEDURES

Although some researchers conceptualize reading as an uni-dimensional mechanistic process the test results do not confirm uniform levels of achievement. Each of the different personalities demonstrated different levels of achievement on a standardized, state mandated proficiency test. To determine whether the difference in performance was significant Chi Square Goodness of Fit was used to establish the validity of the hypothesis using the four primary personalities: NF, NT, SJ, and SP. Chi Square Goodness of Fit was also used to analyze the population of the study to compare it to the American population (Keirsey & Bates, Keirsey) and the American high school population (Mamchur). As expected the college bound population was not equal to the general population. Four separate Multivariate tests for redundancy, equivalence and non-informative data confirmed mastery differences among the four personality types. Post Hoc tests were used for each of the 13 TCAP reading comprehension objectives to determine whether significant differences of mastery existed among the four personality groups. After the Post Hoc tests and Multivariate tests were used to establish the need for further validity computations, One-way ANOVA tests were run to establish a pattern of mastery for the seven objectives which were shown by the post hoc tests to have a significant difference in mastery.

## SUMMARY

Although the review of literature substantiated a probability that the research would confirm the alternative hypothesis which states that a significant difference exists among the four primary personality groups as established by the Myers-Briggs Type Indicator (MBTI), no quantitative study had been done to confirm the qualitative studies. The MBTI and Tennessee Comprehensive Assessment Plan (TCAP) reading comprehension test scores from a high school population of 400 college bound students were analyzed to establish the need for further testing. The results of these tests and the statistics are discussed in Chapter 4.

# CHAPTER 4

## ANALYSIS OF READING COMPREHENSION TENNESSEE COMPREHENSIVE ASSESSMENT PLAN (TCAP) OBJECTIVES

The recent popularity of the Myers-Briggs Type Indicator as a psychometrically valid instrument for ascertaining Jungian personality types, and as predictor of a multiplicity of human behaviors has generated a plethora of pieces published in Journal of Psychological Type and other journals. The subjects of these commentaries range from Management and Organizational Development, Counseling and Clinical Applications; Marriage and Family; Personality and Social Psychology, Psychometric Properties and Validity; Theory, History and other Instruments; Religion; Health and Biological Aspects, Cross-cultural aspects and Education (Carskadon). Workshops, Forums, Seminars and In-service Training have focused on many of these same topics specifically education. Many qualitative studies conclude that personality types perform differently in a manner consistent to their respective types and that it would behoove educators to capitalize upon these preferences. These same research studies suggest that personality type may be the key to improved school performance through improved reading skills. In light of previous research it would seem logical that left brained personalities [SJ and NT] would master left brained skills and would have superior language skills since the language centers of the brain are believed to be located within the left hemisphere. Likewise, it would seem logical to assume that right-brained individuals [SP and NF] would have more difficulty with reading comprehension since their dominant hemisphere does not contain the language centers. Further research suggests that because Sensing (S) personalities process information

deductively and Intuitive (N) process inductively, the performance of these students readers would reflect their brain processing. Some theorists do not subscribe to the theory of different strengths for different people, but stalwartly maintain that the analytic nature of the N personalities has predisposed them to superior reading scores( Gordy & Thorne, Larribee, Myers & McCaully). Still other theorists maintain that since the reading centers of the brain are located in the left hemisphere, the superior scores will be dictated by hemisphericity. In other words, they expect the scores earned by those left-brained students to surpass those of their right-brained counterparts. There are case studies and limited descriptive studies to support each of these theories, but there has been no previously published research reflecting a quantitative study. This study examined the thirteen reading comprehension objectives of the Tennessee Comprehensive Assessment Program (TCAP) for a high school population of 400 college bound students who were pursuing a University or Combination [of university and technical] diploma. All members of this population had passed both the math and the language sections of the TCAP, but not all had demonstrated mastery of the 13 reading comprehension objectives at the 75% level. This chapter will examine the results first by objectives, and then by each of the personality types.

A multivariate analysis of variance was necessary to establish if there were differences among the thirteen TCAP objectives. The test of choice was Wilks' Lambda. These results were confirmed by three other multivariate analysis procedures. After confirming the differences, Post Hoc tests were used for each of the 13 TCAP objectives to determine whether significant differences existed among the mastery of the four MBTI personality groups. The results of this testing revealed that for six of the

13 TCAP objectives there was no significant difference at the .05 level. These post hoc tests also established the existence of significant differences for the seven remaining groups. Analysis of these results exposed patterns of mastery. One-way ANOVA tests were run using the data from the most likely pattern to establish a pattern of mastery. The anticipated pattern was established for five of the seven objectives.

Table 4.1 contains the results of the multivariate analysis of variance for redundancy, equivalence, and non-informative data was found to be significant. ($F = 1.609$, $df = 39.0$, $p = .011$) by the Wilks' Lambda Criterion. Three alternative procedures for testing the multivariate null hypothesis, Pillai's Trace, Hotelling's Trace, and Roy's Largest Root, confirmed a significant difference in the TCAP performance of different personality groups.

**Table 4.1**

**Multivariate Tests[c]**

| Effect | | Value | F | Hypothesis df | Error df | Sig. |
|---|---|---|---|---|---|---|
| Intercept | Pillai's Trace | .988 | 2348.560[a] | 13.000 | 384.000 | .000 |
| | Wilks' Lambda | .012 | 2348.560[a] | 13.000 | 384.000 | .000 |
| | Hotelling's Trace | 79.509 | 2348.560[a] | 13.000 | 384.000 | .000 |
| | Roy's Largest Root | 79.509 | 2348.560[a] | 13.000 | 384.000 | .000 |
| GROUP | Pillai's Trace | .155 | 1.613 | 39.000 | 1158.000 | .010 |
| | Wilks' Lambda | .853 | 1.609 | 39.000 | 1137.854 | .011 |
| | Hotelling's Trace | .163 | 1.604 | 39.000 | 1148.000 | .011 |
| | Roy's Largest Root | .069 | 2.063[b] | 13.000 | 386.000 | .015 |

a. Exact statistic

b. The statistic is an upper bound on F that yields a lower bound on the significance level

c. Design: Intercept+GROUP

Six of the thirteen objectives showed no significant difference in mastery and non-mastery by the four major personality types; thereby giving support to the validity of the Null Hypothesis. For this reason no additional testing was deemed necessary for these objectives:

Objective 36. Recognizing Multiple Meanings of Words

Objective 42. Identifying Cause and Effect Relationships

Objective 43. Identifying Fact and ●pinion

Objective 46. Interpreting Figurative Language

Objective 47. Recognizing Author's Point of View

Objective 49. Following written or Graphic Directions

The remaining seven of the thirteen TCAP objectives showed a significant difference that indicated the need for further testing:

Objective 37. Using Context Clues

Objective 38. Recognizing Propaganda Techniques

Objective 39. Identifying Main Idea

Objective 40. Sequencing events

Objective 41. Making Inferences and Drawing Conclusions

Objective 44. Identifying Details

Objective 45. Identifying the Author's Purpose

ANOVA, Post Hoc Tests, and Homogeneous Subtests confirmed the initial findings of the Chi-Square Goodness of Fit.

Chi Square goodness of Fit was used to test the hypothesis that the observed frequency of mastery, in the intitial discussion; and non-mastery, in subsequent discussions. This conforms to the null hypothesis that states:

> Null Hypothesis: There is no significant difference between the TCAP Subtest scores of any of the different affective learning styles as determined by the personality scores of the MBTI. (*e.g.*, Identifying Main Idea score of $\mathbf{P_1 = P_2 = P_3 = P_4}$).

[$P_1$, P2, $P_3$, and $P_4$ will be used to indicate the major personality group of NF, NT, SJ, and SP, respectively.]

However, the affective learning style theories discussed in Chapter Two suggest that the more probable outcome will be reflected in the Alternative Hypothesis, which states

Alternative Hypothesis: There is a significant difference between the TCAP Subtests scores of any of the different affective learning styles as determined by personality scores of the MBTI.

(*e.g.*, Identifying Main Idea score of $\mathbf{P_1 \neq P_2 \neq P_3 \neq P_4}$)

[$P_1$, $P_2$, $P_3$, $P_4$ will be used to indicate the major personality groups of NF, NT, SJ, and SP, respectively.]

Table 4.2 is a summary of the results of the statistical findings. This table divides the four major personality groups to include the number of subjects within each personality group. The information provided shows the number of students who have demonstrated 100% mastery of all objectives as well as the number of students who have mastered each of the thirteen reading comprehension objectives. The final column lists the total number of students identified as members of each group. As a matter of convenience bold-faced numbers indicate that 100% of a particular personality group have demonstrated mastery of a specific objective.

This summary is followed by an analysis of the results of each specific TCAP Subtest objective previously identified for this inquiry. The statistics for each objective include a table of type distribution of participants, which follows the format used in the Journal of Psychological Type. Three sets of Chi-Square Goodness of Fit statistics are included in Appendix B; they ascertain the validity:

1. of the Null and the alternative hypotheses,
2. of the hemisphericity theories which ascertained the superiority of left brained readers (SJ and NT) over their right brained counterparts
3. of the processing theories which claim a natural supremacy for the Intuitive readers over the Sensing readers.

## MASTERY OF ALL OBJECTIVES

Collectively it was established that 122 students demonstrated mastery of all 13 objectives. The fact that these 122 students were not evenly or proportionately divided among the 16 personalities makes the results of this study more significant. The results have been presented in the order established by the TCAP to display the personalities that have mastered all thirteen objectives. The type distribution of the total population was represented in the previous chapter as Table 3.2.

It has bee noted, as stated in chapter 3, that the population of this study is not similar to either the United States population at large (Keirsey & Bates, Keirsey) or the American High School population (Mamchur), but neither is the population of college graduates (Provost, Ruble, Scheen, Uhl).

In the discussion that follows each of the thirteen designated TCAP objectives will be examined to determine the distribution of mastery for the sixteen individual personalities with attention given to Dichotomous preferences, Pairs and Temperaments, Jungian Types and Dominant Types. As these differentiations were not the intent of the study, the differences are noted, but not discussed. The statistical findings of the Hypotheses have been included and discussed thoroughly. The tables mentioned in the text are found in Appendix B. Table 4.3 represents the 122 students

**Table 4.2 Summary of Results: Number of Students Showing Mastery of Results**

| | 100% | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 49 | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ESTJ | 14 | 40 | 40 | 41 | 40 | 27 | 38 | 37 | 37 | **44** | 34 | 43 | 41 | **44** | 44 |
| ESFJ | 11 | 24 | 26 | 25 | 24 | 21 | 25 | 25 | 22 | 29 | 25 | **31** | 30 | 28 | 31 |
| ISTJ | 12 | 18 | 17 | 18 | 20 | 16 | 19 | 20 | 19 | **21** | 19 | 20 | 19 | **21** | 21 |
| ISFJ | 5 | **16** | 13 | 15 | **16** | 12 | 14 | 14 | 14 | **16** | 11 | 15 | 14 | 14 | 16 |
| ESTP | 10 | 28 | 31 | 31 | 31 | 19 | 27 | 29 | 31 | 35 | 21 | 34 | 31 | 35 | 36 |
| ESFP | 5 | 42 | 31 | 39 | 38 | 30 | 39 | 45 | 35 | 44 | 35 | 46 | 44 | 46 | 48 |
| ISTP | 5 | 11 | 15 | **16** | 11 | 11 | 12 | 12 | 11 | 13 | 13 | 13 | 14 | 15 | 16 |
| ISFP | 2 | 16 | 12 | 14 | 16 | 11 | 12 | 16 | 15 | **17** | 8 | **17** | 15 | 17 | 17 |
| ENTJ | 9 | **15** | 13 | **15** | 13 | 13 | 14 | **15** | 14 | **15** | 11 | **15** | 14 | **15** | 15 |
| ENTP | 10 | 30 | 28 | 31 | 29 | 23 | 28 | 29 | 28 | **33** | 25 | 31 | 31 | 30 | 33 |
| INTJ | 4 | **8** | 7 | **8** | 6 | 3 | 7 | 5 | 7 | 7 | 6 | **8** | 7 | **8** | 8 |
| INTP | 7 | 20 | 20 | 21 | 20 | 15 | 20 | **22** | 21 | **22** | 13 | 17 | 18 | 21 | 22 |
| ENFJ | 4 | 11 | **13** | **13** | 13 | 9 | 10 | **13** | 11 | **13** | 7 | **13** | 11 | **13** | 13 |
| ENFP | 12 | 32 | 32 | 34 | 31 | 29 | 28 | 31 | 25 | 32 | 27 | 32 | 31 | 34 | 35 |
| INFJ | 2 | 9 | 11 | 12 | 11 | 10 | 11 | 12 | 9 | 12 | 7 | **13** | 12 | **13** | 13 |
| INFP | 10 | 26 | 26 | 31 | 29 | 25 | 24 | **32** | 30 | **32** | 23 | **32** | 30 | 31 | 32 |
| TOTALS | **122** | **53** | **65** | **36** | **50** | **124** | **72** | **43** | **71** | **15** | **115** | **20** | **38** | **15** | **400** |

**100%** Mastery of all 13 Objectives

**36.** Recognizing Multiple Meanings of Words

**37.** Using Context Clues

**38.** Recognizing Propaganda Techniques

**39.** Identifying Main Idea

**40.** Sequencing Events

**41.** Making Inferences and Drawing Conclusions

**42.** Identifying Cause and Effect relationships

**43.** Identifying Fact and Opinion

**44.** Identifying Details

**45.** Identifying Author's Purpose

**46.** Interpreting Figurative Language

**47.** Recognizing the Author's Point of View

**49.** Following Written or Graphic Directions

**TOTAL** of participants with a particular personality type

**TOTALS** of subjects showing mastery of a particular objective

who have mastered all objectives by type, by dichotomous preference, by pairs and temperaments, by Jungian types and by dominant types. 30,50% of this population have mastered all 13 objectives. Annual percentages indicate that this population scored higher than the composite state performance; however it must be remembered that many of the general population are not capable of earning the diplomas that this population is pursuing. Statistically, the most difficult reading objective for this college bound secondary population is TCAP Objective 40 Sequencing Events with only 276 of the 400 students obtaining mastery. TCAP Objective 45: Identifying the Author's Purpose closely follows this with only 285 students demonstrating mastery. It is interesting to note that the two inductive personality groups have more difficulty identifying the author's purpose while the two deductive personality groups have more difficulty sequencing events. It is often speculated that the inductive readers (NF and NT) have the ability to organize specific information, but tend to read too much into interpretive material, which may account for this pattern. Likewise conjecture about the sensing or deductive personalities (SJ and SP) states that since the deal with "what is!" rather than "what if?" they are less likely to read extraneous interpretations into what is written. While two of the most difficult are clearly established with fewer than 300 proficiencies there is more variety in the mastery distribution of the other eleven objectives. Table 4.3 displays the number and percentage of each of the individual personality types that mastered all thirteen reading comprehension objectives, including the dichotomous preferences, pairs and temperaments, Jungian types, and dominant types. This table follows the form most commonly used in Journal of

Psychological Type and other MNTI research publications. This table is followed by the Chi Square Goodness of Fit tests in Table 4.4 in appendix B.

## RECOGNIZING MULTIPLE MEANINGS OF WORDS

Statement of Objective 36: Determine the appropriate meaning of a word having multiple meanings when used in context.

The statistics indicating the type distribution of participants who demonstrated mastery of this objective are summarized in Table 4.5. the data showed that 346 of the 400 students demonstrated mastery of this objective ranking it as eighth ($8^{th}$) for aggregate mastery. Ranking for the personality groups was fourth ($4^{th}$) for the Intuitive Thinking (NT) group that had 73 (93.6%) students demonstrate mastery. Objective 36 was seventh ($7^{th}$) for both Sensing personality groups. Sensing Judging (SJ) that had 98 (87.5%) students, and Sensing Perceiving (SP) that had 97 (83%) students score at the mastery level. The same objective ranked ninth ($9^{th}$) for the Intuitive Feeling (NF) group with 79 (85%) of the students scoring the required mastery level. Three of the personality groups (ISFJ, ENTJ, and INTJ) are not represented among those making errors. All of these students demonstrated the desired 75% mastery. The Chi-Square Goodness of Fit findings for hemisphericity and for information processing are included in Table 4.6. The Post Hoc test results, which confirm support of the Null Hypothesis, follow in Table 4.7. Because unanimous support of the Null Hypothesis was evident the ANOVA test was deemed unnecessary.

## USING CONTEXT CLUES

State of Objective 37: Use the context clues to determine the meanings of words.

The statistics indicating the type distribution of participants who demonstrated mastery of this objective are summarized in Table 4.8. The data revealed that the 400 participants scored the 75% required for mastery. The success in using context clues to determine meaning was the fifth most difficult reading comprehension objective. For the NF and SJ groups this skill ranked ninth for mastery while the remaining two groups, NT and SP, it ranked 11$^{th}$ for mastery. Among the 65 students who did not correctly answer the required 75% only one group (ENFJ) is not represented. The distribution of non-mastery among 14 of these personality groups ranges from 1.5% to 9.2%. Over one fourth of the non-mastery students were members of the ESFP group.

Not surprisingly, E's, S's, F's and P's are over represented among the entire group. The chart will show that any combination of these constructs is significantly higher in number of non-mastery. The Dichotomous Preferences, Pairs and Temperaments and Jungian types included on table $.8 support some deceptive conclusions. Initially it would seem that the Extroverts are more easily distracted from the text, S's are not using cognitive functions to process the text, F's are letting their feelings about the text interfere with details and P's are not attending to task. A careful look at the sixteen types reveals different conclusions. Wilks' Lambda and the subsequent ANOVA testing supported the alternative Hypothesis. Further testing indicated that Bottom-up or Inductive Processors indicated by the Intuitive (N) score showed greater mastery of this skill than the Sensing (S) students did. S's tend to prefer to deal with what is rather than trying to figure out a word or a concept. Because SJ's have a strong need for structure and closure, their similar mastery

score may be more understandable. The multivariate and Post Hoc tests indicated the need for ANOVA's to confirm that N's mastered this objective more frequently than S's did. Table 4.8, Type Distribution of Participants precedes Table 4.9, Chi-Square goodness of Fit, and Table 4.10 Post Hoc, and ANOVA test results for this objective. All are found in Appendix B.

## RECOGNIZING PROPAGANDA TECHNIQUES

Statement of Objective 38: Recognize the use of propaganda when used in a reading passage or advertisement.

The statistics indicating the type distribution of participants who failed to demonstrate mastery of this objective are summarized in Table 4.11 found in Appendix B. The data revealed that 364 of the 400 students score the required 75% to achieve mastery of the objective. this objective ranked fourth for mastery among the reading comprehension objectives, with 36 students failing to demonstrate the required 75%.

Quite predictably the analytical N's out scored the holistic S's (Myers and McCaully). For NT's this objective ranked 2nd in mastery, with INTJ and ENTJ showing total mastery. For NF's this objective ranked 3rd with ENFJ showing total mastery. For SJ's and SP's this objective ranked 6th for mastery with ISTP showing total mastery.

As mentioned previously, the S's tend to read what is actually in print, while the N's question and analyze the motives of the author as well as the content of what is written. Undeniably this skill is an important life skill and may require even more attention among the non-college bound population. Table 4.12 Chi-Square Goodness of Fit shows the statistics, which support the alternative Hypothesis, based upon the processing theory. This

is confirmed by Table 4.13, which contains the Post Hoc and ANOVA test results found in Appendix B.

## IDENTIFYING MAIN IDEA

Statement of Objective 39: Identify the main idea of a descriptive, narrative, or expository passage.

The statistics indicating the type distribution of participants who demonstrated mastery of this objective are summarized in Table 4.14. The data revealed that 350 of the 400 participants achieved mastery. This objective ranked seventh, the medial range, for mastery among reading comprehension objectives. 50 students of the 400 member population failed to demonstrate the required 75% mastery. Although this objective is addressed at the primary level, it continues to plague many students for several reasons. First, because they have difficulty recognizing the main idea of a reading passage, they may become interested in a supporting detail or fail to distinguish the difference between a main idea and a conclusion. And secondly, because it is difficult to learn how to recognize a main idea when the concept eludes comprehension.

