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Intelligence & Personality

An Interactive Qualifying Project
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by

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Abstract

The following report attempts to answer the question of whether or not there is a correlation between personality and intelligence. We will investigate this question by using two prominent tests: the MBTI for a person's personality preference and the Woodcock-Johnson III Tests of Cognitive Abilities as an intelligence measure. This study focuses on the analysis of a sample of thirty-four people who took both measures over the past three years. The performance scores on these tests were used to create a data base and correlation analyses. These analyses allowed us to test our own hypotheses to determine which dimensions of the two measures would be related to one another. Analyses showed that more than half of the WJ tests had at least one personality trait correlation indicating a relationship between intelligence and personality.

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Introduction

It has always been thought that personality and intelligence are completely different psychological qualities. Personality measurement, especially the MBTI, is supposed to show a person's preferences with no outcome or classification being superior to another. Whereas general intelligence is the level of logical processing a person can achieve, with a higher level being superior. However, recent intelligence measures have been moving in the direction of identifying multiple intelligences, actually a range of complementary cognitive abilities.

By using two prominent tests; the Woodcock Johnson battery of cognitive abilities, and the Myers-Briggs Type Personality Indicator, we intend to compare the results to see if there is a correlation between any of the seven cognitive abilities and the four dimensions of the MBTI. Could it be possible that personality and intelligence measure the same psychological aspects just in different ways? It is not completely unreasonable to suspect that personality preferences emerge from ability patterns. Learning style preferences indicated by the MBTI have been proven to correlate with the SAT, MCAS, and ACT which are aptitude and achievement tests. The SAT is considered to be a product of the intelligence measurement movement, predicting educational performance was one of the first applications of intelligence testing.

James Creed, a practitioner and trainer of the Woodcock-Johnson, is the study sponsor and has offered to provide materials in return for receiving data to for this study. Creed is willing to train additional people in the use of this measure as an inducement to public schools to participate. John M. Wilkes, our advisor, is an MBTI specialist and has offered to educate us on the MBTI as well as proctor the MBTI if need be.

Students must be at a ninth grade level or above in order to take the MBTI. It would have been ideal to gain access to high school students who have taken the Woodcock-Johnson because it would allow us to focus on the administration of the relatively brief MBTI assessment. However, we were unable to collect data from the test subjects at Fitchburg High School as described in the methodology. Our plan has now shifted towards analyzing existing data from previous project groups involved in personality and intelligence measures.

The debate about IQ and personality has focused on the S-N dimension as it correlates with tests like the SAT. We will be thinking about which dimensions of the WJ we expect the S-N to correlate with and which other MBTI dimensions should also correlate. The combination of MBTI "types" into bundles should differ on WJ dimensions. We will also see which MBTI and WJ dimensions correlate with others in the same measure. Then we will look at the unexpected correlations in Joel's work and see if they make sense theoretically. Special attention will be paid to see if they are correlated due to any uncontrolled third factor related to both of the correlating dimensions.

In summary, our group is in a very good position to break new ground in the field of psychology, by correlating two prominent pieces of cognitive measurement technology used in the field of psychology. As we understand it, exploring the society-technology connection is the very essence of an Interactive Qualifying Project.

Background

Cognitive psychology is defined as, a branch of psychology concerned with mental processes (as perception, thinking, learning, and memory) especially with respect to the internal events occurring between sensory stimulation and the overt expression of behavior.1 Cognition is perhaps one of the most complex areas studied by psychologists. The MBTI personality traits and Woodcock Johnson cognitive abilities are as follows: Note this background is taken from a previous project by Joel Chery and Mary Bock.

Personality Measurement

A tool used for distinguishing personality traits is the Myer-Briggs Type Indicator (MBTI). The MBTI is considered a "personality" test that can determine a person's preferences. The Woodcock-Johnson battery is considered an "intelligence" test that focuses on information processing and decision making. Both tools yield empirical results, and can be used as psychological measurement and classification tools.

It has always been thought that personality did not correlate with intelligence. Through this project we will be examining this theory and trying to disprove it. If personality is correlated to intelligence at all then theories about learning styles will radically change. A child's learning may depend very much on what type of learner they are. The type of learner can hopefully be determined through the use of a personality test. The MBTI is a much shorter test than the WJ and can be administered to large groups. This would possibly help to find children whom may have cognitive based learning problems and can then be administered the much longer and intense Woodcock Johnson intelligence test to explore the details.

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[1] Dictionary.com definition.

The Myers-Briggs Type Indicator (MBTI)

The MBTI is different from most personality trait measures in that it does not measure variation along a continuum. Rather, the measure attempts to find the respondent's position on either side of four different factors, arrayed as dichotomies. The assumption is that one of each pair of categories relates well to the respondent. The measure indicates the respondent's preference between equally viable mental processes and attitudes. The four dichotomies from the Myers-Briggs are as follows:

Extraversion-Introversion

Extraverts are categorized by their focus on the outer world, people, and things. They are active, using trial and error with confidence and environmentally stimulated. Introverts, on the other had, are oriented to the inner world, idea, and inner impressions. They are reflective, considering deeply before acting, and finding stimulation inwardly.

Sensing Perception-Intuitive Perception

Sensing is best described as perceiving with the five senses, and attending to practical and factual detail. Attending to the present moment, confining attention to what is said and done and letting "the eyes tell the mind." Intuition is the opposite, perceiving with memory and associations, seeing patterns and meanings, and projecting possibilities for the future. It is "reading between the line" looking for the big picture, having hunches, and letting "the mind tell the eyes."

Thinking Judgment-Feeling Judgment

When reasoning with thinking, one uses logic, objectivity, and impersonal criteria. They use cause and effect relationships which are firm minded and skeptical,

prizing logical order. When reasoning with feeling, they apply personal priorities, weighing their own and others human values and motives. They value warmth in relationships, prizing empathy, and trust in making a decision.

Judgment-Perception

When taking a judging attitude, one uses thinking or feeling judgments outwardly, which is controlling and regulating, the want for closure, even when data is incomplete. When taking a perceiving attitude, however, one uses sensing or intuitive perception outwardly, which is taking the information with open-mindedness, and has the need to adapt and change to resist closure in order to obtain more data[2].

No trait can be said to be better than another. All eight methods are used, but one is preferred.[3] Almost every human experience involves the use of perception and judgment. Prior findings using high school and college cases show that the Sensing-Intuition dimension is moderately correlated with SAT and ACT scores. These findings give us cause for optimism that some relationships will be found in the comparison personality and intelligence measures.

Intelligence Measurement

The most widely used intelligence theory today is the Cattell-Horn-Carroll (CHC) Theory of Cognitive Abilities. The framework is compromised of 3 strata; general intelligence, broad cognitive abilities, and narrow cognitive abilities. The broad cognitive abilities are Fluid reasoning (Gf), Comprehension-Knowledge (Gc), Short-term Memory (Gsm), Visual Processing (Gv), Auditory Processing (Ga), Long-term Retrieval (Glr),

[2] Myers et al.
[3] Lawrence, p.1

Processing Speed (Gs), Decision/Reaction time or Speed (Gt), Reading and Writing (Grw), and Quantitative Knowledge (Gq). These categories include approximately seventy narrow abilities[4]. CHC consists of nine broad abilities (Gf, Gc, Gv, Ga, Gsm, Glr, Gs, Gq, Grw)[5]. The Woodcock-Johnson III battery tests seven of these abilities, Gf, Gc, Gv, Ga, Gsm, Glr, and Gs. With empirical data obtained on these cognitive abilities a cognitive profile of the subject can be made.

It is relatively easy to test these seven abilities and obtain empirical results. The theory behind the Woodcock-Johnson measure is that if one can obtain empirical data about the seven broad cognitive abilities, which in CHC Theory are a subset of general intelligence, then reasonable conclusions can be made concerning the cognitive strengths of the subject. The test battery consists of 14 individual tests. Each test measures performance of one of the seven broad cognitive abilities:

1. Comprehension Knowledge (Gc)-Test 1: Verbal Comprehension and Test 11: General Information
2. Long Term Retreival (Glr)-Test 2: Visual Auditory Learning and Test 12: Retrieval Fluency
3. Visual Processing (Gv)- Test 3: Spatial Relations and Test 13: Picture Recognition
4. Auditory Processing (Ga)- Test 4: Sound Blending and Test 14: Auditory Attention
5. Fluid Reasoning (Gf)- Test 5: Concept Formation and Test 15: Analysis Synthesis
6. Processing Speed (Gs)- Test 6: Visual Matching and Test 16: Decision Speed
7. Short-Term Memory (Gsm)- Test 7: Numbers Reversed and Test 17: Memory for Words

[4] McGrew, p. 3
[5] McGrew, Evans, p.13

The 14 tests are scored individually, and the resulting empirical data are used to draw conclusions about the cognitive strengths of the subject[6].

Comprehension-Knowledge (*Gc*): "Can be thought of as the intelligence of the culture that is incorporated by individuals through a process of acculturation."[7] *Gc* is typically described as a person's wealth (breadth and depth) of acquired knowledge of the language, information and concepts of a specific culture, and/or the application of this knowledge. *Gc* is primarily a store of verbal or language-based declarative (knowing "what") and procedural (knowing "how") knowledge acquired through the "investment" of other abilities during formal and informal educational and general life experiences.

