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ABSTRACT

The purpose of the present study was to assess the use of multiple intelligence assessment instruments as predictor measurements of achievement. The sample included 51 male and female students enrolled in two sections of an introductory psychology course. They were asked to complete the Multiple Intelligences Challenge (MIC) and the Self Evaluation of Seven Useful Abilities (SEVAL) instruments. Separately, the subjects also completed a timed vocabulary test. The results indicated that the seven categories on both the MIC and the SEVAL were not predictive of achievement in the classroom as determined by mid-term grades, ACT tests, or the vocabulary test. Findings suggested that Gardner's multiple intelligence abilities are either not unique or not accurately assessable by paper and pencil instruments. Appendix A contains the MIC and Appendix E presents the SEVAL instruments. (Contains 15 references and 9 tables.) (Author)

Evaluation of an Instrument for Measuring Multiple Intelligences

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Running head: MULTIPLE INTELLIGENCE

Abstract

The purpose of the present study was to assess the use of multiple intelligence assessment instruments as predictor measurements of achievement. The sample included 51 male and female students enrolled in two sections of an introductory psychology course. They were asked to complete the Multiple Intelligences Challenge (MIC) and the Self Evaluation of Seven Useful Abilities (SEVAL) instruments. Separately, the subjects also completed a timed vocabulary test. The results indicated that the seven categories on both the MIC and the SEVAL were not predictive of achievement in the classroom as determined by mid-term grades, ACT tests, or the vocabulary test. Findings suggested that Gardner's multiple intelligence abilities are either not unique or not accurately assessable by paper and pencil instruments.

Evaluation of an Instrument for Measuring Multiple Intelligences

Throughout the history of psychology, there have been many competing theories of intelligence. Despite these different theories, many psychologists agree on the basic conceptual definition of intelligence as the overall capacity for learning and problem solving. The major differences in theories have involved whether this overall capacity is unitary or multifaceted.

One popular theory of unitary intelligence was pioneered by E.L. Thorndike. Thorndike believed that mental capacities have commonalities that form intellectual clusters (cited in Oakland & Parmalee, 1985). Thorndike specified three clusters of mental ability: social intelligence (people skills), concrete intelligence (dealing with things), and abstract intelligence (verbal and mathematical skills) (cited in Oakland & Parmalee, 1985). However, outside the commonalities there may be, for example, an all-round numerical ability (Murphy, 1951). This numerical ability would have a significant effect on the cluster of abstract intelligence.

Another unitary approach to intelligence is Charles Spearman's theory of intelligence. Spearman speculated that everyone has a general intelligence factor, defined as *g*, as well as a specific task related ability, labeled *s* (cited in Guilford, 1967). Spearman's *g* is involved in "operations of a deductive

nature, linked with skill, speed, intensity, and extensity of a person's intellectual output" (Oakland & Parmelee, 1985, p. 703). For Spearman, one's performance on an intellectual task is reflective of *g* and associated abilities specific to that task. However, efforts to provide support for this theory concluded that more than one common *g* factor was needed to account for the data (Horn, 1987).

J.P. Guilford challenged the unitary position with his multifactor theory of intelligence. Guilford (1967) constructed a structure-of-intellect model that involved 120 factors. These factors were derived from five categories: operation (cognition, memory, divergent production, convergent thinking, and evaluation); four content categories (figural, symbolic, semantic, and behavioral); and six product categories (units, classes, relations, systems transformations, and implications). Guilford hypothesized that intelligence could be understood by the mental operations performed, the type of contents on which the operations were performed, and the results of the operations (cited in Oakland & Parmelee, 1985).

Another supporter of the multifactor theory of intelligence is Howard Gardner. Gardner, while recognizing the advantages of a unitary concept of intelligence, such as the ability to categorize easily an individual's level of

intelligence based on a test score, believed that a unitary approach did not do justice to the strengths and weaknesses in assessing an individual. Gardner (1983) proposed seven primary intelligences. An individual's unique cognitive structure was based on the combination of these intelligences.

Gardner's (1983) seven intelligences cover a broad range of capabilities which can be used to predict occupational aptitudes. Table 1 summarizes the seven intelligences. For example, a logical-mathematical intelligence consists of the core components of "sensitivity to and capacity to discern logical or numerical patterns as well as abilities to handle long chains of reasoning" (Gardner & Hatch, 1989, p. 4). One possessing skill in this area would be career oriented toward the scientific and mathematical professions.