Students who have difficulty recognizing the main idea of a passage often have difficulty writing coherent paragraphs. Reading does not provide a writing model for them. Many language arts teachers recognize the difficulty students may face by failing to master this reading comprehension objective as both reading and writing can be affected (Fisher).

The hemisphericity theory predicted greater mastery for left brained individuals, and the processing theory predicted greater success for the top down processors who do not

have the proclivity of reading too much into what is actually written. However, the pattern of mastery does not support this forecast. For NF's, this objective ranked 6th for mastery. For SJ's, this objective ranked 5th for mastery, with ISFJ showing 100% mastery. For SP's, Objective 39 ranked 9th. With this evidence it is not surprising that the recently published theory of Keirsey provided the explanation for the results supported by the following tests.

The Chi-Square Goodness of Fit scores indicated a pattern of mastery thereby supporting the Alternative Hypothesis, these scores are found in Table 4.15. The identification of this objective through Wilks' Lambda and the subsequent Post Hoc and ANOVA testing revealed that the alternative Hypothesis was supported. These results are found in Table 4.16. Further testing revealed that the Cooperative personalities (NF and SJ) showed significantly greater mastery than the Utilitarian (NT and SP) personalities. Cooperatives are more likely to persevere in spite of their frustration while Utilitarians are more likely to dismiss the task as an effort of futility.

As previously stated in Chapter 2, this theory of pattern functioning is fairly recent (Keirsey, 1998) and therefore the literature is relatively limited. While it certainly seems to offer an explanation for this objective, it she no light on the remaining twelve.

## SEQUENCING EVENTS

Statement of Objective 40: Identify the sequence of events in a reading passage dealing with a series of events.

The statistics indicating type distribution of participants who demonstrated mastery of this objective are summarized in Table 4.17 found in Appendix B. This objective ranked first for non-mastery among the reading comprehension objectives with 124 students failing

to demonstrate the required 75%. The 276 who did score the required 75% for mastery were distributed as follows: NF's ranked 11th for mastery with 73 (78.5%) students showing the required 75%. NT's ranked 12th for mastery with 56 (71.8%) students showing mastery. SJ's and SP's ranked 13th, or last with 76 (67.85%) and 71 (60.68%) students showing mastery, respectively. None of the 16 individual personality groups had 100% mastery for this objective.

Sequencing Events is a reading comprehension skill that is addressed at the primary levels of instruction and yet many people continue to have difficulty sequencing events that are not presented in chronological order. Hemisphericity theories predict that the left-brained personalities would demonstrate greater mastery; however, the dominance of the right-brained NF's negated this concept. The Chi-Square Goodness of Fit test scores revealed that the processing theories which state that the analytical N's are more likely to master this objective (Myers and McCaully, Gordy and Thorne). These results are found in Table 4.18. The identification of this objective through Wilks' Lambda and the subsequent Post Hoc and the ANOVA testing revealed that the Alternative Hypothesis was supported. These test results are located in Table 4.19 located in Appendix B. This additional testing confirmed the dominance of the bottom-up processors who tend to be more analytical as opposed to the top-down S's who prefer to deal with what is and to shy away from analytical tasks.

Despite the continuous attention given to this objective, placing non-chronological material into the appropriate sequence remains a challenge. It seems to be the most difficult of all of the tested reading objectives.

## MAKING INFERENCES AND DRAWING CONCLUSIONS

Statement of Objective 41: Make an inference or draw a conclusion from a given reading passage.

The statistics indicating the type distribution of participants who demonstrated mastery of this objective are summarized in Table 4.20. This objective ranked eleventh for mastery among the reading comprehension objectives. Although 328 students did prove mastery, 72 students failed to demonstrate the required 75%. In comparison to other objectives, the ranked data show that determining cause and effect relationships is one of the more challenging objectives. Ranking for the personality groups was $11^{th}$ for NF's, $9^{th}$ for NT's, tied for $8^{th}$ for SJ's, and $10^{th}$ for SP's. None of the individual personality groups demonstrated 100% mastery.

The dichotomous preferences failed to show any disproportionate findings among those who mastered this objective; however, initial response to the Pairs and Temperaments division of Table 4.20 seemed to indicate that the left-brained personalities were predisposed to mastery of the reading comprehension objective. Theories of processing predicted that the ability to read analytically and inductively would favor the inductive N's for mastery of this objective, but the numbers did not substantiate the theory. Table 4.20 shows that the initial Chi-Square Goodness of Fit supported the Null Hypothesis. Table 4.21 contains the statistical results that the multivariate analysis tests indicated were necessary. This was confirmed by the Post Hoc tests. These results, which favored the accomplishments of the NT's and SJ's, indicated a need for the ANOVA tests to confirm that this was a left-brained function. Unfortunately, the test results for this homogeneous

college bound population were insufficient to confirm the left-brained tendency for proficiency and the Null Hypothesis was supported for this objective.

## IDENTIFYING CAUSE AND EFFECT RELATIONSHIPS

Statement of Objective 42: Identify either the cause of given effect or the effect of a given cause from reading a passage dealing with cause and effect relationships.

This objective ranked eighth ($8^{th}$) for non-mastery among the reading comprehension skills. Only 43 members of this homogeneous population failed to prove mastery of this objective, which made it unlikely that the Null Hypothesis would not be supported. It is interested to note that half of the Intuitive (N) [bottom-up processors] personality groups [INFP, INFJ, INTP, ENTJ] showed 100% mastery of this objective, while none of the Sensing (S) [top-down processors] demonstrated comparable levels of mastery. The range in scores among the groups was only 8.9 from highest to lowest, which made the probability of a significant difference or a discernible pattern unlikely. Ten of the remaining groups revealed that at least 80% of their membership had demonstrated mastery. The remaining two groups INTJ and ISTP revealed that only 62.5% and 75% of their members demonstrated mastery. With the exception of the ENTJ's , which tested 100% for six of thirteen objectives, the mean scores for the objective seem to be distributed among the extroverts while the extreme scores seem to be distributed among the Introverts.

The statistics indicating the type distribution of participants who demonstrated mastery of this objective are summarized in Table 4.23. Because neither the Chi-Square Goodness of Fit, displayed in Table 4.24, nor the Post Hoc tests displayed in Table 4.25 indicated the need for further testing, ANOVA's were not calculated for this objective.

## IDENTIFYING FACT AND OPINION

Statement of Objective 43: Identify statements as fact or opinion as expressed in a given reading passage.

Only three other objectives proved to be collectively more difficult than this one. The universality of difficulty for all personality groups was obvious as the Chi-Square Goodness of Fit scores supported the Null Hypothesis. This was further reinforced as the multivariate and Post Hoc scores substantiated that this objective proved equally difficult for all personality groups with 71 students failing to demonstrate mastery at the required 75% level. For NF's, 75 students (80.6%) demonstrated mastery. For NT's, 70 students (89.7%) demonstrated mastery. For SJ's, 92 students (82%) demonstrated mastery. For SP's, 92 students (78.6%) demonstrated mastery. Table 4.26, which shows the distribution of participants who did master this objective shows that Introverts, Intuitives, and Thinkers wee more likely to discriminate between fact and opinion, but not at a significant level. It may be noted that according to the Myers-Briggs Type Indicator handbook, 60% of the nation's attorneys possess this combination of traits. That means that 2% of the population at large comprise 60% of one profession's membership. Whether this is because only those who are predisposed to this type of thinking are attracted to this profession has not been substantiated. The presumptions of this study asset that only those who can master the essential reading skills can master the curriculum necessary to enter the profession. It would seem that this reading comprehension skill would be classified as an essential life skill and would therefore receive more attention in the curriculum. It is also possible that despite the fact that it does receive extra attention, it is still a difficult concept to master.

The statistics indicating the type distribution of participants who demonstrated mastery of this objective are summarized in Table 4.26 found in Appendix B. The statistics that substantiate the Null Hypothesis through Chi-Square Goodness of Fit are found in Table 4.27. In Table 4.28 only Post Hoc test results are found. Since these confirm all previous tests of this objective, no further tests were deemed necessary; therefore, ANOVA's were not computed.

## IDENTIFYING DETAILS

Statement of objective 44: Identify details from a given passage.

This objective is one of the first examined for reading comprehension. It was also tied with Objective 49: following Written and Graphic Directions as the most frequently mastered objective. Both of these objectives have been consistently taught and tested throughout the public school curriculum. Both objectives were mastered by 385 of the 400 members of this homogeneous population. At the required 75% level. Appendix B contains Table 4.29, which verifies the following levels of achievement. NF's had 89 (95.7%) students attain mastery. NT's had 77 (98.7%) mastery level students. SJ's had 110 (98.2%) mastery level students. SP's had 109 (93.4%) mastery level students. Nine of the sixteen individual personality types had 100% of the participants prove mastery with the following apportioning:

| **SJ** | **SP** |
|---|---|
| ISTJ, ISFJ, ESTJ | ISFP |
| **NT** | **NF** |
| INTP, ENTP, ENTJ | INFP, ENFJ |

With two thirds of the 100% mastery groups being among the left-brained personalities there was reason to consider the possibility that this objective was dominated by the left-brained personalities. With a larger population, or a heterogeneous population, this chart may have been indicative of that very pattern; however, with only 3.75% of the population failing to demonstrate mastery it was unlikely that any pattern would evolve. The Chi-Square Goodness of Fit tests, which are found in Appendix B as Table 4.30, supported the Null Hypothesis. The Post Hoc and Multivariate tests did not. It was then appropriate to run the ANOVA calculation to test the validity of the left-brain theory. The numbers failed to confirm this theory and ultimately the Null Hypothesis was supported. The Post Hoc and ANOVA test score are found in Table 4.31.

## IDENTIFYING THE AUTHOR'S PURPOSE

Statement of Objective 45: Identify the author's purpose in a given reading passage.

Only 285 of the 400-member population proved mastery of this objective at the 75% level. This objective ranked second among the reading comprehension objectives for non-mastery. 115 (28.7%) students failed to master this objective. The pre-research prediction indicated that this objective would be in the domain of the bottom-up processors with their analytical , inferential minds. It was further presumed that the holistic, top-down readers would be less likely to master this objective. While the difficulty of the objective was accurately predicted, the successful participants were not.

The group with the highest percentage of mastery was the deductive, left-brained SJ personality group withn79.5% showing the required 75% mastery. Both the hemisphericity and the processing theories support the NT group, which has continually dominated in the

proficiency of reading comprehension skills. This group contributed 70.5% of the mastery level participants.

The initial Chi-Square Goodness of Fit findings, found in Table 4.33, supported the Null Hypothesis at the 0.05 level. Because of the homogeneous population the scores were compared to the 0,10 level and failed to support the Null Hypothesis. The subsequent Multivariate and Post Hoc tests indicated a need for further testing and the ANOVA supported the hemisphericity theory for this objective. Table 4.34, found in Appendix B, discloses these results.

## INTERPRETING FIGURATIVE LANGUAGE

Statement of objective 46: Interpret figurative language in a given reading passage.

This is the third most frequently mastered objective with 380 of the 400-member homogeneous population demonstrating mastery at the 75% level. The results are contained in Table 4.35, The Type Distribution of Participants, found in Appendix B. Despite the inclination of high school students to complain about poetry, symbolism and other uses of figurative language, only 20 members of this homogeneous population failed to demonstrate mastery. With 95% of the population proving mastery of this objective it was not surprising that half of the 16 individual personality groups had 100% of the membership demonstrate mastery with the following distribution.

| **SJ** | **SP** |
|---|---|
| ESFJ | ISFP |
| **NT** | **NF** |
| ENTP, INTP, INTJ | ENFJ, INFP, INFJ |

Initially, it might be expected that the processing theory once again prevailed; however, the error analysis showed a pattern that did not correlate with the mastery pattern. As Table 4.35, found in Appendix B, shows, the two Cooperative groups [NF and SJ] accounted for only 6 (30%) of the 20 non-mastery participants, while the Utilitarian groups [NT and SP] were responsible for the remaining 14 (70%) students who did not establish mastery. Table 4.36 contains the Chi-Square Goodness of Fit data. The Post Hoc test results are contained in 4.37. The results of these two tests revealed that it was unnecessary to calculate the ANOVA test.

## RECOGNIZING AUTHOR'S POINT OF VIEW

Statement of Objective 47: Recognize the author's point of view in a given reading passage.

This is the fifth most frequently mastered objective with 90.5% of the participants scoring the required 75%. Despite the fact that only 38 members of this homogeneous population failed to demonstrate mastery, no individual personality group demonstrated total mastery by scoring 100%. The 362 who did score the required 75% for mastery were distributed as follows: NF's had 84 (90%) participants achieve mastery. The NT group had 70 (89.7%) participants achieve mastery. The SJ group had 104 (92.8%) participants achieve mastery. The SP group had 104 (88%) participants achieve mastery. The universality of this objective is clearly displayed in Table 4.38 Type Distribution of Participants found in Appendix B.

The pre-research predictions indicated that this objective would be more frequently mastered by the analytical, inductive, Intuitive (N) personalities, but the statistics do not

support the presumption. The range of mastery percentage for all of the groups was 88-92.8%. A heterogeneous population may have disclosed a more definitive pattern, but this homogeneous one did not. Perhaps at an earlier level of matriculation this presumption might prove true, but this secondary college bound population seems to have mastered the concept. None of the Chi-Square Goodness of Fit scores, located in Table 4.39, indicated that the Null Hypothesis would be challenged. The Post Hoc test located in Table 4.40 confirmed this. For that reason no further testing of this objective was deemed necessary.

## FOLLOWING WRITTEN OR GRAPHIC DIRECTIONS

Statement of Objective 49: Interpret written or graphic information such as maps, schedules, time lines, or directions.

The computer age and the everyday experience of using these materials made this one of the most successful objectives tested. This objective and Objective 44. Identifying Details were mastered by 385 of the 400 participants. The statistics indicating the type distribution of participants who mastered this objective are summarized in Table 4.44, which is found in Appendix B. The NF personality group had 91 (97.8%) mastery level participants. The NT personality group had 74 (94.8%) mastery level participants. The SJ group had 107 (95.5%) mastery level participants. The SP personality group had 113 (96.5%) mastery level participants. The results for each of the bipolar constructs were surprisingly similar. The mastery distribution below is subject to misinterpretation unless the distribution figures are consulted. With 96.25% of the population proving mastery of this objective it was not surprising that half of the individual personality groups had 100% of their respective membership demonstrate mastery with the following distribution.

| SJ | SP |
|---|---|
| ISTJ, ESTJ | ISFP |
| **NT** | **NF** |
| ENTJ, INTJ | ENFJ, INFJ |

With so few students failing to show mastery it was not surprising that the homogeneous population should support the null hypothesis that even of the sixteen individual personality groups had 100% mastery. The distribution by type chart is followed by Table 4.45, Chi Square Goodness of fit test and Table 4.46, Post Hoc test. As these tests confirmed the validity of the null hypothesis no further testing was deemed appropriate or necessary.

## ANALYSIS BY PERSONALITY

To examine this data by objective only would defeat the purpose of this study. Research of this nature is more than theories, numbers, and statistic; without the pedagogical implications it will not have any impact on the classroom experiences of developing readers. It was hoped that some of this information would be helpful to those who feel that the classroom experiences do have room for improvement. Even with this homogeneous population it is evident that different students have different areas of mastery. It is not illogical to assume that the new information about brain function and structure may influence results obtained from these tests. Figure 4.1 displays both the numbers of students showing mastery of all objectives and the number of students who did not. This visual representation reiterates the data presented earlier in this chapter. Clearly, the number of students who demonstrated mastery is not proportionate among the four major

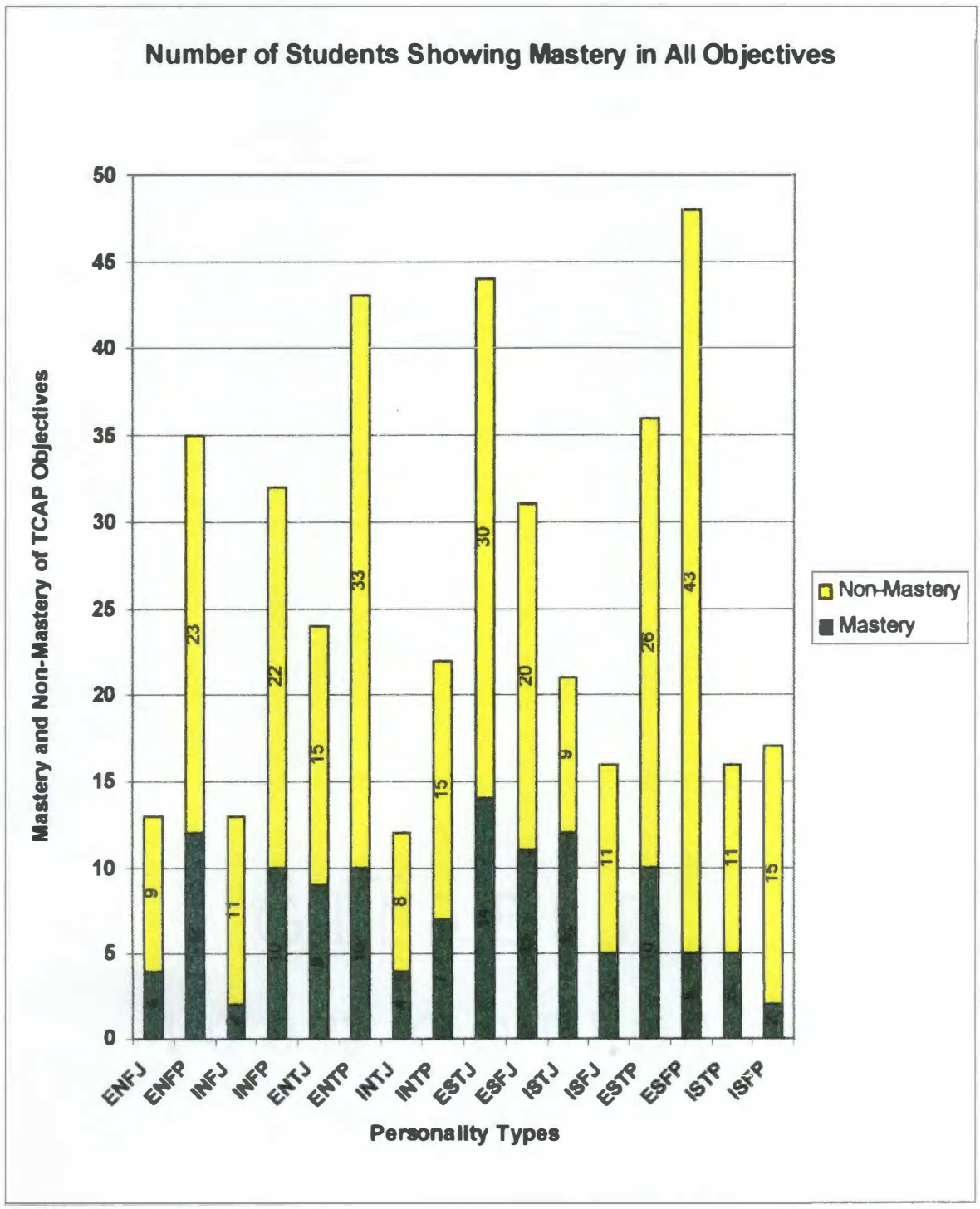

Number of Students Showing Mastery in All Objectives
Mastery and Non-Mastery of TCAP Objectives
50
45
40
35
30
25
20
15
10
5
0
9
23
11
22
15
33
8
15
30
20
9
11
26
43
11
15
ENFJ
ENFP
INFJ
INFP
ENTJ
ENTP
INTJ
INTP
ESTJ
ESFJ
ISTJ
ISFJ
ESTP
ESFP
ISTP
ISFP
Personality Types
Non-Mastery
Mastery

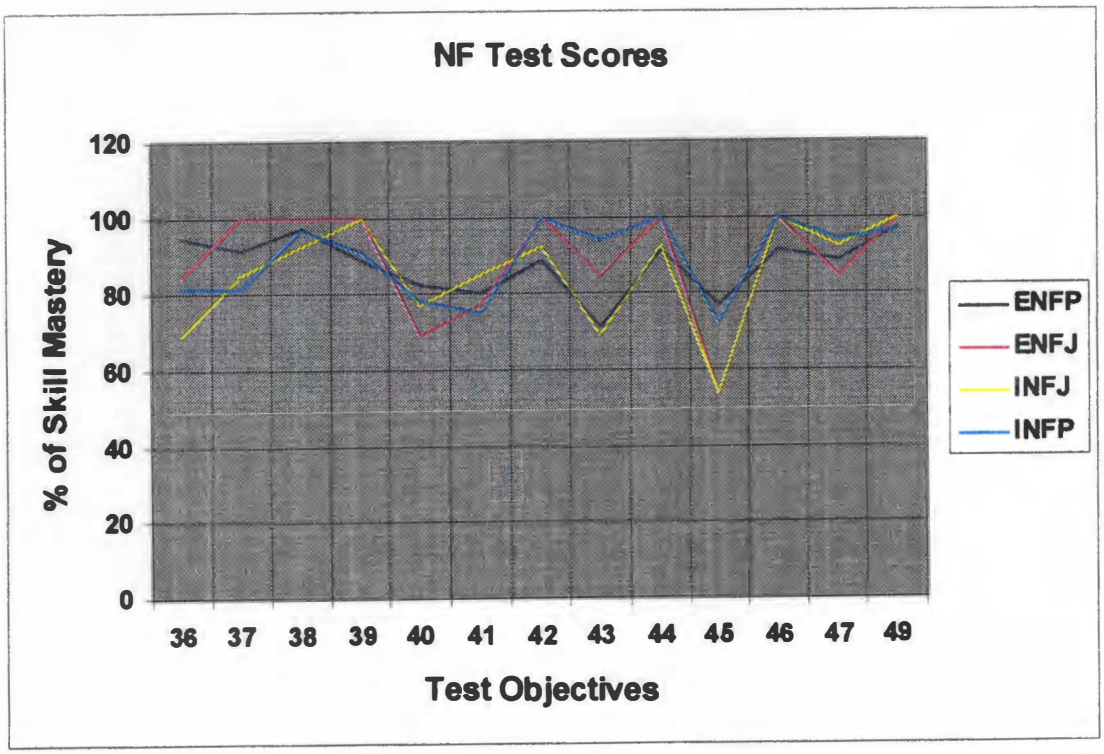
**Figure 4.1**

personality groups, or among the sixteen individual groups. The presentation of data by personalities will first define the major group and then delineate the specifics of the individual groups. The data from the first part of this chapter has been repeated in the form of graphs. An overview of research that might explain the results has been included in the discussion.