Long-term Storage and Retrieval (*Glr*): The ability to store and consolidate new information in long-term memory and later fluently retrieve the stored information (e.g., concepts, ideas, items, names) through association. Memory consolidation and retrieval can be measured in terms of information stored for minutes, hours, weeks, or longer. Horn differentiates two major types of *Glr*—fluency of retrieval of information over minutes or a few hours (intermediate memeory) and fluency of association in retrieval from storage over days, months or years.[8] Exstrom distinguished two additional characteristic processes of *Glr*: "(1) reproductive processes, which are concerned with retrieving stored facts, and (2) reconstructive processes, which involve the generation of material based on stored rules." [9] *Glr* abilities have been prominent in creativity research where they have been referred to as idea production, ideational fluency, or associative fluency.

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[6] The definitions for these seven broad cognitive factors that follow here are taken verbatim from McGrew and Evans' HCA Project Research Report #2.
[7] Horn, 1994, p.443
[8] Horn & Masunaga, 2000
[9] Exstrom et al. 1979 p.24

Visual-Spatial Abilities (*Gv*): "The ability to generate, retain, retrieve, and transform well-structured visual images"[10]. The *Gv* domain represents a collection of different abilities each that emphasize a different process involved in the generation, storage, retrieval and transformation (e.g., mentally reverse or rotate shapes in space) of visual images. *Gv* abilities are measured by tasks (figural or geometric stimuli) that require the perception and transformation of visual shapes, forms, or images and/or tasks that require maintaining spatial orientation with regard to objects that may change or move through space.

Auditory Processing (*Ga*): Abilities that "depend on sound as input and on the functioning of our hearing apparatus"[11]. A key characteristic of *Ga* abilities is the extent an individual can cognitively "control" (i.e., handle the competition between "signal" and "noise") the perception of auditory information, The *Ga* domain circumscribes a wide range of abilities involved in discriminating patterns in sounds and musical structure (often under background noise and/or distorting conditions) and the ability to analyze, manipulate, comprehend and synthesize sound elements, groups of sounds, or sound patterns.[12] Although *Ga* abilities play an important role in the development language abilities (*Gc*), *Ga* abilities do not require the comprehension of language (*Gc*).

Fluid Intelligence/Reasoning (*Gf*): The use of deliberate and controlled mental operations to solve novel "on the spot" problems (i.e., tasks that cannot be performed automatically). Mental operations often include drawing inferences, concept formation, classification, generating and testing hypotheses, identifying relations, comprehending implications, problem solving, extrapolating, and transforming information. Inductive

[10] Lohman, 1994, p.1000
[11] Stankov, 1994, p.157
[12] Gustafsson and Undheim, 1996

(inference of a generalized conclusion from particular instances) and deductive reasoning (the deriving of a conclusion by reasoning; specifically: inference in which the conclusion about particulars follows necessarily from general or universal premises) are generally considered the hallmark indicators of *Gf*. *Gf* has been linked to *congnitive complexity* which can be defined as a greater use of a wide and diverse array of elementary cognitive process during performance.

Cognitive Processing Speed (*Gs*): The ability to automatically and fluently perform relatively easy or over-learned cognitive tasks, especially when high mental efficiency (i.e., attention and focused concentration) is required. The speed of executing relatively over-learned or automatized elementary cognitive processes.

Short-term Memory (*Gsm*): The ability to apprehend and maintain awareness of elements of information in the immediate situation (events that occurred in the last minute or so). A limited-capacity system that loses information quickly through the decay of memory traces, unless an individual activates other cognitive resources to maintain the information in immediate awareness.

The Woodcock-Johnson III Tests of Cognitive Abilities

The Woodcock-Johnson III cognitive test battery examines the seven CHC factors defined in the previous section. The tests that deal with these factors are tests one through seven of the standard battery, and tests eleven through seventeen of the extended battery. The descriptions of the tests are as follows.

Test 1: Verbal Comprehension: This test has four subtests, namely, Picture Vocabulary, Synonyms, Antonyms, and Verbal Analogies. Each tests a different aspect of English language development. Picture Vocabulary measures lexical knowledge. The

test requires the person to identify pictures of objects. The beginning items require the subject to point to pictures of common objects. The remaining items require the subject to name pictures orally. The difficulty of test items increases gradually as the selected pictures are not necessarily commonplace, nor do they necessarily represent familiar concepts. Synonyms measures vocabulary knowledge. The test involves the subject hearing a word and providing a synonym. Antonyms measures a counterpart aspect of vocabulary knowledge. In this test, the subject hears a word and then must provide an antonym for that word. Finally, Verbal Analogies is a measure of the subject's ability to reason using lexical knowledge. In this test, the subject listens to three words of an analogy and must then complete the analogy with an appropriate fourth word. Verbal Comprehension has a median reliability of .90 in the age 2 to 19 range, and .95 in the adult range. The test corresponds to the Gc factor of CHC theory.

Test 2: Visual-Auditory Learning: This test is a long-term storage and retrieval exercise (Glr). The test requires the subject to learn, store, and retrieve a series of visual-auditory associations. On this test of associative and meaningful memory, the subject must learn and recall rebuses (pictographic representations of words). Visual-Auditory Learning has a median reliability of .86 in the age 5 to 19 range and .91 in the adult range.

Test 3: Spatial Relations: This test measures ability in visual-spatial thinking (Gv). The task requires the subject to identify the two or three pieces that form a complete target shape. The difficulty of each test item increases gradually as pieces are flipped, rotated, and become more similar in appearance. Spatial Relations has a median reliability of .81 in the age 5 to 19 range and .85 in the adult range.

Test 4: Sound Blending: This is auditory processing (Ga) measure. The test measures skill in synthesizing language sounds (phonemes). The subject must listen to a series of syllables or phonemes and then blend the sounds into a complete word. The difficulty of test items increases gradually as words comprising an increasing number of phonemes are spoken to the subject. Sound Blending has a median reliability of .86 in the age 5 to 19 range and .93 in the adult range.

Test 5: Concept Formation: This is a test of fluid reasoning (Gf), and is a controlled-learning task. The task involves categorical reasoning based on principles of inductive logic. The test also measures an aspect of executive processing—flexibility in thinking when required to shift mental sets frequently. This test does not include a memory component, which sets it apart from most other concept formation tasks. The subject is presented with a stimulus set from which he or she must derive the rule for each item. For all but the last few test items the subject is given immediate feedback regarding the correctness of each given answer before the next item is presented. Concept Formation has a median reliability of .94 in the age 5 to 19 range and .96 in the adult range.

Test 6: Visual Matching: This is a test of processing speed (Gs). Specifically, the test is a measure of perceptual speed. It measures the speed at which the subject can make visual symbol distinctions. There are two versions of the test. Visual Matching 1 is designed to be administered among preschool children and individuals who have developmental delays or reduced functioning. This version requires the subject to point to the two matching shapes in a row of four to five shapes. There is a two minute time limit and the subject is not required to write. Visual Matching 2 is for individuals above the developmental age of an average 5-year-old. The subject is required to look along a

row of six numbers and circle the two numbers that are the same. The test items increase in difficulty, beginning with single-digit numbers and ending with triple-digit numbers. There is a three minute time limit. Visual Matching has a median reliability of .89 in the age 5 to 19 range and .93 in the adult range. Please note that only Visual Matching 2 applied to the subjects in this project, and Visual Matching 1 was not administered at all.

Test 7: Numbers Reversed: This is a test of short-term memory (Gsm). It is primarily a measure of short-term memory span, but it can also be used to measure working memory or attentional capacity. In this test, the subject must hold a sequence of numbers in memory while performing a mental operation on it, in this case, reversing the order of the numbers. Numbers Reversed has a median reliability of .86 in the age five to nineteen range and .90 in the adult range.

Test 11: General Information: This test measures comprehension-knowledge (Gc), namely the depth of the subject's general verbal knowledge. General Information has two subtests. In the first subtest, subjects are asked "Where would you find...(an object)?" In the second subtest, subjects are asked "What would you do with...(an object)?" The test progresses in difficulty, beginning with objects that are commonplace and ending with objects that are more unusual. General Information has a median reliability of .88 in the age five to nineteen range and .94 in the adult range.

Test 12: Retrieval Fluency: This test measures an aspect of long-term retrieval (Glr), namely fluency of retrieval from stored knowledge. The subject is asked to name as many examples from a given category as possible in one minute. There are three different categories: things you eat or drink, first names of people, and animals. Retrieval

Fluency has a median reliability of .83 in the age five to nineteen range, and .91 in the adult range.

Test 13: Picture Recognition: This test measures an aspect of visual-spatial thinking (Gv), namely, visual memory of objects or pictures. The subject is presented a set of pictures for five seconds, and is asked to identify a subset of those pictures among a field of distracting pictures. Verbal mediation is eliminated as a memory strategy, varieties of the same type of object are used as the stimuli and distraction images. The difficulty of the test increases as the number of stimulus pictures increases. Picture Recognition has a median reliability of .72 in the age five to nineteen range and .79 in the adult range.