Insert Table 1 about here

Because Gardner believes that intelligence is multifaceted, he believes that standardized tests already in use in the classroom are inadequate for measuring intellectual capacity (Gardner, 1983). Intelligence can not be reduced to a single number, such as the Intelligence Quotient (IQ), for Gardner. Past work in learning and intelligence shows that laboratory tasks

and intelligence tests may not transfer to one'sperformance in everyday life, or conversely, one's everyday life may not be expressed in a laboratory exercise or intelligence test (Sternberg, 1985).

Gardner and Hatch (1989) predict that a strength in a particular intelligence category can guide a student's aptitude toward a particular field of study. Gardner's complaint regarding the traditional educational system is its emphasis on logical-mathematical and linguistic abilities from kindergarten to graduate school (Gardner & Hatch, 1986). The traditional educational system bypasses people with dominant abilities in the remaining five categories.

Gardner insists that for the field of education to truly meet the needs of students currently in formal education, as well as generations of students to come, the system must adapt to meet various individual differences for maximum intellectual gain (Kornhaber, Krechevsky, & Gardner, 1990). That is, students' needs must be quickly and accurately assessed so that the educational system can adapt to maximize each students' intellectual gain.

To truly assess a person's cognitive structure one must be able to differentiate between the strength of one ability over another. Gardner proposes that the range of human intelligences is best assessed through performance based instruments (Gardner & Hatch, 1989). The education

system already implements standardized tests, such as the ACT and SAT, for assessment of linguistic and mathematical capabilities. Gardner claims that performance based instruments need to be developed to accurately assess all the intelligences (Gardner & Hatch, 1989). For example, according to Gardner (1983), a test of one's kinesthetic ability should involve a physical task and not a pencil and paper test or questionnaire to maximize true assessment of the ability. The development of such measurement tools is of importance so new teaching methods may be implemented.

Walters (1929) developed the Multiple Intelligences Challenge™ in order to quickly evaluate Gardner's Multiple Intelligence concept. Walters' (1992) Multiple Intelligence Challenge™ is a 79 question test which offers between 7 and 18 alternatives to nine different situations. The subject's task is to choose one or more alternatives within each situation which best describes the subject's abilities in that situation. Presumably, the subject's choices describe the subject's strengths and weaknesses and indirectly evaluate the subject's aptitude for each of Gardner's seven intelligence categories. Whether or not The Multiple Intelligences Challenge™ accurately assesses different intelligences or that it can be used as a predictor of performance and later success is yet to be validated.

The specific purpose of this study was to assess the effectiveness of the multiple intelligence assessment instruments to predict academic performance. The multiple intelligence categories were assessed using an adaptation of Walters' Multiple Intelligences Challenge™ and a self evaluation form developed by Osborne and Osborne (1992). Academic performance was measured via ACT scores, a vocabulary test, and midterm grades. Presumably the linguistic and logical-mathematical intelligences should be positively correlated with academic performance since, as Gardner and Hatch (1986) point out, the education system is biased toward language and mathematical ability.

Method

Subjects

Students (N=51) from two introductory psychology class sections participated in the study in exchange for course credit. Twenty-two subjects (Females=20, Males=2) from a summer school class at a satellite campus of a southeastern university and 29 students (Females=18, Males=11) from the main campus during the Fall semester of 1992 were used for analysis.

Materials

Three instruments were used to profile each subject's seven intelligences as hypothesized by Gardner (1983).

1. An adaptation of The Multiple Intelligences Challenge™ (MIC) developed by Walters (1992) was used. The original version of this test contained 79 items distributed over nine situations. Subjects were instructed to choose 2 or 3 items in each section which were descriptive of them given that section. The original test was scored by summing items which were presumed associated with each of the seven intelligences. Because this technique disregards 50 to 60 of the potential 79 items, the test was revised such that subjects rated themselves on each of the 79 items using 5 point Likert-type scales. Scores for each intelligence category were derived by summing all questions related to a given MIC category. Table 2 presents the 12 MIC items used for determining linguistic intelligence. The top ten items in the table are summed and the last two items are reverse scored (where 1=5, 5=1, etc.) and added to obtain a linguistic raw score. Because the MIC inventory has an unequal number of questions deriving each intelligence score, each raw score was divided by the number of questions to obtain the raw score. Therefore,

the linguistic raw score was divided by 12. (See Appendix A for a copy of the test).