## INTUITIVE FEELING GROUP

This group consists of four sub-groups: ENFJ, ENFP, INFJ, and INFP. All individual groups are right brained according to hemisphericity theory, bottom-up processors (inductive thinkers) according to the processing theory, and cooperatives according to the Keirsey theory (1998). The hemisphericity theories do not favor the reading success of this group because the language centers are located in the left hemisphere; however, the performance of this group indicates otherwise. The processing theories do favor the inductive intuitives (N's); however, the multiplicity of processes involved in these thirteen comprehension skills indicates that good readers are interactive readers and do not confine cerebral activity as disabled readers are believed to do. The Keirsey theory has not been published long enough to have generated the response and discussion that the other two have; however, the statistics for Objective 39, Identifying Main Idea was the most plausible explanation for the success of the Intuitive-Feelers (NF) and the Sensing -Judging (SJ) personalities.

Figure 4.2 illustrates the consistency of performance among this segment of the population. The percentage of mastery ranges from 53.8% for Objective 45, Identifying the Author's Purpose, by INFP's and the ENFJ's; to 12 separate 100% scores dispersed among




| | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 49 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ENFP | 94.3 | 91.4 | 97.1 | 88.5 | 82.9 | 80 | 88.5 | 71.4 | 91.4 | 77 | 91.4 | 88.5 | 97.1 |
| ENFJ | 84.6 | **100** | **100** | **100** | 69.2 | 77 | **100** | 84.6 | **100** | 53.8 | **100** | 84.6 | **100** |
| INFP | 81.3 | 81.3 | 96.9 | 91 | 78 | 75 | **100** | 93.8 | **100** | 72 | **100** | 93.8 | 96.9 |
| INFJ | 69.2 | 85 | 92.3 | **100** | 76.9 | 85 | 92.3 | 69.2 | 92.3 | 53.8 | **100** | 92.3 | **100** |

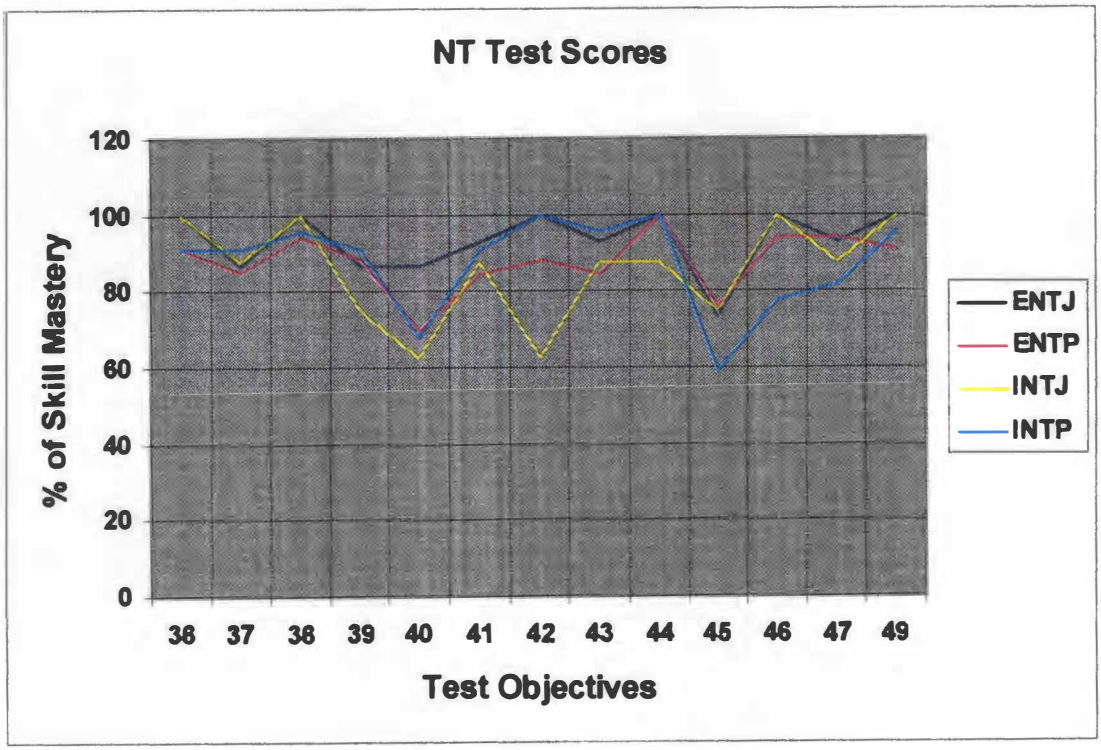
**Figure 4.2 Intuitive-Feeling (NF) Test Scores**

three of the four groups. The seven 100% scores of the ENFJ's would undoubtedly designate them as the strongest readers among the NF's within this population. These personalities tend to read avidly when the material appeals to their sense of justice or other emotions.

## INTUITIVE THINKING GROUP

This group consists of four sub groups: ENTJ, ENTP,INTJ, and INTP. All of the individual groups are left-brained according to the hemisphericity theory, bottom-up processors (inductive thinkers) according to the processing theory, and utilitarians according to the Keirsey theory (1998). The hemisphericity theories favor the reading success of this group because the language centers are located in the left hemisphere. The performance of this group is consistent with this. The processing theories do favor the inductive Intuitives (N's); however, the multiplicity of processes involved in these thirteen reading comprehension skills indicates that good readers are interactive readers and do not confine cerebral activity as disabled readers are believed to do. The Keirsey theory being a fairly recent addition to the body of literature has not yet generated the response and discussion that the other two theories have. The statistics from this study have not revealed any pattern for this group of personalities.

Figure 4.3 reveals that the ENTJ personality is clearly the most dominant of the group. The intuitive thinking (NT) personalities are often found in fields where reading is integral to attaining the knowledge to pursue it as well as to maintain a level of expertise. NT's want to know; they equate knowledge with power and are curious to learn and to




| | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 49 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ENTJ | **100** | 86.6 | **100** | 86.7 | 86.7 | 93 | **100** | 93 | **100** | 73.3 | **100** | 93 | **100** |
| ENTP | 90.9 | 84.8 | 93.9 | 87.9 | 69.6 | 84.5 | 87.9 | 84.5 | **100** | 75.8 | 93.9 | 93.9 | 90.9 |
| INTJ | **100** | 87.5 | **100** | 75 | 62.5 | 87.5 | 62.5 | 87.5 | 87.5 | 75 | **100** | 87.5 | **100** |
| INTP | 90.9 | 90.9 | 95.5 | 90.9 | 68 | 90.9 | **100** | 95.5 | **100** | 59.1 | 77.3 | 81.8 | 95.5 |

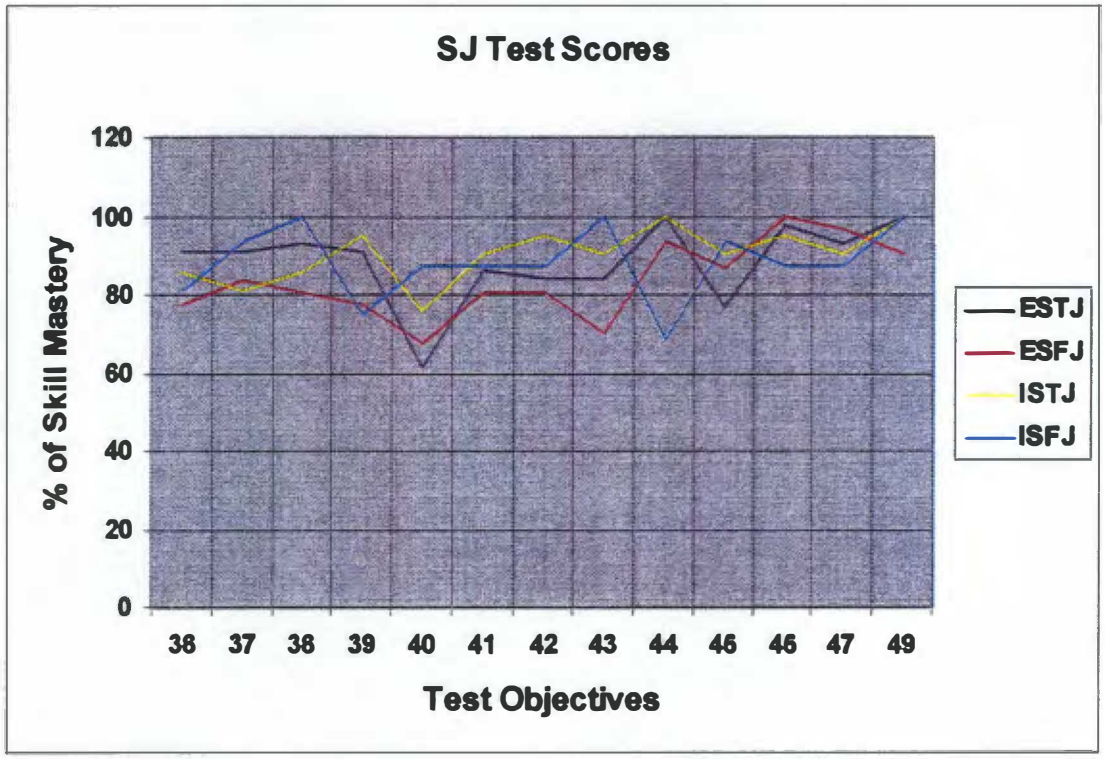
**Figure 4.3 Intuitive-Thinking (NT) Test Scores**

discover. Reading is a natural vehicle for them. Considering that the two prevailing theories favor this personality type, the high scores are not surprising.

## SENSING JUDGING GROUP

This group of four sub-groups: ESTJ, ESFJ, ISTJ, and ISFJ. All of these individual groups are left brained according to the hemisphericity theory. They are top-down processors (deductive thinkers) according to the processing theory, and cooperatives according to the Keirsey theory (1998). The hemisphericity theories favor the language skills of this group because the language centers are located in this group's dominant hemisphere. The processing theories do not. The belief is that deductive thinkers are very literal and less likely to use inference skills and to feel comfortable second guessing the material. The Keirsey theory has not been in existence long enough to have generated significant research that would predict reading ability; however the statistics for Objective 39, Identifying Main Idea was the most plausible explanation for the success of the Intuitive-Feelers (NF) and the Sensing-Judging (SJ) personalities. Figure 4.4 illustrates the consistency of performance among this segment of the population. The percentage of mastery ranges from 61.3%for Objective 40, Sequencing Events, by the ESTJ's to eight separate 100% scores dispersed among the four groups.

These students are conscientious about complying with structure and expectations of authority figures. Most of the elementary level teachers are SJ's and many theorists believe that the similarity of communication patterns may account for the early success and work ethic that motivates these students to cooperate with the school structure (Keirsey & Bates, 1984). Generally, they do not make a career or research. They are successful executors of




| | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 49 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ESTJ | 90.9 | 90.9 | 93.2 | 90.9 | 61.3 | 86 | 84.1 | 84.1 | **100** | 77 | 97.7 | 93.2 | **100** |
| ESFJ | 77.4 | 83.9 | 80.7 | 77.4 | 67.7 | 80.7 | 80.7 | 70 | 93.5 | 86.7 | **100** | 96.7 | 90.3 |
| ISTJ | 85.7 | 81 | 85.7 | 95 | 76 | 90.4 | 95 | 90.4 | **100** | 90.4 | 95 | 90.4 | **100** |
| ISFJ | **100** | 81.3 | 93.8 | **100** | 75 | 87.5 | 87.5 | 87.5 | **100** | 68.8 | 93.8 | 87.5 | 87.5 |

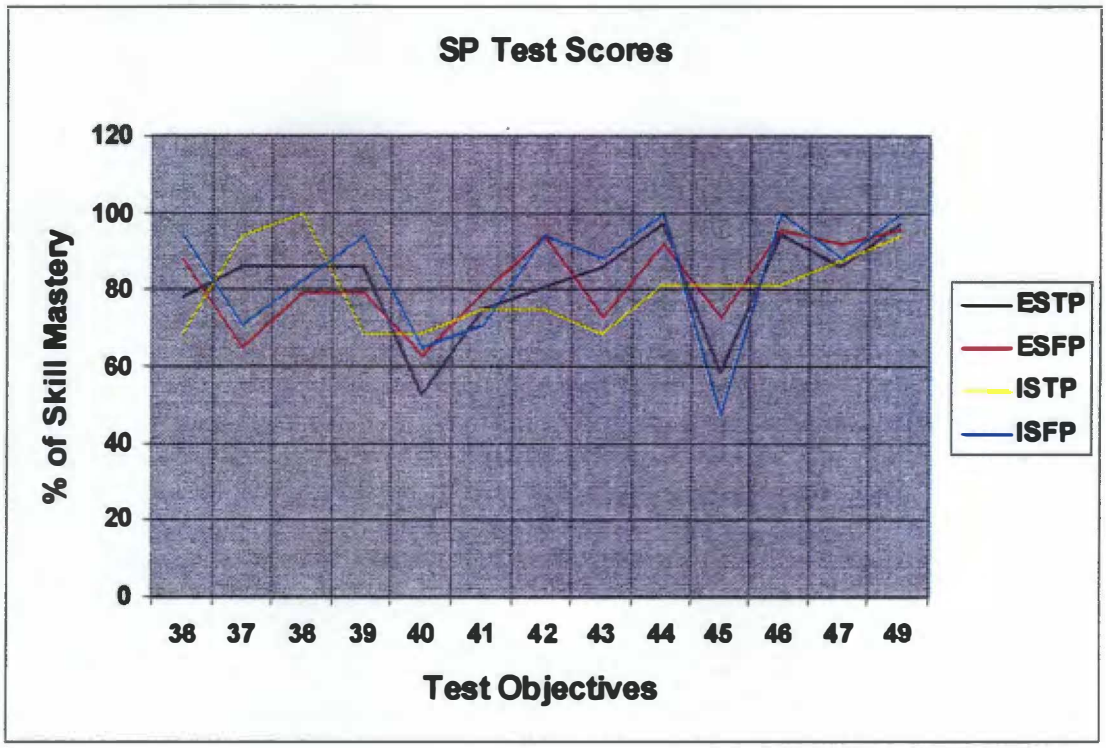
**Figure 4.4 Sensing-Judging (SJ) Test Scores**

Of well researched theories. Because they had the practical and realistic elements to theories they are excellent administrators or guardians. They have a practical sense of implementing well-developed plans.

## SENSING PERCEIVING GROUP

This group consists of four sub-groups: ESTP, ESFP, ISTP, and ISFP. All of the individual groups are right-brained according to the hemisphericity theory, top-down processors (deductive thinkers) according to the processing theory, and utilitarians according to the Keirsey theory (1998). Neither the hemisphericity theory not the processing theory favors the reading success of this group, and the test scores do nothing to negate this opinion. Although the Sensing-Perceiving (SP) portion of thhis population was greater than any other group, the number of students who mastered all of the objectives was substantially less. There is a wide range of scores with only the two introverted groups scoring 100% mastery in only four of the thirteen objectives.

There are several factors that contribute to these results. These students are very competitive and the pass-fail grading criterion may not inspire them to strive for perfection, particularly if they are secure in their language skills. These students do not want to know; they want to do. Knowledge is a tool to help them be more competitive (Keirsey & Bates, 1984, and Golay). They create internal mental competitions because they like games and the thrill of "winning". The demographics of the teaching profession indicate that while SP's comprise 38% of the population at large, only 4 % of the teaching profession are SP's. The preponderance of these teachers are either in the early primary grades where learning can be a series of games, and where every child can earn (win) a sticker or a star; the




| | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 49 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ESTP | 77.8 | 86 | 86. | 86 | 52.8 | 75 | 80.5 | 86 | 97.2 | 58.3 | 94.4 | 86 | 97.2 |
| ESFP | 87.5 | 64.6 | 79.2 | 79 | 62.5 | 79.2 | 93.8 | 73 | 91.7 | 73 | 95.8 | 91.7 | 95.8 |
| ISTP | 68.8 | 94 | **100** | 68.8 | 68.8 | 75 | 75 | 68.7 | 81.3 | 81.3 | 81 | 87.5 | 94 |
| ISFP | 94 | 70.6 | 82.4 | 94 | 64.7 | 70.6 | 94 | 88 | **100** | 47 | **100** | 88 | **100** |

**Figure 4.5 Sensing-Perceiving (SP) Test Scores**

remaider are often found as the stereo-typical win-at-all-cost coaches found in the secondary level (Keirsey & Bates). "Don't let the Moon break you Heart" is an insightful chapter of Dr. Carolyn Mamchur's book which recounts her ESFP daughter's disastrous sophomore English experience. Although the girl was an avid reader and wrote poetry, she was unable to relate to the approach her non-SP English teacher was using. The failing grades she received eventually caused her to adopt W.C Fields' attitude

" If at first you don't succeed, give up!
Why make a damn fool of yourself?"

Having an ESFP daughter, as Dr. Mamchur does, and having been made aware of the individual differences in the learning styles of average and above average students, this researcher zealously endorses individualized instruction.

The absence of SP teachers may account for the accelerated dropout rate for this personality group. These students are a delight to their primary teachers because of their enthusiasm. As the curriculum becomes more structured, the students who are not as academically capable fall through the cracks of the system. Individualized instruction might provide enough of the success that is needed to lower the dropout rate. Figure 4.5 displays the scores reported by the reading comprehension objectives earlier in this chapter.