Test 14: Auditory Attention: This test measures an aspect of speech-sound discrimination—the ability to overcome the effects of auditory distortion or masking in understanding oral language. This is one of the narrow cognitive factors of auditory processing (Ga) that requires selective attention. The subject must listen to a word while seeing a row of four pictures, and must point to the correct picture for that word. The difficulty increases as some background noise increases in intensity. Auditory Attention has a median reliability of .87 in the age five to nineteen range, and .89 in the adult range.

Test 15: Analysis-Synthesis: This is a test of fluid reasoning (Gf), namely, general deductive reasoning, a thinking ability. It is a controlled-learning task in which the subject is given instructions on how to perform an increasingly complex procedure. In all but the last few test items, the subject is given immediate corrective feedback for each response before the next item is presented. The test actually involves learning a miniature system of mathematics, although this information is not told to the subject. The test also contains some of the features involved in using symbolic formulations in

other fields, like logic and chemistry. Analysis-Synthesis has a median reliability of .89 in the age five to nineteen range and .94 in the adult range.

Test 16: Decision Speed: This measures an aspect of processing speed (Gs), namely, the ability to make correct conceptual decisions quickly. The subject is shown rows of pictures. For each row he or she must locate as quickly as possible the two pictures that are most similar conceptually. There is a three minute time limit. Decision speed has a median reliability of .87 in the age five to nineteen range and .90 in the adult range.

Test 17: Memory for Words: This test measures short term memory span (Gsm). The subject is asked to repeat lists of unrelated words in the order they are given. As the test progresses, the number of words in each list increases. Memory for Words has a median reliability of .78 in the age five to nineteen range and .85 in the adult range.

As described above, each of the fourteen tests from the Woodcock-Johnson III Tests of Cognitive Abilities that were administered as part of this study corresponds to one of the seven previously defined CHC factors. Each factor also has exactly two tests that measure cognitive performance of a subject therein. Given that none of the tests administered has a median reliability below .72, it is reasonably safe to assume that once all tests are administered to a particular subject, researchers will have a good measure of the cognitive performance of the subject in the Gc, Glr, Gv, Ga, Gf, Gs, and Gsm factors of CHC theory.[13]

[13] Special credit is due to Mary Bock and Joel Chery for their original background information on the MBTI and Woodcock Johnson.

Hypotheses

The fourteen cognitive abilities will be investigated separately and compared to the sixteen MBTI personality types. We have predicted which ability will correlate the best with certain personalities based on the descriptions of the WJ test, and the descriptions of MBTI profile results.

Verbal Comprehension (WJ1): has the largest probability of correlating with intuitive (N) perception (P). Verbal comprehension ranks the vocabulary ability and knowledge a person has, which will be helped by perception with memory. Intuitive types let the mind tell the eye the meaning of what it sees. The predicted rank order for verbal comprehension is NP, NJ, SP, SJ.

Visual-Auditory learning (WJ2): people with strong intuition (N) and a perceptive attitude (P) should show strong abilities in this aspect. Visual-auditory learning is based on memory storage and retrieval. Intuition is based on perception with memory and association, and perception helps to contribute to the taking in of information. Therefore these two types should show a correlation with visual-auditory learning. The predicted rank order for visual-auditory learning is NP, NJ, SP, SJ.

Spatial Relations (WJ3): Thinking judgment (T) uses objective and impersonal criteria in making a logical analysis. Sensing (S) perceives with the five senses, of these sight being the most important in being able to form a target shape from given pieces. These people are more in touch with physical realities and may have an easier time and identifying what goes together easily. The predicted rank order for spatial relations is ST, NT, SF, NF.

Sound Blending (WJ4): Sound blending requires the ability to listen to and combine syllables into words. Perceiving with the five senses (especially hearing) and using perception to take in these sounds and information is helped through a sensing and perceiving personality. The predicted rank order for sound blending is SP, SJ, NP, NJ.

Concept Formation (WJ5): The ability to form a rule is very much aided by thinking and logical order present in the thinking type of person. Judgment also lends a hand to this task. Judgment depends on controlling and regulating, which will help to spot rules that objects are following. The predicted rank order of concept formation is TJ, TP, FJ, FP.

Visual Matching (WJ6): Visual matching is aided by sensing and using perception by sight. This may also be easier for extroverts since it is a measure of speed and extraverts are more active and stimulated. The predicted rank order for visual matching is SP, SJ, NP, NJ.

Numbers Reversed (WJ7): Intuition and thinking should lend a hand in this task. Intuitive people acquire information through memory which will allow them to easily remember numbers being read to them. When reasoning with thinking one uses logical analysis and prizes logical order. This will help aide in the ability to reverse numbers held in the mind in a logical order. The predicted rank order for number reversal is NT, NF, ST, SF.

General Information (WJ11): Since this test involves answering where and what factual questions, the Sensing (S) might have precedence over the others. A person with Sensing personality tends to draw on experience and precedence. They have a good command of facts and details that underlie current policies and procedures. Whereas, the

Intuitives (N) insight comes from inspiration and their ideas are new ones that they come up with on their own. Introverts (I) will probably do better than Extroverts (E) on this test because of their tendency to internalize information and facts. Our rankings for this category would be IS>IN>ES>EN.

Retrieval Fluency (WJ12): During this test, the respondent tries to name as many things possible in one minute in a respective category (i.e. fruits). Extraverts (E) would respond high in this category because their decision making is at a rapid pace and they are focused on action. Even though this is a timed event, Intuitives (N) might do well in this case because they come up with patterns and relationships easily. For example, the examinee might devise a plan before naming fruits such as naming all of the red ones he or she can think of and all of the yellow ones and so forth. Another plan may be to start with the letter A and name all of the fruits they can think of with A, then B, and C, etc. My rankings for this category are as follows: EN, ES, IN, and IS being the lowest scorer on this test.

Picture Recognition (WJ13): Sensing types (S) would probably do best during the task of identifying a picture in a group of similar pictures 5 seconds after seeing it alone. This group tends to let the "eyes tell the mind" what to do. Judging (J) types might also succeed in this test because their personalities involve stability and planning responses to change. A person who is in the judging category will be able to respond to the change when other pictures are added to the surroundings of the original. They will not get distracted; they will know where to direct their attention. Our rankings for this category in descending order are: SJ, SP, NJ, and NP.

Auditory Attention (WJ14): Extraverts (E) would score higher on this test than Introverts (I). Also Sensing (S) types would most likely score higher during this test because they respond systematically under stressful situations. Intuitive (N) types would be at a disadvantage. Our rankings in descending order are ES, EN, IS and IN.

Analysis Synthesis (WJ15): Intuitives (N) might do well in this test area because they are able to predict patterns, which is often involved in both scientific and mathematic problem solving. They also might do well on this task because it is not timed and they are allowed to process the information internally and reflect on it. Thinking (T) might score high on this test because they often use logic to solve problems. Our rankings in descending order are NT, NF,ST and SF.

Decision Speed (WJ16): In a row of pictures, the examinee must find the two that are most similar conceptually. Since this is a timed event Extraverts (E) and Judging (J) types would probably do best because they are focused on action at a rapid pace. Sensing should also do well because they are attending to practical and factual detail when making a conceptual correlation in their mind. Our rankings are as follows: EJ, EP, IJ, and IP being the least correlated.

Memory for Words (WJ17): Since this test involves repeating words aloud, Extraverts (E) would probably respond higher in this test because talking is their trigger for internal information processing. Sensing (S) types might also thrive in this area because they are good with problem solving strategies that will help them plan a way to remember these words. For example, the test taker might remember the first letter of each word that was dictated to them to help them remember the full word when asked to

repeat the series back to the proctor. So I would hypothesize that the rankings would be as follows: ES, IS, EN, and the lowest being IN.

Another hypothesis is that abilities requiring speed should be easier for extraverts who are very active. Introverts should show increases in abilities that require focus and deeper consideration.

Any observations and analysis that come out of this project may lean more towards thinking personality types. All of the people surveyed in our data base are student from WPI and therefore many of the student may have cognitive or personality similarities. Since WPI is a science and technology university many of the students surveyed tend to have a thinking personality that will give them logical analytical skills. Thinking is the only traits that we see having a possibility of being more common in technologically related students.

Methodology

There have been many changes to our original proposal. When starting the project our ideal time frame of this project would have been as follows: From the time of agreement with Fitchburg High School in A term until the end of B term, preparations and appointments would be made to begin the administration of the MBTI. C term would be spent analyzing the data, interpreting results, and drawing conclusions which would culminate into a final written report. At the beginning of A term, 2005, we offered to help Fitchburg High School gain more knowledge about what types of students thrive and struggle in the existing programs. Not only would this research have been beneficial to our project on the correlations between intelligence and personality but it would also have provided the school system with a chance to explore cognitive measures that could shape different learning styles. For reference, the original project proposal can be found in Appendix A.