Insert Table 2 about here

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2. Self Evaluation of Seven Useful Abilities (SEVAL). This test, developed by Osborne and Osborne (1992), presented a definition of each of the seven sets of core components described in Table 1. The subjects' task was to rate themselves on a 10-point (1-low to 10-high) scale on each of the seven abilities. When they completed the seven individual 10-point scales subjects rank ordered the seven abilities overall as they applied to them with 7 being the highest ranking and 1 being the lowest ranking for each ability (See Appendix B for a copy of this test).

3. Wide Range Vocabulary Test - Ver. 3. This test was used as an independent measure of linguistic ability. The vocabulary test was devised by French, Ekstrom, and Price (1962) and consisted of 48 vocabulary words with five definitions from which to choose. Each subject had 12 minutes to answer as many questions as possible. The score used for analysis was the number of correct responses.

In addition, a test of learning styles (The Learning Styles Inventory or LSI) as developed by Schmeck, Ribich, and Ramanaiah (1977) was given but will not be discussed in this study. The Learning Styles Inventory was given in conjunction with a parallel study, where its results will be reported.

Procedure

The students were given separate informed consent forms for participating in the research and to authorize the release of their ACT scores. The experimenter also informed all subjects of the details involving the study and gave each subject the option of withdrawal from the experiment at any time.

The tests were administered approximately one quarter of the way into the school term. The tests were administered to the subjects in a single one hour test session.

The tests were administered, in two distinct sections. The MIC, SEVAL, and LSI were distributed together and instructions for each were given. Each subject was given the opportunity to finish them at his/her own pace. The vocabulary test was not given until after the completion of the MIC, SEVAL, and LSI.

One concern, given the difficulty of the test, was that a poor

performance on the vocabulary test would alter self perception of linguistic ability. Therefore, the vocabulary test was given separately to control for a carry over effect of performance expectancies. The vocabulary test was distributed and subjects were given instructions not to guess because there would be a penalty for guessing.

Data Analysis

Pearson r correlations were calculated to examine the intercorrelations of the MIC categories and the SEVAL categories. Further correlations were calculated between the Multiple Intelligence tests (MIC and SEVAL) and performance indicators: vocabulary test scores, ACT scores, and midterm grades.

To examine the contribution of the MIC categories and the SEVAL categories to performance indicators, vocabulary test scores, ACT scores, and midterm grades, separate regression analyses were conducted.

The ACT scores used were the four subscores of English, Math, Reading, and Science Reasoning along with the ACT composite score. For the midterm grades the decision to use z-scores, based on performance in the subjects' class section, was made due to the varying length of the two school

terms. The use of standardized scores allowed for a more accurate comparison between subjects in the introductory psychology course.

Results

Table 3 presents descriptive statistics for age, vocabulary scores, and ACT performances. The students ranged in age from 17 to 42 with a mean of 21.5. Age data were obtained for the on-campus sample only. The off-campus sample was comparable, but age data were not obtained. The age variable was significantly and positively skewed (skew=2.25, $p < 0.05$) indicating that many of the subjects were on the lower end of the age range.

Insert Table 3 about here

The off-campus sample had a higher class mean at the time that this data were collected (MIDGRD1=13.3, SD=3.27), where MIDGRD1 represents the off-campus and MIDGRD2 represents the on-campus sample in the respective tables, than did the on-campus sample (MIDGRD2=9.7, SD=5.98). The means and standard deviations were used to obtain standard grade scores for each sample. Obviously, midterm performance differences between the two samples was most likely due to the difference in semester

length: 4 weeks for the off-campus summer class versus 16 weeks for the on-campus Fall semester class.

Additionally, performance indicators--ACT scores and vocabulary scores--are examined in Table 3. The vocabulary test was of particular interest. The subjects' mean score was 15.9 out of a possible 48 points, 33 percent correct (SD=5.65). This suggests that the vocabulary test was unusually difficult for these subjects given that they scored only slightly below the national average on the ACT English subtest.

The national average for the ACT English subtest was 21.2 (SD=5.3) and the university average was 19.4 (J. Osborne, 1992). These subjects averaged 17.9 on the ACT English subtest, indicating that the subjects were representative of the university population but fell one standard deviation below the national average.

The validity of the vocabulary test was supported by its significant correlations with ACT reading scores ($r=0.46$, $p < 0.01$) and ACT English scores ($r=0.36$, $p < 0.05$). One's score on the vocabulary test is a good predictor of performance on the ACT tests associated with reading and English.

