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THE INTUITIVE ADVANTAGE AND LEAD INDICATORS OF THE MCAS

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Executive Summary

Introduction of the Massachusetts Comprehensive Assessment System (MCAS) test in Massachusetts public schools has opened heated debates between politicians, educators, parents, and students. Particularly at issue are what the MCAS test actually measures and its fairness to different types of learners. Does the administration of high stakes standardized assessment tests raise standards or merely sort students according to the ability to excel at test taking? The format of questions that allows standardized tests to be easily reproduced, administered, and scored is often criticized as being superficial and as having little application to the real world. As there are different types of learners, care should be taken to ensure that assessment is based on different forms of authentic measures.

Findings of an analysis of 1129 public school students revealed a learning style bias on the fourth grade MCAS test. The students, from towns of varying degrees of socioeconomic status, came from nine schools in the three districts of Fitchburg, Nashoba and Worcester. The type preferences of the students were determined using the Murphy-Meisgeier Type Indicator for Children (MMTIC) while they were in the fourth, fifth, or seventh grade. The MMTIC is based on Carl Jung's type theory and the Myers-Briggs Type Indicator (MBTI) which identifies preferences of mental processes.

The MMTIC, similar to the MBTI, measures preferences on four different dimensions. The first dimension, Extraversion/Introversion, tells whether individuals tend to focus their attention on the inner or outer world. Extraverts tend to focus on the people and events around them while Introverts are more focused on ideas and concepts. The Sensing/Intuition dimension describes how individuals absorb information and how they perceive it. Sensing people depend on their senses and pay attention to details while Intuitives can often make connections and see patterns without all of the details. The Thinking/Feeling dimension describes how individuals come to decisions about information they have perceived. Thinking people will use impersonal logic and analysis to make decisions while Feeling people rely on personal or social values. The Judging/Perceiving dimension describes two different ways of dealing with the outer

world. Judging people like things to be structured and definite and like to decide things rather quickly, while Perceiving people prefer to postpone decisions, keeping things open to change.

This study concentrated on the Sensing/Intuition and Judging/Perceiving dimensions because they appeared to have a pattern of a relationship with test scores. Previous studies at WPI had also reported relationships between these two dimensions (as measured by the MBTI) and SAT scores.

All of the students in the sample had taken the fourth grade MCAS test in 1998 or 1999. The fourth grade MCAS tested students in English Language Arts (ELA), Mathematics, and Science. Scores are categorized in one of four levels, Failing, Needs Improvement, Proficient, or Advanced. MCAS scores were disappointing in 1998 and 1999 for many school districts, with a majority of students earning Failing or Needs Improvement scores, especially in ELA and Math.

Fourth grade MCAS scores were collected for all of the students in the sample. Additional data collected included Iowa Test of Basic Skills (ITBS) administered in third grade, the scores of various standardized tests administered by each district, and report card grades. The relevant data from the different assessment measures was limited to subjects that appeared on the MCAS test, Reading, Writing, Mathematics, and Science.

The statistical method used to examine the relationship between MMTIC data and MCAS scores was the Spearman rank correlation because the test scores can be ranked from low to high. Correlation coefficients close to 1 represent strong correlations while those close to 0 signify that no relationship exists. Mean MCAS scores were also compared by type to examine how scores differed. Crosstabulations were done to determine the best predictor of ELA MCAS scores, ITBS-3 reading scores or reading and language grades.

The analysis revealed Intuitive and Perceiving advantages on all three subjects of the MCAS, results reminiscent of the pattern observed with the SAT and the MBTI as the learning styles indicator. Sensing Judging students had the most risk of doing poorly on the MCAS. The strongest correlation factors were present in the ELA section, followed by the Science section, and finally the Math section. Students in the schools with the lowest average MCAS scores were the most likely to be affected by a learning style bias.

The best indicator of how a student would do on the ELA MCAS was the ITBS-3 reading scores. The ITBS-3 was usually an excellent predictor, unlike grades, which differed from district to district on how predictive they were. The MCAS performance of some types of learners is more predictable than that of others using prior grades and ITBS scores. Correlation of "predictability" ranged from .66 to .93, with some types' school grades being fairly predictive as well, however this varied by system and type of learner.

The analysis revealed that a strong relationship exists between different standardized tests, a relationship that is stronger than that between tests and grades, even though the MCAS is considered to be curriculum based. This supports the notion that students will usually either do well on these tests or not depending on learning style, with little variation by subject or format, even when students' grades differ from subject to subject.

Abstract

An analysis of 1129 cases of fourth grade Massachusetts Comprehensive Assessment System (MCAS) test results from 9 schools in 3 districts by learning style, grades, and other achievement tests revealed several useful and some disquieting patterns in the results. The learning style indicator (MMTIC) identified a fairly consistent rank ordering of scores by type of learners regardless of subject. In short, the MCAS is cognitively biased in a pattern reminiscent of the SAT at the high school level. However, using information available at the time the students took the test (3rd grade test scores and 4th grade report cards) it is possible to predict who is most likely to have difficulty with the test. Some of the MMTIC types are more predictable than others based on this kind of information. Those in the districts that had the lowest average scores are the most predictable. Hence, considerable progress has been made in coming to understand the MCAS and who it serves most and least well, given its cognitive bias.

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1.0 Introduction

On the surface, standardized assessment tests seem to be a fair and convenient way to measure the progress of students from kindergarten to the high school level, as well as measure the effectiveness of the education students receive. Standardized tests represent an efficient and objective way to sort students, efficient because they can be administered and scored easily in large numbers, objective because the scoring is done by machines or professional scorers. President Bush's claim that "You teach a child to read, and he or her will be able to pass a literacy test" [1] has been a mantra of sorts for high stakes testing. Unfortunately, the issue is often not as simple as President Bush and other proponents of standardized tests believe.

Naturally, success in the public school system should be based on merit and the ability to master at least the basic skills needed. However, the method used to measure merit can define which students succeed and which students fail. If merit is measured exclusively by test results that have been shown to favor students of a certain socioeconomic class, then the system becomes a form of social control that favors the children of the elite and is an obstacle for poorer children. Many standardized tests may also favor a certain kind of thinker while ignoring others. "Is there something in the nature of standardized tests themselves - particularly the very multiple-choice format that permits high levels of standardization, reproducibility, and ease of scoring - that rewards some kinds of thinking processes and penalizes other types?" [2] The ability or inability to correctly guess the answer to a question may reflect different thinking styles rather than the mastery of a subject.

The introduction of the Massachusetts Comprehensive Assessment System test in the spring of 1998 added Massachusetts to the growing list of states that use standardized tests to assess students and educators. The test has opened a heated debate about education in Massachusetts. Supporters of the new assessment tool believe that the MCAS will raise standards and hold educators responsible for how well their students perform. The potential negative consequences of the MCAS continue to concern many

parents and teachers over three years later. Using MCAS scores as the only indicator for assessing a student's performance, spending millions of dollars on developing and scoring the test, and using increased classroom time preparing for the test are some of the concerns of critics.

The manner in which MCAS scores will be used is especially troubling to opponents of high stakes testing. The fact that some students may be performing better in school than their MCAS scores indicate punishes those who have difficulty with standardized tests, especially when high stakes are attached. Using scores as a diagnostic tool to assess school systems may be more effective than using them to assess students on an individual basis. Using MCAS scores as part of an assessment system instead of as the main measure for students may also provide a more level playing field.

The use of the MCAS as a one-size-fits-all assessment raises the question of the fairness of the test itself for students who are different types of learners. If the MCAS poses questions in a format that is more difficult for students with certain learning styles, a bias may exist between the test and learner, resulting in lower scores for that cognitive type. A relationship between SAT scores and learning types (measured by cognitive style instruments) was found in previous studies indicating that some types do have an advantage in taking certain kinds of tests. The question is whether the MCAS test is like the SAT in this respect. The MCAS would fail its goal of assessing student competence in basic skills if the test was biased towards a portion of the student population at the expense of others.

Although educators can use many different kinds of assessments to monitor their students' progress, the state places great importance on one assessment tool. Teachers are finding that they need to concentrate on MCAS performance although it may not be the best assessment for all students. Educators can find it helpful to be able to predict performance on standardized tests. If a learning style bias exists, teachers can use that information to coach that type, specifically targeting test-taking weaknesses.

This study used two revised versions of the Murphy-Meisgeier Type Indicator for Children (MMTIC) to examine the different learning styles of students who took the fourth grade MCAS test in the springs of 1998 and 1999. The data set consisted of 1129 children from the three public school systems of Worcester, Fitchburg, and Nashoba. Relationships between learning styles, as measured by the MMTIC, and MCAS scores

were studied to determine if a cognitive bias existed. Other standardized test scores and grades were also examined to determine which measure was a better indicator of how different types of learners would score on the MCAS. The different grading schemes of the three school systems also came into play when examining predictors of MCAS scores.

2.0 Background

Four measures were used to examine relationships between learning styles and performance on the MCAS exam. All of the students in the sample took one of two revised versions of the MMTIC as well as the fourth grade MCAS in 1998 or 1999. Other standardized test scores were also taken into consideration. Other tests included the Iowa Test of Basic Skills taken in third, fifth, and sixth grade, and the Stanford Achievement Test taken in fourth grade and fifth grade. Each school system in the sample varied according to which additional tests it administered, although testing of reading and spelling using the third grade Iowa Test of Basic Skills was common to all three systems. The fourth measure examined was report card grades concerning Reading, Writing (or Language), Math, and Science. Each system graded students differently and within systems grading from school to school was not always uniform.

2.1 Murphy-Meisgeier Type Indicator

The MMTIC was developed by Elizabeth Murphy and Charles Meisgeier to help teachers and parents understand the preferred learning processes of children from the second to eighth grade levels. The MMTIC is based on Carl Jung's theory of psychological types and the Myers-Briggs Type Indicator (MBTI) which was developed by Isabel Myers and Katharine Briggs. Jung's type theory was developed to explain differences in the ways individuals behave and process information. Isabel Myers and Katharine Briggs developed the MBTI to determine an individual's preferences based on Jung's type theory. The MMTIC is intended to be the children's version of the MBTI.

The MMTIC (and MBTI) is used to indicate preferences in four dimensions, Extraversion/Introversion, Sensing/Intuition, Thinking/Feeling, and Judging/Perceiving.

Type theory suggests that individuals may use both of the processes described in each of the four dimensions of the MMTIC. However, one is usually preferred and dominant, and so depended on more than the other. It cannot be said that one combination of the four dimensions is better or more important than the others are, as each combination has its own strengths and weaknesses. It may help parents and teachers if they understand a child's preferred way of learning and processing information.

The Extraversion/Introversion (E/I) dimension tells whether individuals tend to focus their attention on the inner or outer world. Extraverts tend to focus on the people and events around them while Introverts are more focused on the inner world of ideas and concepts. The Sensing/Intuition (S/N) dimension describes how individuals absorb information and how they perceive it. Sensing people depend on their senses and rely on facts and details while Intuitives depend on their imaginations and can intuitively see connections and patterns. The Thinking/Feeling (T/F) dimension describes how individuals come to decisions about information they have perceived. Thinking people will use impersonal logic and analysis to make decisions while Feeling people rely on empathy, harmony, and personal or social values. The Judging/Perceiving (J/P) dimension describes two different ways of dealing with the outer world. Judging people like things to be structured and definite and like to decide things rather quickly, based on a reasonable amount of information, while Perceiving people prefer to postpone decisions, keep things open to change and gather information well beyond the point that one could make a decision. [3]

Some of the differences between each dimension are described in Table 2.1, adapted from the Murphy-Meisgeier Type Indicator for Children Manual.

Extraversion	**Introversion**
Energized by the external world Shows thoughts and feelings openly Acts, then reflects Learns by doing; trial and error	Energized by inner resources Tends to keep thoughts and feelings to self Reflects, then acts Wants to understand something before trying it
Sensing	**Intuition**
Focuses on applications Looks at specific parts and pieces Has acute powers of observation Accumulates facts slowly, carefully Learns best with a step-by-step, hand-on approach	Focuses on concepts Looks at patterns and relationships Passes quickly over details Works off hunches and insight Learns best with a global approach
Thinking	**Feeling**
Is good at analyzing ideas, plans Uses logic to decide Looks at things objectively Tries to understand cause-and-effect relationships	Is good at making others feel secure Uses values to decide Looks at things from a personal perspective Tries to understand how things affect people
Judging	**Perceiving**
Works best when they can plan their work and follow the plan Likes to have things settled and decided Prefers completing a project before starting another Likes assignments to be clear and definite Gets assignments done on schedule	Works best when they are free to adapt Likes to keep decisions flexible and open Likes working on many projects at once Likes open-ended assignments May be late with assignments

Table 2.1 Descriptions of preferences, adapted from the MMTIC Manual

The MMTIC also allows for an Undetermined (U) category if a child's score on any of the dimensions falls in the middle. For example, Sensing children will score to the left of the U-band on the Sensing/Intuition scale, while Intuitive children score to the right.

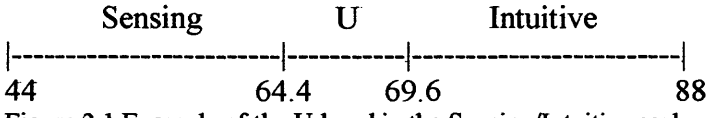

Figure 2.1 Example of the U-band in the Sensing/Intuitive scale.

An Undetermined score indicates that a child's preference is not clear according to the measure or that the preference is still developing, not necessarily that the child has no preference. [4]

This study used two revised versions of the MMTIC. Out of 1129 cases, 939 students took the first version (MMTIC-R1). It was decided later in the project to add about 200 cases to the Worcester sample. The Worcester sample was supplemented with 190 cases from Forest Grove Middle School who took the second revised version of the MMTIC (MMTIC-R2), as MMTIC-R1 was no longer available at that time. It was decided to pool the sample, as the differences between the two versions did not seem to affect the results of the study. In MMTIC-R2, about 63% of the items were the same as items in MMTIC-R1. An additional 21% of the items seemed to be the same as an item on the MMTIC-R1 although reworded slightly. Approximately 16% of the items on the MMTIC-R2 did not appear on MMTIC-R1.

Thirteen students from the original Worcester sample were included in the sample from Forest Grove Middle School. As these students took both MMTIC-R1 and MMTIC-R2, their MMTIC results were compared to detect any changes. There were one or no changes in preferences for approximately 77% of these students, and two changes were present in approximately 23%. None of these students showed changes in preferences in three or all four of the dimensions. This includes changes from one side of each scale to the other and not into or out of the Undetermined band. Only one of the 13 students had changed in the Sensing/Intuition scale. The strongest correlation between learning style and MCAS scores showed up in the S/N dimension, making this another sign that to pool the two versions of the type indicator would not compromise the data. Correlation factors between learning styles and MCAS scores varied little between the two versions. As of yet, no information was received from the developers of the MMTIC about the intended purpose of the revisions or which dimensions they might effect.