A term, we wrote and hand delivered a proposal to the Fitchburg High School public school system. Before the proposal was accepted several meetings were required to set up the technicalities of the project. This involved several trips outside of our actual project meeting time. This proposal was then accepted by Christopher Woods, a member of the guidance department. We were told that we would be notified when everything fell into place. While we were waiting for Fitchburg to arrange for the project to be set up we were taught the two tests that were being used. We first met with James Creed, an expert practitioner on the Woodcock-Johnson, to learn about different factors of the Woodcock Johnson. We were given a tutorial on the different cognitive factors and general information on how the test is administered. Both of us were administered the

Woodcock Johnson individually by James Creed. Our scores were delivered and interpreted by Creed at a separate meeting thereafter. Several meetings were also devoted to being taught different aspects of the MBTI by John Wilkes. We learned the different personality types involved in MBTI as well as how it is administered. We were given the MBTI to take home and look at and administer to ourselves. Our personality types were given to us at the next meeting along with a booklet that both interpreted and analyzed the findings. Being administered both the WJ and the MBTI gave us a better understanding of what was actually being tested as well as providing two more cases to the data set.

B term was apparent that the administration at Fitchburg High School still had to tie up a couple of loose ends before we were able to go in and test the students. During this term, phone calls, emails and meetings were arranged to try to move the project along a little quicker because we were not confident that everything would actually work out and we were on a time schedule. At the end of B term we decided that we would need a cut off date for the final response from Fitchburg if the project was going to work out as scheduled. We then wrote a letter to Fitchburg explaining that our project was time sensitive. The letter contained a deadline in mid January so we could collect the data during winter break and it would be readily available to interpret and analyze during the entirety of C term. We got a response a week after they received our request saying that they found a class that agreed to have the MBTI administered to and that they just needed to send out a permission slip to the parents of the children to participate in this study.

C term This provided us with false hope, because when we returned from winter break there was no further response from Fitchburg. They continued to ignore our requests for

a final answer throughout the entire month of January. Project meetings for the beginning of C term were then devoted to coming up with alternate plans for the study. Some ideas included: 1) working with the other Personality and Intelligence group that received cases from the West Boylston Public System. 2) Obtain MBTI samples from a C term Sociology class and ask Mary Brock to administer the WJ to any willing participants or 3) Quickly patch up holes in existing data and reanalyze the existing data and hypotheses. The latter was chosen by default since West Boylston system also failed to deliver cases. They tried, but the students had not been administered the whole WJ or sometimes it was old data, and the system wanted delays to re-administer the WJ battery. There was no time for that in our schedule. The other team decided to extend the project and recruit more cases for administration of the WJ on campus as their back up plan while waiting out West Bolyston. We could not do that, so with the addition of 3-4 cases to the data set, our own and those of the other team members, we decided to reanalyze the existing data set of 34 cases, as our own hypotheses differed from those of Mary and Joel, the prior analysis team.

After critically reviewing last year's report we began to write our own report. As noted, we reviewed last year's hypotheses, MBTI and WJ literature and formulated our own rather different hypotheses. After filling in a couple of holes in the existing data we were ready to see if our hypotheses were supported. Reanalysis of last year's data, our own analyses, and final conclusions will set the stage for the other team to add 20 more cases taking the data set from 34 to 54 and then retest our hypotheses. Our combined analyses should provide a solid initial data set for any subsequent project work that involves correlating and continuing data on personality and intelligence. Hopefully by

next year West Boylston will have contributed the 25 cases they promised and the data set will include 80 cases which was our minimum goal for this year.

Analysis

Based mainly on last year's database with the addition of our own cases and filling of a few holes we have 34 complete cases. The data set was restructured in Microsoft Excel and new labels were added to make for a more coherent structure. The data was then ran through correlation cross tabs in SPSS.

After analysis of each of the fourteen cognitive abilities we have come to the following conclusions about each of the abilities and the personality type that best correlated:

Verbal Comprehension (WJ1): The original hypothesis was NP>NJ>SP>SJ. Looking at analysis in Table 1, it can be seen that neither a perceptive attitudes or sensing gives an advantage in this test. Therefore Verbal comprehension is not correlated to the SN or JP aspect of personality.

Table 1

			trichotomized 1A			
			Low	Medium	High	Total
verbal comp WJ1	SJ	Count	2	3	3	8
		% within verbal comp WJ1	25.0%	37.5%	37.5%	100.0%
		% within trichotomized 1A	14.3%	30.0%	37.5%	25.0%
	SP	Count	4	3	1	8
		% within verbal comp WJ1	50.0%	37.5%	12.5%	100.0%
		% within trichotomized 1A	28.6%	30.0%	12.5%	25.0%
	NJ	Count	4	0	1	5
		% within verbal comp WJ1	80.0%	.0%	20.0%	100.0%
		% within trichotomized 1A	28.6%	.0%	12.5%	15.6%
	NP	Count	4	4	3	11
		% within verbal comp WJ1	36.4%	36.4%	27.3%	100.0%
		% within trichotomized 1A	28.6%	40.0%	37.5%	34.4%
Total		Count	14	10	8	32
		% within verbal comp WJ1	43.8%	31.3%	25.0%	100.0%
		% within trichotomized 1A	100.0%	100.0%	100.0%	100.0%

After analyzing Table 1 we will assume that the actual rank order is SJ>NP>SP>NJ.

Visual Auditory (WJ2): The original hypothesis for Visual auditory learning was NP>NJ>SP>SJ. As predicted, intuitive personalities showed the best correlation with visual auditory learning. An advantage in perception had also been hypothesized, which came out to be false. Judgment had a slight advantage in this ability. This can be seen in Table 2.

Table 2

			Tricotomized WJ2			
			Low	Medium	High	Total
verbal auditory learning WJ2	SJ	Count	2	4	2	8
		% within verbal auditory learning WJ2	25.0%	50.0%	25.0%	100.0%
		% within Tricotomized WJ2	20.0%	33.3%	20.0%	25.0%
	SP	Count	4	0	4	8
		% within verbal auditory learning WJ2	50.0%	.0%	50.0%	100.0%
		% within Tricotomized WJ2	40.0%	.0%	40.0%	25.0%
	NJ	Count	1	2	2	5
		% within verbal auditory learning WJ2	20.0%	40.0%	40.0%	100.0%
		% within Tricotomized WJ2	10.0%	16.7%	20.0%	15.6%
	NP	Count	3	6	2	11
		% within verbal auditory learning WJ2	27.3%	54.5%	18.2%	100.0%
		% within Tricotomized WJ2	30.0%	50.0%	20.0%	34.4%
Total		Count	10	12	10	32
		% within verbal auditory learning WJ2	31.3%	37.5%	31.3%	100.0%
		% within Tricotomized WJ2	100.0%	100.0%	100.0%	100.0%

After analyzing Table 2 we will assume that the actual rank order is NJ>SJ, NP>SP.

Spatial Relations (WJ3): The original hypothesis for spatial relations was ST>NT>SF>NF. After running analysis as shown in Table 3, it can be seen that there is not a correlation between SN or TF with spatial relations.

Table 3

			trichotomized wj3			
			Low	Medium	High	Total
spatial reasoning WJ3	NF	Count	1	3	3	7
		% within spatial reasoning WJ3	14.3%	42.9%	42.9%	100.0%
		% within trichotomized wj3	7.7%	30.0%	33.3%	21.9%
	NT	Count	4	4	1	9
		% within spatial reasoning WJ3	44.4%	44.4%	11.1%	100.0%
		% within trichotomized wj3	30.8%	40.0%	11.1%	28.1%
	ST	Count	8	3	5	16
		% within spatial reasoning WJ3	50.0%	18.8%	31.3%	100.0%
		% within trichotomized wj3	61.5%	30.0%	55.6%	50.0%
Total		Count	13	10	9	32
		% within spatial reasoning WJ3	40.6%	31.3%	28.1%	100.0%
		% within trichotomized wj3	100.0%	100.0%	100.0%	100.0%

After analyzing Table 3 we will assume that the actual rank order is NF>ST>NT. None being present in SF.

Sound Blending (WJ4): The original hypothesis for sound blending was SP>SJ>NP>NJ. Table 4 shows that people with the sensing trait showed an increase in sound blending. Perception does not show an increase over judgment though.

Table 4

			trichotomized wj4			
			Low	Medium	High	Total
Sound blending WJ4	SP	Count	4	3	1	8
		% within Sound blending WJ4	50.0%	37.5%	12.5%	100.0%
		% within trichotomized wj4	25.0%	33.3%	14.3%	25.0%
	SJ	Count	3	3	2	8
		% within Sound blending WJ4	37.5%	37.5%	25.0%	100.0%
		% within trichotomized wj4	18.8%	33.3%	28.6%	25.0%
	NP	Count	6	2	3	11
		% within Sound blending WJ4	54.5%	18.2%	27.3%	100.0%
		% within trichotomized wj4	37.5%	22.2%	42.9%	34.4%
	NJ	Count	3	1	1	5
		% within Sound blending WJ4	60.0%	20.0%	20.0%	100.0%
		% within trichotomized wj4	18.8%	11.1%	14.3%	15.6%
Total		Count	16	9	7	32
		% within Sound blending WJ4	50.0%	28.1%	21.9%	100.0%
		% within trichotomized wj4	100.0%	100.0%	100.0%	100.0%

After analyzing Table 4 we will assume that the actual rank order is SJ>SP>NP>NJ.