Descriptive statistics for the MIC and SEVAL categories are shown in Table 4 and Table 5 respectively. Variability in MIC category scores was not equal or homogeneous across groups, F-max (7,49)=2.97, $p < 0.05$. However, variability in the SEVAL scores was homogeneous across groups, F-max (7,49)=2.51, $p > 0.05$. It was tentatively assumed that the regression analysis was sufficiently robust to handle most departures from normality and homogeneity within the MIC categories.

Insert Tables 4 and 5 about here

Both the MIC and SEVAL data suggest these students perceive their logical-mathematical skills as the poorest of the seven categories which is not consistent with their ACT scores.

Table 6 presents the intercorrelations of the Multiple Intelligences Challenge™, which shows that each of the seven categories were significantly correlated with a minimum of three other categories. For example, intrapersonal ability was significantly correlated with all other categories except musical ability. Linguistic ability was correlated with all categories except music and bodily-kinesthetic abilities. This high percentage of

intercorrelation suggests that the MIC is a relatively weak instrument for measuring intelligence categories as independent entities.

Insert Table 6 about here

Table 7 presents the intercorrelations of the seven SEVAL categories. The table shows that self perceptions of ability were not overly interrelated with one exception: linguistic ability was significantly correlated with three of the remaining abilities. Intrapersonal ability was significantly correlated with musical ability ($r=0.44$, $p < 0.01$). Kinesthetic ability was significantly correlated with interpersonal ability ($r=0.43$, $p < 0.01$) and logical-mathematical ability ($r=0.35$, $p < 0.01$). Lastly, interpersonal ability was correlated significantly with intrapersonal ability ($r=0.36$, $p < 0.05$).

Insert Table 7 about here

The correlation between the MIC categories and the vocabulary scores, ACT scores, and the midterm z-scores yielded but one significant correlation. Linguistic ability and vocabulary test scores were negatively correlated

(r=-0.33, $p < 0.05$)--diametrically opposed to expectation. Additionally, kinesthetic ability was significantly correlated with vocabulary scores (r=0.36, p=0.01). All remaining MIC--performance correlations ranged from--0.28 to 0.21. Of the 49 correlations in Table 8, 27 of the MIC--performance correlations were negative.

Insert Table 8 about here

Multiple intelligence abilities measured by SEVAL categories were correlated with vocabulary scores, ACT scores, and midterm z-scores. This yielded three significant correlations. Spatial ability correlated positively with both vocabulary scores (r=0.26, p=0.05) and with ACT reading comprehension scores (r=0.34, p=0.05). Logical-mathematical ability was correlated positively with ACT math scores (r=0.40, p=0.01). Additionally, interpersonal ability was significantly and negatively correlated with ACT composite performance (r=-.34, $p < 0.05$). Of the 49 correlations in Table 9, 31 SEVAL-performance correlations were negative.

Insert Table 9 about here

Separate regression analyses were computed using MIC category scores as predictor variables and vocabulary scores, midterm scores, and ACT composite scores as dependent variables. The MIC was a significant predictor of vocabulary scores, $F(7,39)=2.66$, $p < 0.05$. The MIC was not a good predictor of midterm grades or ACT composite scores, $F < 1$.

The MIC kinesthetic ability score made a significant contribution to the model predicting vocabulary scores, $p=0.01$. Recall that linguistic ability and vocabulary scores were also a significant bivariate correlation involving the MIC and vocabulary scores. The regression analysis indicates that while the MIC is a predictor of vocabulary scores, the only significant contributor to the model is kinesthetic ability. The MIC categories accounted for 32 percent of the variance in vocabulary scores ($R^2=0.32$) suggesting the instrument was not a strong predictor of vocabulary scores.

The multiple intelligence concept predicts that linguistic ability would be the most significant contributor to vocabulary scores. However, the analysis indicates that as the seven intelligences are combined they do not

enhance the predictive value of the instrument. The MIC makes a more significant contribution to the prediction of vocabulary scores when the intelligences are considered as a single unit rather than individually. Using SEVAL category ratings as predictor variables and vocabulary scores, midterm scores, and ACT composite scores as dependent variables separate regression analyses were performed. None of the self evaluations of abilities significantly predicted vocabulary scores, ACT composite scores or midterm z-scores.

Overall, the results indicate that both the MIC and SEVAL are weak assessment instruments and are unsupportive of the hypothesis that they predict academic performance. While the MIC was a significant predictor of vocabulary scores, the hypothesis that linguistic ability would be significantly and positively correlated with ACT English, ACT Reading, and vocabulary scores was unsubstantiated.