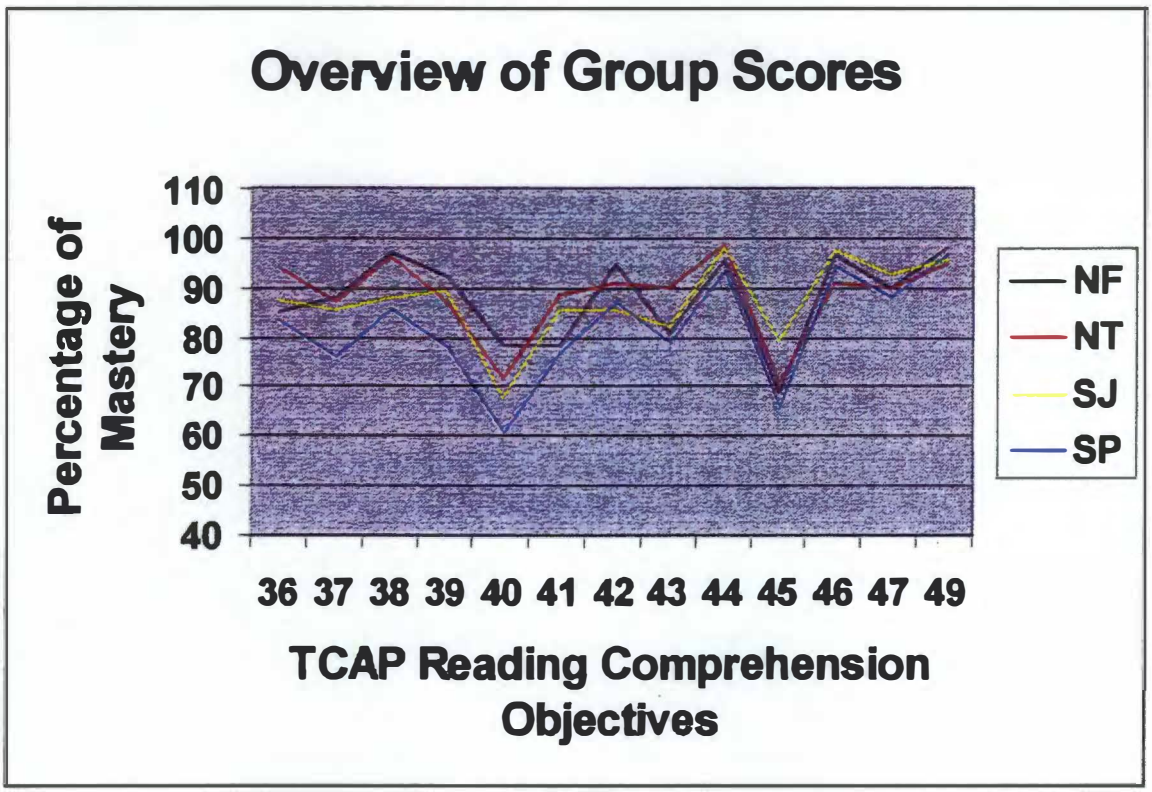
## SUMMARY

Despite comparable abilities and academic performance, this study has shown that reading comprehension skill mastery is not consistent among the personality groups or even within the groups. While there is some consistency of mastery of certain objectives, this is

not predictable. There are some parallels showing patterns of hemisphericity, and still other patterns showing support for the processing theories.

In order to eliminate the variables of motivation and of ability it was necessary to utilize the availability of a homogeneous population. While it was understood that the range of scores would not be as diversified and differences may not be recognized in more readily mastered objectives, it was expected that significant differences would exist. For seven of the thirteen objectives a significant difference was found; ANOVA scores confirmed a pattern of mastery for five of these. For the remaining six objectives test scores were unable to confirm a significant difference among the personality groups.

This study establishes the existence of differences and it is believed that a heterogeneous study will be more revealing in the attempt to discover patterns of mastery that are suggested in the brain based literature. It is believed that once the patterns have been established, multiple methods of presentation may be developed which will enable more students to master essential reading comprehension objectives. The information, which has been presented in numerical tables earlier in this chapter, is displayed in Figure 4.6.




36. Recognizing Multiple Meanings of Words
37. Using Context Clues
38. Recognizing Propaganda Techniques
39. Identifying Main Idea
40. Sequencing Events
41. Making Inferences and Drawing Conclusions
42. Identifying Cause and Effect Relationships
43. Identifying Fact and Opinion
44. Identifying Details
45. Identifying Author's Purpose
46. Interpreting Figurative Language
47. Recognizing the Author's Point of View
49. Following Written or Graphic Directions

**Figure 4.6 Overview of Group Scores**

# CHAPTER 5

# SUMMARY, CONCLUSIONS, DISCUSSION AND IMPLICATIONS

## SUMMARY

The purpose of this study was to ascertain the validity of the theoretical concept that affective learning style, as determined by the Myers-Briggs Type Indicator (MBTI), would reveal natural proclivities for mastery of reading comprehension skills as measured by the Tennessee Comprehensive Assessment Plan (TCAP).

## RESEARCH PROCEDURES

This quantitative study involved a population of 400 college bound secondary students. Because only students identified as college bound by the guidance counselors were involved in the research, it was possible to assume that motivation and innate ability were not factors that would drastically affect their performance on standardized tests. Each member of this population had previously taken the MBTI and had passed the Language Arts section of the TCAP. The information was obtained according to the guidelines of Human Subjects Form A wherein all data was appropriately paired and purged of any identifying information. The data was analyzed through Chi-Square Goodness of Fit, Multivariate tests for redundancy, Post Hoc tests, and ANOVA tests to obtain the results that have been presented and discussed in this chapter. This discussion includes the effect of the limitations, as well as the implications for instruction and for future research.

## SUMMARY OF RESULTS OF NULL HYPOTHESIS

Null Hypothesis: There is no significant difference between the TCAP Sub-test scores of any of the affective learning styles as determined by the personality scores of the MBTI.

| | |
|---|---|
| Objective 36: Recognizing Multiple Meanings of Words | $H_O$ Supported |
| Objective 37: Using Context Clues | $H_O$ Not Supported |
| Objective 38: Recognizing Propaganda Techniques | $H_O$ Not Supported |
| Objective 39: Identifying Main Idea | $H_O$ Not Supported |
| Objective 40: Sequencing Events | $H_O$ Not Supported |
| Objective 41: Making Inferences and Drawing Conclusions | $H_O$ Supported |
| Objective 42: Identifying Cause and Effect | $H_O$ Supported |
| Objective 43: Identifying Fact and Opinion | $H_O$ Supported |
| Objective 44: Identifying Details | $H_O$ Supported |
| Objective 45: Identifying Author's Purpose | $H_O$ Not Supported |
| Objective 46: Interpreting Figurative Language | $H_O$ Supported |
| Objective 47: Recognizing Author's Point of View | $H_O$ Supported |
| Objective 49: Following Written and Graphic Directions | $H_O$ Supported |

## CONCLUSIONS AND DISCUSSION

In conclusion, it has been shown that the unique combinations of personalities are not restricted to preferences for particular kinds of reading, or for particular interpretations of reading. Previous research has established that thinking (T)

personalities prefer to study novels from sociological perspectives –examining economic issues that are the result of world politics and commerce. Feeling (F) personalities prefer to identify the human issues which include, but are not limited to values and the quest for happiness. Other studies have shown that Sensing (S) personalities prefer to read and to accept their personal interpretations as the definitive one. Intuitive (N) personalities are much more likely to incorporate previous knowledge of the historical period, psychological interpretations, the author's life and personality into their interpretations of the novel. The premise of this body of research was that this is not the result of coincidence, but the result of brain function and processing.

While it is certainly true that people do have choices and that they can choose to function in what has been defined as other quadrants, there is a biological preference for a particular one. There is no question that good readers are interactive readers and are fully capable of functioning in all four quadrants. College bound students, in particular, have learned to develop skills, which they may not enjoy, in order to meet college admission criteria and to satisfy graduation requirements.

## LIMITATIONS OF THE STUDY

This study has been plagued by a particular limitation. While the primary goal of this research was to show a relationship between personality or affective learning style, and reading comprehension skill mastery, it seems that this was a study where personality effects were unlikely to manifest themselves. The most serious limitation of this study was the homogeneous population. The lack of diversity is student ability and achievement may be the cause of less definitive results. The preponderance of this

population is 11th and 12th graders, plus the honors 10th grade English class. Students who cannot read the text and other required readings do not remain in the college bound program. They cannot pass the required foreign language classes if they are not able to first function in their primary language. The fact that each of the four hundred students had passed the Language Arts section of the proficiency test further reinforces the position that a limited range was most probable. For this reason statistical validity of the 0.10 level was considered in addition to the educational standard of 0.05. In some instances, as noted in the previous chapter, a significant difference was found, but in most cases, the relaxed standard did not. It is unlikely that a homogeneous population will show very much diversity in the area of their homogeneousness.

Regardless of the population, definite patterns were detected for seven of the 13 objectives and confirmed at the preferred .05 level for five of them. The theories of hemisphericity, processing and function established patterns of mastery for five of the seven objectives that showed a significant multivariate pattern.

It was possible that the hemisphericity theory did indeed predispose left-brained personalities (NT and SJ) to greater success in the following objectives:

Objective 41: Making Inferences and Drawing Conclusions

Objective 45: Identifying the Author's Purpose

This is quite probable based upon the tendency to order and organize information that is attributed to left-brained people, especially for Objective 41. Processing theories might presuppose that ability to infer and to read between the lines would be dominated by the Intuitive personalities. Ultimately the ANOVA scores showed that the numbers were not sufficient to confirm that left-brained students did not dominate Objective 41 mastery.

It had been previously assumed that mastery of Objective 45 had to be dominated by the abstract thinking Intuitives, thereby supporting the processing theory. The statistics indicated otherwise. Within this population students identified as left brained significantly showed greater mastery than the right-brained students.

Studies showing that Intuitives (N's) are ludic readers (*i.e.* those who read for pleasure) evidenced by the fact that they not only read more books, but also select a wider variety of genres and subject matter. This suggests that the processing theories, which claim that bottom-up processors or inductive thinkers, would prove to be the most proficient readers. Preliminary statistical procedures indicated that this might be true for the following objectives:

Objective 37. Using Context Clues

Objective 38. Recognizing Propaganda Techniques

Objective 40. Sequencing Events

Objective 44. Identifying Details

Intuitives definitely showed greater mastery in utilizing contextual clues to ascertain meaning.

It was not surprising that the Intuitives (NF and NT) had greater mastery of Objective 37. The inductive process of assimilating information to reach a conclusion is a process that seems to be indigenous to Intuitives. Sensing personalities (SJ and SP), seem to have little difficulty mastering this skill as 335 of the 400 students within this population demonstrated mastery at the 75% level. It is significant that only 21 of the 65 who failed to demonstrate mastery were N's; 44 of the 65 were S's. N's seem to have less difficulty looking for clues to build a bigger concept.

The natural curiosity of the N's who ask "what if" and look for subtle messages and undertones makes this objective a natural domain for the Intuitive personalities. Objective 38, Recognizing Propaganda Techniques, was shown by the ANOVA statistics to be more frequently mastered by the Intuitive students. Although 364 of the population of 400 students mastered this objective, it is significant that only 6 of these 36 who failed to demonstrate mastery were N's while the S's had 30 of the 36. It seems that this population of 400 college bound students included more N's who were able to recognize propaganda techniques than S's. The deductive nature of the S's predisposes them to accept what is rather than questions or read as critically as N's seem to do.

Objective 40, Sequencing Events, was presupposed to be a left brained skill owing to the hemisphericity theories that left brained people have a natural ability to organize. The statistics simply did not substantiate this, but instead showed that only one of the left-brained personalities, NT's, showed mastery. The Multivariate tests showed a stronger mastery pattern for the Intuitives and this was confirmed by the ANOVA that was calculated for that purpose. Not only were the N's more adept at mastering this skill, the hemisphericity theory is not substantiated as the NF's had a greater percentage of mastery than the NT's by 6.7%.

The final objective investigated for inductive-deductive mastery pattern was the most frequently mastered Objective 44, Identifying Details. Only 15 of the 400 students failed to master this objective. Two thirds of those who failed to show mastery, or 10 students, were S's, while the remaining five (5) were N's. Because the identification of details is one of the earliest reading comprehension skills addressed, it is not surprising that this was the most frequently mastered objective. It is interesting to note that eight (8)

of the 15 students who failed to demonstrate mastery were SP's, the personality group that becomes bored with details. Although the multivariate analysis revealed a possibility of N mastery, the ANOVA tests failed to confirm this and the Null Hypothesis was supported by this objective.

The final category of explanation has appeared in the literature more recently and does not yet have an abundance of studies to support its existence. Keirsey (1998) maintains that the appropriate personality pairing should be based upon preferred function rather than processing or hemisphericity. The theory maintains that the SJ and NF groups are cooperatives, meaning that they try to fit into existing situations. SJ's do this, as a means of satisfying needs for structure and closure. The strong sense of "shoulds," "musts," and "oughts," gives them a need for a standard operating procedure, a structure, a set of expectations. NF's do essentially the same thing, but for different reasons. NF's do not like conflict. Their need for harmony, their sensitivity to criticism and their empathy for the injured feelings of others makes them the natural arbitrators and peacemakers. Both cooperate to the greatest degree possible. The second personality pairing consists of NT's and SP's. These are called the Utilitarians. These personalities are more concerned with what works or what enabled them to achieve their goals. Instead of cooperating with the existing social structure, they view the existing structures in terms of how they can be useful to them. For the SP's things must be immediately and concretely useful while NT's are more concerned about the effectiveness of the systems or methods they employ. For this population the Cooperatives significantly outscored the Utilitarians. The basic percentages were 92.4% and 89.3% for NF's and SJ's, respectively. Main Idea is a reading comprehension concept that is taught very early in

the reading curriculum. For a significant difference to be apparent for a particular pair of personality groups based upon function an explanation, which is not readily apparent, seems to be required. Considering the nature of the two groups, it may be that the cooperatives are more motivated to comply with the expectations of their teachers while the Utilitarians are more apt to dismiss the learning experience as an exercise in futility. For SP's the frustration of wrong answers is inefficient; for NT's who tend to read too much into what is printed, the frustration is an ineffective. Unlike the processing and the hemisphericity theories, which are biologically based, this concept offers no anatomical explanation and is therefore subject to conjecture.

Despite the homogeneous population, significant differences were suspected in seven of the objectives and confirmed in five of them. There is every reason to believe that a more inclusive study which included those students who have not achieved as much may demonstrate a pattern which could enable educators to anticipate and modify instruction to enable these students greater reading comprehension skill mastery and greater literacy.

## INSTRUCTIONAL IMPLICATIONS

If students learn differently because their brains process information differently there are two prevalent theories about what should be done to enable students to enjoy the academic success that cannot be achieved with out the essential basic reading skills. As discussed in Chapter 2, some theorists believe that students should be taught as they prefer to learn (Golay). Other theorists believe that in order to develop the capacities of the whole brain, students should be taught in the opposite manner (Gregorc, 1984). That

is to say that a student whose natural preference is right-brained and deductive should be taught in the manner preferred by left-brained and inductive students. The number of at risk students who are attempting to complete the required remedial reading courses should verify the folly of these pre-existing methods. There can be no argument that successful readers are interactive readers; that is, they are capable of shifting into each quadrant when necessary. Students who lack this mental flexibility have difficulty comprehending as well as their peers. Students who are not encouraged to function in all quadrants can not be expected to develop this flexibility.

Dividing the class into four groups and teaching specifically to each group can seriously handicap this critical development. From a practical standpoint, these groups would not be equal in size. Even if the Intuitive (N's) are grouped, they are going to be fewer in number than each of the Sensing (S) groups. Not only does this practice lead to labeling, pigeonholing, and stereotyping, but the combined N's would not be receiving precisely what they needed. The larger S groups, including the lower achieving SP groups, would receive less individualized instruction. The inequity of this solution should dismiss it from any further consideration. Likewise, students who are forced to function in their least dominant quadrant will find learning to read a source of frustration. Many will read to obtain information, but are less likely to become ludic readers after associating a feeling of disappointment with the reading experience. Reading should be an interdisciplinary experience in both content and methods. It has been established that the exclusive use of [see-Spot-run] basal readers does not produce the mental flexibility that is necessary for success in reading. The idea of forcing students to function in their

least preferred function would not only generate the inequitable previously described groups, but could also negate the entire reading experience.

Reading which includes a variety of content and presentations encourages students to interact differently with different texts. Group instruction, which addresses each quadrant, can subtly encourage mental flexibility and enable each member of the group to enjoy a positive learning experience. Lest this concept be dismissed as equally impractical, a brief description is included. Utilizing the Tennessee Instructional Model (TIMS), this format can be easily implemented. The SET portion of the lesson, which introduces the objectives of the lesson and is designed to engage the students in the learning process, is the optimum time to hook the most difficult students.

Top-down processing

| | |
|---|---|
| SJ Sensing-Judging | SP Sensing-Perceiving |
| NT Intuitive-Thinking | NF Intuitive-Feeling |

Bottom-up processing

SJ's will generally cooperative with the lesson and attempt to comply with the expectations of the teacher. They have a strong need for a sense of structure. NF's will cooperate either to fit in or to avoid being corrected. As they mature NF's will cooperate because they don't want to hurt the teacher's feelings. The Utilitarian personalities do not have the same need to cooperate. They may acquiesce because they are motivated to earn good grades, but in order to insure that they will engage with the text it is advisable to provide them with a reason to do so. NT's will be most motivated if they think that they may learn something that will be useful at some time in their lives. The competitive

SP's will aggressively plunge into a lesson if they think that it will be fun, or that there will be some competition where this information will provide success. It is important to hook these two groups first because the cooperatives will follow their lead. Reading lessons which allow SP's to role play, while providing SJ's with a sense of structure, and giving the NF's an opportunity to discuss other possible motivations and even permit the NT's to present a rebuttal are the quintessential "something for everyone lesson". Teachers who work to design such lessons must be aware that everything can get old. Not every lesson must be structured with these objectives, but lessons that encourage the students to engage with the text produce more capable and more ludic readers.

## IMPLICATIONS FOR FURTHER RESEARCH

Because a study of this type is quite rare, the possibilities for research and subsequent theoretical development are currently open-ended. The following questions are among those that hold promise for further study.

> Would a duplicate study involving a heterogeneous population yield more definitive results? Would a population, which was exclusively college bound, be less likely to show definitive patterns of cerebral processing than an all-inclusive population?
>
> Would a duplicate study restricted to an at-risk college population show a definite pattern of mastery and non-mastery? This population would have demonstrated the motivation to attend college, despite the fact that they must first take remedial reading classes, but definitely have a lack of reading comprehension skills.
>
> What type of patterns would a study of intermediate school students yield? The MBTI for Children would make it possible to study a younger population and to compare the patterns of mastery and non-mastery by personality type. Some inferential reading comprehension skills would not be assessed for the younger population, but many of the skills would be the same.

Would a longitudinal study that compares the results of the students who were studied at the intermediate level with their performance at the secondary level evidence definite patterns in skill mastery over time?

Would a longitudinal study reveal a need for early intervention that would produce better test scores by the time these students reach the secondary level of testing?

Does brain based education negate the implications of a critical period for reading comprehension skills? Could instruction based upon the learning style preferences of the individual enable them to acquire comparable skills despite the fact that they have passed the critical period for doing so?

Would instruction based upon personality at the primary level eliminate the need for remedial programs in later years?

Do systems of reading instruction in the English language currently exist [in other cultures, other countries] which have been designated to facilitate instruction based upon affective learning style preferences? If so, what practices and materials are used?