2.2 MCAS

The Massachusetts Comprehensive Assessment System (MCAS) test was introduced in the spring of 1998 to students in the fourth, eighth, and tenth grades in Massachusetts public schools. The MCAS test was designed to be part of the Education

Reform Law of 1993. The Education Reform Law requires that all public school students, as well as those in private schools that receive state grants, be tested at least in fourth, eighth, and tenth grade. In 2001 the state plans to test students in grades three, four, five, six, seven, eight, and ten so as to spread out the testing of different subjects. The law also requires that students with disabilities or limited English proficiency who have been attending U.S. schools for more than three years also be tested.

The MCAS test is meant to work in conjunction with a curriculum that is set by the state. The Massachusetts Curriculum Framework learning standards were implemented in order to raise standards and provide a uniform foundation for all Massachusetts public school students. One of the proposed functions of the MCAS test is to provide information on how students and schools are performing regarding the Massachusetts Curriculum Framework. The curriculum-based test is used to assess not only students' performance, but also the performance of schools and districts, as part of the movement to hold students and educators accountable. The introduction of high stakes testing has received mixed reviews in Massachusetts.

Supporters of high stakes testing believe the MCAS will raise academic standards in Massachusetts by ensuring that students will not graduate from high school without at least the basic skills they will need. Educators are held accountable for MCAS results, and would therefore ensure that children master the material that might appear on the MCAS. Schools throughout the state have the same curriculum guidelines and should be able to achieve the same high standards.

Opponents of high-stakes standardized tests are critical of the ability of the MCAS to measure students' performance. Many believe that one test can not be an adequate assessment alone. Taking other factors into consideration may be more accurate, factors such as projects and student portfolios. Opponents have been especially critical of the high school graduation requirement of passing the tenth grade MCAS. They predict that high school dropout rates will rise or that good students will conclude that college is beyond their reach if they do not perform well on this standardized test. Instead of solving the problem of high school graduates that lack basic academic skills, the MCAS could make the problem worse by pushing at-risk students to give up.

Critics of standardized tests also claim that the tests consume valuable class time with teaching students how to pass the test. "The problem with standardized tests and the

fixed curricula they engender is their tendency to kill off the kind of education that matters most...The temptation to teach students to do well on standardized tests is almost unavoidable when performance on such tests is how entire school systems are evaluated." [5]

Those who are concerned about the effect of high stakes testing want to know what standardized tests actually measure. Do these tests measure academic achievement or test-taking ability? Are some students simply better at taking standardized tests for reasons other than curriculum mastery? The fact that the MCAS is based on a standard curriculum is supposed to give students an even playing field; as long as they have mastered the curriculum, they should do well on the MCAS. This may not be true if the test is biased towards some types of students.

The 1998 and 1999 fourth grade MCAS tested students in English Language Arts, Mathematics, and Science. The English Language Arts section covered topics in reading and writing. The section for Mathematics includes questions that cover topics in number sense, patterns and relationships, geometry and measurement, and statistics and probability. The Science portion covers topics in inquiry, physical sciences, life sciences, earth and space sciences, and technology. The test includes three types of questions. Multiple-choice questions appear in all three categories. Short answer questions appear in the Math section only, usually as an answer to a computation. The third type is open response questions and can be found throughout the test. Open response questions may ask for an essay or a graph or to explain an answer.

The MCAS is an untimed test given in sessions of about 45 minutes each with extra time allowed within reason. In 1998, the fourth grade MCAS took approximately 11 hours to administer, or 14 sessions of approximately 45 minutes each. [6] MCAS scores fall into one of four levels. Scores of 200-219 are Failing, 220-239 Needs Improvement, 240-259 Proficient, and scores of 260-280 are labeled as Advanced.

The MCAS is regarded as one of the most difficult standardized tests in the country. The high percentage of students whose performance level on the MCAS was either Needs Improvement or Failing is discouraging and gives fuel to critics of the test. In 1998, only 19% of fourth-graders who took the test scored in the Proficient level in the English Language Arts section. In 1999, this figure went up to 21% and was back at 19% in 2000. In 1998 and 2000, only 1% of fourth graders scored in the Advanced level, while

in 1999 0% scored in the Advanced level. The English Language Arts section has often been criticized for using words and passages that are beyond the fourth grade level.

Before the 2001 testing takes place, the MCAS test is still controversial and hotly debated. The Massachusetts Teachers Association, as well as some parent and student groups, has advocated ending or postponing the use of the tenth grade MCAS test as a graduation requirement. However, the Massachusetts Department of Education has launched its own campaign to retain high stakes testing in all public schools.

2.3 Additional Standardized Tests

Most schools administer other standardized tests to their students in addition to the MCAS test. Standardized test data for the sample included the Iowa Test of Basic Skills (ITBS) and the Stanford Achievement Test.

The Massachusetts Board and Department of Education decided to use the ITBS to test all third graders in Reading and Spelling starting in the spring of 1997. The Reading portion of the test contains subtests in comprehension and vocabulary. The ITBS is a multiple-choice test and takes about 75 minutes broken up into several sessions. Students take the ITBS over a one-week period. [7] The sample for this project included ITBS-3 data for 446 students from all three school districts.

The ITBS was also given to some students in the sample in fifth or sixth grade. Students from the Nashoba school system took the ITBS in fifth grade. These students were administered a full battery of tests in Reading, Language, Math, Science, and Social Studies. The sample included 157 students from Nashoba with ITBS-5 data. Fitchburg students were given the full battery of the ITBS in sixth grade. ITBS-6 data for 110 Fitchburg students was collected for the project.

Worcester students in the sample took the full battery of the Stanford Achievement Test in fourth, fifth, and sixth grade. The Stanford tests given in Worcester are multiple-choice and timed. Subtests vary in length and test time. Students are usually tested over a period of 2-3 days. The sample included fourth grade Stanford test scores in Reading and Math for 121 Worcester students and fifth grade Stanford test scores in Reading and Math for 158 Worcester students.

2.4 Grading Schemes

The data collected for this study included report card grades in Reading, Writing, Math, and Science. Although it was expected that the three systems would have different grading schemes, schools within the Nashoba district each had very different third and fourth grade report cards. Fitchburg and Worcester seemed to have grading schemes that were uniform from school to school within the district. Different report cards, those of students who had moved to a school from a school with a different grading scheme, were not included with the grade data.

Nashoba report cards differed greatly in third and fourth grade. In Lancaster, third and fourth graders were graded on many subcategories in Reading, Writing, and Math. For instance, third grade Reading had as many as 33 subcategories in items such as reading for certain amounts of time, alphabetizing, predicting outcomes from reading, and so on. There were no overall grades for each subject. Bolton also had fairly detailed report cards in third and fourth grade, while Stow report cards were less detailed. Fifth grade report cards were similar in Bolton and Lancaster, but those in Stow did not resemble them. By sixth grade, the three schools in the Nashoba district had similar report cards. The differences made it difficult to do a grade analysis for the Nashoba district as a whole.

Worcester grading schemes seemed to be similar from school to school. Instead of placing report cards in each student's file, grade averages were entered on a single card at the end of every year. This card had grades from second grade to sixth grade in the same subjects entered in the same way for all of the Worcester schools. Fitchburg grades were also entered this way for most of the students with grade data in the Fitchburg sample. This made it easier to do a grade analysis for Worcester and Fitchburg.

2.5 Previous Studies

Previous studies of the effect of type preferences on SAT scores have shown an Intuitive advantage over Sensing students, as well as a Perceiving advantage. A study done in the late 1950's by Isabel Myers, then at the Educational Testing Service, showed

that male college freshman from several colleges in the study scored 47 points more on the verbal SAT test if they were Intuitives than if they were Sensing.

Several studies done at Worcester Polytechnic Institute have also shown that Intuitive and Perceiving students have an advantage on the SAT. A study conducted in 1995 by Danielle Batey, Paula Brezniak, and Ashwin Purohit found a correlation between learning styles, using the MBTI, and the SAT. This study of 250 Worcester and Nashoba public high school students reported a 160-170 point Intuitive advantage on combined SAT scores, with a stronger correlation between learning style and the verbal section than between learning style and the math section. A Perceiving advantage of 111 points on combined SAT scores was also reported. A study conducted by John Pieper in 1997 reported a similar Intuitive advantage as well as a Perceiving advantage on the PSAT for 1267 public high school students from Worcester, Nashoba Regional, and Massachusetts Academy of Math and Science.

3.0 Hypothesis

The purpose of this study was to determine whether learning styles had an effect on MCAS scores for students as young as fourth graders. The fact that previous studies had shown a relationship between the PSAT/SAT and MBTI types raised the possibility of finding a similar bias on a standardized assessment test using a type indicator designed for children.

Because the MCAS test is not completely multiple-choice, the possibility that it is less biased than other tests was considered. One would expect multiple-choice tests, such as the SAT, to be more skewed towards a particular thinking style than tests that offer some open-ended questions and short answer questions, as well as multiple-choice questions. Sensing types who have trouble intuitively choosing the right answer in a multiple-choice question may be better at writing a detailed essay for an open-ended question. If both types of questions are distributed evenly on the test a bias may be less evident. However, qualified MBTI users often note that some essay questions are structured in ways that may appeal to different psychological types.

Another issue that came up when considering learning styles and the MCAS test was that of the best predictors of MCAS performance based on type. If a learning style

bias was found then it was possible that different measures would be better predictors for different types of learners. Another standardized test such as the ITBS-3 would be expected to be a good predictor for types of learners that test well, while grades might be a better predictor for other types.

3.1 Data Set

The data set for this project consisted of 1129 students who took the fourth grade MCAS test in 1998 or 1999. 939 students took the MMTIC-R1 while in fourth or fifth grade. The remaining 191 students took the MMTIC-R2 while in seventh grade. The school systems involved were Worcester, Fitchburg, and Nashoba. Worcester and Fitchburg are urban areas and the schools in the Nashoba district are in mainly rural/suburban towns.

The schools from Worcester that participated in the study were May Street School, Midland Street School, and Forest Grove Middle School together making up 300 students participating in the study. These schools are all in the Doherty Quadrant, which is predominantly made up of middle-class and stable working-class neighborhoods. Students who were fourth graders in 1998 or 1999 were both included.

The Fitchburg schools involved were Crocker Elementary, Reingold School, and South Street Complex. The participating Fitchburg schools made up three out of the four elementary schools in the city. The fourth school, McKay Campus, has a comparable racial breakup to the other three schools. Average MCAS scores at McKay were within 2-3 points of those at Crocker Elementary or South Street Complex. The three participating schools seemed to be a good representation of the city as a whole. Fitchburg students participating in the study numbered 669 students from the fourth and fifth grades of 1999.

Nashoba students in the study were all fifth graders and numbered 160 students from Hale Middle School in Stow, Florence Sawyer School in Bolton, and Lancaster Middle School in Lancaster. These schools are the only middle schools in each town making the sample a good representation but sample size was relatively small from each school.

Tables 3.1 and 3.2 show some of the differences between these districts.

District	Per Pupil Spending	Average Annual Salary	Average ELA MCAS		Average Math MCAS		Average Science MCAS	
			1998	1999	1998	1999	1998	1999
Fitchburg	4,724	29,291	224	227	222	226	231	234
Nashoba	5,562	Varies by town	235	237	240	245	244	247
Worcester	4,960	34,779	227	229	231	231	235	236

Table 3.1 School districts participating in the study

Nashoba District Towns	Average Annual Salary
Bolton	42,250
Lancaster	27,247
Stow	59,940

Table 3.2 Average salaries within Nashoba district

For the Extravert/Introvert preference, Extravert students made up 68.8% of the sample and Introverts made up 26.3%. This is close to general population figures for the U.S. based on the MBTI. The students that were Undetermined were about 4.9% of the total. For the Sensing/Intuitive preference, Intuitive students comprised 57.1% of the sample and Sensing students were 37%, with Undetermined students making up 5.9%. This distribution is very different from that produced by the MBTI in assessing the general population. Normally Intuitives are in the minority by a 3 or 4 to 1 margin. In the Thinking/Feeling category, the sample consisted of 28.2% Thinking students, 66.4% Feeling students, and 5.4% Undetermined. The general population is about 50-50 on this dimension with the MBTI, but males and females differ 60-40, with males more likely to be T's and females more likely to be F's. As for the Perceiving/ Judging category, the sample consisted of 32.7% Judging students, 60.3% Perceiving students, and 7% were Undetermined. Again, the MMTIC-R results diverge from those produced by the MBTI with a general population. Normally, J's outnumber P's.

	# of Cases	E vs. I	S vs. N	T vs. F	J vs. P
Normative Sample	1000+	74%/26%	57%/43%	20%/80%	34%/66%
Project Sample	1129	69%/26%	37%/57%	28%/66%	33%/60%
Fitchburg Sample	669	68%/31%	39%/58%	30%/69%	35%/63%
Nashoba Sample	160	70%/20%	22%/61%	19%/66%	13%/73%
Worcester Sample	300	71%/20%	40%/52%	30%/61%	38%/48%

Table 3.3 Distribution of types for the entire sample and by district.

	# of Cases	U's in E/I scale	U's in S/N scale	U's in T/F scale	U's in J/P scale
Project Sample	1129	4.9%	5.9%	5.4%	7%
Fitchburg Sample	669	1.6%	2.4%	1.5%	1.6%
Nashoba Sample	160	10%	16.9%	15%	15%
Worcester Sample	300	9.3%	7.7%	9%	14.7%

Table 3.4 Distribution of Undetermined types in each dimension by district

Distributions for the sample by school appear in the following table. U's are not included in these figures.

	# of Cases	E vs. I	S vs. N	T vs. F	J vs. P
Normative Sample	1000+	74%/26%	57%/43%	20%/80%	34%/66%
Crocker Elemen.	157	59%/37%	41%/54%	26%/72%	40%/57%
Reingold School	267	72%/27%	35%/64%	32%/68%	32%/67%
South Street	236	69%/30%	41%/56%	31%/67%	36%/63%
Lancaster M.S.	73	67%/22%	26%/58%	21%/64%	7%/81%
Hale M.S.	52	73%/19%	21%/62%	27%/62%	15%/67%
Florence Sawyer	35	71%/17%	14%/69%	3%/77%	20%/63%
May Street	48	79%/17%	33%/66%	25%/71%	44%/54%
Midland Street	60	68%/29%	33%/66%	30%/69%	38%/61%
Forest Grove	191	70%/17%	45%/45%	31%/57%	36%/42%

Table 3.5 Distribution of types by school.