Concept formation (WJ5): The original hypothesis for concept formation was TJ>TP>FJ>FP. Table 5 shows that people that use perception rather than thinking actually do better when it comes to concept formation, which is opposite of what had been hypothesized. Thinking does not show and advantage over feeling, in fact the type that correlated highest with concept formation was a feeling type.

Table 5

			Trichotomized WJ5			
			30-35	36-38	39-40	Total
concept formation WJ5	FP	Count	1	1	3	5
		% within concept formation WJ5	20.0%	20.0%	60.0%	100.0%
		% within Trichotomized WJ5	9.1%	11.1%	27.3%	16.1%
	FJ	Count	0	2	0	2
		% within concept formation WJ5	.0%	100.0%	.0%	100.0%
		% within Trichotomized WJ5	.0%	22.2%	.0%	6.5%
	TP	Count	5	2	6	13
		% within concept formation WJ5	38.5%	15.4%	46.2%	100.0%
		% within Trichotomized WJ5	45.5%	22.2%	54.5%	41.9%
	TJ	Count	5	4	2	11
		% within concept formation WJ5	45.5%	36.4%	18.2%	100.0%
		% within Trichotomized WJ5	45.5%	44.4%	18.2%	35.5%
Total		Count	11	9	11	31
		% within concept formation WJ5	35.5%	29.0%	35.5%	100.0%
		% within Trichotomized WJ5	100.0%	100.0%	100.0%	100.0%

After analyzing Table 5 we will assume that the actual rank order is FP>TP>FJ>TJ.

Visual Matching (WJ6): The original hypothesis for visual matching was SP>SJ>NP>NJ. This turned out to be a perfect reversal of the actual findings. Table 6 shows a clear definition between each type, and it can be seen that intuition comes first in giving an advantage, followed by judgment.

Table 6

			trichotomized wj6			
			Low	Medium	High	Total
visual matching WJ6	NJ	Count	1	1	3	5
		% within visual matching WJ6	20.0%	20.0%	60.0%	100.0%
		% within trichotomized wj6	7.7%	10.0%	33.3%	15.6%
	NP	Count	4	3	4	11
		% within visual matching WJ6	36.4%	27.3%	36.4%	100.0%
		% within trichotomized wj6	30.8%	30.0%	44.4%	34.4%
	SJ	Count	4	2	2	8
		% within visual matching WJ6	50.0%	25.0%	25.0%	100.0%
		% within trichotomized wj6	30.8%	20.0%	22.2%	25.0%
	SP	Count	4	4	0	8
		% within visual matching WJ6	50.0%	50.0%	.0%	100.0%
		% within trichotomized wj6	30.8%	40.0%	.0%	25.0%
Total		Count	13	10	9	32
		% within visual matching WJ6	40.6%	31.3%	28.1%	100.0%
		% within trichotomized wj6	100.0%	100.0%	100.0%	100.0%

After analyzing Table 6 we will assume that the actual rank order is NJ>NP>SJ>SP.

Numbers Reversed (WJ7): The original hypothesis for number reversal was NT>NF>ST>SF. Table 7 shows that intuition does help with number reversal. Our hypothesis was correct, and our analysis shows that intuition is the most predominant correlation to number reversal, followed by thinking.

Table 7

			trichotomized wj7			
			Low	Medium	High	Total
numbers reversed WJ7	ST	Count	8	6	2	16
		% within numbers reversed WJ7	50.0%	37.5%	12.5%	100.0%
		% within trichotomized wj7	57.1%	54.5%	28.6%	50.0%
	NF	Count	1	5	1	7
		% within numbers reversed WJ7	14.3%	71.4%	14.3%	100.0%
		% within trichotomized wj7	7.1%	45.5%	14.3%	21.9%
	NT	Count	5	0	4	9
		% within numbers reversed WJ7	55.6%	.0%	44.4%	100.0%
		% within trichotomized wj7	35.7%	.0%	57.1%	28.1%
Total		Count	14	11	7	32
		% within numbers reversed WJ7	43.8%	34.4%	21.9%	100.0%
		% within trichotomized wj7	100.0%	100.0%	100.0%	100.0%

After analyzing Table 7 we will assume that the actual rank order is NT>NF>ST. No SF were reported.

General Information (WJ11): Our original hypothesis was IS>IN>ES>EN. As shown in Table 8 ES appears to be the lowest scoring group with most in the medium and low categories. Introverts (I) did best during this test as shown below because IN types have scored the highest followed by IS types. The prediction that Sensing (S) types would be favored for this test was not true, Intuitives (I) ended up scoring higher.

Table 8

			trichotomized 11A			
			Low	Medium	High	Total
general info WJ11	EN	Count	4	1	2	7
		% within general info WJ11	57.1%	14.3%	28.6%	100.0%
		% within trichotomized 11A	26.7%	12.5%	22.2%	21.9%
	ES	Count	4	3	1	8
		% within general info WJ11	50.0%	37.5%	12.5%	100.0%
		% within trichotomized 11A	26.7%	37.5%	11.1%	25.0%
	IN	Count	3	3	3	9
		% within general info WJ11	33.3%	33.3%	33.3%	100.0%
		% within trichotomized 11A	20.0%	37.5%	33.3%	28.1%
	IS	Count	4	1	3	8
		% within general info WJ11	50.0%	12.5%	37.5%	100.0%
		% within trichotomized 11A	26.7%	12.5%	33.3%	25.0%
Total		Count	15	8	9	32
		% within general info WJ11	46.9%	25.0%	28.1%	100.0%
		% within trichotomized 11A	100.0%	100.0%	100.0%	100.0%

After analyzing Table 8 we will assume that the actual rank order is IN>IS>EN>ES.

Retrieval Fluency (WJ12): Our original hypothesis was: EN>ES>IN>IS. It is evident that there is an Extravert (E) advantage over the Introverts (I) as seen in Table 9. The results from this table show that Sensing (S) types have an advantage over the Intuitives (N) which is the opposite of what we predicted. It is clear that IN's would most likely score the lowest during this WJ test because 0 were high scorers and most of the bulk of INs fell into the low end.

Table 9

			trichotomized 12A			
			Low	Medium	High	Total
returieval fluency WJ12	IS	Count	4	1	3	8
		% within returieval fluency WJ12	50.0%	12.5%	37.5%	100.0%
		% within trichotomized 12A	30.8%	11.1%	30.0%	25.0%
	IN	Count	5	2	0	7
		% within returieval fluency WJ12	71.4%	28.6%	.0%	100.0%
		% within trichotomized 12A	38.5%	22.2%	.0%	21.9%
	ES	Count	2	2	4	8
		% within returieval fluency WJ12	25.0%	25.0%	50.0%	100.0%
		% within trichotomized 12A	15.4%	22.2%	40.0%	25.0%
	EN	Count	2	4	3	9
		% within returieval fluency WJ12	22.2%	44.4%	33.3%	100.0%
		% within trichotomized 12A	15.4%	44.4%	30.0%	28.1%
Total		Count	13	9	10	32
		% within returieval fluency WJ12	40.6%	28.1%	31.3%	100.0%
		% within trichotomized 12A	100.0%	100.0%	100.0%	100.0%

After analyzing Table 9 we will assume that the actual rank order is ES>EN>IS>IN.

Picture recognition (WJ13): Our original hypothesis was: SJ>SP>NJ>NP. As seen in Table 10, the number of cases in NJ's high and medium categories were high percentage wise, even showing no low scorers proving that NJ is the high scorer. There is a clear S-N finding. Judging types have an advantage over Perceiving (P) types because there is a high percentage of high and medium scorers for both NJ and SJ over SP and NP. One thing that stands out is that SP's will most likely have a disadvantage in this WJ test as indicated by the table below because there are no high scorers.

Table 10

			trichotomized WJ13			
			Low	Medium	High	Total
picture recognition WJ13	NP	Count	2	3	2	7
		% within picture recognition WJ13	28.6%	42.9%	28.6%	100.0%
		% within trichotomized WJ13	18.2%	20.0%	33.3%	21.9%
	NJ	Count	0	7	2	9
		% within picture recognition WJ13	.0%	77.8%	22.2%	100.0%
		% within trichotomized WJ13	.0%	46.7%	33.3%	28.1%
	SP	Count	6	2	0	8
		% within picture recognition WJ13	75.0%	25.0%	.0%	100.0%
		% within trichotomized WJ13	54.5%	13.3%	.0%	25.0%
	SJ	Count	3	3	2	8
		% within picture recognition WJ13	37.5%	37.5%	25.0%	100.0%
		% within trichotomized WJ13	27.3%	20.0%	33.3%	25.0%
Total		Count	11	15	6	32
		% within picture recognition WJ13	34.4%	46.9%	18.8%	100.0%
		% within trichotomized WJ13	100.0%	100.0%	100.0%	100.0%

After analyzing Table 10 we will assume that the actual rank order is NJ>NP>SJ>SP.