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# APPENDIXES

# Appendix A

| SOURCE | NF | NT | SJ | SP |
|---|---|---|---|---|
| Myers-Briggs Type Indicator (MBTI) | ENFJ, ENFP INFJ, INFP | ENTJ, ENTP INTJ, INTP | ESTJ, ESFJ ISTJ, ISFJ | ESTP, ESFP ISTP, ISFP |
| True Colors (True Colors) | BLUE | GREEN | GOLD | ORANGE |
| NCTI Color Matrixx (NCTI Color Matrix) | TRUE BLUE FEELING INDUCTIVE RIGHT-BRAIN | CURIOUS GREEN THOUGHT INDUCTIVE LEFT-BRAIN | SOLID GOLD JUDGMENTAL DEDUCTIVE LEFT-BRAIN | ACTION ORANGE PERCEPTIVE DEDUCTIVE RIGHT-BRAIN |
| Mythology (Keirsey & Bates, Keirsey) | APOLLO SOUL | PROMETHEUS SCIENCE KNOWLEDGE | EPIMETHIUS DUTY | DIONYSUS JOY |
| Hippocrates (Keirsey & Bates, Keirsey) | CHOLERIC | PHLEGMATIC | MELANCHOLY | SANGUINE |
| Claudius Galen (Jung, Keirsey & Bates, Keirsey) | HEA RT | KIDNEYS | LUNGS | LIVER |
| Plato's social roles (Keirsey) | NOETIC IDEALIST | DIANOETIC RATIONAL | PISTIC GUARDIAN | ICONIC ARTISAN |
| Aristotle's terms of happiness (Keirsey) | ETHIKOS MORAL VIRTUE | DIALOGIKE LOGICAL INVESTIGATION | PROPRAIETARI ASSET ACQUISITION | HEDONE SENSUAL PLEASURE |
| Swiss physician 16th Century (Michael) | FIRE | WATER | EARTH | AIR |

| Paracelsus (Keirsey & Bates, Keirsey) | NYMPHS INSPIRED AND PASSIONATE | SYLPHS CURIOUS AND CALM | GNOMES INDUSTRIOUS AND GUARDED | SALAMANDERS IMPLUSIVE AND CHANGEABLE |
|---|---|---|---|---|
| American plains Indians (Hirsch) | WEST WIND INTROSPECTION | EAST WIND IMAGINATION | SOUTH WIND WISDOM | NORTH WIND INNOCENCE |
| European Renaissance (Bolt) | SUMMER | AUTUMN | WINTER | SPRING |
| Adickes (Keirsey & Bates, Keirsey) | DOGMATIC | AGNOSTIC | TRADITIONAL | INNOVATIVE |
| Dreikurs' mistaken goals (Keirsey & Bates, Keirsey) | RECOGNITION | POWER | SERVICE | REVENGE |
| Spranger's Value Attitudes | RELIGIOUS ETHICS | THEORETICAL SCIENCE | ECONOMIC COMMERCE | AESTHETIC ARTISTRY |
| Kretchner's Body Build (Keirsey & Bates, Keirsey) | HYPERESTHETIC THUS: TOO SENSITIVE | ANESTHETIC THUS: TOO INSENSITIVE | MELANCHOLIC THUS: TOO SERIOUS | HYPOMANIC THUS: TOO EXCITABLE |
| Fromm's Orientations (Keirsey) | RECEPTIVE | MARKETING | HOARDING | EXPLOITATIVE |
| Psychological theory (Golay, Keirsey & Bates, Keirsey) | MASLOW/ ROGERS SELF-ACTUALIZATION | ADLER KNOWLEDGE IS POWER COMPETENCE | SULLIVAN SECURITY SOCIAL SOLIDARITY | FREUD PLEASURE EROS DRIVE |

| Christian movements (Michael & Norrisey) | AUGUSTINIAN | THOMISTIC | IGNATION | FRANCISCAN |
|---|---|---|---|---|
| Gospel preference (Michael & Norrisey) | ST. LUKE | ST. JOHN | ST. MATTHEW | ST. MARK |
| Golay (Golay) | DOLPHIN<br>CONCEPTUAL<br>GLOBAL | OWL<br>CONCEPTUAL<br>SPECIFIC | BEAR<br>ACTUAL<br>ROUTINIZED | APE<br>ACTUAL<br>SPONTANEOUS |
| Gregorc Style Delineator (Roebeck & Wallace) | ABSTRACT<br>RANDOM | ABSTRACT<br>SEQUENTIAL | CONCRETE<br>SEQUENTIAL | CONCRETE<br>RANDOM |
| Keirsey-Bates (Keirsey & Bates) | IDEALIST<br>ABSTRACT<br>MORALITY | RATIONAL<br>ABSTRACT<br>PRAGMATICS | GUARDIAN<br>CONCRETE<br>MORALITY | ARTISAN<br>CONCRETE<br>PRAGMATIST |
| Keirsey (Keirsey) | COOPERATIVE | UTILITARIAN | COOPERATIVE | UTILITARIAN |
| Performax (DISC) (True colors) | INFLUENCING<br>I | COMPLIANCE<br>C | STEADINESS<br>S | DOMINANCE<br>D |
| KOLB (True Colors) | DIVERGER | ASSIMILATOR | CONVERGER | ACCOMODATOR |
| Bud Grant (McGrane) | Players who overrun the newly seeded grass immediately back up and go around | Players who overrun the newly seeded grass Stop and evaluate how they can get out and do the least damage | Players do not overrun the newly seeded grass; they make a point of going around the area | Players are oblivious to the warning and overrun it consistently |

# APPENDIX B

## STATISTICAL TABLES OF

## CHAPTER 4

## ANALYSIS OF READING COMPREHENSION ASSESSMENT PLAN OBJECTIVES

# TABLE 4.3
## Type Distribution of Participants
Mastery of all Objectives

The Sixteen Complete Types

| **ISTJ** | **ISFJ** | **INFJ** | **INTJ** |
|---|---|---|---|
| n = 12 | n = 5 | n = 2 | n = 4 |
| 57 % | 31.25 % | 15 % | 33.3 % |
| **ISTP** | **ISFP** | **INFP** | **INTP** |
| n = 5 | n = 2 | n = 10 | n = 7 |
| 31.25 % | 11.76 % | 31.25 % | 31.8 % |
| **ESTP** | **ESFP** | **ENFP** | **ENTP** |
| N = 10 | n = 5 | n = 12 | n = 10 |
| 27.8 % | 10.41 % | 34.28 % | 23.25 % |
| **ESTJ** | **ESFJ** | **ENFJ** | **ENTJ** |
| n = 14 | n = 11 | n = 4 | n = 9 |
| 31.8 % | 35.48 % | 30.76 % | 37.5 % |

Dichotomous Preferences

| | n | % |
|---|---|---|
| **E** | 75 | 25.4 |
| **I** | 47 | 32.4 |
| **S** | 64 | 27.9 |
| **N** | 58 | 33.9 |
| **T** | 71 | 36.4 |
| **F** | 51 | 4.9 |
| **J** | 61 | 37.8 |
| **P** | 61 | 25.5 |

Pairs and Temperaments

| | n | % |
|---|---|---|
| **IJ** | 23 | 39.6 |
| **IP** | 24 | 27.6 |
| **EP** | 37 | 29 |
| **EJ** | 38 | 29.7 |
| **ST** | 41 | 35 |
| **SF** | 23 | 20.5 |
| **NF** | **28** | **30** |
| **NT** | **30** | **38.5** |
| **SJ** | **42** | **37.5** |
| **SP** | **22** | **18** |
| **NP** | 39 | 31.9 |
| **NJ** | 19 | 38.7 |

| | n | % |
|---|---|---|
| **TJ** | 39 | 44.3 |
| **TP** | 32 | 30 |
| **FP** | 29 | 22 |
| **FJ** | 22 | 30 |
| **IN** | 23 | 30.6 |
| **EN** | 35 | 36.5 |
| **IS** | 24 | 34.2 |
| **ES** | 40 | 25 |
| **ET** | 43 | 33.6 |
| **EF** | 32 | 25.2 |
| **IF** | 19 | 24.4 |
| **IT** | 28 | 42 |

**Jungian Types (E)**

| | n | % |
|---|---|---|
| E-TJ | 23 | 39 |
| E-FJ | 15 | 34 |
| ES-P | 15 | 18 |
| EN-P | 22 | 32 |

**Jungian Types (I)**

| | n | % |
|---|---|---|
| I-TP | 12 | 32 |
| I-FP | 12 | 24.5 |
| IS-J | 17 | 46 |
| IN-J | 6 | 28.6 |

**Dominant Types**

| | n | % |
|---|---|---|
| Dt. T | 35 | 33.6 |
| Dt. F | 27 | 25.2 |
| Dt. S | 32 | 24.4 |
| Dt. N | 28 | 42 |

n: reflects the number of participants who demonstrated mastery of this objective
%: indicates the percent of that particular sub-population who demonstrated mastery

**E** Extrovert **S** Sensing **T** Thinking **J** Judging
**I** Introvert **N** Intuitive **F** Feeling **P** Perceiving

# TABLE 4.4

## Chi Square Goodness of Fit

Mastery of all Objectives

| | Mastery | Non Mastery | |
|---|---|---|---|
| NF | 28 | 65 | 93 |
| NT | 30 | 48 | 78 |
| SJ | 42 | 70 | 112 |
| SP | 22 | 95 | 117 |
| | 102 | 278 | 400 |

df = 3 $X^2 = 18.098$

Because $X^2 = 18.09 > 7.851$, 11.345, and 16.266;
$H_O$ is rejected at the 0.05 , 0.01 and .001 levels, respectively.

Hemisphericity

| | Mastery | Non-Mastery | |
|---|---|---|---|
| Left brain | 72 | 118 | 190 |
| Right brain | 50 | 160 | 229 |
| | 122 | 278 | 400 |

df = 1 $X^2 = 9.336$

Because $X^2 = 9.336 > 3.841$ and 6.635; $H_O$ is not accepted at the 0.05 and 0.01 levels, respectively

Processing Style

| | Mastery | Non-Mastery | |
|---|---|---|---|
| Intuitive | 64 | 165 | 171 |
| Sensing | 58 | 113 | 229 |
| | 122 | 278 | 400 |

df = 1 $X^2 = 3.46$

Because $X^2 = 3.46 < 3.841$; $H_O$ is accepted at the 0.05 level
Because $X^2 = 3.46 > 2.706$; $H_O$ is not accepted at the 0.10 level

# TABLE 4.5
## Type Distribution of Participants
### Objective 36: Recognizing Multiple Meanings of Words

The Sixteen Complete Types

| | | | |
|---|---|---|---|
| **ISTJ** | **ISFJ** | **INFJ** | **INTJ** |
| n=18 | n=16 | n=9 | n=8 |
| 85.7 % | 100 % | 69.2 % | 100 % |
| **ISTP** | **ISFP** | **INFP** | **INTP** |
| n=11 | n=1 | n=26 | n=20 |
| 68.75 % | 94 % | 81.3 % | 90.9 % |
| **ESTP** | **ESFP** | **ENFP** | **ENTP** |
| n=28 | n=42 | n=33 | n=30 |
| 77.8 % | 87.5 % | 94.3 % | 90.9 % |
| **ESTJ** | **ESFJ** | **ENFJ** | **ENTJ** |
| n=40 | n=24 | n=11 | n=15 |
| 90.9 % | 77.4 % | 84.6 % | 100 % |

Dichotomous Preferences

| | n | % |
|---|---|---|
| **E** | 223 | 87.5 |
| **I** | 124 | 85.5 |
| **S** | 195 | 85 |
| **N** | 152 | 88.9 |
| **T** | 170 | 87 |
| **F** | 177 | 86 |
| **J** | 141 | 87.5 |
| **P** | 206 | 86 |

Pairs and Temperaments

| | n | % |
|---|---|---|
| **IJ** | 51 | 88 |
| **IP** | 73 | 84 |
| **EP** | 108 | 85 |
| **EJ** | 115 | 89.8 |
| **ST** | 97 | 83 |
| **SF** | 98 | 87.5 |
| **NF** | **79** | **85** |
| **NT** | **73** | **93.6** |
| **SJ** | **98** | **87.5** |
| **SP** | **97** | **83** |
| **NP** | 107 | 87.7 |
| **NJ** | 45 | 92 |

| | n | % |
|---|---|---|
| **TJ** | 81 | 92 |
| **TP** | 89 | 83 |
| **FP** | 115 | 87 |
| **FJ** | 62 | 85 |
| **IN** | 63 | 84 |
| **EN** | 89 | 93 |
| **IS** | 61 | 87 |
| **ES** | 134 | 84 |
| **ET** | 113 | 88 |
| **EF** | 110 | 87 |
| **IF** | 67 | 86 |
| **IT** | 57 | 85 |

**Jungian Types (E)**

| | n | % |
|---|---|---|
| E-TJ | 55 | 93 |
| E-FJ | 35 | 80 |
| ES-P | 70 | 83 |
| EN-P | 63 | 93 |

**Jungian Types (I)**

| | n | % |
|---|---|---|
| I-TP | 31 | 82 |
| I-FP | 42 | 86 |
| IS-J | 34 | 92 |
| IN-J | 17 | 81 |

**Dominant Types**

| | n | % |
|---|---|---|
| Dt. T | 86 | 89 |
| Dt. F | 77 | 83 |
| Dt. S | 104 | 86 |
| Dt. N | 80 | 90 |

n: reflects the number of participants who demonstrated mastery of this objective
%: indicates the percent of that particular sub-population who demonstrated mastery

**E** Extrovert **S** Sensing **T** Thinking **J** Judging
**I** Introvert **N** Intuitive **F** Feeling **P** Perceiving

# TABLE 4.6

Chi Square Goodness of Fit

Objective 36: Recognizing Multiple Meanings of Words

| | Mastery | Non Mastery | |
|---|---|---|---|
| NF | 79 | 14 | 93 |
| NT | 73 | 5 | 78 |
| SJ | 98 | 14 | 112 |
| SP | 97 | 20 | 117 |
| | 347 | 53 | 400 |

df = 3 $X^2 = 4.67$

Because $X^2 = 4.67 < 7.85$ and 6.251; $H_O$ is accepted at the 0.05 and 0.10 levels

Hemisphericity

| | Mastery | Non-Mastery | |
|---|---|---|---|
| Left Brain | 171 | 19 | 190 |
| Right Brain | 176 | 34 | 210 |
| | 347 | 53 | 400 |

df = 1 $X^2 = 3.32$

Because $X^2 = 3.32 < 3.841$; $H_O$ is accepted at the 0.05 level. However, since $X^2$ at the 0.10 level is 2.706> 3.32; $H_O$ is not accepted at the 0.10 level.

Processing Style

| | Mastery | Non-Mastery | |
|---|---|---|---|
| Intuitive | 152 | 19 | 171 |
| Sensing | 195 | 34 | 229 |
| | 347 | 53 | 400 |
| | | | |

Df = 1 $X^2 = 1.89$

Because $X^2 = 1.89 < 3.841$ and 2.706; $H_O$ is accepted at the 0.05 and 0.10 level, respectively

TABLE 4.7

## Post Hoc Tests
## GROUP
## Homogeneous Subsets

**OBJ36**

Tukey HSD[a,b,c]

| | | Subset |
|---|---|---|
| GROUP | N | 1 |
| SP | 117 | .8291 |
| NF | 93 | .8387 |
| SJ | 112 | .8750 |
| NT | 78 | .9359 |
| Sig. | | .127 |

Means for groups in homogeneous subsets are displayed.
Based on Type III Sum of Squares
The error term is Mean Square(Error) = .116.

a. Uses Harmonic Mean Sample Size = 97.445.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

# TABLE 4.8
## Type Distribution of Participants
### Objective 37: Using Context Clues

The Sixteen Complete Types

| ISTJ | ISFJ | INFJ | INTJ |
|---|---|---|---|
| n= 17 | n=13 | n=11 | n=7 |
| 81 % | 81.25 % | 85 % | 87.5 % |
| **ISTP** | **ISFP** | **INFP** | **INTP** |
| n=15 | n=12 | n=26 | n=20 |
| 94 % | 70.6 % | 81.25 % | 90.9 % |
| **ESTP** | **ESFP** | **ENFP** | **ENTP** |
| n=31 | n=31 | n=32 | n=28 |
| 86 % | 64.6 % | 91.42 % | 84.8 % |
| **ESTJ** | **ESFJ** | **ENFJ** | **ENTJ** |
| n=40 | n=26 | n=13 | n=13 |
| 90.9% | 83.87 % | 100 % | 86.67 % |

Dichotomous Preferences

| | n | % |
|---|---|---|
| **E** | 214 | 83.92 |
| **I** | 121 | 83.45 |
| **S** | 185 | 80.79 |
| **N** | 150 | 87.72 |
| **T** | 171 | 87.70 |
| **F** | 142 | 69.20 |
| **J** | 140 | 86.95 |
| **P** | 195 | 81.58 |

Pairs and Temperaments

| | n | % |
|---|---|---|
| **IJ** | 48 | 82.76 |
| **IP** | 73 | 83.90 |
| **EP** | 97 | 76.38 |
| **EJ** | 117 | 91.41 |
| **ST** | 113 | 97 |
| **SF** | 82 | 73 |
| **NF** | **82** | **88** |
| **NT** | **68** | **87** |
| **SJ** | **96** | **85.7** |
| **SP** | **89** | **76** |
| **NP** | 106 | 87 |
| **NJ** | 44 | 90 |

| | n | % |
|---|---|---|
| **TJ** | 77 | 87.5 |
| **TP** | 93 | 87.5 |
| **FP** | 101 | 76.5 |
| **FJ** | 63 | 86.5 |
| **IN** | 64 | 85 |
| **EN** | 86 | 89.5 |
| **IS** | 57 | 81.4 |
| **ES** | 128 | 80.5 |
| **ET** | 112 | 87.5 |
| **EF** | 102 | 80.3 |
| **IF** | 62 | 79.48 |
| **IT** | 58 | 88 |

**Jungian Types (E)**

| | n | % |
|---|---|---|
| E-TJ | 53 | 90 |
| E-FJ | 39 | 89 |
| ES-P | 62 | 74 |
| EN-P | 60 | 88 |

**Jungian Types (I)**

| | n | % |
|---|---|---|
| I-TP | 35 | 92 |
| I-FP | 38 | 78 |
| IS-J | 30 | 81 |
| IN-J | 18 | 86 |

**Dominant Types**

| | n | % |
|---|---|---|
| Dt. T | 88 | 91 |
| Dt. F | 77 | 83 |
| Dt. S | 92 | 76 |
| Dt. N | 78 | 88 |

n: reflects the number of participants who demonstrated mastery of this objective
%: indicates the percent of that particular sub-population who demonstrated mastery

**E** Extrovert **S** Sensing **T** Thinking **J** Judging
**I** Introvert **N** Intuitive **F** Feeling **P** Perceiving

# TABLE 4.9

## Chi Square Goodness of Fit

Objective 37: Using Context Clues

| | Mastery | Non-Mastery | |
|---|---|---|---|
| NF | 82 | 11 | 93 |
| NT | 68 | 10 | 78 |
| SJ | 96 | 16 | 112 |
| SP | 89 | 28 | 117 |
| | 335 | 65 | 400 |

df = 3 $X^2 = 6.13$

Because $X^2 = 6.13 < 7.85$ and 6.251; $H_O$ is accepted at both the 0.05 and 0.10 levels

Hemisphericity

| | Mastery | Non-Mastery | |
|---|---|---|---|
| Left- | 164 | 26 | 190 |
| Sensing | 171 | 39 | 229 |
| | 335 | 65 | 400 |

df = 1 $X^2 = 1.76$

Because $X^2 = 1.76 < 3.841$ and 2.706; $H_O$ is accepted at the 0.05 and 0.10 levels, respectively

Processing Style

| | Mastery | Non-Mastery | |
|---|---|---|---|
| Intuitive | 150 | 21 | 171 |
| Sensing | 185 | 44 | 229 |
| | 335 | 65 | 400 |

df = 1 $X^2 = 3.46$

Because $X^2 = 3.46 < 3.841$; $H_O$ is accepted at the 0.05 level

Because $X^2 = 3.46 > 2.706$; $H_O$ is not accepted at the 0.10 level

TABLE 4.10

## Post Hoc Tests
## GROUP
## Homogeneous Subsets

**OBJ37**

Tukey HSD[a,b,c]

| GROUP | N | Subset 1 |
|---|---|---|
| SP | 117 | .7607 |
| SJ | 112 | .8571 |
| NT | 78 | .8718 |
| NF | 93 | .8817 |
| Sig. | | .098 |

Means for groups in homogeneous subsets are displayed.
Based on Type III Sum of Squares
The error term is Mean Square(Error) = .135.

a. Uses Harmonic Mean Sample Size = 97.445.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| OBJ37 | Between Groups | .471 | 1 | .471 | 3.471 | .063 |
| | Within Groups | 53.967 | 398 | .136 | | |
| | Total | 54.438 | 399 | | | |