The data collected that was common to all of the school systems included the MMTIC-R results, fourth grade MCAS scores for English Language Arts, Math, and Science, ITBS-3 scores, and gender. Other standardized test scores and report card grades were collected from each school and examined by district and by school.

Because the Fitchburg system was undergoing reorganization at the time of data collection, it would have been difficult to track down most of the students in the sample. In order to have grade data and other standardized test scores, it was decided to take a restricted random sample of 110 students from the largest middle school, Academy Middle School.

The random sample from Fitchburg was restricted to students in the sample who took the MCAS in 1998, students who were then seventh graders. MCAS scores for 1998 and 1999 showed similar trends when the S/N and J/P dimensions were compared to MCAS averages. Intuitive and Perceiving types had higher MCAS scores for both years, while Sensing and Judging types had lower scores; therefore, the restriction should not affect the reliability of the sample. Sensing students were over-sampled to bring the S/N distribution to 50%/50%. Although there was some concern that this might not be representative of the whole sample (with S/N distribution 39%/58%), looking at correlation factors for both samples showed little difference.

	SN/JP correlation w/ELA MCAS	SN/JP correlation w/Math MCAS	SN/JP correlation w/Science MCAS
Random Fitchburg Sample	.343**	.259**	.376**
Fitchburg Sample	.358**	.287**	.334**

**Correlation is significant at the .01 level

Table 3.6 Comparison of relationships of entire sample and random sample from Fitchburg.

Data was entered in SPSS 9.0, the software used to do the statistical analysis. Report card grades were entered as numbers, for instance an A became a 12, A- became 11, and so on. ITBS and Stanford test scores entered in the data set were Normal Curve Equivalent (NCE) scores because they were common to the two measures. When computing crosstabulations, MCAS scores were separated into the levels specified by the MCAS test of Advanced, Proficient, Needs Improvement, and Failing and ITBS-3 scores were quartiled. This was done because crosstabulations show the relationship between two or more categorical variables rather than continuous variables.

4.0 Analysis

The relationship between MMTIC-R data and MCAS scores was examined using the Spearman rank correlation because the test scores can be ordered from low to high. Correlation coefficients between 0.2 and 0.4 represent a small to moderate correlation, and coefficients over 0.4 represent a moderate to strong correlation. A correlation coefficient of 1 represents a perfect correlation. Mean MCAS scores were also compared by type to examine how scores differed. This study concentrated on the S/N and J/P dimensions because they seemed to have a pattern of a relationship with test scores. There were relationships with other MMTIC dimensions in some cases, but these were scattered and not particularly strong. Previous studies had also reported relationships between the S/N and J/P dimensions and SAT scores, and there were the consistent findings in this study.

Other standardized test scores and grades were compared to MCAS scores to examine which measure correlated more with MCAS scores. For crosstabulations, the gamma measure of association was examined. Gamma is used between two ordinal variables and falls between -1 and 1. Values close to 1 represent a strong relationship, those close to 0 indicate little or no relationship, and those close to -1 indicate a negative relationship. Crosstabulations were limited to ITBS-3 Reading scores and fourth grade reading and language grades because ITBS-3 was taken before the MCAS test and the report card grades were for the time just before and during the MCAS test. Additionally, ITBS-3 reading scores, reading and language grades, and ELA MCAS scores were chosen for crosstabulation because they were in the same subject.

The next sections start with an analysis of the entire sample, followed by analysis by district, followed by analysis by school.

4.1 All Cases

A relationship between MMTIC-R and MCAS scores was found between the Sensing/Intuitive dimension and all three subjects of the fourth grade MCAS when all of the common data from the three systems was pooled together. The relationship was stronger with ELA and Science MCAS scores than with Math MCAS scores. There was

also a relationship between the Judging/Perceiving dimension and MCAS scores. When the Sensing/Intuitive dimension was combined with the Judging/Perceiving dimension the relationship with MCAS scores became slightly stronger.

Intuitive students had an advantage over Sensing students in all 3 subjects of the MCAS. The Intuitive advantage translated into an average of 6 points in ELA MCAS, 7 points in Math MCAS and 7 points in Science MCAS. The Intuitive students were scoring 20 points higher than Sensing students on the composite score.

	ELA MCAS	Math MCAS	Science MCAS
Correlation factors w/SN category	.295**	.229**	.266**
Sensing MCAS average	224.68	225.92	232.56
Intuitive MCAS average	230.92	232.89	239.76

**Correlation is significant at the .01 level

Table 4.1 Correlation factors and MCAS means for S/N dimension for entire sample.

Perceiving students had an advantage over Judging students in all 3 subjects of the MCAS. Perceiving students scored an average of 5 points higher in ELA MCAS, 6 points higher in Math MCAS, and 6 points higher in Science MCAS.

	ELA MCAS	Math MCAS	Science MCAS
Correlation factors w/JP category	.209**	.182**	.215**
Judging MCAS average	225.26	226.36	232.85
Perceiving MCAS average	230.05	232.05	238.85

**Correlation is significant at the .01 level

Table 4.2 Correlation factors and MCAS means for J/P dimension for entire sample.

There is also a correlation when the SN and JP categories are combined. The Intuitive Perceiving (NP) students had the highest MCAS averages and the Sensing Judging (SJ) students had the lowest. The overall difference between the lowest (SJ) and highest (NP) scoring groups was now 27 points.

	ELA MCAS	Math MCAS	Science MCAS
Correlation factors w/SNJP category	.316**	.252**	.298**
SJ MCAS average Number of Cases = 204	223.04	224.21	230.31
SP MCAS average Number of Cases = 159	226.64	228.09	235.03
NJ MCAS average Number of Cases = 123	229.36	230.5	237.72
NP MCAS average Number of Cases = 472	231.25	233.15	240.22

**Correlation is significant at the .01 level

Table 4.3 Correlation factors and MCAS means for 2 dimensions S/N and J/P for entire sample.

Average fourth grade MCAS scores of the sample for 1998 and 1999 showed that Sensing Judging students usually scored below average while Intuitive Perceiving students usually scored above average. The SJ average is often close to the line indicating failure on the test (220 points).

1998 Average MCAS Scores	ELA MCAS	Math MCAS	Science MCAS
Statewide Averages 1998	230	234	238
Sample Averages 1998	228.5	230.1	236.9
Sensing Judging 1998	222.2	224.8	230.3
Intuitive Perceiving 1998	231.5	234.03	240.8

Table 4.4 MCAS averages by type in 1998 for entire sample.

1999 Average MCAS Scores	ELA MCAS	Math MCAS	Science MCAS
Statewide Averages 1999	231	235	240
Sample Average 1999	229	229	236
Sensing Judging 1999	224.2	223.4	230.3
Intuitive Perceiving 1999	231	231.9	239.5

Table 4.5 MCAS averages by type in 1999 for entire sample.

As each system had data concerning the ITBS-3, English Language Arts MCAS scores were compared to ITBS-3 Reading Total scores. These two measures were strongly related with a .687 correlation factor, significant at the .01 level. Crosstabulation analyses were done to determine which type the ITBS-3 was a better predictor for on the

ELA MCAS test. For the S/N dimension ITBS-3 Reading scores were good indicators for both types, although they were slightly better for Intuitive types. As for the J/P scale, the ITBS-3 scores were excellent indicators for Judging types and good for Perceiving types. These findings prompted the combining of the S/N and J/P dimensions. This showed that ITBS-3 scores were excellent indicators for ELA MCAS scores for SJ types and NJ types and moderate indicators for SP types and NP types.

	Gamma for ITBS-3	Significance
Sensing Judging Number of Cases	.842 74	.000
Sensing Perceiving Number of Cases	.666 64	.000
Intuitive Judging Number of Cases	.930 44	.000
Intuitive Perceiving Number of Cases	.658 187	.000

Table 4.6 Crosstabs for ITBS-3 and types for entire sample.

The .658 - .666 correlation for SP's and NP's explains about 44% of the variance in MCAS scores in terms of ITBS-3 scores, while the .842 - .930 correlation explains 70% to almost 90% of the variance. The two measures of ELA MCAS and ITBS-3 reading test can be viewed as virtually identical indicators for NJ types.

4.2 Fitchburg

The sample from Fitchburg consisted of 669 students from Crocker Elementary School, Reingold School, and South Street Complex. The students took the Murphy-Meisgeier Type Indicator for Children - Revised (MMTIC-R) in 1999, when they were in the fourth and fifth grades. The data collected included the MMTIC-R results, fourth grade MCAS scores for English Language Arts, Math, and Science, gender, and participation in the free lunch program. Report card grades for third and fourth grade as well as ITBS-3 and ITBS-6 scores were collected for a random sample of 110 Fitchburg students.

A relationship between MMTIC-R and MCAS scores was found between the Sensing/Intuitive dimension and all three subjects of the fourth grade MCAS. The

relationship was stronger in ELA and Science MCAS scores. There was also a relationship between the Judging/Perceiving dimension and MCAS scores. When the Sensing/Intuitive dimension was combined with the Judging/Perceiving dimension the relationship with MCAS scores became slightly stronger.

Intuitive students in Fitchburg had an advantage over Sensing students on all 3 subject areas of the MCAS. The Intuitive advantage translated into an average of 6 points in ELA MCAS, 7 points in Math MCAS and 8 points in Science MCAS higher than Sensing students.

	ELA MCAS	Math MCAS	Science MCAS
Correlation factors w/SN category	.337**	.267**	.305**
Sensing MCAS average	223.29	222.26	229.8
Intuitive MCAS average	229.22	229.36	237.87

**Correlation is significant at the .01 level

Table 4.7 Correlation factors and MCAS means for S/N dimension in Fitchburg.

Perceiving students had an advantage over Judging students in all 3 subjects of the MCAS. Perceiving students scored an average of 5 points higher in ELA MCAS, 6 points higher in Math MCAS, and 6 points higher in Science MCAS.

	ELA MCAS	Math MCAS	Science MCAS
Correlation factors w/JP category	.249**	.221**	.251**
Judging MCAS average	223.95	222.79	230.37
Perceiving MCAS average	228.36	228.41	236.84

**Correlation is significant at the .01 level

Table 4.8 Correlation factors and MCAS means for J/P dimension in Fitchburg.

There is also a correlation when the SN and JP categories are combined. The Intuitive Perceiving (NP) students had the highest MCAS averages and the Sensing Judging (SJ) students had the lowest.

	ELA MCAS	Math MCAS	Science MCAS
Correlation factors w/SNJP category	.359**	.286**	.335**
SJ MCAS average Number of cases = 145	221.92	220.43	227.46
SP MCAS average Number of cases = 110	225.25	224.75	232.95
NJ MCAS average Number of cases = 84	227.79	227.48	236.02
NP MCAS average Number of cases = 304	229.57	229.77	238.33

**Correlation is significant at the .01 level

Table 4.9 Correlation factors and MCAS means for 2 dimensions S/N and J/P in Fitchburg.

When compared to average fourth grade MCAS scores in Fitchburg for 1998 and 1999, the Fitchburg sample showed that Sensing Judging students usually scored below average while Intuitive Perceiving students usually scored above average. The SJ students were very much at risk of failing in 1998, and although scores were better in 1999 they are still very close to the line on average. NP students have a bigger margin between their average scores and failing scores.

1998 Average MCAS Scores	ELA MCAS	Math MCAS	Science MCAS
Statewide Averages 1998	230	234	238
Fitchburg Averages 1998	224	222	231
Sensing-Judging 1998	220.42	218.27	226.06
Intuitive-Perceiving 1998	228.23	227.61	237.72

Table 4.10 MCAS averages by type in Fitchburg for 1998

1999 Average MCAS Scores	ELA MCAS	Math MCAS	Science MCAS
Statewide Averages 1999	231	235	240
Fitchburg Average 1999	227	226	234
Sensing-Judging 1999	223.21	222.28	228.67
Intuitive-Perceiving 1999	230.56	231.36	238.78

Table 4.11 MCAS averages by type in Fitchburg for 1999.

Grade data and ITBS scores were part of the Fitchburg data for the sample of 110 students. The analysis concentrated on fourth grade report cards as they probably related

best to the MCAS. Correlation coefficients showed that all three measures correlated significantly with each other, but the standardized tests correlated with each other more than grades did with either test.

	4th grade reading grades	4th grade language grades	4th grade math grades	4th grade science grades
ITBS-3 Reading Number of cases	.528** 97	.535** 98	—	—
ITBS-6 Reading Number of cases	.607** 76	.616** 76	—	—
ITBS-6 Language Number of cases	.657** 77	.705** 77	—	—
ITBS-6 Math Number of cases	—	—	.552** 77	—
ITBS-6 Science Number of cases	—	—	—	.452** 77
ELA MCAS Number of cases	.672** 104	.682** 105	—	—
Math MCAS Number of cases	—	—	.523** 105	—
Science MCAS Number of cases	—	—	—	.578** 104

**Correlation is significant at the .01 level

Table 4.12 Correlation factors of test scores and grades in Fitchburg.

	ITBS-3 Reading	ITBS-6 Reading	ITBS-6 Lang.	ITBS-6 Math	ITBS-6 Science
ELA MCAS Number of cases	.732** 107	.774** 83	.847** 84	—	—
Math MCAS Number of cases	—	—	—	.742** 84	—
Science MCAS Number of cases	—	—	—	—	.710** 84

**Correlation is significant at the .01 level

Table 4.13 Correlation factors of MCAS test scores and ITBS test scores in Fitchburg.

Crosstabulations were done for reading and language grades and ELA MCAS scores and for ITBS-3 Reading and ELA MCAS scores. Gamma results showed that reading and language grades were a better indicator for SP and NP types and ITBS-3 Reading scores were a near perfect indicator for NJ and NP types.

	Gamma for Reading grades	Sig. Read grades	Gamma for Lang. Grades	Sig. Lang. Grades	Gamma for ITBS-3 Reading	Sig. ITBS-3 Read.
Sensing Judging Number of Cases	.461 31	.078	.452 32	.049	.733 30	.006
Sensing Perceiving Number of Cases	.783 19	.001	.579 19	.036	.714 20	.000
Intuitive Judging Number of Cases	.667 9	.128	.200 9	.657	1.000 10	.002
Intuitive Perceiving Number of Cases	.888 45	.016	.859 45	.018	.980 47	.005

Table 4.14 Crosstabs of test scores and grades to type in Fitchburg.

4.2.1 Crocker Elementary

The sample from Fitchburg included 157 fourth and fifth grade students from Crocker Elementary School.