Auditory attention (WJ14): Original hypothesis was: ES>EN>IS>IN. As shown in Table 11, IS would most likely score the highest on this test because they had the most high and medium scorers with ES coming in with a close second place. There is a clear S-N finding as both ES and IS had the most high scorers showing that it is likely that Sensing types will score higher on this test than Intuitives (N).

Table 11

			trichotomized WJ14			
			Low	Medium	High	Total
Auditory attention WJ14	IN	Count	5	2	0	7
		% within Auditory attention WJ14	71.4%	28.6%	.0%	100.0%
		% within trichotomized WJ14	50.0%	15.4%	.0%	21.9%
	IS	Count	1	3	4	8
		% within Auditory attention WJ14	12.5%	37.5%	50.0%	100.0%
		% within trichotomized WJ14	10.0%	23.1%	44.4%	25.0%
	EN	Count	2	6	1	9
		% within Auditory attention WJ14	22.2%	66.7%	11.1%	100.0%
		% within trichotomized WJ14	20.0%	46.2%	11.1%	28.1%
	ES	Count	2	2	4	8
		% within Auditory attention WJ14	25.0%	25.0%	50.0%	100.0%
		% within trichotomized WJ14	20.0%	15.4%	44.4%	25.0%
Total		Count	10	13	9	32
		% within Auditory attention WJ14	31.3%	40.6%	28.1%	100.0%
		% within trichotomized WJ14	100.0%	100.0%	100.0%	100.0%

After analyzing Table 11 we will assume that the actual rank order is IS>ES>EN>IN.

Analysis-Synthesis (WJ15): Our original hypothesis was NT> NF>ST>SF. Most of the NT types were in the medium and high groups as seen in Table 12, indicating that they will most likely perform best on this test. Whereas, most of the NF types scored in the low area indicating that they will show a weaker performance on this test.

Table 12

			trichotomized WJ15			
			Low	Medium	High	Total
analysis synthesis WJ15	ST	Count	8	4	4	16
		% within analysis synthesis WJ15	50.0%	25.0%	25.0%	100.0%
		% within trichotomized WJ15	53.3%	44.4%	50.0%	50.0%
	NF	Count	5	0	2	7
		% within analysis synthesis WJ15	71.4%	.0%	28.6%	100.0%
		% within trichotomized WJ15	33.3%	.0%	25.0%	21.9%
	NT	Count	2	5	2	9
		% within analysis synthesis WJ15	22.2%	55.6%	22.2%	100.0%
		% within trichotomized WJ15	13.3%	55.6%	25.0%	28.1%
Total		Count	15	9	8	32
		% within analysis synthesis WJ15	46.9%	28.1%	25.0%	100.0%
		% within trichotomized WJ15	100.0%	100.0%	100.0%	100.0%

After analyzing Table 12 we will assume that the actual rank order is NT>ST>NF.

Decision Speed (WJ16): Original hypothesis was: EJ>EP> IJ> IP. As seen in Table 13, our hypothesis is opposite from the actual results. IP types performed the best on this test area as seen with their total number of medium scorers and the fewest amount of low scorers relative to the total amount of people in this category. It was clear that EJ's performed significantly lower on this test than the rest of the types, which is the opposite of what we predicted.

Table 13

			trichotomized WJ16		
			Low	Medium	Total
Decision Speed WJ16	IP	Count	3	5	8
		% within Decision Speed WJ16	37.5%	62.5%	100.0%
		% within trichotomized WJ16	21.4%	27.8%	25.0%
	IJ	Count	4	5	9
		% within Decision Speed WJ16	44.4%	55.6%	100.0%
		% within trichotomized WJ16	28.6%	27.8%	28.1%
	EP	Count	5	6	11
		% within Decision Speed WJ16	45.5%	54.5%	100.0%
		% within trichotomized WJ16	35.7%	33.3%	34.4%
	EJ	Count	2	2	4
		% within Decision Speed WJ16	50.0%	50.0%	100.0%
		% within trichotomized WJ16	14.3%	11.1%	12.5%
Total		Count	14	18	32
		% within Decision Speed WJ16	43.8%	56.3%	100.0%
		% within trichotomized WJ16	100.0%	100.0%	100.0%

After analyzing Table 13 we will assume that the actual rank order is IP>IJ/EP>EJ (with a tie between IP and IJ).

Memory for Words (WJ17): Our original hypothesis was ES>EN>IS>IN. Our predicted ES advantage was correct as they had the most high cases and the fewest low cases compared to the other groups as seen in Table 14. IS types only had one high scorer and the most percentage of low scorers compared with the rest putting this group in last place.

Table 14

			trichotomized wj17			
			Low	Medium	High	Total
Memory for words WJ17	IN	Count	3	3	1	7
		% within Memory for words WJ17	42.9%	42.9%	14.3%	100.0%
		% within trichotomized wj17	20.0%	37.5%	11.1%	21.9%
	EN	Count	4	2	3	9
		% within Memory for words WJ17	44.4%	22.2%	33.3%	100.0%
		% within trichotomized wj17	26.7%	25.0%	33.3%	28.1%
	IS	Count	5	2	1	8
		% within Memory for words WJ17	62.5%	25.0%	12.5%	100.0%
		% within trichotomized wj17	33.3%	25.0%	11.1%	25.0%
	ES	Count	3	1	4	8
		% within Memory for words WJ17	37.5%	12.5%	50.0%	100.0%
		% within trichotomized wj17	20.0%	12.5%	44.4%	25.0%
Total		Count	15	8	9	32
		% within Memory for words WJ17	46.9%	25.0%	28.1%	100.0%
		% within trichotomized wj17	100.0%	100.0%	100.0%	100.0%

After analyzing Table 14 we will assume that the actual rank order is ES>EN>IN>IS.

Summary of Findings

Table 15

WJ test	Hypothesis	Actual	Both dimensions correct	One dimension correct	No dimensions correct	gamma values*
WJ1	NP>NJ>SP>SJ	SJ>NP>SP>NJ			x	N/A
WJ2	NP>NJ>SP>SJ	NJ>SJ>NP>SP		N>S		N/A
WJ3	ST>NT>SF>NF	NF>ST>NT			x	N/A
WJ4	SP>SJ>NP>NJ	SJ>SP>NP>NJ		S>N		-0.042
WJ5	TJ>TP>FJ>FP	FP>TP>FJ>TJ	-x			-0.333
WJ6	SP>SJ>NP>NJ	NJ>NP>SJ>SP			x	-0.409
WJ7	NT>NF>ST>SF	NT>NF>ST	x			-0.207
WJ11	IS>IN>ES>EN	IN>IS>EN>ES		I>E		0.301
WJ12	EN>ES>IN>IS	ES>EN>IS>IN		E>I		0.267
WJ13	SJ>SP>NJ>NP	NJ>NP>SJ>SP		J>P		-0.287
WJ14	ES>EN>IS>IN	IS>ES>EN>IN		S>N		0.358
WJ15	NT>NF>ST>SF	NT>ST>NF>SF		T>F		N/A
WJ16	EJ>EP>IJ>IP	IP>IJ/EP>EJ			x	-0.115
WJ17	ES>EN>IS>IN	ES>EN>IN>IS		E>I		0.104

*determined from the gamma values within the symmetric measures found in appendices

Several of our hypotheses were confirmed using correlation analyses and tests for significance using SPSS. In 8 out of the 14 total tests we accurately predicted that at least one dimension of the MBTI would be related to that aspect of the WJ battery. In 4 out of the 14 tests we had unpredicted findings. The full pattern of results including more cases will be discussed in detail by the other project team finishing up D term.

Our analysis lead to two significant cases, WJ7 numbers reversed. Our hypothesis for this case was that intuition would be the best correlation, followed by thinking. Our analysis proved this hypothesis without a question, that intuition and thinking help with this aspect

The second significant finding that came out of this project was that of WJ5 Concept Formation. We predicted that intuition would have the best correlation, but we found a correlation to be completely opposite of what we had hypothesized. This was

another correlation that could be seen without a question that intuition had the strongest correlation, followed by thinking.

Overall, given the number of relationships we expected to find, the weight of evidence suggests that the differences between the personality measure and intelligence measure are more striking than the similarities. However, the existence of some unique relationships between MBTI and WJ dimensions raise questions that deserve further analysis with a much larger sample.

Appendix A: WJ1- verbal comprehension v. SN JP

Table 16

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.281[a]	6	.508
Likelihood Ratio	6.701	6	.349
Linear-by-Linear Association	.193	1	.660
N of Valid Cases	32		

a. 12 cells (100.0%) have expected count less than 5. The minimum expected count is 1.25.

Appendix B: WJ2- Visual auditory learning v. SN JP

Table 17

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.176[a]	6	.305
Likelihood Ratio	9.903	6	.129
Linear-by-Linear Association	.034	1	.854
N of Valid Cases	32		

a. 12 cells (100.0%) have expected count less than 5. The minimum expected count is 1.56.