# TABLE 4.11

## Type Distribution of Participants

Objective 38: Recognizing Propaganda Techniques

The Sixteen Complete Types

| | | | |
|---|---|---|---|
| **ISTJ** | **ISFJ** | **INFJ** | **INTJ** |
| n=18 | n=15 | n=12 | n=8 |
| 85.7 % | 93.75 % | 92.31 % | 100 % |
| **ISTP** | **ISFP** | **INFP** | **INTP** |
| n=16 | n=14 | n=31 | n=21 |
| 100 % | 82.35 % | 96.88 % | 95.45 % |
| **ESTP** | **ESFP** | **ENFP** | **ENTP** |
| n=31 | n=38 | n=34 | n=31 |
| 86.1 % | 79.16 % | 97.14 % | 93.98 % |
| **ESTJ** | **ESFJ** | **ENFJ** | **ENTJ** |
| n=41 | n=25 | n=13 | n=15 |
| 93.2 % | 80.65 % | 100 % | 100 % |

Dichotomous Preferences

| | n | % |
|---|---|---|
| **E** | 229 | 89.8 |
| **I** | 135 | 93.1 |
| **S** | 199 | 86.8 |
| **N** | 165 | 96.5 |
| **T** | 181 | 92.8 |
| **F** | 183 | 89.3 |
| **J** | 147 | 91.3 |
| **P** | 217 | 90.8 |

Pairs and Temperaments

| | n | % | | n | % | | n | % |
|---|---|---|---|---|---|---|---|---|
| **IJ** | 53 | 91.3 | **TJ** | 82 | 93.1 |
| **IP** | 82 | 94.3 | **TP** | 99 | 92.5 |
| **EP** | 110 | 86.6 | **FP** | 118 | 89.4 |
| **EJ** | 119 | 92.9 | **FJ** | 65 | 89 |
| **ST** | 106 | 90.6 | **IN** | 72 | 96 |
| **SF** | 93 | 83. | **EN** | 93 | 97 |
| **NF** | **90** | **97** | **IS** | 63 | 90 |
| **NT** | **75** | **96** | **ES** | 136 | 86 |
| **SJ** | **99** | **88** | **ET** | 118 | 92 |
| **SP** | **100** | **85.5** | **EF** | 111 | 87 |
| **NP** | 117 | 96 | **IF** | 72 | 92 |
| **NJ** | 48 | 98 | **IT** | 63 | 94 |

**Jungian Types (E)**

| | n | % |
|---|---|---|
| E-TJ | 56 | 95 |
| E-FJ | 38 | 86 |
| ES-P | 70 | 83.3 |
| EN-P | 65 | 96 |

**Jungian Types (I)**

| | n | % |
|---|---|---|
| I-TP | 37 | 97 |
| I-FP | 45 | 92 |
| IS-J | 33 | 89.1 |
| IN-J | 20 | 95.2 |

**Dominant Types**

| | n | % |
|---|---|---|
| Dt. T | 93 | 96 |
| Dt. F | 83 | 89 |
| Dt. S | 103 | 85 |
| Dt. N | 85 | 96 |

n: reflects the number of participants who demonstrated mastery of this objective

%: indicates the percent of that particular sub-population who demonstrated mastery

**E** Extrovert **S** Sensing **T** Thinking **J** Judging

**I** Introvert **N** Intuitive **F** Feeling **P** Perceiving

# TABLE 4.12
## Chi-Square Goodness of Fit

Objective 38 Recognizing Propaganda Techniques

| | Mastery | Non Mastery | |
|---|---|---|---|
| NF | 90 | 3 | 93 |
| NT | 75 | 3 | 78 |
| SJ | 99 | 13 | 112 |
| SP | 100 | 17 | 117 |
| | 364 | 36 | 400 |

df = 3 $X^2 = 12.08$

Because $X^2 = 12.08 > 7.85$ and $6.251$; $H_O$ is rejected at the 0.10, 0.05, and 0.01 levels, respectively

Hemisphericity

| | Mastery | Non-Mastery | |
|---|---|---|---|
| Left-Brain | 174 | 16 | 190 |
| Right-Brain | 190 | 20 | 210 |
| | 364 | 36 | 400 |

df = 1 $X^2 = 1.177$

Because $X^2 = 1.177 < 3.841$ and $2.70$; $H_O$ is accepted at the 0.05 and 0.10 levels, respectively

Processing Style

| | Mastery | Non-Mastery | |
|---|---|---|---|
| Intuitive | 165 | 6 | 171 |
| Sensing | 199 | 30 | 229 |
| | 364 | 36 | 400 |

df = 1 $X^2 = 11.373$

Because $X^2 = 11.373 > 3.841$, $6.635$ and $7.879$; $H_O$ is not accepted at the 0.05, 0.01 and 0.005 levels, respectively

TABLE 4.13

## Post Hoc Tests
## GROUP
## Homogeneous Subsets

**OBJ38**

Tukey HSD[a,b,c]

| GROUP | N | Subset 1 | Subset 2 |
|---|---|---|---|
| SP | 117 | .8462 | |
| SJ | 112 | .8929 | .8929 |
| NT | 78 | | .9615 |
| NF | 93 | | .9677 |
| Sig. | | .657 | .252 |

Means for groups in homogeneous subsets are displayed.
Based on Type III Sum of Squares
The error term is Mean Square(Error) = 8.013E-02.

a. Uses Harmonic Mean Sample Size = 97.445.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| OBJ38 | Between Groups | .901 | 1 | .578 | 11.251 | .001 |
| | Within Groups | 31.859 | 398 | 8.005E-02 | | |
| | Total | 32.760 | 399 | | | |

# TABLE 4.14
## Type Distribution of Participants
### Objective 39: Identifying Main Idea

The Sixteen Complete Types

| ISTJ | ISFJ | INFJ | INTJ |
|---|---|---|---|
| n=20 | n=16 | n=13 | n=6 |
| 95 % | 100 % | 100 % | 75 % |
| **ISTP** | **ISFP** | **INFP** | **INTP** |
| n=11 | n=16 | n=29 | n=20 |
| 68.75 % | 94 % | 90.6% | 90.9 % |
| **ESTP** | **ESFP** | **ENFP** | **ENTP** |
| n=31 | n=38 | n=31 | n=29 |
| 86 % | 79 % | 88.5 % | 87.9 % |
| **ESTJ** | **ESFJ** | **ENFJ** | **ENTJ** |
| n=40 | n=24 | n=13 | n=13 |
| 90.9 % | 77.4 % | 100 % | 86.7 % |

Dichotomous Preferences

| | n | % |
|---|---|---|
| **E** | 219 | 85.8 |
| **I** | 131 | 90.3 |
| **S** | 196 | 85.6 |
| **N** | 154 | 90 |
| **T** | 170 | 87 |
| **F** | 180 | 87.8 |
| **J** | 145 | 90 |
| **P** | 205 | 85.7 |

Pairs and Temperaments

| | n | % |
|---|---|---|
| **IJ** | 55 | 94.8 |
| **IP** | 76 | 87.3 |
| **EP** | 104 | 81.9 |
| **EJ** | 115 | 89.8 |
| **ST** | 102 | 87.1 |
| **SF** | 94 | 83.9 |
| **NF** | **86** | **92.4** |
| **NT** | **68** | **87.1** |
| **SJ** | **100** | **89.3** |
| **SP** | **91** | **77.8** |
| **NP** | 109 | 89.3 |
| **NJ** | 45 | 91.8 |

| | n | % |
|---|---|---|
| **TJ** | 79 | 89.7 |
| **TP** | 91 | 85 |
| **FP** | 114 | 86.3 |
| **FJ** | 66 | 90.4 |
| **IN** | 68 | 90.6 |
| **EN** | 86 | 89.6 |
| **IS** | 63 | 90 |
| **ES** | 133 | 83.6 |
| **ET** | 113 | 88.2 |
| **EF** | 106 | 83.4 |
| **IF** | 74 | 95 |
| **IT** | 57 | 85 |

**Jungian Types (E)**

| | n | % |
|---|---|---|
| E-TJ | 53 | 89.8 |
| E-FJ | 37 | 84 |
| ES-P | 69 | 82 |
| EN-P | 60 | 88 |

**Jungian Types (I)**

| | n | % |
|---|---|---|
| I-TP | 31 | 81.6 |
| I-FP | 45 | 91.8 |
| IS-J | 36 | 97.2 |
| IN-J | 19 | 90.5 |

**Dominant Types**

| | n | % |
|---|---|---|
| Dt. T | 84 | 86.6 |
| Dt. F | 82 | 88 |
| Dt. S | 105 | 86.7 |
| Dt. N | 79 | 88.8 |

n: reflects the number of participants who demonstrated mastery of this objective
%: indicates the percent of that particular sub-population who demonstrated mastery
**E** Extrovert **S** Sensing **T** Thinking **J** Judging
**I** Introvert **N** Intuitive **F** Feeling **P** Perceiving

# TABLE 4.15

## Chi Square Goodness of Fit

### Objective 39: Identifying Main Idea

| | Mastery | Non Mastery | |
|---|---|---|---|
| NF | 79 | 14 | 93 |
| NT | 58 | 20 | 78 |
| SJ | 88 | 24 | 112 |
| SP | 75 | 42 | 117 |
| | 300 | 100 | 400 |

df =3 $X^2 = 13.0$

Because $X^2 = 13.06 > 7.815$, 11.345 and 12.838; $H_O$ is rejected at the 0.10 , 0.05, and 0.005 levels, respectively

### Hemisphericity

| | Mastery | Non-Mastery | |
|---|---|---|---|
| Left-Brain | 168 | 22 | 190 |
| Sensing | 177 | 33 | 210 |
| | 345 | 55 | 400 |

df = 1 $X^2 = 1.43$

Because $X^2 = 1.43 < 3.841$ and 2.706; $H_O$ is accepted at the 0.05 and 0.10 levels, respectively

### Processing Style

| | Mastery | Non-Mastery | |
|---|---|---|---|
| Intuitive | 154 | 17 | 171 |
| Sensing | 196 | 33 | 229 |
| | 350 | 50 | 400 |

df = 1 $X^2 = 1.788$

Because $X^2$ is 1.788 , 3.841 and 2.706; $H_O$ is accepted at the 0.05 and 0.10 levels, respectively

### Keirsey

| | Mastery | Non-Mastery | |
|---|---|---|---|
| Cooperatives | 186 | 19 | 205 |
| Utilitarians | 159 | 36 | 195 |
| | 345 | 55 | 400 |

df = 1 X2 = 7.124

Because $X^2 = 7.124 < 3.841$ and 6.635; $H_O$ is not accepted at the 0.05 and 0.01 levels, respectively

TABLE 4.16

## Post Hoc Tests
## GROUP
## Homogeneous Subsets

**OBJ39**

Tukey HSD[a,b,c]

| GROUP | N | Subset 1 |
|---|---|---|
| SP | 117 | .8205 |
| NT | 78 | .8718 |
| SJ | 112 | .9107 |
| NF | 93 | .9247 |
| Sig. | | .111 |

Means for groups in homogeneous subsets are displayed.
Based on Type III Sum of Squares
The error term is Mean Square(Error) = .105.

a. Uses Harmonic Mean Sample Size = 97.445.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| OBJ39 | Between Groups | .578 | 1 | .578 | 5.521 | .019 |
| | Within Groups | 41.667 | 398 | .105 | | |
| | Total | 42.240 | 399 | | | |

# TABLE 4.17
## Type Distribution of Participants
### Objective 40: Sequencing Events

The Sixteen Complete Types

| **ISTJ** | **ISFJ** | **INFJ** | **INTJ** |
|---|---|---|---|
| n=16 | n=12 | n=10 | n=5 |
| 76 % | 75 % | 76.9 % | 62.5 % |
| **ISTP** | **ISFP** | **INFP** | INTP |
| n=11 | n=11 | n=25 | n=15 |
| 68.75 % | 64.7 % | 78 % | 68 % |
| **ESTP** | **ESFP** | **ENFP** | **ENTP** |
| n=19 | n=30 | n=29 | n=23 |
| 52.78 % | 62.5 % | 82.85 % | 69.6 % |
| **ESTJ** | **ESFJ** | **ENFJ** | **ENTJ** |
| n=27 | n=21 | n=9 | n=13 |
| 61.3 % | 67.7 % | 69.2 % | 86.67 % |

Dichotomous Preferences

| | n | % |
|---|---|---|
| **E** | 171 | 67 |
| **I** | 105 | 72.4 |
| **S** | 147 | 64.2 |
| **N** | 129 | 75.4 |
| **T** | 129 | 66 |
| **F** | 147 | 71.7 |
| **J** | 113 | 70.2 |
| **P** | 163 | 68.2 |

Pairs and Temperaments

| | n | % |
|---|---|---|
| **IJ** | 43 | 74 |
| **IP** | 62 | 71 |
| **EP** | 76 | 59.8 |
| **EJ** | 95 | 74 |
| **ST** | 73 | 62.4 |
| **SF** | 74 | 66 |
| **NF** | **73** | **78.5** |
| **NT** | **56** | **71.8** |
| **SJ** | **76** | **67.85** |
| **SP** | **71** | **60.68** |
| **NP** | 92 | 75.41 |
| **NJ** | 37 | 75.51 |

| | n | % |
|---|---|---|
| **TJ** | 61 | 69.3 |
| **TP** | 68 | 63.5 |
| **FP** | 95 | 72 |
| **FJ** | 52 | 71.2 |
| **IN** | 55 | 73 |
| **EN** | 74 | 77.1 |
| **IS** | 50 | 71.4 |
| **ES** | 97 | 61 |
| **ET** | 82 | 64 |
| **EF** | 89 | 70 |
| **IF** | 58 | 74 |
| **IT** | 47 | 70 |

**Jungian Types (E)**

| | n | % |
|---|---|---|
| E-TJ | 40 | 67.8 |
| E-FJ | 30 | 68 |
| ES-P | 49 | 58 |
| EN-P | 52 | 76 |

**Jungian Types (I)**

| | n | % |
|---|---|---|
| I-TP | 26 | 68 |
| I-FP | 26 | 53 |
| IS-J | 28 | 76 |
| IN-J | 15 | 71 |

**Dominant Types**

| | n | % |
|---|---|---|
| Dt. T | 66 | 68 |
| Dt. F | 66 | 71 |
| Dt. S | 77 | 63 |
| Dt. N | 67 | 75 |

n: reflects the number of participants who demonstrated mastery of this objective
%: indicates the percent of that particular sub-population who demonstrated mastery

**E** Extrovert **S** Sensing **T** Thinking **J** Judging
**I** Introvert **N** Intuitive **F** Feeling **P** Perceiving

# TABLE 4.18

## Chi Square Goodness of Fit

Objective 40: Sequencing Events

| | Mastery | Non Mastery | |
|---|---|---|---|
| NF | 73 | 20 | 93 |
| NT | 56 | 22 | 78 |
| SJ | 76 | 36 | 112 |
| SP | 71 | 46 | 117 |
| | 276 | 124 | 400 |

df = 3 $X^2 = 8.06$

Because $X^2 = 8.06 > 7.85$ and 6.251; $H_O$ is rejected at the 0.05 and 0.10 levels, respectively.

Hemisphericity

| | Mastery | Non-Mastery | |
|---|---|---|---|
| Left-Brain | 132 | 58 | 190 |
| Right-Brain | 144 | 66 | 210 |
| | 276 | 124 | 400 |

df = 3 $X^2 = 0.036$

Because $X^2 = 0.036 < 3.841$ and 2.706; $H_O$ is accepted at the 0.05 and 0.10 levels, respectively.

Processing Style

| | Mastery | Non-Mastery | |
|---|---|---|---|
| Intuitive | 129 | 42 | 171 |
| Sensing | 147 | 82 | 229 |
| | | | 400 |

df = 1 $X^2 = 5.789$

Because $X^2 = 5.789 > 3.841$ and 2.706; $H_O$ is accepted at the 0.05 and 0.10 levels, respectively.

TABLE 4.19

## Post Hoc Tests
## GROUP
## Homogeneous Subsets

**OBJ40**

Tukey HSD[a,b,c]

| GROUP | N | Subset 1 | Subset 2 |
|---|---|---|---|
| SP | 117 | .6068 | |
| SJ | 112 | .6786 | .6786 |
| NT | 78 | .7179 | .7179 |
| NF | 93 | | .7849 |
| Sig. | | .331 | .371 |

Means for groups in homogeneous subsets are displayed.
Based on Type III Sum of Squares
The error term is Mean Square(Error) = .212.

a. Uses Harmonic Mean Sample Size = 97.445.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| OBJ40 | Between Groups | 1.238 | 1 | 1.238 | 5.844 | .016 |
| | Within Groups | 84.322 | 398 | .212 | | |
| | Total | 85.560 | 399 | | | |

# TABLE 4.20
## Type Distribution of Participants
### Objective 41: Making Inferences and Drawing Conclusions

The Sixteen Complete Types

| ISTJ | ISFJ | INFJ | INTJ |
|---|---|---|---|
| n=19 | n=14 | n=11 | n=7 |
| 90.4 % | 87.5 % | 85 % | 87.5 % |

| ISTP | ISFP | INFP | INTP |
|---|---|---|---|
| n=12 | n=12 | n=24 | n=20 |
| 75 % | 70.6 % | 75 % | 90.9 % |

| ESTP | ESFP | ENFP | ENTP |
|---|---|---|---|
| n=27 | n=38 | n=28 | n=28 |
| 75 % | 79.16 % | 80 % | 84.5 % |

| ESTJ | ESFJ | ENFJ | ENTJ |
|---|---|---|---|
| n=38 | n=25 | n=10 | n=14 |
| 86 % | 80.65 % | 77 % | 93 % |

Dichotomous Preferences

| | n | % |
|---|---|---|
| **E** | 209 | 81.9 |
| **I** | 119 | 82 |
| **S** | 186 | 81.2 |
| **N** | 142 | 83 |
| **T** | 165 | 84.6 |
| **F** | 163 | 79.5 |
| **J** | 138 | 85.7 |
| **P** | 190 | 79.5 |

Pairs and Temperaments

| | n | % |
|---|---|---|
| **IJ** | 51 | 87.9 |
| **IP** | 68 | 78.2 |
| **EP** | 97 | 76.4 |
| **EJ** | 112 | 87.5 |
| **ST** | 96 | 82.1 |
| **SF** | 90 | 80 |
| **NF** | **73** | **78.5** |
| **NT** | **69** | **88.5** |
| **SJ** | **96** | **85.7** |
| **SP** | **90** | **76.9** |
| **NP** | 100 | 82 |
| **NJ** | 42 | 85.7 |

| | n | % |
|---|---|---|
| **TJ** | 78 | 88.6 |
| **TP** | 87 | 81.3 |
| **FP** | 103 | 78 |
| **FJ** | 60 | 82.2 |
| **IN** | 62 | 82.6 |
| **EN** | 80 | 83.3 |
| **IS** | 57 | 81.4 |
| **ES** | 129 | 81.1 |
| **ET** | 107 | 83.6 |
| **EF** | 102 | 80.3 |
| **IF** | 61 | 78.2 |
| **IT** | 58 | 86.6 |

**Jungian Types (E)**

| | n | % |
|---|---|---|
| E-TJ | 52 | 88 |
| E-FJ | 35 | 79.5 |
| ES-P | 66 | 78.6 |
| EN-P | 56 | 82.3 |

**Jungian Types (I)**

| | n | % |
|---|---|---|
| I-TP | 32 | 84.2 |
| I-FP | 36 | 73.5 |
| IS-J | 34 | 91.9 |
| IN-J | 17 | 80.9 |

**Dominant Types**

| | n | % |
|---|---|---|
| Dt. T | 84 | 86.6 |
| Dt. F | 71 | 76 |
| Dt. S | 99 | 81.8 |
| Dt. N | 74 | 83.1 |

n: reflects the number of participants who demonstrated mastery of this objective
%: indicates the percent of that particular sub-population who demonstrated mastery

**E** Extrovert **S** Sensing **T** Thinking **J** Judging
**I** Introvert **N** Intuitive **F** Feeling **P** Perceiving

TABLE 4.21

Chi Square Goodness of Fit

Objective 41: Making Inferences and Drawing Conclusions

| | Mastery | Non Mastery | |
|---|---|---|---|
| NF | 73 | 20 | 93 |
| NT | 69 | 9 | 78 |
| SJ | 96 | 16 | 112 |
| SP | 90 | 27 | 117 |
| | 328 | 72 | 400 |

df = 3 $X^2 = 6.08$

Because $X^2 = 6.08 < 7.85$ and 6.251; $H_O$ is accepted at the 0.05 and 0.10 levels, respectively

Hemisphericity

| | Mastery | Non-Mastery | |
|---|---|---|---|
| Left-Brain | 165 | 25 | 190 |
| Right-Brain | 163 | 47 | 210 |
| | 328 | 72 | 400 |

df = 1 $X^2 = 5.74$

Because $X^2 = 5.74 > 3.841$ and 5.024; $H_O$ is not accepted at the 0.05 and 0.025 levels, respectively

Processing Style

| | Mastery | Non-Mastery | |
|---|---|---|---|
| Intuitive | 186 | 43 | 171 |
| Sensing | 142 | 29 | 229 |
| | 328 | 72 | 400 |

df = 1 $X^2 = 0.218$

Because $X^2 = 0.218 < 3.841$ and 2.706; $H_O$ is accepted at the 0.05 and 0.10 levels, respectively.