Crocker Elementary had the strongest correlation between Sensing/Intuitive and MCAS scores of the 3 Fitchburg schools. Intuitives did an average of 6 points better on ELA, 9 points better in Math and 10 points better in Science than Sensing students did.

	ELA MCAS	Math MCAS	Science MCAS
Correlation factors w/SN category	.374**	.320**	.371**
Sensing MCAS average	221.56	217.69	226.84
Intuitive MCAS average	227.98	226.42	236.80

**Correlation is significant at the .01 level

Table 4.15 Correlation factors and MCAS means for S/N dimension at Crocker Elementary.

The Judging/Perceiving dimension correlated with MCAS scores in all 3 subjects. This meant a 3 point advantage in ELA, a 6 point advantage in Math, and a 7 point advantage in Science for Intuitive students at Crocker Elementary.

	ELA MCAS	Math MCAS	Science MCAS
Correlation factors w/JP category	.166*	.243**	.257**
Judging MCAS average	223.29	218.84	228.61
Perceiving MCAS average	226.52	225.19	235.26

*Correlation is significant at the .05 level
**Correlation is significant at the .01 level

Table 4.16 Correlation factors and MCAS means for J/P dimension at Crocker Elementary.

Combining the Sensing/Intuitive and Judging/Perceiving categories also showed a correlation with MCAS scores. A Sensing Judging student did not do as well as an Intuitive Perceiving student did in all 3 subject areas of the MCAS.

	ELA MCAS	Math MCAS	Science MCAS
Correlation factors w/SNJP category	.370**	.313**	.370**
SJ MCAS average Number of cases = 36	221.06	216.17	225.28
SP MCAS average Number of cases = 27	222.59	219.33	228.67
NJ MCAS average Number of cases = 25	226.64	223.2	233.76
NP MCAS average Number of cases = 60	228.53	227.77	238.07

**Correlation is significant at the .01 level

Table 4.17 Correlation factors and MCAS means for 2 dimensions S/N and J/P at Crocker Elementary.

4.2.2 Reingold School

The Fitchburg sample included 267 fourth and fifth grade students from the Reingold School.

The Intuitive advantage of the total Fitchburg sample drops somewhat at the Reingold School. ELA and Science MCAS scores have a stronger correlation than Math MCAS does. Sensing students were 5 points behind Intuitive students in ELA, 6 points behind in Math, and 7 points behind in Science.

	ELA MCAS	Math MCAS	Science MCAS
Correlation factors w/SN category	.280**	.195**	.234**
Sensing MCAS average	225.31	227.61	233.61
Intuitive MCAS average	230.17	233.59	240.05

**Correlation is significant at the .01 level

Table 4.18 Correlation factors and MCAS means for S/N dimension at Reingold School.

Judging/Perceiving correlation factors were also lower for Reingold students than other Fitchburg schools. Perceiving students did about 3 points better in ELA, Math, and Science.

	ELA MCAS	Math MCAS	Science MCAS
Correlation factors w/JP category	.175**	.118	.143*
Judging MCAS average	226.48	229.43	235.21
Perceiving MCAS average	229.32	232.29	238.91

*Correlation is significant at the .05 level
**Correlation is significant at the .01 level

Table 4.19 Correlation factors and MCAS means for J/P dimension at Reingold School.

Combining the Sensing/Intuitive and Judging/Perceiving categories also showed a correlation with MCAS scores. A Sensing Judging student did not do as well as an Intuitive Perceiving student did in all 3 subject areas of the MCAS.

	ELA MCAS	Math MCAS	Science MCAS
Correlation factors w/SNJP category	.278**	.184**	.226**
SJ MCAS average Number of cases = 50	224.84	226.48	232.28
SP MCAS average Number of cases = 43	225.86	228.93	235.16
NJ MCAS average Number of cases = 34	228.88	233.34	239.53
NP MCAS average Number of cases = 137	230.41	233.34	240.09

**Correlation is significant at the .01 level

Table 4.20 Correlation factors and MCAS means for 2 dimensions S/N and J/P at Reingold School.

4.2.3 South Street Complex

The Fitchburg sample included 236 students from the fourth and fifth grades at South Street Complex.

The Intuitive advantage in the MCAS is present in the South Street sample, with the strongest correlation in ELA MCAS scores. This showed up as a 6 point advantage in ELA, 5 points in Math, and 7 points in Science for Intuitive students.

	ELA MCAS	Math MCAS	Science MCAS
Correlation factors w/SN category	.337**	.221**	.275**
Sensing MCAS average	222.71	220.65	228.88
Intuitive MCAS average	228.9	225.92	235.57

**Correlation is significant at the .01 level

Table 4.21 Correlation factors and MCAS means for S/N dimension at South Street.

A Judging/Perceiving correlation with MCAS scores was also evident in South Street. Perceiving students had advantages of 6 points in ELA, 6 points in Math, and 8 points in Science.

	ELA MCAS	Math MCAS	Science MCAS
Correlation factors w/JP category	.344**	.263**	.311**
Judging MCAS average	222.02	219.47	227.37
Perceiving MCAS average	228.51	225.97	235.70

**Correlation is significant at the .01 level

Table 4.22 Correlation factors and MCAS means for J/P dimension at South Street.

Combining the Sensing/Intuitive and Judging/Perceiving categories also showed a correlation with MCAS scores. The correlation factors were stronger than the factors for the separate dimensions. A Sensing Judging student did not do as well as an Intuitive Perceiving student did in all 3 subject areas of the MCAS.

	ELA MCAS	Math MCAS	Science MCAS
Correlation factors w/SNJP category	.392**	.269**	.352**
SJ MCAS average Number of cases = 56	219.96	218.29	225.29
SP MCAS average Number of cases = 39	226.77	224.36	234.31
NJ MCAS average Number of cases = 25	227.44	223.2	233.52
NP MCAS average Number of cases = 106	229.26	226.57	236.47

**Correlation is significant at the .01 level

Table 4.23 Correlation factors and MCAS means for S/N and J/P dimensions at South Street.

4.3 Nashoba

The sample from the Nashoba school district consisted of 160 students from schools in Lancaster, Bolton, and Stow. These students were all fifth graders when they took the MMTIC in 1999. Data collected included fourth grade MCAS scores, grades, and ITBS scores.

Surprisingly, the Intuitive and Perceiving advantage disappeared in the Nashoba sample. Correlation factors showed no relationship between type and MCAS scores.

MCAS score means showed that SJ types were no longer the low scorers and NP types were no longer the high scorers.

	ELA MCAS	Math MCAS	Science MCAS
Correlation factors w/SN category	.1	-.028	.097
Correlation factors w/JP category	.015	.094	.06
Correlation factors w/SN/JP category	.108	.046	.111

Table 4.24 Correlation factors for S/N and J/P dimensions and MCAS in Nashoba.

	ELA MCAS	Math MCAS	Science MCAS
Correlation factors w/SNJP category	.108	.046	.111
SJ MCAS average Number of cases = 10	238.2	246.8	247.6
SP MCAS average Number of cases = 18	233.4	241.2	245.2
NJ MCAS average Number of cases = 6	233.7	229.0	239.3
NP MCAS average Number of cases = 76	236.4	242.2	246.1

Table 4.25 Correlation factors and MCAS means for S/N and J/P dimensions in Nashoba.

MCAS averages differed very little between types in Nashoba.

1998 Average MCAS Scores	ELA MCAS	Math MCAS	Science MCAS
Statewide Averages 1998	230	234	238
Nashoba Averages 1998	235	240	244
Sensing Averages1998	234.57	242.57	244.9
Intuitive Averages 1998	236.2	241.18	245.96

Table 4.26 MCAS averages by type in Nashoba for 1998

ITBS scores did correlate significantly with MCAS scores.

	ITBS-3 Reading	ITBS-5 Reading	ITBS-5 Language	ITBS-5 Math	ITBS-5 Science
ELA MCAS	.506**	.703**	.686**	.603**	.532**
Math MCAS	.409**	.503**	.567**	.527**	.642**
Science MCAS	.449**	.556**	.420**	.587**	.412**

**Correlation is significant at the .01 level

Table 4.27 Correlation factors for ITBS scores and MCAS in Nashoba.

Crosstabulations were run on ITBS-3 Reading totals and ELA MCAS scores by type. Fourth grade grades across the three schools in Nashoba were too different to pool together. A crosstabulation was done with sixth grade Language grades. This was considered a good substitution as there were usually correlation factors of .5 on average between fourth grade language grades and sixth grade language grades, as well as a .705 correlation factor between ITBS-3 Reading and ITBS-5 Reading. Crosstabulations showed that the predictive power of the ITBS-3 Reading scores was strongest for Judging students. Crosstabulations of sixth grade language grades and MCAS scores showed that, in Nashoba, grades were better predictors for Sensing and Judging students. The SN and JP dimensions were not combined, as the number of cases in some of the four categories became small and were not reliable.

	Gamma for ITBS-3	Significance for ITBS-3	Gamma for 6th Lang. Grades	Significance For 6th Lang. Grades
Sensing Number of Cases	.181 35	.541	.535 35	.025
Intuitive Number of Cases	.402 93	.009	.297 93	.047
Judging Number of Cases	.786 19	.011	.793 19	.005
Perceiving Number of Cases	.304 110	.041	.205 110	.147

Table 4.28 Crosstabs MCAS and ITBS-3 and 6th grade language grades in Nashoba.

4.3.1 Lancaster

The sample from Lancaster consisted of 73 students from Lancaster Middle School. A slight relationship between learning styles and MCAS scores appeared when this sample was examined alone.

ELA and Science MCAS scores correlated with the Sensing/Intuitive category in Lancaster. The Intuitive types have slight advantages in ELA MCAS, Math MCAS, and Science MCAS scores. There was not a significant correlation between type and Math MCAS in Lancaster. The Judging/Perceiving dimension did not correlate significantly with MCAS scores, but mean MCAS scores showed that Perceiving types performed slightly better. The number of cases was not large enough to combine the SN and JP dimensions together.

	ELA MCAS	Math MCAS	Science MCAS
Correlation factors w/SN category	.238*	.123	.291*
Correlation factors w/JP category	.153	.173	.023
Correlation factors w/SN/JP category	.329**	.243*	.274*

*Correlation is significant at the .05 level
**Correlation is significant at the .01 level

Table 4.29 Correlation factors for S/N and J/P dimensions and MCAS in Lancaster.

	ELA MCAS	Math MCAS	Science MCAS
Sensing Number of cases = 19	229.37	239.47	242.53
Intuitive Number of cases = 40	232.3	241.75	247.95

Table 4.30 MCAS means for S/N dimension in Lancaster.

	ELA MCAS	Math MCAS	Science MCAS
J MCAS average Number of cases = 5	229.6	238.8	242.8
P MCAS average Number of cases = 57	231.26	241.44	245.05

Table 4.31 MCAS means for J/P dimension in Lancaster.

Overall, MCAS scores and ITBS scores correlate more with each other than test scores and grades. Lancaster did not have reading grades for sixth grade.

Reading Grades	3rd Grade	4th Grade	5th Grade
Correlation with ELA MCAS	.547**	.415**	.508**
Correlation with ITBS-3 Reading	.660**	.244	.411**
Correlation with ITBS-5 Reading	.569**	.340**	.445**

**Correlation is significant at the .01 level

Table 4.32 Correlation factors for MCAS and ITBS scores and reading grades in Lancaster.

Language Grades	3rd Grade	4th Grade	5th Grade	6th Grade
Correlation with ELA MCAS	.392**	.259*	.394**	.554**
Correlation with ITBS-5 Language	.378**	.243	.350**	.659**

**Correlation is significant at the .01 level

Table 4.33 Correlation factors for MCAS and ITBS scores and language grades in Lancaster.

Science grades and Science MCAS scores correlated less than ITBS-5 science scores and grades. For third and fourth grade science grades, Lancaster used an S for Satisfactory progress and N for Little or no progress. As most of the students received an S for science in fourth grade no correlation was calculated.

Science Grades	3rd Grade	4th Grade	5th Grade	6th Grade
Correlation with Science MCAS	-.076	None	.313**	.392**
Correlation with ITBS-5 Science	.350**	None	.462**	.727**

**Correlation is significant at the .01 level

Table 4.34 Correlation factors for MCAS and ITBS scores and science grades in Lancaster.

ITBS-5 math totals correlate with math grades much more than Math MCAS does. Math MCAS does not correlate with third and fourth grade math averages, but ITBS-5 math and third and fourth grade averages do correlate. In fifth and sixth grades a correlation with Math MCAS does show up, but ITBS-5 is still more strongly correlated with grades than the MCAS which is designed to test mastery of the curriculum.

Math Grades	3rd Grade	4th Grade	5th Grade	6th Grade
Correlation with Math MCAS	.216	.221	.616**	.576**
Correlation with ITBS-5 Math	.572**	.406**	.846**	.814**

**Correlation is significant at the .01 level

Table 4.35 Correlation factors for MCAS and ITBS scores and math grades in Lancaster.

As was usually the case, the tests all strongly correlated with each other, and the grades were not as effective a lead indicator.

	ITBS-3 Reading	ITBS-5 Reading	ITBS-5 Language	ITBS-5 Math	ITBS-5 Science
ELA MCAS	.599**	.641**	.524**	—	—
Math MCAS	—	—	—	.602**	—
Science MCAS	—	—	—	—	.512**

**Correlation is significant at the .01 level

Table 4.36 Correlation factors for MCAS and ITBS scores in Lancaster.

4.3.2 Bolton

The sample from Bolton consisted of 35 students from Florence Sawyer School.

A significant correlation between learning styles and MCAS scores does not show up in Bolton data. ELA MCAS and reading grades correlated significantly in third, fourth, fifth, and sixth grades, as did ITBS scores.

Reading Grades	3rd Grade	4th Grade	5th Grade	6th Grade
Correlation with ELA MCAS	.832**	.806**	.626**	.805**
Correlation with ITBS-3 Reading	.621**	.681**	.681**	.706**
Correlation with ITBS-5 Reading	.737**	.632**	.741**	.728**

**Correlation is significant at the .01 level

Table 4.37 Correlation factors for MCAS and ITBS scores and reading grades in Bolton.

Language grades also correlate significantly to both ELA MCAS scores and ITBS-5 Language scores.

Language Grades	3rd Grade	4th Grade	5th Grade	6th Grade
Correlation with ELA MCAS	.697**	.793**	.656**	.646**
Correlation with ITBS-5 Language	.574**	.832**	.812**	.516**

**Correlation is significant at the .01 level

Table 4.38 Correlation factors for MCAS and ITBS scores and language grades in Bolton.