The significant contribution of kinesthetic ability to the prediction of vocabulary scores further provides evidence for the inability of the MIC to distinguish the appropriate intelligence category as a predictor of academic performance.

The hypothesis that multiple intelligence assessment instruments were effective predictors of academic performance was not supported by the current

results. Additionally, individual linguistic and mathematical abilities were not positively correlated to academic performance contributing to the rejection of the hypothesis.

Discussion

The number of intercorrelations within the multiple intelligence assessment tests, the MIC and SEVAL, seriously question the use of these instruments to test Gardner's (1983) multiple intelligences concept as individual entities. Further question of these instruments is brought about by the low number of significant correlations between the assessment instruments and the performance tests. Additionally, the substantial number of negative correlations associated with the MIC and SEVAL challenge the test's true assessment ability.

The correlations found between multiple intelligence test categories and performance indicators suggest that chance may have played a role in the determination of performance in relation to the assessment tools implemented. Tables 7 and 8 summarized 98 correlations. One could expect five percent or five correlations to be significant just due to chance--there were five significant correlations, suggesting chance may be involved.

Equally as significant were the number of negative correlations associated with the multiple intelligence categories. The ability of the assessment tools to predict performance is not only weak, but contrary to the proposed purpose of the assessment instruments. An example of this is the negative correlation between language ability and vocabulary test scores. This correlation indicates that the more developed the language skills are the lower the performance on the vocabulary test.

Without the ability to accurately assess Gardner's (1983) Multiple Intelligence concept one can not clearly point out its effectiveness in improving classroom structure. Self-evaluative techniques are apparently not the solution. Certainly examining an individual's kinesthetic ability in a written test makes use of linguistic ability, resulting in a biased assessment. A more accurate assessment of Gardner's (1983) Multiple Intelligence concept would incorporate a series of tests true to the nature of the tested intelligence.

To assess one's linguistic ability one can use many of the standardized tests already implemented by the Educational Testing Service (ETS) as examples. Linguistic intelligence, as defined in Table 1, could be assessed through a series of reading and writing exercises. A proper test should also involve an oral exam to test the ability thoroughly. A comprehensive

examination of an ability should be restricted as much as possible to that ability to ensure validity.

A written self-evaluation of one's logical-mathematical ability is not testing mathematical ability at all. Problem solving with numbers and numerical logic patterns are what is needed to objectively look at logical ability. It is imperative to eliminate the contamination of this ability with another ability, such as the linguistic ability when written likert scales are involved.

A test of kinesthetic intelligence should involve an athletic activity, for example. To ask a subject to rate his/her kinesthetic ability on a written likert scale not only is involving linguistic ability in the rating process, but has little to do with kinesthetic ability at all. The development of category specific tests is needed to develop a proper student portfolio for implementation in education.

An examination of the intercorrelations in the MIC and the SEVAL indicate that these assessment tools are relatively weak in examining multiple intelligences. Similarly, when one looks at the regression analyses, as well as the correlations, the test does not give an indication of Spearman's (cited in Guilford, 1967) g being operative. The correlations would give support for

such a unitary definition by showing performance indicators being significantly correlated with all seven intelligences. Overall, the results show the MIC and SEVAL as being weak assessment tools universally.

Walters' (1992) Multiple Intelligences Challenge™ and the Self Evaluation of Seven Useful Abilities (Osborne & Osborne, 1992) failed to assess intellectual abilities, as defined by Gardner (1983), accurately and quickly. In fact, Gardner (1983) speculated that these seven intelligences would be difficult to measure via a paper and pencil test. Thus, the search for a quick measure of Gardner's (1983) multiple intelligences continues.

Authors' Notes

This is a revised version of a paper presented at the annual meeting of the Kentucky Academy of Sciences, Ashland, KY, October 1992.

References

French, J.N., Ekstrom, R.B., & Price, L.A. (1962). Manual for kit of reference test for cognitive factors. Princeton: Educational Testing Service.

Gardner, H. (1983). Frames of mind: The theory of multiple intelligences. New York: Basic Books.

Gardner, H., & Hatch, T. (1989). Multiple intelligences go to school: Educational implications of the theory of multiple intelligences. Educational Researcher, 18 (8), 4-10.

Guilford, J.P. (1967). The nature of human intelligence. New York: McGraw-Hill.