Appendix C: WJ3- spatial relations v. SN TF

Table 18

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.699[a]	4	.320
Likelihood Ratio	5.322	4	.256
Linear-by-Linear Association	.666	1	.415
N of Valid Cases	32		

a. 7 cells (77.8%) have expected count less than 5. The minimum expected count is 1.97.

Appendix D: WJ4-sound blending v. SN JP

Table 19

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.911[a]	6	.928
Likelihood Ratio	1.996	6	.920
Linear-by-Linear Association	.005	1	.942
N of Valid Cases	32		

a. 11 cells (91.7%) have expected count less than 5. The minimum expected count is 1.09.

Table 20

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Ordinal by Ordinal	Gamma	-.042	.221	-.192	.848
	Spearman Correlation	-.037	.174	-.202	.841[c]
Interval by Interval	Pearson's R	-.013	.170	-.072	.943[c]
N of Valid Cases		32			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Appendix E: WJ5-Concept Formation v. TF JP

Table 21

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.938[a]	6	.177
Likelihood Ratio	9.230	6	.161
Linear-by-Linear Association	2.027	1	.155
N of Valid Cases	31		

a. 12 cells (100.0%) have expected count less than 5. The minimum expected count is .58.

Table 22

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Ordinal by Ordinal	Gamma	-.333	.196	-1.648	.099
N of Valid Cases		31			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Appendix F: WJ6-Visual matching v. SN JP

Table 23

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.527[a]	6	.367
Likelihood Ratio	8.307	6	.216
Linear-by-Linear Association	3.961	1	.047
N of Valid Cases	32		

a. 12 cells (100.0%) have expected count less than 5. The minimum expected count is 1.41.

Table 24

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Ordinal by Ordinal	Gamma	-.409	.177	-2.200	.028
N of Valid Cases		32			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Appendix G: WJ7- Numbers Reversed v. EI SN

Table 25

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.677[a]	4	.030
Likelihood Ratio	13.225	4	.010
Linear-by-Linear Association	.816	1	.366
N of Valid Cases	32		

a. 7 cells (77.8%) have expected count less than 5. The minimum expected count is 1.53.

Table 26

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Ordinal by Ordinal	Gamma	.207	.264	.768	.442
	Spearman Correlation	.145	.196	.805	.427[c]
Interval by Interval	Pearson's R	.162	.195	.901	.375[c]
N of Valid Cases		32			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Appendix H: WJ11- General Information v. EI JP

Table 27

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.165[a]	6	.523
Likelihood Ratio	5.282	6	.508
Linear-by-Linear Association	1.718	1	.190
N of Valid Cases	32		

a. 11 cells (91.7%) have expected count less than 5. The minimum expected count is 1.00.

Symmetric Measures

Table 28

		Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Ordinal by Ordinal	Gamma	.301	.199	1.476	.140
N of Valid Cases		32			

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.

Appendix I: WJ12- Retrieval Fluency v. EI SN

Table 29

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.814[a]	6	.252
Likelihood Ratio	9.821	6	.132
Linear-by-Linear Association	1.457	1	.227
N of Valid Cases	32		

a. 12 cells (100.0%) have expected count less than 5. The minimum expected count is 1.97.

Table 30

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Ordinal by Ordinal	Gamma	.267	.206	1.287	.198
N of Valid Cases		32			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Appendix J: WJ13- Picture recognition v. SN JP

Table 31

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.935[a]	6	.063
Likelihood Ratio	15.358	6	.018
Linear-by-Linear Association	1.438	1	.231
N of Valid Cases	32		

a. 12 cells (100.0%) have expected count less than 5. The minimum expected count is 1.31.

Table 32

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Ordinal by Ordinal	Gamma	-.287	.224	-1.267	.205
N of Valid Cases		32			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Appendix K: WJ14- Auditory Attention v. EI SN

Table 33

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	12.721[a]	6	.048
Likelihood Ratio	13.640	6	.034
Linear-by-Linear Association	3.164	1	.075
N of Valid Cases	32		

a. 12 cells (100.0%) have expected count less than 5. The minimum expected count is 1.97.

Table 34

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Ordinal by Ordinal	Gamma	.358	.209	1.660	.097
N of Valid Cases		32			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Appendix L: WJ15- Analysis Synthesis v. SN TF

Table 35

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.596[a]	4	.159
Likelihood Ratio	8.187	4	.085
Linear-by-Linear Association	.375	1	.540
N of Valid Cases	32		

a. 8 cells (88.9%) have expected count less than 5. The minimum expected count is 1.75.

Appendix M: WJ16- Decision Speed V. EI JP

Table 36

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.205[a]	3	.977
Likelihood Ratio	.206	3	.977
Linear-by-Linear Association	.178	1	.673
N of Valid Cases	32		

a. 6 cells (75.0%) have expected count less than 5. The minimum expected count is 1.75.

Table 37

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Ordinal by Ordinal	Gamma	-.115	.269	-.425	.671
N of Valid Cases		32			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Appendix N: WJ17- Memory for words v. EI SN

Table 38

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Ordinal by Ordinal	Gamma	.104	.218	.475	.635
N of Valid Cases		32			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Table 39

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.642[a]	6	.591
Likelihood Ratio	4.597	6	.596
Linear-by-Linear Association	.363	1	.547
N of Valid Cases	32		

a. 12 cells (100.0%) have expected count less than 5. The minimum expected count is 1.75.

Appendix O: Data Set

Table 40

MBTI	verbal comp	visual -aud	spatial rel	sound blend	concept form	visual match	number rev	general info	retrieval	picture rec	Auditory Att	analysis -synth	decis. speed	word memory
	WJ1	WJ2	WJ3	WJ4	WJ5	WJ6	WJ7	WJ11	WJ12	WJ13	WJ14	WJ15	WJ16	WJ17
ISTJ	19	6	64	27	32	52	15	19	39	48	41	29	37	19
ESTJ	20	8	70	27	35	36	17	21	28	50	38	25	29	20
ESTP	20	1	71	28	35	35	23	19	45	50	49	28	34	22
ISTP	20	10	71	25	32	44	18	17	23	51	42	25	32	21
ESTP	17	22	71	26	30	55	19	19	26	49	44	25	39	19
INTP	18	10	73	26	40	56	19	21	33	53	43	32	38	19
ENFP	21	3	74	21	36	36	21	21	25	57	39	28	40	20
ISTJ	20	2	75	28	37	45	19	18	37	57	44	30	37	19
ENTJ	18	5	75	25	37	58	27	18	26	52	42	32	40	21
ENTP	20	5	75	25	36	46	24	19	21	52	41	26	35	20
ISTJ	20	5	75	25	39	55	20	23	21	54	44	34	40	18
ENTP	22	6	75	23	35	47	11	24	23	50	40	30	39	18
ISTP	17	9	75	29	35	49	21	15	31	58	44	25	40	21
ISTJ	22	1	76	30	35	56	16	22	29	49	40	31	36	21
ESTP	21	3	76	29	39	60	15	24	23	54	46	28	40	21
INTP	20	4	76	25	40	60	29	22	30	54	39	32	40	22
ISTJ	20	4	76	29	35	60	25	20	24	54	42	30	33	21
ENTJ	22	5	76	29	40	60	16	22	28	55	43	33	39	20
ESTJ	22	8	76	33	37	49	23	20	42	53	42	30	37	19
ESTP	18	8	76	24	37	51	23	19	18	47	42	28	37	17
INFJ	18	8	76	24	38	51	23	16	30	52	41	27	32	21
INFJ	19	0	77	26	38	60	22	19	26	56	42	34	40	18
INTP	20	4	77	25	39	59	19	23	46	53	43	34	40	20
ENFP	17	7	77	33	35	60	23	18	30	52	39	29	40	19
INTJ	18	11	77	25	38	60	26	19	36	56	45	29	40	19
INTP	19	3	78	25	39	57	16	21	16	54	42	31	35	17
ISTJ	19	7	78	22	33	58	23	21	43	54	42	33	40	21
ENFP	19	14	78	28	40	56	22	19	19	48	41	28	37	19
ESTP	18	0	79	27	39	56	28	19	27	53	42	33	40	20
ESTP	20	2	79	23	39	60	17	20	27	47	45	29	37	18
ESTP	21	2	79	25	40	60	24	22	39	51	46	34	40	18
INFP	23	3	79	29	40	60	24	24	40	54	43	34	38	21
ISTJ	21	4	79	25	34	57	16	22	36	54	44	32	40	20
INFP	20	6	79	30	40	52	14	20	35	54	43	29	34	20

Appendix P: Original Proposal

Introduction

As former Fitchburg High School graduates, when the question of a correlation between intelligence and personality was brought to our attention, our natural reaction for a school system to work with was our alma mater, the Fitchburg public school system.

It has always been thought that personality and intelligence are completely different psychological qualities. Personality is supposed to show a person's preferences with no area being superior to another. Whereas general intelligence is the level of logical processing a person can achieve, with a higher level being superior. However, recent intelligence measures have been moving in the direction of identifying multiple intelligences, actually a range of complementary cognitive abilities.