Science MCAS and science grades and ITBS-5 Science and science grades usually correlate significantly, as do math test scores and math grades.

Science Grades	3rd Grade	4th Grade	5th Grade	6th Grade
Correlation with Science MCAS	.580**	.630**	.793**	.673**
Correlation with ITBS-5 Science	.391	.483*	.720**	.595**

*Correlation is significant at the .05 level
**Correlation is significant at the .01 level

Table 4.39 Correlation factors for MCAS and ITBS scores and science grades in Bolton.

Math Grades	3rd Grade	4th Grade	5th Grade	6th Grade
Correlation with Math MCAS	.469*	.550**	.734**	.476**
Correlation with ITBS-5 Math	.398	.689**	.824**	.452**

*Correlation is significant at the .05 level
**Correlation is significant at the .01 level

Table 4.40 Correlation factors for MCAS and ITBS scores and math grades in Bolton.

The standardized tests correlate significantly with each other as they have in other schools.

	ITBS-3 Reading	ITBS-5 Reading	ITBS-5 Language	ITBS-5 Math	ITBS-5 Science
ELA MCAS	.797**	.676**	.740**	—	—
Math MCAS	—	—	—	.712**	—
Science MCAS	—	—	—	—	.778**

**Correlation is significant at the .01 level

Table 4.41 Correlation factors for MCAS and ITBS scores in Bolton.

4.3.3 Stow

The Stow sample consisted of 52 students from Hale Middle School. The Stow sample had a weak relationship with learning types, as was the case in Bolton. Similar to the other schools in the study, test scores and grades often correlate significantly, although science grades were a different story in Stow.

Reading Grades	3rd Grade	4th Grade	5th Grade	6th Grade
Correlation with ELA MCAS	.293*	.684**	.483**	.671**
Correlation with ITBS-3 Reading	.321*	.613**	.285	.576**
Correlation with ITBS-5 Reading	.366*	.740**	.400**	.595**

*Correlation is significant at the .05 level
**Correlation is significant at the .01 level

Table 4.42 Correlation factors for MCAS and ITBS scores and reading grades in Stow.

Language grades correlate with ELA MCAS scores at a greater level than ITBS-5 Language scores do.

Language Grades	3rd Grade	4th Grade	5th Grade	6th Grade
Correlation with ELA MCAS	.443**	.653**	.606**	.662**
Correlation with ITBS-5 Language	.391**	.570**	.480**	.423**

**Correlation is significant at the .01 level

Table 4.43 Correlation factors for MCAS and ITBS scores and language grades in Stow.

Science MCAS does not correlate significantly with science grades in third and fourth grade, but does approach significance in fifth and sixth grade. ITBS-5 Science does not correlate significantly with science grades until sixth grade.

Science Grades	3rd Grade	4th Grade	5th Grade	6th Grade
Correlation with Science MCAS	.086	.222	.424**	.341*
Correlation with ITBS-5 Science	.105	.183	.278	.316*

*Correlation is significant at the .05 level
**Correlation is significant at the .01 level

Table 4.44 Correlation factors for MCAS and ITBS scores and science grades in Stow.

ITBS-5 Math correlates with math grades at a higher level than Math MCAS scores do.

Math Grades	3rd Grade	4th Grade	5th Grade	6th Grade
Correlation with Math MCAS	.287	.409**	.550**	.354*
Correlation with ITBS-5 Math	.498**	.656**	.806**	.545**

*Correlation is significant at the .05 level
**Correlation is significant at the .01 level

Table 4.45 Correlation factors for MCAS and ITBS scores and math grades in Stow.

The different standardized test scores also correlated with each other in each subject.

	ITBS-3 Reading	ITBS-5 Reading	ITBS-5 Language	ITBS-5 Math	ITBS-5 Science
ELA MCAS	.612**	.680**	.557**	—	—
Math MCAS	—	—	—	.408**	—
Science MCAS	—	—	—	—	.601**

**Correlation is significant at the .01 level

Table 4.46 Correlation factors for MCAS and ITBS scores in Stow.

4.4 Worcester

The Worcester sample consisted of 300 students who took the MMTIC in 1999 and 2000. Data collected included fourth grade MCAS scores, grades, ITBS-3 scores, and fourth and fifth grade Stanford Achievement test scores. The Worcester analysis was not done school by school because the schools involved were in the same quadrant and their

grading systems were very similar. It appeared to be a good idea to pool the data. Worcester MCAS scores show an Intuitive advantage over the Sensing students. Intuitive types have a 5 point advantage on average in ELA MCAS. They have an 8 point advantage in Math MCAS and a 5 point advantage in Science MCAS.

	ELA MCAS	Math MCAS	Science MCAS
Correlation Factors with SN Category	.284**	.255**	.234**
Sensing Average Number of cases = 92	227.13	229.76	235.55
Intuitive Average Number of cases = 139	232.16	237.04	240.92

**Correlation is significant at the .01 level

Table 4.47 Correlation factors and MCAS means for S/N dimension in Worcester.

The J/P dimensions did not correlate significantly with MCAS scores, but combining the S/N and J/P dimensions showed that Sensing Judging students usually scored the lowest on all three subjects of the MCAS.

	ELA MCAS	Math MCAS	Science MCAS
Correlation factors w/SNJP category	.298**	.233**	.268**
SJ MCAS average Number of cases = 48	227.75	230.78	235.22
SP MCAS average Number of cases = 31	227.61	232.32	236.52
NJ MCAS average Number of cases = 34	232.12	237.94	241.24
NP MCAS average Number of cases = 92	232.54	236.61	241.61

**Correlation is significant at the .01 level

Table 4.48 Correlation factors and MCAS means for S/N and J/P dimensions in Worcester.

Looking at average scores by year showed that Sensing Judging students were scoring slightly lower than Intuitive Perceiving students, although not always below the district's average as was the case in Fitchburg.

Language Grades	3rd Grade	4th Grade	5th Grade
Correlation with ELA MCAS	.529**	.582**	.591**
ITBS-3 Spelling	.566**	.605**	.604**
Correlation with Stanford4 Read.	.495**	.514**	.482**
Correlation with Stanford5 Read.	.592**	.673**	.546**

**Correlation is significant at the .01 level

Table 4.52 Correlation factors for MCAS and Stanfords for language in Worcester.

Math grades usually correlated significantly with the different standardized test scores, as did science grades.

Math Grades	3rd Grade	4th Grade	5th Grade
Correlation with Math MCAS	.497**	.575**	.583**
Correlation with Stanford4 Math	.493**	.548**	.512**
Correlation with Stanford5 Math	.656**	.703**	.735**

**Correlation is significant at the .01 level

Table 4.53 Correlation factors for MCAS and Stanford tests with math grades in Worcester.

Science Grades	3rd Grade	4th Grade	5th Grade
Correlation with Science MCAS	.450**	.538**	.468**

**Correlation is significant at the .01 level

Table 4.54 Correlation factors for MCAS and Stanford tests with science grades in Worcester.

As usual, MCAS scores correlated significantly with other test scores.

	ITBS-3 Reading	Stanford4 Reading	Stanford5 Reading	Stanford4 Math	Stanford5 Math
Correlation with ELA MCAS	.722**	.654**	.756**	—	—
Correlation with Math MCAS	—	—	—	.506**	.624**

**Correlation is significant at the .01 level

Table 4.55 Correlation factors for MCAS and other tests in Worcester.

Crosstabulations were used to determine the best predictor of MCAS scores. Effectiveness of grades as predictors differed for some types but no pattern was discernible. The ITBS-3 was a powerful indicator of ELA MCAS scores especially for Sensing types, while grades were an excellent indicator especially for Sensing Perceiving types.

	Gamma for Reading grades	Sig. Read. Grades	Gamma for Lang. Grades	Sig. Lang. grades	Gamma for ITBS-3 Reading	Sig. ITBS-3 Reading
Sensing Judging Number of Cases	.662 40	.015	.783 40	.002	.952 34	.003
Sensing Perceiving Number of Cases	.910 27	.018	.805 27	.025	.852 26	.076
Intuitive Judging Number of Cases	.636 33	.003	.773 33	.000	.769 29	.002
Intuitive Perceiving Number of Cases	.699 73	.000	.702 73	.000	.788 66	.000

Table 4.56 Crosstabs for reading, language, ITBS-3 and ELA MCAS in Worcester.

5.0 Conclusion

Although it was difficult to gather uniform data on children this young in different school systems, the analysis of the data revealed some interesting relationships between learning styles and the MCAS exam.

Learning style advantages showed up in the S/N and J/P scales as they did in other studies. Correlations were slightly weaker for Math MCAS scores than for ELA and Science MCAS scores as was also found in other studies.

Relationships between the two were usually weaker for Math MCAS scores and learning styles. It is possible that there would be less of a bias for Sensing types in math because, according to the MMTIC manual, they like things definite and measurable, are careful with facts, and rely on facts. These are probably good qualities to have for the computation sections of the Math MCAS.

Learning style advantages sometimes meant only a few points difference, but they were often close to cutoff points between Failing and Needs Improvement or between Needs Improvement and Proficient.

Standardized test scores almost always correlated significantly with other test scores, in some cases extremely well. This supports the notion that students usually either do well on these tests or do not, with little variation by subject or format. Additionally, correlations between tests were very often significant across test subjects. So a student who did not do well on one subject of a standardized test would most likely not do well on the other subjects, even when their grades were stronger in one subject than in another.

When looking for predictors of how students would do on the MCAS test, it was evident that the ITBS-3 was a very good indicator, in many cases exceptional, of how a child in Worcester or Fitchburg would do on the MCAS. The ITBS-3 was also a good indicator of how Nashoba students would do on the MCAS. Grades were generally not as effective indicators as the ITBS-3. Grades were very good indicators in some cases, and this sometimes differed by type. However, the type and best predictors differed in each system. This may be motivated by different teaching philosophies that are advocated by administrations, as well as different teaching styles among teachers. For instance, some school systems may emphasize homework and projects more than tests, which might be an advantage for Judging students who, according to the MMTIC manual, live by schedules, are decisive, are orderly and organized, and like to plan their work. A Sensing Judging student might do well on report cards at a school like this, but according to some of the results of this study, score lower than an Intuitive Perceiving student on the MCAS. In this case, grades would not be a good indicator of how this student would do on the MCAS. One would have to be very involved in a school to learn more about what measures and techniques are emphasized for assessment within that system.

After analyzing the data by district and then by school, there appeared to be a pattern to relationships between learning styles and MCAS scores. Relationships were usually the strongest for schools that had the lowest average MCAS scores. The strength of correlation factors was roughly inversely proportional to average MCAS scores. This was observed in three cases, when relationships were compared by district, when relationships were compared within the Fitchburg district, and when they were compared within the Nashoba district.

By district, the order of the strength of relationships between learning style and MCAS scores was Fitchburg, Worcester, and finally Nashoba. This was also the order of MCAS averages from lowest to highest.

District	SN/JP correlation ELA MCAS	Average ELA MCAS		Average Math MCAS		Average Science MCAS	
		1998	1999	1998	1999	1998	1999
Fitchburg	.359**	224	227	222	226	231	234
Worcester	.298**	227	229	231	231	235	236
Nashoba	.108	235	237	240	245	244	247

**Correlation is significant at the .01 level

Table 5.1 School districts in the study in order of MCAS averages and relationships.

This was also true for schools within a district that had differences in MCAS averages. Lancaster, which had lower average MCAS scores than Bolton and Stow, showed a stronger relationship with learning styles. In Fitchburg, the Reingold School, which had higher MCAS averages than Crocker Elementary and South Street Complex also had weaker relationships between MMTIC types and MCAS scores.

District	School	SN/JP correlation ELA MCAS	Average ELA MCAS		Average Math MCAS		Average Science MCAS	
			1998	1999	1998	1999	1998	1999
Fitchburg	South St	.392**	224	226	220	224	229	232
	Crocker	.370**	221	226	219	225	230	233
	Reingold	.278**	227	229	230	232	237	238

*Correlation is significant at the .05 level
**Correlation is significant at the .01 level

Table 5.2 Fitchburg schools in the study in order of MCAS averages and relationships.

District	School	S/N correlation ELA MCAS	Average ELA MCAS		Average Math MCAS		Average Science MCAS	
			1998	1999	1998	1999	1998	1999
Nashoba	Lancaster	.238*	230	236	239	245	244	245
	Bolton	-.131	235	236	235	242	245	247
	Stow	.032	240	238	245	248	245	249

*Correlation is significant at the .05 level

Table 5.3 Nashoba schools in the study in order of MCAS averages and relationships.

These results seem to point to the possibility that at-risk students may rely more on their preferred thinking processes than well-prepared students do. Students who, for whatever reason, less effective coaching, socioeconomic status, less spending per pupil, are likely to do poorly on the MCAS, succumb to their preferences instead of using the strategy that would work best on the MCAS. If that were the case, at-risk Sensing Judging students would have a compounded hardship concerning standardized tests and learning style biases would effect them the most. At-risk Intuitive Perceiving students might just be able to get by using their preferred thinking processes, as they are more appropriate to dealing with this type of task.

It appears that the results of this study warrant further investigation with larger data sets with more uniform grade data. Issues such as learning style biases must be carefully considered when using standardized measures with such high stakes. Children may become frustrated at a very young age when confronted with tests that they do not have the strategies to cope with. While assessment is essential to ensure that students are receiving an adequate education, assessment systems need to be carefully designed to ensure that no child is left behind.

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WORDS TO HELP UNDERSTANDING OF TYPE CONCEPTS

E: EXTRAVERSION

When extraverting, I am...

- Oriented to the outer world
- Focusing on people and things
- Active
- Using trial and error with confidence
- Scanning the environment for stimulation

I: INTROVERSION

When introverting, I am...

- Oriented to the inner world
- Focusing on ideas, inner impressions
- Reflective
- Considering deeply before acting
- Finding stimulation inwardly

S: SENSING PERCEPTION

When using my sensing, I am...

- Perceiving with the five senses
- Attending to practical and factual details
- In touch with the physical realities
- Attending to the present moment
- Confining attention to what is said and done
- Seeing "little things" in everyday life
- Attending to step-by-step experience
- Letting "the eyes tell the mind"

N: INTUITIVE PERCEPTION

When using my intuition, I am...

- Perceiving with memory and associations
- Seeing patterns and meanings
- Seeing possibilities
- Projecting possibilities for the future
- Imagining; "reading between the lines"
- Looking for the big picture
- Having hunches; "ideas out of nowhere"
- Letting "the mind tell the eyes"

T: THINKING JUDGMENT

When reasoning with thinking, I am...