TABLE 4.22

## Post Hoc Tests
## GROUP
## Homogeneous Subsets

**OBJ41**

Tukey HSD[a,b,c]

| GROUP | N | Subset 1 |
|---|---|---|
| SP | 117 | .7692 |
| NF | 93 | .7849 |
| SJ | 112 | .8661 |
| NT | 78 | .8846 |
| Sig. | | .148 |

Means for groups in homogeneous subsets are displayed.
Based on Type III Sum of Squares
The error term is Mean Square(Error) = .145.

a. Uses Harmonic Mean Sample Size = 97.445.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| OBJ41 | Between Groups | 1.926E-02 | 1 | 1.926E-02 | .131 | .717 |
| | Within Groups | 58.378 | 398 | .147 | | |
| | Total | 58.398 | 399 | | | |

# TABLE 4.23
## Type Distribution of Participants
### Objective 42: Identifying Cause and Effect Relationships

The Sixteen Complete Types

| ISTJ | ISFJ | INFJ | INTJ |
|---|---|---|---|
| n=20 | n=14 | n=12 | n=5 |
| 95 % | 87.5 % | 92.31 % | 62.5 % |
| **ISTP** | **ISFP** | **INFP** | **INTP** |
| n=12 | n=16 | n=32 | n=22 |
| 75 % | 94 % | 100 % | 100 % |
| **ESTP** | **ESFP** | **ENFP** | **ENTP** |
| n=29 | n=45 | n=31 | n=29 |
| 80.5 % | 93.75 % | 88.5 % | 87.9 % |
| **ESTJ** | **ESFJ** | **ENFJ** | **ENTJ** |
| n=37 | n=25 | n=13 | n=15 |
| 84.1 % | 80.65 % | 100 % | 100 % |

Dichotomous Preferences

| | n | % |
|---|---|---|
| **E** | 224 | 87.8 |
| **I** | 133 | 91.7 |
| **S** | 198 | 86.5 |
| **N** | 159 | 92.9 |
| **T** | 175 | 88.2 |
| **F** | 185 | 90.2 |
| **J** | 141 | 87.5 |
| **P** | 216 | 90.3 |

Pairs and Temperaments

| | n | % |
|---|---|---|
| **IJ** | 51 | 87.9 |
| **IP** | 82 | 94.2 |
| **EP** | 109 | 85.8 |
| **EJ** | 115 | 89.8 |
| **ST** | 98 | 83.7 |
| **SF** | 100 | 89.3 |
| **NF** | **88** | **94.6** |
| **NT** | **71** | **91** |
| **SJ** | **96** | **85.7** |
| **SP** | **102** | **87.2** |
| **NP** | 114 | 93.4 |
| **NJ** | 45 | 91.8 |

| | N | % |
|---|---|---|
| **TJ** | 77 | 87.5 |
| **TP** | 92 | 86 |
| **FP** | 124 | 93.9 |
| **FJ** | 64 | 87.7 |
| **IN** | 71 | 94.7 |
| **EN** | 88 | 91.7 |
| **IS** | 63 | 90 |
| **ES** | 136 | 85.5 |
| **ET** | 11 | 85.9 |
| **EF** | 80 | 86 |
| **IF** | 74 | 95 |
| **IT** | 59 | 88 |

**Jungian Types (E)**

| | n | % |
|---|---|---|
| E-TJ | 52 | 88 |
| E-FJ | 38 | 86 |
| ES-P | 74 | 88.1 |
| EN-P | 60 | 88 |

**Jungian Types (I)**

| | n | % |
|---|---|---|
| I-TP | 34 | 89.5 |
| I-FP | 48 | 98 |
| IS-J | 34 | 91.9 |
| IN-J | 17 | 80.1 |

**Dominant Types**

| | N | % |
|---|---|---|
| Dt. T | 86 | 88.6 |
| Dt. F | 86 | 92.5 |
| Dt. S | 108 | 89.25 |
| Dt. N | 77 | 86.5 |

n: reflects the number of participants who demonstrated mastery of this objective
%: indicates the percent of that particular sub-population who demonstrated mastery

**E** Extrovert **S** Sensing **T** Thinking **J** Judging
**I** Introvert **N** Intuitive **F** Feeling **P** Perceiving

## TABLE 4.24

## Chi Square Goodness of Fit

Objective 42: Identifying Cause and Effect Relationships

| | Mastery | Non Mastery | |
|---|---|---|---|
| NF | 88 | 5 | 93 |
| NT | 71 | 7 | 78 |
| SJ | 96 | 16 | 112 |
| SP | 102 | 15 | 117 |
| | 357 | 43 | 400 |

df = 3 $X^2 = 5.01$

Because $X^2 = 5.01 < 7.815$ and 6.251; $H_0$ is accepted at the 0.05 and 0.01 levels, respectively.

Hemisphericity

| | Mastery | Non-Mastery | |
|---|---|---|---|
| Left-Brain | 167 | 23 | 190 |
| Right-Brain | 190 | 20 | 210 |
| | 357 | 43 | 400 |

df = 1 $X^2 = 5.13$

Because $X^2 = 5.13 < 3.841$ and 5.024; $H_0$ is not accepted at the 0.05 and 0.025 levels, Respectively.

Processing Style

| | Mastery | Non-Mastery | |
|---|---|---|---|
| Intuitive | 159 | 12 | 171 |
| Sensing | 198 | 31 | 229 |
| | 357 | 43 | 400 |

df = 1 $X^2 = 4.339$

Because $X^2 = 4.339 > 3.841$ and 2.706; $H_0$ is not accepted at the 0.05 and 0.01 levels, respectively.

TABLE 4.25

## Post Hoc Tests
## GROUP
## Homogeneous Subsets

**●BJ42**

Tukey HSD[a,b,c]

| | | Subset |
|---|---|---|
| GROUP | N | 1 |
| SJ | 112 | .8571 |
| SP | 117 | .8718 |
| NT | 78 | .9103 |
| NF | 93 | .9462 |
| Sig. | | .184 |

Means for groups in homogeneous subsets are displayed.
Based on Type III Sum of Squares
The error term is Mean Square(Error) = 9.569E-02.

a. Uses Harmonic Mean Sample Size = 97.445.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

# TABLE 4.26
## Type Distribution of Participants
### Objective 43: Identifying Fact and Opinion

The Sixteen Complete Types

| **ISTJ** | **ISFJ** | **INFJ** | **INTJ** |
|---|---|---|---|
| n=19 | n=14 | n=9 | n=7 |
| 90.4 % | 87.5 % | 69.2 % | 87.5 % |
| **ISTP** | **ISFP** | **INFP** | **INTP** |
| n=11 | n=15 | n=30 | n=21 |
| 68.75 % | 88 % | 93.75 % | 95.45 % |
| ESTP | **ESFP** | **ENFP** | **ENTP** |
| n=31 | n=35 | n=25 | n=28 |
| 86 % | 73 % | 71.4 % | 84.5 % |
| **ESTJ** | **ESFJ** | **ENFJ** | **ENTJ** |
| n=37 | n=22 | n=11 | n=14 |
| 84.1 % | 70 % | 84.6 % | 93 % |

Dichotomous Preferences

| | n | % |
|---|---|---|
| **E** | 203 | 79.6 |
| **I** | 126 | 86.9 |
| **S** | 184 | 80.3 |
| **N** | 145 | 84.8 |
| **T** | 168 | 86.2 |
| **F** | 161 | 78.5 |
| **J** | 133 | 82.6 |
| **P** | 196 | 82 |

Pairs and Temperaments

| | n | % |
|---|---|---|
| **IJ** | 49 | 84.5 |
| **IP** | 77 | 88.5 |
| **EP** | 94 | 74 |
| **EJ** | 109 | 85.2 |
| **ST** | 98 | 83.7 |
| **SF** | 86 | 76.8 |
| **NF** | **75** | **80.6** |
| **NT** | **70** | **89.7** |
| **SJ** | **92** | **82** |
| **SP** | **92** | **78.6** |
| **NP** | 104 | 85.2 |
| **NJ** | 41 | 83.7 |

| | n | % |
|---|---|---|
| **TJ** | 77 | 87.5 |
| **TP** | 91 | 85 |
| **FP** | 105 | 80 |
| **FJ** | 56 | 76.7 |
| **IN** | 67 | 89.3 |
| **EN** | 78 | 81.25 |
| **IS** | 59 | 75.6 |
| **ES** | 125 | 78.6 |
| **ET** | 110 | 85.9 |
| **EF** | 93 | 73.2 |
| **IF** | 68 | 87.2 |
| **IT** | 58 | 86.6 |

**Jungian Types (E)**

| | n | % |
|---|---|---|
| E-TJ | 51 | 86.4 |
| E-FJ | 33 | 75 |
| ES-P | 66 | 78.6 |
| EN-P | 53 | 77.9 |

**Jungian Types (I)**

| | n | % |
|---|---|---|
| I-TP | 32 | 84 |
| I-FP | 45 | 91.8 |
| IS-J | 33 | 89.1 |
| IN-J | 16 | 76.2 |

**Dominant Types**

| | n | % |
|---|---|---|
| Dt. T | 83 | 85.6 |
| Dt. F | 78 | 83.8 |
| Dt. S | 99 | 81.8 |
| Dt. N | 69 | 77.5 |

n: reflects the number of participants who demonstrated mastery of this objective
%: indicates the percent of that particular sub-population who demonstrated mastery

**E** Extrovert **S** Sensing **T** Thinking **J** Judging
**I** Introvert **N** Intuitive **F** Feeling **P** Perceiving

# TABLE 4.27
## Chi Square Goodness of Fit

Objective 43: Identifying Fact and Opinion

| | Mastery | Non Mastery | |
|---|---|---|---|
| NF | 75 | 18 | 93 |
| NT | 70 | 8 | 78 |
| SJ | 92 | 20 | 112 |
| SP | 92 | 25 | 117 |
| | 329 | 71 | 400 |

Df = 3 $X^2 = 4.21$

Because $X^2 = 4.21 < 7.85$ and 6.251; $H_O$ is accepted at the 0.05 and 0.10 levels, Respectively.

Hemisphericity

| | Mastery | Non-Mastery | |
|---|---|---|---|
| Left-Brain | 162 | 28 | 190 |
| Right-Brain | 167 | 43 | 210 |
| | 329 | 71 | 400 |

Df= 1 $X^2 = 2.25$

Because $X^2 = 2.25 < 3.841$ and 2.706; $H_O$ is accepted at the 0.05 and 0.10 levels, Respectively.

Processing Style

| | Mastery | Non-Mastery | |
|---|---|---|---|
| Intuitive | 145 | 26 | 171 |
| Sensing | 184 | 45 | 229 |
| | 329 | 71 | 400 |

df = 1 $X^2 = 1.325$

Because $X^2 = 1.325 < 3.841$ and 2.706; $H_O$ is accepted at the 0.05 and 0.10 levels, respectively.

TABLE 4.28

## Post Hoc Tests
## GROUP
## Homogeneous Subsets

**OBJ43**

Tukey HSD[a,b,c]

| | | Subset |
|---|---|---|
| GROUP | N | 1 |
| SP | 117 | .7863 |
| NF | 93 | .8065 |
| SJ | 112 | .8214 |
| NT | 78 | .8974 |
| Sig. | | .177 |

Means for groups in homogeneous subsets are displayed.
Based on Type III Sum of Squares
The error term is Mean Square(Error) = .146.

a. Uses Harmonic Mean Sample Size = 97.445.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

# TABLE 4.29
## Type Distribution of Participants

Objective 44: Identifying Details
The Sixteen Complete Types

| **ISTJ** | **ISFJ** | **INFJ** | **INTJ** |
|---|---|---|---|
| n=21 | n=16 | n=12 | n=7 |
| 100 % | 100 % | 92.31 % | 87.5 % |
| **ISTP** | **ISFP** | **INFP** | **INTP** |
| n=13 | n=17 | n=32 | n=22 |
| 81.25 % | 100 % | 100 % | 100 % |
| **ESTP** | **ESFP** | **ENFP** | **ENTP** |
| n=35 | n=44 | n=32 | n=33 |
| 97.2 % | 91.7 % | 91.42 % | 100 % |
| **ESTJ** | **ESFJ** | **ENFJ** | **ENTJ** |
| n=44 | n=29 | n=13 | n=15 |
| 100 % | 93.5 % | 100 % | 100 % |

Dichotomous Preferences

| | n | % |
|---|---|---|
| **E** | 245 | 96.1 |
| **I** | 140 | 96.5 |
| **S** | 219 | 95.6 |
| **N** | 166 | 97.1 |
| **T** | 190 | 97.4 |
| **F** | 195 | 95.1 |
| **J** | 157 | 97.5 |
| **P** | 228 | 95.3 |

Pairs and Temperaments

| | n | % |
|---|---|---|
| **IJ** | 56 | 96.5 |
| **IP** | 84 | 96.5 |
| **EP** | 119 | 93.7 |
| **EJ** | 30 | 93.8 |
| **ST** | 113 | 96.6 |
| **SF** | 106 | 94.6 |
| **NF** | **89** | **95.7** |
| **NT** | **77** | **98.7** |
| **SJ** | **110** | **98.2** |
| **SP** | **109** | **93.4** |
| **NP** | 119 | 97.5 |
| **NJ** | 47 | 95.9 |

| | n | % |
|---|---|---|
| **TJ** | 87 | 98.8 |
| **TP** | 103 | 96.26 |
| **FP** | 125 | 94.7 |
| **FJ** | 70 | 95.9 |
| **IN** | 73 | 97.3 |
| **EN** | 93 | 96.8 |
| **IS** | 67 | 95.7 |
| **ES** | 152 | 95.6 |
| **ET** | 127 | 99.2 |
| **EF** | 118 | 92.9 |
| **IF** | 77 | 98.7 |
| **IT** | 63 | 94 |

**Jungian Types (E)**

| | n | % |
|---|---|---|
| E-TJ | 59 | 100 |
| E-FJ | 42 | 95.5 |
| ES-P | 79 | 94 |
| EN-P | 65 | 95.5 |

**Jungian Types (I)**

| | n | % |
|---|---|---|
| I-TP | 35 | 92.1 |
| I-FP | 49 | 100 |
| IS-J | 37 | 100 |
| IN-J | 19 | 90.5 |

**Dominant Types**

| | n | % |
|---|---|---|
| Dt. T | 94 | 97 |
| Dt. F | 91 | 97.8 |
| Dt. S | 116 | 95.8 |
| Dt. N | 84 | 94.3 |

n: reflects the number of participants who demonstrated mastery of this objective
%: indicates the percent of that particular sub-population who demonstrated mastery

**E** Extrovert **S** Sensing **T** Thinking **J** Judging
**I** Introvert **N** Intuitive **F** Feeling **P** Perceiving

# TABLE 4.30

## Chi Square Goodness of Fit

### Objective 44: Identifying Details

| | Mastery | Non Mastery | |
|---|---|---|---|
| NF | 89 | 4 | 93 |
| NT | 77 | 1 | 78 |
| SJ | 110 | 2 | 112 |
| SP | 109 | 8 | 117 |
| | 385 | 15 | 400 |

df=3 $X^2 = 5.68$

Because $X^2 = 5.68 < 7.85$ and 6.251; $H_O$ is accepted at the 0.05 and 0.10 levels, respectively.

### Hemisphericity

| | Mastery | Non-Mastery | |
|---|---|---|---|
| Left-Brain | 187 | 3 | 171 |
| Right-Brain | 198 | 12 | 229 |
| | 385 | 15 | 400 |

df=1 $X^2 = 4.722$

Because $X^2 = 4.722 > 3.841$ and 2.706; $H_O$ is not accepted at the 0.05 and 0.10 levels, respectively.

### Processing Style

| | Mastery | Non-Mastery | |
|---|---|---|---|
| Intuitive | 166 | 5 | 171 |
| Sensing | 219 | 10 | 229 |
| | 385 | 15 | 400 |

df=1 $X^2 = 0.564$

Because $X^2 = 0.564 > 3.841$ and 2.706; $H_O$ is accepted at the 0.05 and 0.10 levels, respectively.

TABLE 4.31

## Post Hoc Tests
## GROUP
## Homogeneous Subsets

**OBJ44**

Tukey HSD[a,b,c]

| GROUP | N | Subset 1 |
|---|---|---|
| SP | 117 | .9231 |
| NF | 93 | .9570 |
| SJ | 112 | .9821 |
| NT | 78 | .9872 |
| Sig. | | .100 |

Means for groups in homogeneous subsets are displayed.
Based on Type III Sum of Squares
The error term is Mean Square(Error) = 3.810E-02.

a. Uses Harmonic Mean Sample Size = 97.445.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| OBJ44 | Between Groups | 3.458E-02 | 1 | 3.458E-02 | .898 | .344 |
| | Within Groups | 15.325 | 398 | 3.851E-02 | | |
| | Total | 15.360 | 399 | | | |

# TABLE 4.32
## Type Distribution of Participants
### Objective 45: Identifying the Author's Purpose

The Sixteen Complete Types

| ISTJ | ISFJ | INFJ | INTJ |
|---|---|---|---|
| n=19 | n=11 | n=7 | n=6 |
| 90.4 % | 68.75 % | 53.8 % | 75 % |
| **ISTP** | **ISFP** | **INFP** | **INTP** |
| n=13 | n=8 | n=23 | n=13 |
| 81.25 % | 47 % | 72 % | 59.1 % |
| **ESTP** | **ESFP** | **ENFP** | **ENTP** |
| n=21 | n=35 | n=27 | n=25 |
| 58.3 % | 73 % | 77 % | 75.8 % |
| **ESTJ** | **ESFJ** | **ENFJ** | **ENTJ** |
| n=34 | n=25 | n=7 | n=11 |
| 77 % | 86.65 % | 53.8 % | 73.3 % |

Dichotomus Preferences

| | n | % |
|---|---|---|
| **E** | 185 | 72.5 |
| **I** | 100 | 69 |
| **S** | 166 | 72.5 |
| **N** | 119 | 70 |
| **T** | 142 | 72.8 |
| **F** | 143 | 70 |
| **J** | 120 | 74.5 |
| **P** | 165 | 69 |

Pairs and Temperaments

| | n | % |
|---|---|---|
| **IJ** | 43 | 74 |
| **IP** | 57 | 65.5 |
| **EP** | 83 | 65.3 |
| **EJ** | 102 | 79.7 |
| **ST** | 87 | 74 |
| **SF** | 79 | 70.5 |
| **NF** | **64** | **68.8** |
| **NT** | **55** | **70.5** |
| **SJ** | **89** | **79.5** |
| **SP** | **77** | **65.8** |
| **NP** | 88 | 72.1 |
| **NJ** | 31 | 63.2 |

| | n | % |
|---|---|---|
| **TJ** | 70 | 79.5 |
| **TP** | 72 | 67.2 |
| **FP** | 93 | 70.5 |
| **FJ** | 50 | 68 |
| **IN** | 49 | 65.3 |
| **EN** | 70 | 72.9 |
| **IS** | 51 | 72.8 |
| **ES** | 115 | 72.3 |
| **ET** | 91 | 71.1 |
| **EF** | 94 | 74 |
| **IF** | 49 | 62.8 |
| **IT** | 51 | 76.1 |

**Jungian Types (E)**

| | n | % |
|---|---|---|
| E-TJ | 44 | 74.5 |
| E-FJ | 32 | 72.7 |
| ES-P | 56 | 66.7 |
| EN-P | 52 | 76.4 |

**Jungian Types (I)**

| | n | % |
|---|---|---|
| I-TP | 26 | 68.4 |
| I-FP | 31 | 63.3 |
| IS-J | 30 | 81.1 |
| IN-J | 13 | 61.9 |

**Dominant Types**

| | n | % |
|---|---|---|
| Dt. T | 71 | 73.2 |
| Dt. F | 63 | 67.7 |
| Dt. S | 86 | 71.1 |
| Dt. N | 65 | 73 |

n: reflects the number of participants who demonstrated mastery of this objective
%: indicates the percent of that particular sub-population who demonstrated mastery
E Extrovert S Sensing T Thinking J Judging
I Introvert N Intuitive F Feeling P Perceiving

# TABLE 4.33

## Chi Square Goodness of Fit

Objective 45: Identifying Author's Purpose

| | Mastery | Non Mastery | |
|---|---|---|---|
| NF | 64 | 29 | 93 |
| NT | 55 | 23 | 78 |
| SJ | 89 | 23 | 112 |
| SP | 77 | 40 | 117 |
| | 285 | 115 | 400 |

df=3 $X^2 = 7.74$

Because $X^2 = 7.74 < 7.815$; $H_O$ is accepted at the 0.05 level
Because $X^2 = 7.74 > 6.251$; $H_O$ is not accepted at the 0.10 level

Hemisphericity

| | Mastery | Non-Mastery | |
|---|---|---|---|
| Left-Brain | 144 | 46 | 190 |
| Right-Brain | 141 | 69 | 210 |
| | 285 | 115 | 400 |

df=1 $X^2 = 3.26$

Because $X^2 = 3.26 < 3.841$; $H_O$ is accepted at the 0.05 level
Because $X^2 = 3.26 > 2.706$; $H_O$ is not accepted at the 0.10 level

Processing Style

| | Mastery | Non-Mastery | |
|---|---|---|---|
| Intuitive | 119 | 52 | 171 |
| Sensing | 166 | 63 | 229 |
| | 285 | 115 | 400 |

df=1 $X^2 = 0.401$

Because $X^2 = 0.401 < 3.841$ and 2.706; $H_O$ is accepted at the 0.05 and the 0.10 levels, respectively.