By using two prominent tests; the Woodcock Johnson battery of cognitive abilities, and the Myers-Briggs Type Personality Indicator, we intend to compare the results to see if there is any correlation between any of the seven cognitive abilities and the four dimensions of the MBTI. Could it be possible that personality and intelligence measure the same psychological aspects just in different ways? It is not completely unreasonable to suspect that preferences emerge from ability patterns. Learning style preferences indicated by the MBTI have been proven to correlate with the SAT, MCAS, and ACT which are aptitude and achievement tests. The SAT is considered to be a product of the intelligence measurement movement, predicting educational performance was one of the first applications of intelligence testing.

Gaining access to high school students who have taken the Woodcock-Johnson in Fitchburg would allow us to focus on administrating the much briefer MBTI assessment in order to gather data on approximately fifty cases for this study that would have taken

both measures. Students must be at a ninth grade level or above in order to take the MBTI, hence this is being proposed to the high school.

It is our understanding that a few people at Fitchburg High School already have experience administering the Woodcock-Johnson II. James Creed, a practitioner and trainer of the Woodcock-Johnson, has offered to provide these people a refresher course and materials (a gift they can keep) in return for providing data to this study. Creed is also willing to train additional people in the use of this measure. We can handle the MBTI administration, or delegate it to those administering the Woodcock-Johnson, whichever you prefer.

Background

Cognitive psychology is defined as, *a branch of psychology concerned with mental processes (as perception, thinking, learning, and memory) especially with respect to the internal events occurring between sensory stimulation and the overt expression of behavior.*[14] This cognition is perhaps one of the most complex areas studied by psychologists.

A tool used for distinguishing traits is the Myer-Briggs Type Indicator (MBTI). The MBTI is considered a "personality" test that can determine a person's preferences. The Woodcock-Johnson battery is considered an "intelligence" test that focuses on information processing and decision making. Both tools yield empirical results, and can be used as psychological measurement and classification tools.

Personality Measurement

The MBTI is different from most personality trait measures in that it does not measure variation along a continuum. Rather, the measure attempts to find the respondent's position on either side of four different factors, arrayed as dichotomies.

[14] Dictionary.com definition.

The assumption is that one of each pair of categories relates well to the respondent. The measure indicates the respondent's preference between equally viable mental processes and attitudes. The four dichotomies from the Myers-Briggs are as follows:

Extraversion-Introversion

Extraverts are categorized by their focus on the outer world, people, and things. They are active, using trial and error with confidence and environmentally stimulated. Introverts, on the other had, are oriented to the inner world, idea, and inner impressions. They are reflective, considering deeply before acting, and finding stimulation inwardly.

Sensing Perception-Intuitive Perception

Sensing is best described as perceiving with the five senses, and attending to practical and factual detail. Attending to the present moment, confining attention to what is said and done and letting "the eyes tell the mind." Intuition is the opposite, perceiving with memory and associations, seeing patterns and meanings, and projecting possibilities for the future. It is "reading between the line" looking for the big picture, having hunches, and letting "the mind tell the eyes."

Thinking Judgment-Feeling Judgment

When reasoning with thinking, one uses logic, objectivity, and impersonal criteria. They use cause and effect relationships which are firm minded and skeptical, prizing logical order. When reasoning with feeling, they apply personal priorities, weighing their own and others human values and

motives. They value warmth in relationships, prizing empathy, and trust in making a decision.

Judgment-Perception

When taking a judging attitude, one uses thinking or feeling judgments outwardly, which is controlling and regulating, the want for closure, even when data is incomplete. When taking a perceiving attitude, however, one uses sensing or intuitive perception outwardly, which is taking the information with open-mindedness, and has the need to adapt and change to resist closure in order to obtain more data[15].

No trait can be said to be better than another. All eight methods are used, but one is preferred.[16] Almost every human experience involves the use of perception and judgment. Prior findings using high school and college cases show that the Sensing-Intuition dimension is moderately correlated with SAT and ACT scores. These findings give us cause for optimism that some relationships will be found in the comparison personality and intelligence measures.

Intelligence Measurement

The most used intelligence theory today is the Cattell-Horn-Carroll (CHC) Theory of Cognitive Abilities. The framework is compromised of 3 strata—general intelligence, broad cognitive abilities, and narrow cognitive abilities. The broad cognitive abilities are Fluid reasoning (*Gf*), Comprehension-Knowledge (*Gc*), Short-term Memory (*Gsm*), Visual Processing (*Gv*), Auditory Processing (*Ga*), Long-term Retrieval (*Glr*), Processing Speed (*Gs*), Decision/Reaction time or Speed (*Gt*), Reading and Writing

[15] Myers et al.
[16] Lawrence, p.1

(*Grw*), and Quantitative Knowledge (*Gq*). These categories include approximately seventy narrow abilities (McGrew, p. 3). CHC consists of nine broad abilities (*Gf, Gc, Gv, Ga, Gsm, Glr, Gs, Gq, Grw*) (McGrew, Evans, p.13). The Woodcock-Johnson III battery tests seven of these abilities, *Gf, Gc, Gv, Ga, Gsm, Glr,* and *Gs*. With empirical data obtained on these cognitive abilities a cognitive profile of the subject can be made.

Theoretical Summary

Whether or not there is a correlation between personality preferences and certain cognitive abilities remains unknown at this time. Thus far, there has been no formal research or investigation on this subject matter published. Without this knowledge, we have nothing off of which to base the expectations of our study. Theorizing must then be based on the logic of these measures and prior findings with other comparative studies using the MBTI and cruder measurer of intelligence, such as the SAT. In order to conduct an accurate study, each project member must achieve a working knowledge of the MBTI and also have a basic understanding of how the Woodcock-Johnson test is conducted and analyzed. This means that the project team must have a solid grasp of what each tool is designed to measure, as well the ability to specify expected correlations between the scores of each indicator, and then see if these hypothesis are confirmed.

Data Collection and Research Strategy

In this research proposal we are offering to help out Fitchburg High School gain more knowledge about what types of students thrive and struggle in the existing programs. Not only will this research be beneficial to our theoretical research on the correlations between intelligence and personality but it will also provide the school system with a chance to explore how to measure certain cognitive qualities that most

likely shape different learning styles. The following aspects of the project are described to aid the school administration in deciding whether to participate: time frame overview, cost estimates, administration procedures, access to scores, and feedback.

The time frame of the project will ideally span about three of our college terms (which last seven weeks each). Rough estimates of time allocation are as follows. From the time of agreement of the proposal until the school system's holiday break- preparations will be made to begin the study and set up to administer the MBTI. This includes requesting funds from WPI as soon as Fitchburg decides to participate, as well as actually collecting the data. Once classes resume after holiday break and until the beginning of March our time will be spent analyzing the data, performing extended research, interpretation of results, and drawing conclusions. All of these activities will then culminate into a final report to be delivered to the faculty of the Worcester Polytechnic Institute

If this proposal is accepted, the research process will be very inexpensive to the school system. We propose that WPI will cover the costs of the following materials: MBTI administration booklets, scoring sheets and feedback materials for approximately fifty students. If the FHS administration would like to test more than fifty students we would be able to provide additional materials to the school system at a discounted rate and our own labor for free. If more than fifty students are tested, not only will the validity of our predictions increase but you will also have a better profile (distribution) of the types of students in your in your student body for future reference. If you decide that you would like to continue with the study after our research is completed, you would then have a contacts at WPI which will enable you to obtain these same special rates for testing materials in the future.

In our research we will need to gather information on personality preferences by administering the MBTI and will depend on FHS to collect the WJ-II data. The MBTI data collection will be accomplished by qualified staff at Fitchburg High School or, if preferred, by our project team members. The research sample will be selected from those students who have already taken the Woodcock-Johnson or the students that will be taking the Woodcock-Johnson for assessment purposes. We prefer to collect an equal number of data points from males and females, to rule out any potential skew in the data due to gender. Our goal is to collect as many data points as possible; at least thirty but preferably about fifty. When collecting and analyzing the data we will conform to the strictest ethical standards regarding privacy and respect for students.

In doing this research we will also need access to the subject's Woodcock-Johnson scores and must connect them with their MBTI score . Once data is collected, a database will have to be constructed in order to easily correlate elements from the two psychological testing instruments.

Although it is not necessary to give the students a feedback session once they complete the MBTI, it is highly recommended that we do so. If Fitchburg High School does not have a qualified or willing individual to provide a feedback and verification session we would be more than willing to devote our time in doing so. Feedback is a very good way for the students to understand the purpose of this study and also to help them as they try to better understand themselves. Our advisors are qualified to run verification and feedback sessions, as they have been through a four day workshop on how to do this, run by the MBTI's publisher.

All of these activities will then culminate in a final report to be delivered to the faculty of the Worcester Polytechnic Institute in early spring. FHS will certainly get a copy of the report and if asked we will gladly come and do a brief presentation of the main findings. Your help in collection of this data will be vital to our success and we hope you decide to participate in this study. Not only do we plan to determine if there is a correlation between intelligence and personality, but we also hope that this study provides your school system with knowledge that will spark further interest and study into the psychological aspects of learning of the students of Fitchburg High School. The learning style approach to studying student performance at WPI had produced useful results, and we'd like to see FHS consider using the same approach.

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