- Using logical analysis
- Using objective and impersonal criteria
- Drawing cause and effect relationships
- Being firm-minded
- Prizing logical order
- Being skeptical

F: FEELING JUDGMENT

When reasoning with feeling, I am...

- Applying personal priorities
- Weighing human values and motives, my own and others
- Appreciating
- Valuing warmth in relationships
- Prizing harmony; trusting

J: JUDGMENT

When I take a judging attitude, I am...

- Using thinking or feeling judgment outwardly
- Deciding and planning
- Organizing and scheduling
- Controlling and regulating
- Goal oriented
- Wanting closure, even when data are incomplete

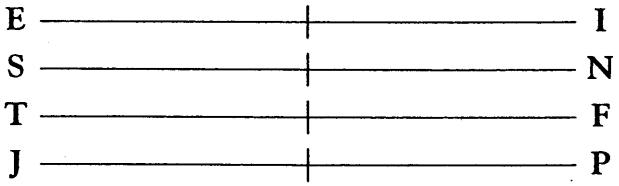
P: PERCEPTION

When I take a perceiving attitude, I am...

- Using sensing or intuitive perception outwardly
- Taking in information
- Adapting and changing
- Curious and interested
- Open-minded
- Resisting closure to obtain more data

WHAT THE MBTI REPORTS

- The instrument you responded to, the Myers-Briggs Type Indicator (MBTI)®, identifies people's preferences among sets of mental processes.
- Each MBTI item you answered is counted on one of four scales.
- Each scale is made up of a pair of opposites, with a range between them and a midpoint, suggested by the diagram.
- Your answers on each scale add up to a preference score, to estimate how much you prefer one of each pair over the other. The larger your preference score, the farther it lies from the midpoint.
- The eight letters below represent preferred ways of attending to the world and making decisions, eight different mental habits.



- Everyone uses all eight, but each person has preferences among them and uses those more. It is a lot like handedness — everyone uses both hands, but favors and is better at using one of them.
- Each different combination of preferences represents a type — what the psychology pioneer Carl Jung called psychological types. There are 16 combinations to represent the 16 types.
- A type is not a pigeonhole or stereotype; it is a particular way that mental energy is organized.
- Your results from the MBTI will indicate one of the 16 type descriptions for you to consider.

DESCRIPTIONS OF THE SIXTEEN TYPES REPORTED BY THE MBTI

Using these descriptions and other resources, decide if the indicated description fits you. If it does, the resources will help you see many uses of this knowledge. If the description does not seem to be a good fit, look for another description that is a better fit. The person explaining your MBTI results can direct you to the other resources. The MBTI is a tool to help you start examining the types. While it was developed with great care, and is accurate for most people, you are the one to decide which type is the best fit for you. You may want to read all of the descriptions as you decide.

HOW TO READ THE DESCRIPTIONS

The descriptions are grouped in two ways. The extraverting types are on the left side of each page, introverting types are on the right. The types with Thinking as the strongest mental process are grouped together and across from those with Feeling as the strongest mental process (on pages 2 and 3), as are the Sensing types across from the Intuitive types (on pages 4 and 5).The strongest mental process in each case is indicated by the larger letter in the four letter type designation, such as ISFP.

The descriptions are arranged with opposite types across from each other on the same page. For example, ENTJ is across from ISFP, the type that is opposite in all four dimensions. As you read the phrases listed for each type, you should not assume that a positive value listed for one type implies a negative trait for the opposite type. For example, when we read that ENTJs value efficiency, we must not infer that ISFPs are inefficient. Similarly, because ISFPs value compassion does not mean that ENTJs are cold-hearted. Opposite types are across from each other to help you decide your best fit type.The contrasts shown by the opposites help to clarify what is given priority in our mental processing. What has high priority for ISFP is not given high priority by ENTJ, and vice versa. The descriptions emphasize the values and priorities of the types more than they tell what behaviors are associated with each of the types. The values are emphasized because they are the motivational energy behind the behaviors.

ENTJ

Intuitive, innovative **ORGANIZERS;** analytical, systematic, confident; push to get action on new ideas and challenges. Having extraverted **THINKING** as their strongest mental process, ENTJs are at their best when they can take charge and set things in logical order. They value:

- Analyzing abstract problems, complex situations
- Foresight; pursuing a vision
- Changing, organizing things to fit their vision
- Putting theory into practice, ideas into action
- Working to a plan and schedule
- Initiating, then delegating
- Efficiency; removing obstacles and confusion
- Probing new possibilities
- Holding self and others to high standards
- Having things settled and closed
- Tough-mindedness, directness, task-focused behavior
- Objective principles; fairness, justice
- Assertive, direct action
- Intellectual resourcefulness
- Driving toward broad goals along a logical path
- Designing structures and strategies
- Seeking out logical flaws

ESTJ

Fact-minded practical **ORGANIZERS;** assertive, analytical, systematic; push to get things done and working smoothly and efficiently. Having extraverted **THINKING** as their strongest mental process, they are at their best when they can take charge and set things in logical order. They value:

- Results; doing, acting
- Planned, organized work and play
- Common sense practicality
- Consistency; standard procedures
- Concrete, present-day usefulness
- Deciding quickly and logically
- Having things settled and closed
- Rules, objective standards, fairness by the rules
- Task-focused behavior
- Directness, tough-mindedness
- Orderliness; no loose ends
- Systematic structure; efficiency
- Categorizing aspects of their life
- Scheduling and monitoring
- Protecting what works

ISFP

Observant, loyal **HELPERS;** reflective, realistic, empathic, patient with details. Shunning disagreements, they are gentle, reserved and modest. Having introverted **FEELING** as their strongest mental process, they are at their best when responding to the needs of others. They value:

- Personal loyalty; a close, loyal friend
- Finding delight in the moment
- Seeing what needs doing to improve the moment
- Freedom from organizational constraints
- Working individually
- Peacemaking behind the scenes
- Attentiveness to feelings
- Harmonious, cooperative work settings
- Spontaneous, hands-on exploration
- Gentle, respectful interactions
- Deeply held personal beliefs
- Reserved, reflective behavior
- Practical, useful skills and know-how
- Having their work life be fully consistent with deeply held values
- Showing and receiving appreciation

INFP

Imaginative, independent **HELPERS;** reflective, inquisitive, empathic, loyal to ideals: more tuned to possibilities than practicalities. Having introverted **FEELING** as their strongest mental process, they are at their best when their inner ideals find expression in their helping of people. They value:

- Harmony in the inner life of ideas
- Harmonious work settings; working individually
- Seeing the big picture possibilities
- Creativity; curiosity, exploring
- Helping people find their potential
- Giving ample time to reflect on decisions
- Adaptability and openness
- Compassion and caring; attention to feelings
- Work that lets them express their idealism
- Gentle, respectful interactions
- An inner compass; being unique
- Showing appreciation and being appreciated
- Ideas, language and writing
- A close, loyal friend
- Perfecting what is important

ESFJ

Practical **HARMONIZERS,** workers-with-people; sociable, orderly, opinioned; conscientious, realistic and well tuned to the here and now. Having extraverted **FEELING** as their strongest mental process, they are at their best when responsible for winning people's cooperation with personal caring and practical help. They value:

- An active, sociable life, with many relationships
- A concrete, present-day view of life
- Making daily routines into gracious living
- Staying closely tuned to people they care about so as to avoid interpersonal troubles
- Talking out problems cooperatively, caringly
- Approaching problems through rules, authority, standard procedures
- Caring, compassion and tactfulness
- Helping organizations serve their members well
- Responsiveness to others, and to traditions
- Being prepared, reliable in tangible, daily work
- Loyalty and faithfulness
- Practical skillfulness grounded in experience
- Structured learning in a humane setting
- Appreciation

ENFJ

Imaginative **HARMONIZERS,** workers with people; expressive, orderly, opinioned, conscientious; curious about new ideas and possibilities. Having extraverted **FEELING** as their strongest mental process, they are at their best when responsible for winning people's cooperation with caring insight into their needs. They value:

- Having a wide circle of relationships
- Having a positive, enthusiastic view of life
- Seeing subtleties in people and interactions
- Understanding others' needs and concerns
- An active, energizing social life
- Seeing possibilities in people
- Thorough follow-through on important projects
- Working on several projects at once
- Caring and imaginative problem solving
- Maintaining relationships to make things work
- Shaping organizations to better serve members
- Sociability and responsiveness
- Structured learning in a humane setting
- Caring, compassion and tactfulness
- Appreciation as the natural means of encouraging improvements

INTP

Inquisitive **ANALYZERS;** reflective, independent, curious; more interested in organizing ideas than situations or people. Having introverted **THINKING** as their strongest mental process, they are at their best when following their intellectual curiosity, analyzing complexities to find the underlying logical principles. They value:

- A reserved outer life; an inner life of logical inquiry
- Pursuing interests in depth, with concentration
- Work and play that is intriguing, not routine
- Being free of emotional issues when working
- Working on problems that respond to detached intuitive analysis and theorizing
- Approaching problems by reframing the obvious
- Complex intellectual mysteries
- Being absorbed in abstract, mental work
- Freedom from organizational constraints
- Independence and nonconformance
- Intellectual quickness, ingenuity, invention
- Competence in the world of ideas
- Spontaneous learning by following curiosity and inspirations

ISTP

Practical **ANALYZERS;** value exactness; more interested in organizing data than situations or people; reflective, cool and curious observers of life. Having introverted **THINKING** as their strongest mental process, they are at their best when analyzing experience to find the logical order and underlying properties of things. They value:

- A reserved outer life
- Having a concrete, present-day view of life
- Clear, exact facts; a large storehouse of them
- Looking for efficient, least-effort solutions based on experience
- Knowing how mechanical things work
- Pursuing interests in depth, such as hobbies
- Collecting things of interest
- Working on problems that respond to detached, sequential analysis and adaptability
- Freedom from organizational constraints
- Independence and self-management
- Spontaneous hands-on learning experience
- Having useful technical expertise
- Critical analysis as a means to improving things

ESTP

REALISTIC ADAPTERS in the world of material things; good-natured, easygoing; oriented to practical, firsthand experience; highly observant of details of things. Having extraverted **SENSING** as their strongest mental process, they are at their best when free to act on impulses, or responding to concrete problems that need solving. They value:

- A life of outward, playful action, in the moment
- Being a trouble-shooter
- Finding ways to use the existing system
- Clear, concrete, exact facts
- Knowing the way mechanical things work
- Being direct, to the point
- Learning through spontaneous, hands-on action
- Practical action, more than words
- Plunging into new adventures
- Responding to practical needs as they arise
- Seeing the expedient thing and acting on it
- Pursuing immediately useful skills
- Finding fun in their work and sparking others to have fun
- Looking for efficient, least-effort solutions
- Being caught up in enthusiasms

ESFP

REALISTIC ADAPTERS in human relationships; friendly and easy with people, highly observant of their feelings and needs; oriented to practical, firsthand experience. Extraverted SENSING being their strongest mental process, they are at their best when free to act on impulses, responding to needs of the here and now. They value:

- An energetic, sociable life, full of friends and fun
- Performing, entertaining, sharing
- Immediately useful skills; practical know-how
- Learning through spontaneous, hands-on action
- Trust and generosity; openness
- Patterning themselves after those they admire
- Concrete, practical knowledge; resourcefulness
- Caring, kindness, support, appreciation
- Freedom from irrelevant rules
- Handling immediate, practical problems, crises
- Seeing tangible realities; least-effort solutions
- Showing and receiving appreciation
- Making the most of the moment; adaptability
- Being caught up in enthusiasms
- Easing and brightening work and play

INFJ

People-oriented **INNOVATORS** of ideas; serious, quietly forceful and persevering; concerned with work that will help the world and inspire others. Having introverted INTUITION as their strongest mental process, they are at their best when caught up in inspiration, envisioning and creating ways to empower self and others to lead more meaningful lives. They value:

- A reserved outer life; spontaneous inner life
- Planning ways to help people improve
- Seeing complexities, hidden meanings
- Understanding others' needs and concerns
- Imaginative ways of saying things
- Planful, independent, academic learning
- Reading, writing, imagining; academic theories
- Being restrained in outward actions; planful
- Aligning their work with their ideals
- Pursuing and clarifying their ideals
- Taking the long view
- Bringing out the best in others through appreciation
- Finding harmonious solutions to problems
- Being inspired and inspiring others

INTJ

Logical, critical, decisive **INNOVATORS** of ideas; serious, intent, very independent, concerned with organization; determined, often stubborn. With introverted **INTUITION** as their strongest mental process, they are at their best when inspiration turns insights into ideas and plans for improving human knowledge and systems. They value:

- A restrained, organized outer life; a spontaneous, intuitive inner life
- Conceptual skills, theorizing
- Planful, independent, academic learning
- Skepticism; critical analysis; objective principles
- Originality, independence of mind
- Intellectual quickness, ingenuity
- Non-emotional tough-mindedness
- Freedom from interference in projects
- Working to a plan and schedule
- Seeing complexities, hidden meanings
- Improving things by finding flaws
- Probing new possibilities; taking the long view
- Pursuing a vision; foresight; conceptualizing
- Getting insights to reframe problems

ENTP

Inventive, analytical **PLANNERS OF CHANGE;** enthusiastic and independent; pursue inspiration with impulsive energy; seek to understand and inspire. Extraverted **INTUITION** being their strongest mental process, they are at their best when caught up in the enthusiasm of a new project and promoting its benefits. They value:

- Conceiving of new things and initiating change
- The surge of inspirations; the pull of emerging possibilities
- Analyzing complexities
- Following their insights, wherever they lead
- Finding meanings behind the facts
- Autonomy, elbow room, openness
- Ingenuity, originality, a fresh perspective
- Mental models and concepts that explain life
- Fair treatment
- Flexibility, adaptability
- Learning through action, variety and discovery
- Exploring theories and meanings behind events
- Improvising, looking for novel ways
- Work made light by inspiration

ISFJ

Sympathetic **MANAGERS OF FACTS AND DETAILS,** concerned with people's welfare; stable, conservative, dependable, painstaking, systematic. Having introverted **SENSING** as their strongest mental process, they are at their best when using their sensible intelligence and practical skills to help others in tangible ways. They value:

- Preserving, enjoying the things of proven value
- Steady, sequential work yielding reliable results
- A controlled, orderly outer life
- Patient, persistent attention to basic needs
- Following a sensible path, based on experience
- A rich memory for concrete facts
- Loyalty; strong relationships
- Consistency, familiarity, the tried and true
- Firsthand experience of what is important
- Compassion, kindness, caring
- Working to a plan and schedule
- Learning through planned, sequential teaching
- Set routines, common sense options
- Rules, authority, set procedures
- Hard work, perseverance