TABLE 4.34

## Post Hoc Tests
## GROUP
## Homogeneous Subsets

**OBJ45**

Tukey HSD[a,b,c]

| GROUP | N | Subset 1 |
|---|---|---|
| SP | 117 | .6581 |
| NF | 93 | .6882 |
| NT | 78 | .7051 |
| SJ | 112 | .8036 |
| Sig. | | .108 |

Means for groups in homogeneous subsets are displayed.
Based on Type III Sum of Squares
The error term is Mean Square(Error) = .202.

a. Uses Harmonic Mean Sample Size = 97.445.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| OBJ45 | Between Groups | .552 | 1 | .552 | 2.721 | .100 |
| | Within Groups | 80.958 | 398 | .203 | | |
| | Total | 81.510 | 399 | | | |

# TABLE 4.35
## Type Distribution of Participants
Objective 46: Interpreting figurative language

The Sixteen Complete Types

| ISTJ | ISFJ | INFJ | INTJ |
|---|---|---|---|
| n=20 | n=15 | n=13 | n=8 |
| 95 % | 93.75 % | 100 % | 100 % |
| **ISTP** | **ISFP** | **INFP** | **INTP** |
| n=13 | n=17 | n=32 | n=17 |
| 81 % | 100 % | 100 % | 77.3 % |
| **ESTP** | **ESFP** | **ENFP** | **ENTP** |
| n=34 | n=46 | n=32 | n=31 |
| 94.4% | 95.8 % | 91.42 % | 93.93 % |
| **ESTJ** | **ESFJ** | **ENFJ** | **ENTJ** |
| n=43 | n=31 | n=13 | n=15 |
| 97.7 % | 100 % | 100 % | 100 % |

Dichotomous Preferences

| | n | % |
|---|---|---|
| **E** | 245 | 96 |
| **I** | 135 | 93.1 |
| **S** | 219 | 95.6 |
| **N** | 161 | 94.1 |
| **T** | 181 | 92.8 |
| **F** | 199 | 97 |
| **J** | 158 | 98.1 |
| **P** | 222 | 92.8 |

Pairs and Temperaments

| | n | % |
|---|---|---|
| **IJ** | 56 | 96.5 |
| **IP** | 79 | 90.8 |
| **EP** | 118 | 92.9 |
| **EJ** | 127 | 99.2 |
| **ST** | 110 | 94 |
| **SF** | 109 | 97.3 |
| **NF** | **90** | **96.7** |
| **NT** | **71** | **91** |
| **SJ** | **109** | **97.3** |
| **SP** | **110** | **94.0** |
| **NP** | 112 | 91.8 |
| **NJ** | 49 | 100 |

| | n | % |
|---|---|---|
| **TJ** | 86 | 97.7 |
| **TP** | 95 | 88.7 |
| **FP** | 127 | 96.2 |
| **FJ** | 72 | 98.6 |
| **IN** | 70 | 93.3 |
| **EN** | 91 | 94.7 |
| **IS** | 65 | 92.8 |
| **ES** | 154 | 96.8 |
| **ET** | 123 | 96.0 |
| **EF** | 122 | 96.1 |
| **IF** | 99 | 98.7 |
| **IT** | 58 | 86.5 |

**Jungian Types (E)**

| | n | % |
|---|---|---|
| E-TJ | 58 | 98.3 |
| E-FJ | 44 | 100 |
| ES-P | 80 | 65.2 |
| EN-P | 63 | 92.6 |

**Jungian Types (I)**

| | n | % |
|---|---|---|
| I-TP | 30 | 78.9 |
| I-FP | 49 | 100 |
| IS-J | 65 | 94.6 |
| IN-J | 21 | 100 |

**Dominant Types**

| | n | % |
|---|---|---|
| Dt. T | 88 | 90.7 |
| Dt. F | 93 | 100 |
| Dt. S | 115 | 95 |
| Dt. N | 84 | 94.3 |

n: reflects the number of participants who demonstrated mastery of this objective
%: indicates the percent of that particular sub-population who demonstrated mastery
**E** Extrovert **S** Sensing **T** Thinking **J** Judging
**I** Introvert **N** Intuitive **F** Feeling **P** Perceiving

# TABLE 4.36

## Chi Square Goodness of Fit

Objective 46: Interpreting Figurative Language

| | Mastery | Non Mastery | |
|---|---|---|---|
| NF | 90 | 3 | 93 |
| NT | 71 | 7 | 78 |
| SJ | 109 | 3 | 112 |
| SP | 110 | 7 | 117 |
| | 380 | 20 | 400 |

df=3 $X^2$ =7.20

Because $X^2 = 7.20 < 7.815$; $H_O$ is accepted at the 0.05 level

Because $X^2 = 7.20 > 6.251$; $H_O$ is rejected at the 0.10 level

Hemisphericity

| | Mastery | Non-Mastery | |
|---|---|---|---|
| Left-Brain | 144 | 46 | 190 |
| Right-Brain | 141 | 69 | 210 |
| | 285 | 115 | 400 |

df=1 $X^2 = 3.26$

Because $X^2 = 3.26 < 3.841$; $H_O$ is accepted at the 0.05 level

Because $X^2 = 3.26 > 2.706$; $H_O$ is not accepted at the 0.10 level

Processing Style

| | Mastery | Non-Mastery | |
|---|---|---|---|
| Intuitive | 119 | 52 | 171 |
| Sensing | 166 | 63 | 229 |
| | 285 | 115 | 400 |

df=1 $X^2$ =0.401

Because $X^2 = 0.401 < 3.841$ and 2.706; $H_O$ is accepted at the 0.05 and the 0.10 levels, respectively.

TABLE 4.37

**Post Hoc Tests**
**GROUP**
**Homogeneous Subsets**

**OBJ46**

Tukey HSD [a,b,c]

| | | Subset |
|---|---|---|
| GROUP | N | 1 |
| NT | 78 | .9103 |
| SP | 117 | .9402 |
| NF | 93 | .9677 |
| SJ | 112 | .9732 |
| Sig. | | .181 |

Means for groups in homogeneous subsets are displayed.
Based on Type III Sum of Squares
The error term is Mean Square(Error) = 4.741E-02.

a. Uses Harmonic Mean Sample Size = 97.445.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

TABLE 4.38

Type Distribution of Participants

Objective 47: Recognizing Author's Point of View

The Sixteen Complete Types

| ISTJ | ISFJ | INFJ | INTJ |
|---|---|---|---|
| n=19 | n=14 | n=12 | n=7 |
| 90.4 % | 87.5 % | 92.31 % | 87.5 % |
| **ISTP** | **ISFP** | **INFP** | **INTP** |
| n=14 | n=15 | n=30 | n=18 |
| 87.5 % | 88 % | 93.75 % | 81.8 % |
| **ESTP** | **ESFP** | **ENFP** | **ENTP** |
| n=31 | n=44 | n=31 | n=31 |
| 86 % | 91.7 % | 88.5 % | 93.93 % |
| **ESTJ** | **ESFJ** | **ENFJ** | **ENTJ** |
| n=41 | n=30 | n=11 | n=14 |
| 93.2 % | 96.7 % | 84.6 % | 93 % |

Dichotomous Preferences

| | n | % |
|---|---|---|
| **E** | 233 | 91.3 |
| **I** | 129 | 88.9 |
| **S** | 208 | 90.8 |
| **N** | 154 | 90 |
| **T** | 175 | 89.7 |
| **F** | 187 | 91.2 |
| **J** | 148 | 91.9 |
| **P** | 214 | 89.5 |

Pairs and Temperaments

| | n | % | | n | % | | n | % |
|---|---|---|---|---|---|---|---|---|
| | | | **IJ** | 52 | 89.6 | **TJ** | 81 | 92 |
| | | | **IP** | 77 | 88.5 | **TP** | 94 | 87.8 |
| | | | **EP** | 112 | 88 | **FP** | 120 | 90.9 |
| | | | **EJ** | 121 | 94.5 | **FJ** | 67 | 91.7 |
| | | | **ST** | 105 | 89.7 | **IN** | 67 | 89.3 |
| | | | **SF** | 103 | 91.9 | **EN** | 87 | 90.6 |
| | | | **NF** | **84** | **90** | **IS** | 62 | 88.5 |
| | | | **NT** | **70** | **89.7** | **ES** | 146 | 91.8 |
| | | | **SJ** | **104** | **92.8** | **ET** | 117 | 91.4 |
| | | | **SP** | **104** | **88** | **EF** | 116 | 91.3 |
| | | | **NP** | 110 | 90.1 | **IF** | 71 | 91 |
| | | | **NJ** | 44 | 89.7 | **IT** | 58 | 86.5 |

| **Jungian Types (E)** | n | % | **Jungian Types (I)** | n | % | **Dominant Types** | n | % |
|---|---|---|---|---|---|---|---|---|
| E-TJ | 55 | 93.2 | I-TP | 32 | 84 | Dt. T | 87 | 89.6 |
| E-FJ | 41 | 93.1 | I-FP | 45 | 91.8 | Dt. F | 86 | 92.4 |
| ES-P | 78 | 89.2 | IS-J | 33 | 89 | Dt. S | 108 | 89.2 |
| EN-P | 62 | 91.1 | IN-J | 19 | 90 | Dt. N | 81 | 91.0 |

n: reflects the number of participants who demonstrated mastery of this objective

%: indicates the percent of that particular sub-population who demonstrated mastery

**E** Extrovert **S** Sensing **T** Thinking **J** Judging

**I** Introvert **N** Intuitive **F** Feeling **P** Perceiving

# TABLE 4.39
Chi Square Goodness of Fit

Objective 47: Recognizing the Author's Point of View

| | Mastery | Non-Mastery | |
|---|---|---|---|
| NF | 84 | 9 | 93 |
| NT | 70 | 8 | 78 |
| SJ | 104 | 8 | 112 |
| SP | 104 | 13 | 117 |
| | 362 | 38 | 400 |

df =3 $X^2 = 1.14$

Because $X^2 = 1.14 < 7.85$ and 6.251; $H_0$ is accepted at the 0.05 and 0.10 levels

Hemisphericity

| | Mastery | Non-Mastery | |
|---|---|---|---|
| Left-Brain | 174 | 16 | 171 |
| Right-Brain | 188 | 22 | 229 |
| | 362 | 38 | 400 |

df = 1 $X^2 = 0.49$

Because $X^2 = 0.49 < 3.841$ and 2.706; $H_0$ is accepted at the 0.05 and at the 0.10 levels, respectively.

Processing Style

| | Mastery | Non-Mastery | |
|---|---|---|---|
| Intuitive | 208 | 21 | 171 |
| Sensing | 154 | 17 | 229 |
| | 362 | 38 | 400 |

df = 1 $X^2 = 1.355$

Because $X^2 = 1.355 < 3.841$ and 2.706; $H_0$ is accepted at the 0.05 and at the 0.10 levels, respectively.

TABLE 4.40

**Post Hoc Tests**
**GROUP**
**Homogeneous Subsets**

**OBJ47**

Tukey HSD [a,b,c]

| GROUP | N | Subset 1 |
|---|---|---|
| SP | 117 | .8889 |
| NT | 78 | .8974 |
| NF | 93 | .9032 |
| SJ | 112 | .9286 |
| Sig. | | .783 |

Means for groups in homogeneous subsets are displayed.
Based on Type III Sum of Squares
The error term is Mean Square(Error) = 8.660E-02.

a. Uses Harmonic Mean Sample Size = 97.445.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

# TABLE 4.41
## Type Distribution of Participants
### Objective 49: Following Written or Graphic Directions

The Sixteen Complete Types

| ISTJ | ISFJ | INFJ | INTJ |
|---|---|---|---|
| n=21 | n=14 | n=13 | n=8 |
| 100 % | 87.5 % | 100 % | 100% |
| **ISTP** | **ISFP** | **INFP** | **INTP** |
| n=15 | n=17 | n=31 | n=21 |
| 94 % | 100 % | 96.88 % | 95.45 % |
| **ESTP** | **ESFP** | **ENFP** | **ENTP** |
| n=35 | n=46 | n=34 | n=30 |
| 97.2% | 95.8 % | 97.14 % | 90.9 % |
| **ESTJ** | **ESFJ** | **ENFJ** | **ENTJ** |
| n=44 | n=28 | n=13 | n=15 |
| 100 % | 90.3 % | 100 % | 100 % |

Dichotomous Preferences

| | n | % |
|---|---|---|
| **E** | 245 | 96 |
| **I** | 140 | 96.5 |
| **S** | 220 | 96 |
| **N** | 165 | 96.49 |
| **T** | 189 | 96.9 |
| **F** | 196 | 95.6 |
| **J** | 156 | 96.89 |
| **P** | 229 | 95.8 |

Pairs and Temperaments

| | n | % |
|---|---|---|
| **IJ** | 56 | 96.5 |
| **IP** | 84 | 96.5 |
| **EP** | 120 | 94.4 |
| **EJ** | 125 | 97.6 |
| **ST** | 115 | 98.2 |
| **SF** | 107 | 95.5 |
| **NF** | **91** | **97.8** |
| **NT** | **74** | **94.8** |
| **SJ** | **107** | **95.5** |
| **SP** | **113** | **96.5** |
| **NP** | 116 | 95 |
| **NJ** | 49 | 100 |

| | n | % |
|---|---|---|
| **TJ** | 88 | 100 |
| **TP** | 106 | 99 |
| **FP** | 128 | 96.9 |
| **FJ** | 68 | 93.1 |
| **IN** | 73 | 97.3 |
| **EN** | 92 | 95.8 |
| **IS** | 67 | 95.7 |
| **ES** | 153 | 96.2 |
| **ET** | 126 | 98.4 |
| **EF** | 121 | 95.2 |
| **IF** | 75 | 96.1 |
| **IT** | 65 | 97 |

**Jungian Types (E)**

| | n | % |
|---|---|---|
| E-TJ | 59 | 100 |
| E-FJ | 41 | 93.1 |
| ES-P | 81 | 96.4 |
| EN-P | 64 | 94.1 |

**Jungian Types (I)**

| | n | % |
|---|---|---|
| I-TP | 36 | 94.7 |
| I-FP | 48 | 97.9 |
| IS-J | 35 | 94.5 |
| IN-J | 21 | 100 |

**Dominant Types**

| | n | % |
|---|---|---|
| Dt. T | 95 | 97.9 |
| Dt. F | 89 | 95.69 |
| Dt. S | 116 | 95.86 |
| Dt. N | 85 | 95.5 |

n: reflects the number of participants who demonstrated mastery of this objective
%: indicates the percent of that particular sub-population who demonstrated mastery

E Extrovert S Sensing T Thinking J Judging
I Introvert N Intuitive F Feeling P Perceiving

# TABLE 4.42

Chi Square Goodness of Fit

## Objective 49: Following Written or Graphic Directions

| | Mastery | Non- Mastery | |
|---|---|---|---|
| NF | 91 | 2 | 93 |
| NT | 74 | 4 | 78 |
| SJ | 107 | 5 | 112 |
| SP | 113 | 4 | 117 |
| | 385 | 15 | 400 |

df = 3 $X^2 = 2.73$

Because $X^2 = 2.73 < 7.85$ and 6.251; $H_O$ is accepted at the 0.05 and 0.10 levels, respectively.

Hemisphericity

| | Mastery | Non-Mastery | |
|---|---|---|---|
| Left-Brain | 181 | 9 | 171 |
| Right-Brain | 204 | 6 | 229 |
| | 385 | 15 | 400 |

df = 3 $X^2 = 2.831$

Because $X^2 = 2.831 < 3.841$ and 2.706; $H_O$ is accepted at the 0.05 and 0.10 levels, respectively.

Processing Style

| | Mastery | Non-Mastery | |
|---|---|---|---|
| Intuitive | 165 | 6 | 171 |
| Sensing | 220 | 9 | 229 |
| | 385 | 15 | 400 |

df = 1 $X^2 = 0.055$

Because $X^2 = 0.055 < 3.841$ and 2.706; $H_O$ is accepted at the 0.05 and 0.10 levels, respectively.

TABLE 4.42

**Post Hoc Tests**
**GROUP**
**Homogeneous Subsets**

**OBJ49**

Tukey HSD [a,b,c]

| | | Subset |
|---|---|---|
| GROUP | N | 1 |
| NT | 78 | .9487 |
| SJ | 112 | .9554 |
| SP | 117 | .9658 |
| NF | 93 | .9785 |
| Sig. | | .696 |

Means for groups in homogeneous subsets are displayed.
Based on Type III Sum of Squares
The error term is Mean Square(Error) = 3.634E-02.

a. Uses Harmonic Mean Sample Size = 97.445.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

# VITA

Victoria Jacobs Gray was born in Lexington, Kentucky, on 5 September 1947. She attended the Fayette County Schools graduating from Bryan Station High School in 1864. She attended Lindenwood College, and the University of Kentucky; then she graduated from Eastern Kentucky University with a Bachelor of Arts (AB) degree reflecting an Area of Concentration in English and a major in Social Sciences. Her first teaching position made her realize that deficient reading skills prevented some of her students did not enjoy literature as much as she did. By attending the University of Louisville as a part-time graduate student Victoria earned a Masters in Education(Med) in Early and Middle Childhood Education with a major in Reading In 1974.

In the years that followed her marriage was blessed with four children. Following her divorce in 1992, she accepted an adjunct faculty position at Walters State Community College. While pursuing her college teaching career, Victoria began a doctoral program in Education at the University of Tennessee. She received the Doctor of Education degree in 1999.

The author has been honored with various awards including a membership in Outstanding Young Women of America. She is on the staff of American Football Coach and Player magazines as a contributing writer. She is a member of the International Reading Association, National Council of Teachers of English and a charter member of the Institute of Learning Styles Research. After completing her Ed.D., she will pursue a full time college teaching position.