ENFP

Warmly enthusiastic **PLANNERS OF CHANGE;** imaginative, individualistic; pursue inspiration with impulsive energy; seek to understand and inspire others. With extraverted **INTUITION** as the strongest mental process, they are at their best when caught in the enthusiasm of a project, sparking others to see its benefits. They value:

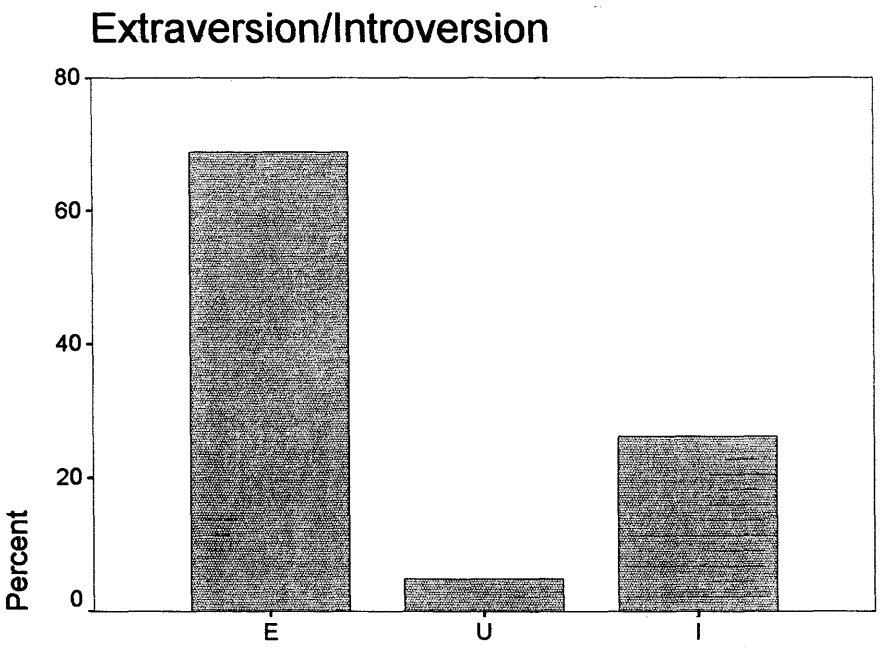
- The surge of inspirations; the pull of emerging possibilities
- A life of variety, people, warm relationships
- Following their insights wherever they lead
- Finding meanings behind the facts
- Creativity, originality, a fresh perspective
- An optimistic, positive, enthusiastic view of life
- Flexibility and openness
- Exploring, devising and trying out new things
- Open ended opportunities and options
- Freedom from the requirement of being practical
- Learning through action, variety, and discovery
- A belief that any obstacles can be overcome
- A focus on people's potentials
- Brainstorming to solve problems
- Work made light and playful by inspiration

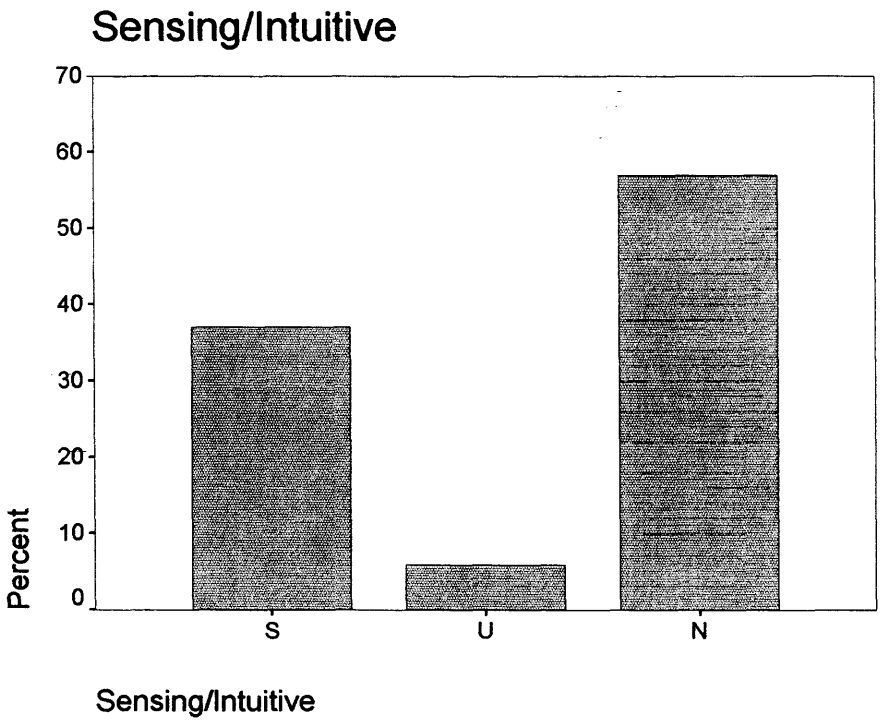
ISTJ

Analytical **MANAGER OF FACTS AND DETAILS;** dependable, conservative, systematic, painstaking, decisive, stable. Having introverted **SENSING** as their strongest mental process, they are at their best when charged with organizing and maintaining data and material important to others and to themselves. They value:

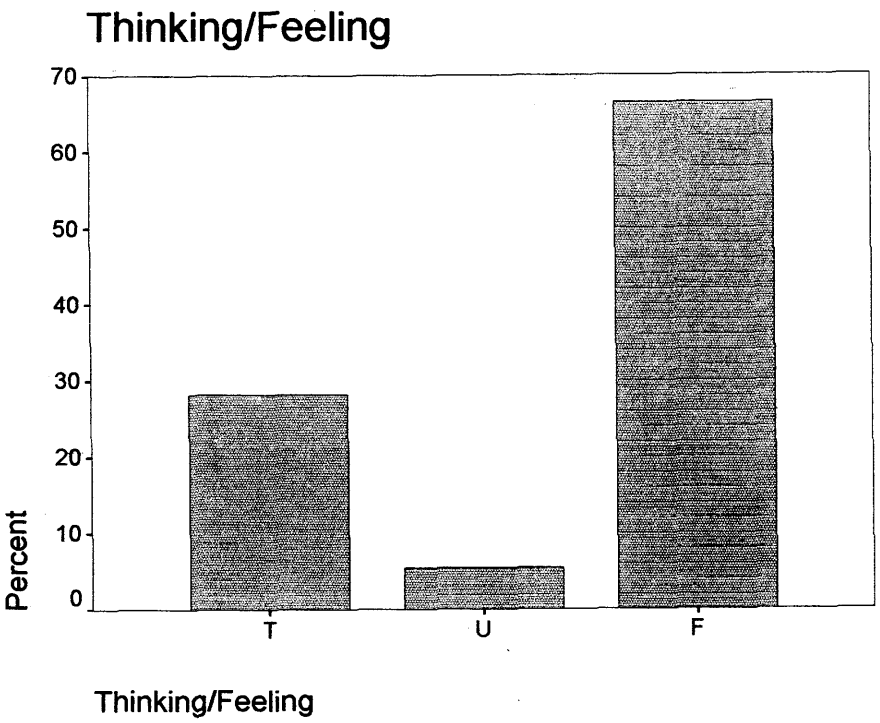
- Steady, systematic work that yields reliable results
- A controlled outer life grounded in the present
- Following a sensible path, based on experience
- Concrete, exact, immediately useful facts, skills
- Consistency, familiarity, the tried and true
- A concrete, present-day view of life
- Working to a plan and schedule
- Preserving and enjoying things of proven value
- Proven systems, common sense options
- Freedom from emotionality in deciding things
- Learning through planned, sequential teaching
- Skepticism; wanting to read the fine print first
- A focus on hard work, perseverance
- Quiet, logical, detached problem solving
- Serious and focused work and play

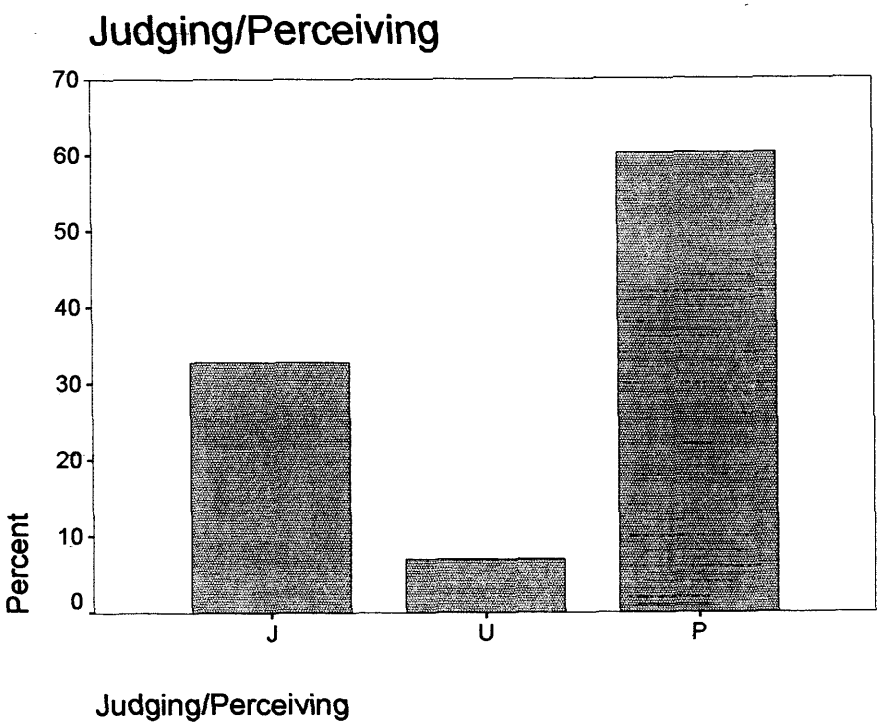
Sample Distribution of MMTIC Data





Sample Distribution of MMTIC Data





name:
sex (M/F):
grade:
birthdate:

Murphy-Meisgeier Type Indicator-R Part 2

56. **People who make a mistake, don't really try, and don't do well should:**

A. Get the grade they earned
B. Still be given a second chance

57. **You should:**

A. Get work done first
B. Have fun when you can

58. **You like to:**

A. Work. Finish. Then have fun
B. Have fun while you work, but get the work done.

59. **When you join a new team, you first:**

A. Get excited about playing with new people
B. Hold back to watch and listen and learn the team's way of playing

60. **You like to play games you:**

A. Know
B. Make up

61. **Choose the word you like best:**

A. Good
B. Fun

62. **You like to:**

A. Do a good job
B. Make up good ideas

63. **People do better when they:**

A. Know the rules
B. Know someone cares about them

64. **Meeting someone new is:**

A. Exciting
B. Awkward at first

65. **What bothers you more?**

A. Not knowing why
B. People getting angry

66. **It is better to:**

A. Plan ahead
B. Have fun today

67. **Choose the word you like best:**

A. Think
B. Feel

68. **Choose the word you like best:**

A. Exciting
B. Calm

69. **For fun, you usually read more:**

A. Newspapers and magazines
B. Books

70. **On a bike ride you like to:**

A. Know where you will go
B. Just ride around

71. **You like:**

A. Stories about real people
B. Make-believe stories

72. **You want to:**

A. Do what is right
B. Find new things to explore

73. **Which is more interesting for you?**

A. Facts and information
B. Fantasy

74. **It is more important to:**

A. Be right about things
B. Care about feelings

75. **Choose the word you like best:**

A. Tell
B. Listen

76. **You prefer to get work started:**

A. When it is assigned
B. Just before it is due

77. **In a new school, making friends is:**

A. Exciting
B. Hard

78. **You would rather:**

A. Know or practice
B. Imagine

79. **You like:**

A. Doing
B. Imagining

80. **Kids who steal should be:**

A. Punished
B. Helped to stop stealing

81. **Choose the word you like best.**

A. Most
B. Few

82. **You get along better if there are:**

A. Clear rules
B. Few rules, if any

83. **Choose the word you like best:**

A. All
B. Some

84. **Choose the word you like best:**

A. Debate
B. Discuss

85. **Choose the word you like best.**

A. Make
B. Design

86. **Choose the word you like best.**

A. Practice
B. Invent

87. **You like being:**

A. Right
B. Friendly

88. **You like:**

A. Doing
B. Designing

89. **You:**

A. Like to talk to people you meet
B. Keep you feelings to yourself

90. **When a job or game is new to you, you want to:**

A. Try it out
B. Watch first

91. **Choose the word you like best.**

A. Challenge
B. Caring

92. **When your team loses, you:**

A. Plan how you can win next time
B. Try to cheer everybody up

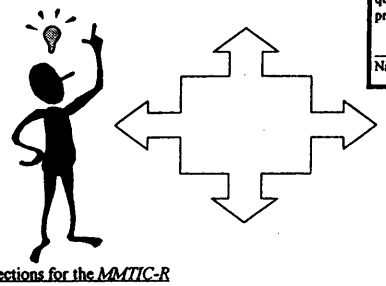
93. **Choose the word you like best.**

A. Known
B. Unknown

Murphy-Meisgeier Type Indicator for Children – Revised (MMTIC-R)

I volunteer to answer these questions as part of a research project.

Name _____ D



Directions for the *MMTIC-R*

You are about to answer some question about what you like. These questions give you an opportunity to say which answer you like best-the answer you prefer-the answer that is most lik you. There are no right or wrong answers to these questions.

We want to know how you feel and think about things. Do not answer the questions the w you think your parents or teachers might want you to answer. Answer the way you really belie you are. Simply pick the answer you prefer the most.

Below each question are two possible answers. Choose which answer fits you best and th mark your answer on the test. You are only to fill in *ONE* answer for each question. This is very important. If both answers seem like you, please choose the one that y like the most. Answer all questions.

On the: top you should...

1. Fill in your name.
2. Fill in M for male if you are a boy and F for female if you are a girl.
3. Fill in your grade or education.
4. Fill in your birthdate.

Your teacher may have additional directions.

5. Your teacher can help you with any questions or reading but you must decide which answ you prefer.

Murphy-Meisgeier Type Indicator for Children - Revised

Part I

1. **When you join a new team, you:**

   A. Get excited about meeting new people
   B. Worry about getting along on the team

2. **When meeting new classmates for the first time, you:**

   A. Start to talk to someone first
   B. Wait until someone talks to you

3. **Adults should:**

   A. Tell people what is expected
   B. Listen to other's ideas

4. **You like talking to:**

   A. Lots of people
   B. Only close friends

5. **You would rather:**

   A. Know how to do something the right way
   B. Use your imagination

6. **Choose the word you like best.**

   A. Do
   B. Think

7. **After finishing a very hard job you:**

   A. Call friends to do something fun
   B. Feel proud but take some time alone

8. **Choose the word you like best.**

   A. Active
   B. Quiet

9. **You like to learn things:**

   A. With others
   B. On your own

10. **Choose the word you like best.**

    A. What
    B. Who

11. **Choose one. Both are good.**

    A. a...b...c...d...e...f...g...h...i...
    B. K...T...S...*...@...M...P...#...K...

12. **You find that:**

    A. Talking with others helps you to think your best
    B. You think , then tell others your ideas

13. **At a party with strangers you like to:**

    A. Meet and talk with others
    B. Wait for someone to come talk to you first

14. **Teachers should:**

    A. Have lessons planned that kids like
    B. Create lessons with fun in them

15. **You like to tell about things you:**

    A. Can see and touch
    B. Pretend

16. **You like:**

    A. Having things decided
    B. Having choices

17. **You get good ideas for stories from:**

    A. Things you know about
    B. Your imagination

18. **You like teachers to:**

    A. Tell you what to do next
    B. Let you choose what to do

19. **You like:**

    A. Doing things the way you were taught
    B. Finding new ways to do it

20. **When you win a race, you:**

    A. Feel great!
    B. Are proud but feel badly for the loser

21. **Choose the word you like best.**

    A. Line
    B. Web

22. **If you needed a toy rocket for your game, you would:**

    A. Try to find one
    B. Invent something to use

23. **You prefer:**

    A. Doing things you have learned to do
    B. Creating new projects

24. **Choose the word you like best.**

    A. Public
    B. Private

25. **Which is more interesting:**

    A. True stories
    B. Pretend stories

26. **When the work is hard I like to:**

    A. Think with others I know
    B. Think by myself

27. **You think people who try but don't do well should:**

    A. Get the grade they earned
    B. Be given a second chance

28. **You like to:**

    A. Know what will happen next
    B. Try new things

29. **You would rather:**

    A. Solve a problem
    B. Teach a friend

30. **Your friend is too fat or too slow to make the team. Would you:**

    A. Tell your friend the real reason
    B. Make up another reason

31. **You would choose a:**

    A. Straight line
    B. Zig zag/curly line

32. **You like to get people:**

    A. Organized to do the job
    B. Excited about doing the job

33. **Choose the word you like best:**

    A. Success
    B. Family

34. **Choose the word you like best:**

    A. Know
    B. Care

35. **Choose the one you like best:**

    A. Many friends
    B. Close friends

36. **Choose the word you like best:**

    A. Remember
    B. Create

37. **Teachers should:**

    A. Tell kids what to study
    B. Let kids choose things to learn

38. **You would rather:**

    A. Figure out how something works
    B. Think of ways to help others

39. **Most of the time:**

    A. You take notes home on the day they are given
    B. You leave things at school

40. **When you are hurt or angry:**

    A. Talking with someone right away helps
    B. Talking with someone later is best

41. **It is better for projects to be:**

    A. Organized
    B. New and fun to work on

42. **A team should:**

    A. Play well and win
    B. Get along and win

43. **Choose the word you like best:**

    A. Decide
    B. Choices

44. **It is better to:**

    A. Be fair
    B. Care about feelings

45. **Teachers should:**

    A. Make the decisions
    B. Talk things over with kids

46. **It's more fun for you to:**

    A. Practice things you learned
    B. Find something new to learn

47. **Interruptions:**

    A. Keep you from working
    B. Can make the day more exciting

48. **You like:**

    A. To know the plans of the day
    B. To be able to change the plans

49. **Choose the word you like best:**

    A. Information
    B. Ideas

50. **People need to:**

    A. Do things in order
    B. Do things the way they choos

51. **You prefer to:**

    A. Fill in the blanks
    B. Make up a story

52. **People should:**

    A. Work first, then have fun
    B. Have fun while you get the wo

53. **Choose the word you like best.**

    A. Sooner
    B. Later

54. **It is important to:**

    A. Be right
    B. Make your friends happy

55. **It is easier for you to:**

    A. Remember the birth date for e in your family
    B. Design a special birthday pres

43. **You like teachers to:**

A. Tell you what to do next ☐
B. Let you choose what to do ☐

44. **It is more fun to:**

A. Get projects done ☐
B. Start projects ☐

45. **You get along better if there are:**

A. Flexible rules ☐
B. Clear rules ☐

46. **Teachers should:**

A. Tell kids what to study ☐
B. Let kids choose things to learn ☐

47. **Most of the time:**

A. You take notes home on the day they are given ☐
B. You get notes home eventually ☐

48. **Interruptions:**

A. Make the day more exciting ☐
B. Keep you from working ☐

49. **You like:**

A. To know the plans of the day ☐
B. To be able to change the plans ☐

50. **People need to:**

A. Do things the way they choose ☐
B. Do things in order ☐

51. **People should:**

A. Work first, then have fun ☐
B. Have fun while you get the work done ☐

52. **Choose which you like better.**

A. Sooner ☐
B. Just in time ☐

53. **You should:**

A. Get work done first ☐
B. Have fun working ☐

54. **It is better to:**

A. Plan ahead ☐
B. Have fun today ☐

55. **On a bike ride you like to:**

A. Just ride around ☐
B. Know where you will go ☐

56. **You want to:**

A. Do what is right ☐
B. Find new things to explore ☐

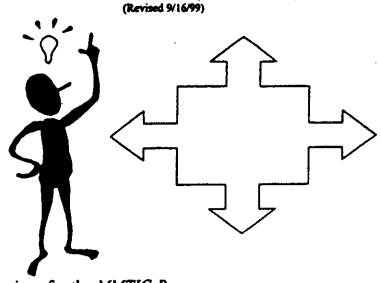
57. **You prefer to get work started:**

A. When it is assigned ☐
B. In time to turn it in when it is due ☐

[illegible] (please print):
gender (male / female):
grade:
birthdate:

Murphy-Meisgeier Type Indicator for Children – Revised (MMTIC-R)

(Revised 9/16/99)



Directions for the *MMTIC-R*

You are about to answer some question about what you like. These questions give yo opportunity to say which answer you like best-the answer you prefer-the answer that is mo you. There are no right or wrong answers to these questions.

We want to know how you feel and think about things. Do not answer the questions t you think your parents or teachers might want you to answer. Answer the way you really t you are. Simply pick the answer you prefer the most.

Below each question are two possible answers. Choose which answer fits you best an mark your answer on the sheet. You are only to fill in ***ONE*** answer for ea question. **This is very important.** If both answers seem like you, please choose the one tl like the most. Answer all questions.

Answer Sheet:

On the top you should...

1. Fill in your name.
2. Fill in M for male if you are a boy and F for female if you are a girl.
3. Fill in your grade or education.
4. Fill in your birthdate.

Your teacher may have additional directions.

5. Your teacher can help you with any questions or reading but you must decide which a you prefer.

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1. **When meeting new classmates for the first time you:**
   - A. Start to talk to someone first ☐
   - B. Wait until someone talks to you ☐

2. **You like talking to:**
   - A. Only close friends ☐
   - B. Lots of people ☐

3. **When working on a very hard job you:**
   - A. Call friends for help ☐
   - B. Want to work alone ☐

4. **You usually show your excitement**
   - A. To others ☐
   - B. You feel your excitement inside you. ☐

5. **Choose the word you like better.**
   - A. Private ☐
   - B. Public ☐

6. **Choose the one you like better.**
   - A. Close friends ☐
   - B. Many friends ☐

7. **When you are hurt or angry**
   - A. Talking with someone right away helps ☐
   - B. Talking with someone later is best ☐

8. **In a new school making friends is**
   - A. Exciting ☐
   - B. Hard ☐

9. **You:**
   - A. Keep your feelings to yourself ☐
   - B. Like to talk to people you meet ☐

10. **When a job or game is new to you, you want to:**
    - A. Try it out ☐
    - B. Watch first ☐

11. **You would rather:**
    - A. Know how to do something the right way ☐
    - B. Use your imagination ☐

12. **Choose one line. Both are good.**
    - A. a....b...c...d...e...f...g...h...i... ☐
    - B. !...*....#...M....&...K...@...!....L.. ☐

13. **You get good ideas for stories from:**
    - A. Your imagination ☐
    - B. Things you know about ☐

14. **Which is more interesting for you?**
    - A. True stories ☐
    - B. Pretend or fantasy stories ☐

15. **Choose the word you like better.**
    - A. Create ☐
    - B. Describe ☐

16. **You prefer to:**
    - A. Make up a story ☐
    - B. Fill in the blanks ☐

17. **It is easier for you to:**
    - A. Remember the birth date for people in your family ☐
    - B. Design a special birthday present for them. ☐

18. **You like to play games you:**
    - A. Make-up ☐
    - B. Know ☐

19. **You like to:**
    - A. Do a good job ☐
    - B. Create projects ☐

20. **You like:**
    - A. Make-believe or fantasy stories ☐
    - B. Stories about real people ☐

21. **Which is more interesting for you?**
    - A. Facts and information ☐
    - B. Fantasy ☐

22. **You would rather**
    - A. Know or practice ☐
    - B. Imagine ☐

23. **You like:**
    - A. Imagining ☐
    - B. Doing ☐

24. **Choose the word you like better.**
    - A. Invent ☐
    - B. Make ☐

25. **You like:**
    - A. Producing (completing the project) ☐
    - B. Designing ☐

26. **You would rather**
    - A. Watch the video ☐
    - B. Read the book ☐

27. **You should:**
    - A. Tell the truth ☐
    - B. Help others ☐

28. **Choose the word you like better.**
    - A. Who ☐
    - B. What ☐

29. **Choose the word you like better.**
    - A. Understand ☐
    - B. Care ☐

30. **You would rather:**
    - A. Figure out how something works ☐
    - B. Think of ways to help others ☐

31. **It is better to:**
    - A. Care about feelings ☐
    - B. Be fair ☐

32. **People do better when they:**
    - A. Know the rules ☐
    - B. Know someone cares about them ☐

33. **Choose the word you like better.**
    - A. Heart ☐
    - B. Smart ☐

34. **What bothers you more?**
    - A. Not knowing why ☐
    - B. People getting angry ☐

35. **You would rather:**
    - A. Help a friend ☐
    - B. Solve the problem ☐

36. **You like to get people:**
    - A. Organized to do the job ☐
    - B. Excited about doing the job ☐

37. **It is more important to:**
    - A. Be right about things ☐
    - B. Care about feelings ☐

38. **Kids who steal should be:**
    - A. Helped to stop stealing ☐
    - B. Punished ☐

39. **You like being:**
    - A. Right ☐
    - B. Friendly ☐

40. **Choose the word you like better.**
    - A. Helpful ☐
    - B. Challenge ☐

41. **When your team loses you:**
    - A. Plan how you can win next time ☐
    - B. Try to cheer everybody up ☐

42. **A team should:**
    - A. Play well ☐
    - B. Get along ☐

Percentages of Students in Each ELA MCAS Level By Type

ELA MCAS levels * S/N & J/P Crosstabulation

			S/N & J/P				Total
			SJ	SP	NJ	NP	
ELA MCAS levels	Failing	Count	60	37	17	39	153
		% within ELA MCAS levels	39.2%	24.2%	11.1%	25.5%	100.0%
		% within S/N & J/P	29.6%	23.1%	13.7%	8.2%	15.9%
	Needs Improv	Count	129	109	90	361	689
		% within ELA MCAS levels	18.7%	15.8%	13.1%	52.4%	100.0%
		% within S/N & J/P	63.5%	68.1%	72.6%	76.2%	71.7%
	Proficient	Count	14	14	17	74	119
		% within ELA MCAS levels	11.8%	11.8%	14.3%	62.2%	100.0%
		% within S/N & J/P	6.9%	8.8%	13.7%	15.6%	12.4%
Total		Count	203	160	124	474	961
		% within ELA MCAS levels	21.1%	16.6%	12.9%	49.3%	100.0%
		% within S/N & J/P	100.0%	100.0%	100.0%	100.0%	100.0%

Percentages of Students in Each Math MCAS Level By Type

Math MCAS levels * S/N & J/P Crosstabulation

			S/N & J/P				
			SJ	SP	NJ	NP	Total
Math MCAS levels	Failing	Count	87	50	35	78	250
		% within Math MCAS levels	34.8%	20.0%	14.0%	31.2%	100.0%
		% within S/N & J/P	42.6%	31.3%	28.2%	16.5%	26.0%
	Needs Improv	Count	87	80	62	261	490
		% within Math MCAS levels	17.8%	16.3%	12.7%	53.3%	100.0%
		% within S/N & J/P	42.6%	50.0%	50.0%	55.1%	50.9%
	Proficient	Count	20	25	20	101	166
		% within Math MCAS levels	12.0%	15.1%	12.0%	60.8%	100.0%
		% within S/N & J/P	9.8%	15.6%	16.1%	21.3%	17.3%
	Advanced	Count	10	5	7	34	56
		% within Math MCAS levels	17.9%	8.9%	12.5%	60.7%	100.0%
		% within S/N & J/P	4.9%	3.1%	5.6%	7.2%	5.8%
Total		Count	204	160	124	474	962
		% within Math MCAS levels	21.2%	16.6%	12.9%	49.3%	100.0%
		% within S/N & J/P	100.0%	100.0%	100.0%	100.0%	100.0%

Percentages of Students in Each Science MCAS Level By Type

Science MCAS levels * S/N & J/P Crosstabulation

			S/N & J/P				Total
			SJ	SP	NJ	NP	
Science MCAS levels	Failing	Count	39	19	7	17	82
		% within Science MCAS levels	47.6%	23.2%	8.5%	20.7%	100.0%
		% within S/N & J/P	19.1%	11.9%	5.6%	3.6%	8.5%
	Needs Improv	Count	116	76	62	188	442
		% within Science MCAS levels	26.2%	17.2%	14.0%	42.5%	100.0%
		% within S/N & J/P	56.9%	47.5%	50.0%	39.7%	45.9%
	Proficient	Count	45	62	52	246	405
		% within Science MCAS levels	11.1%	15.3%	12.8%	60.7%	100.0%
		% within S/N & J/P	22.1%	38.8%	41.9%	51.9%	42.1%
	Advanced	Count	4	3	3	23	33
		% within Science MCAS levels	12.1%	9.1%	9.1%	69.7%	100.0%
		% within S/N & J/P	2.0%	1.9%	2.4%	4.9%	3.4%
Total		Count	204	160	124	474	962
		% within Science MCAS levels	21.2%	16.6%	12.9%	49.3%	100.0%
		% within S/N & J/P	100.0%	100.0%	100.0%	100.0%	100.0%