Hatch, T.C., & Gardner, H. (1986). From testing intelligence to assessing competencies: A pluralistic view of intellect. Roeper Review, 3, 147-150.

Kornhaber, M., Krechevsky, M., & Gardner, H. (1990). Engaging intelligence. Educational Psychologist, 25, 177-199.

Murphy, G. (1949). Historical introduction to modern psychology. New York: Harcourt, Brace & Co.

Oakland, T., & Parmelee, R. (1985). Mental measurement of minority-group children. In Wolman, B.B. (Ed.), Handbook of intelligence: Theories, measurement, and applications (59-118). New York: Wiley.

Osborne, J. (1992). Morehead State University Statistical Profile for Fall 1991. Statistical information for the Office of Planning at Morehead State University.

Osborne, F., & Osborne, J. (1992). The self evaluation of seven useful abilities. Morehead State University, Morehead, KY.

Reading-Brown, M.S., & Hayden, R.R. (1989). Learning Styles--Liberal arts and technical training: What's the difference? Psychological Reports, 64, 507-518.

Schmeck, R.B., Ribich, F.D., & Ramanaiah, N.V. (1977). Development of a self-report inventory for assessing individual differences in learning processes. Applied Psychological Measurement, 1, 413-431.

Sternberg, R.J. (1985). Cognitive approaches to intelligences. In B.B. Wolman (Ed.), Handbook of intelligence: Theories, measurements, and applications (59-118). New York: Wiley.

Vandenberg, S.G., & Volger, G.P. (1985). Genetic determinants of intelligence. In B.B. Wolman (Ed.), Handbook of intelligence: Theories, measurements, and applications (3-58). New York: Wiley.

Walters, J. (1992). The Multiple Intelligences Challenge. Cambridge: Harvard University, Project Zero. Presented at a Project Zero workshop, January 1992.

Table 1
The Seven Intelligences

Intelligence	End-States	Core Components
Logical-mathematical	Scientist Mathematician	Sensitivity to and capacity to discern logical or numerical patterns; abilities to handle long chains of reasoning.
Linguistic	Poet Journalist	Sensitivity to sounds, rhythms, and meanings of words; sensitivity to the different functions of language.
Musical	Composer Violinist	Abilities to produce and appreciate rhythm, pitch, and timbre; appreciation of the forms of musical expressiveness.
Spatial	Navigator Sculptor	Capacities to perceive the visual-spatial world accurately and to perform transformations on one's initial perceptions.
Bodily-kinesthetic	Dancer Athlete	Abilities to control one's body movements and to handle objects skillfully.
Interpersonal	Therapist Salesperson	Capacities to discern and respond appropriately to the moods, temperaments, motivations, and desires of other people.
Intrapersonal	Person with detailed, accurate self-knowledge	Access to one's own feelings and the ability to discriminate among them and draw upon them to guide behavior, knowledge of ones' own strengths, weaknesses, desires, and intelligences.

Gardner, H., & Hatch, T. (1989). Multiple intelligences go to school: Educational implications of the theory of multiple intelligences. Educational Research, 18 (8), 4-10.

Table 2
MIC Items Used to Evaluate Linguistic Ability

The following MIC items were used to evaluate linguistic ability:

Each question has a five point scale (A-E) in which A means YES it applies to you and E means NO it does not apply to you.

In my school or work, the job I will often volunteer for is...
YES-A B C D E-NO 1. Creating the school newsletter.

Of the games on this list my favorites are...
YES-A B C D E-NO 20. Dictionary.

I often laugh out loud at...
YES-A B C D E-NO 25. Victor Borge.
YES-A B C D E-NO 29. George Carlin.

When I see a movie, the aspect that I remember most vividly is...
YES-A B C D E-NO 35. The dialogue.

If I were entertaining children in the car, I would like to...
YES-A B C D E-NO 38. Play alphabet games.
YES-A B C D E-NO 41. Read books.

I hate to brag, but when I was a kid I...
YES-A B C D E-NO 49. Learned to ready at an early age.

My hobbies include...
YES-A B C D E-NO 63. Reading short stories.
YES-A B C D E-NO 67. Crossword puzzles.

The following items were reverse scored for Linguistic Ability:
But I would be a poor choice for...
YES-A B C D E-NO 9. Creating the office newsletter.

...but as an adult, I confess..
YES-A B C D E-NO 61. I am bored by poetry.

The 12 items were summed fo: each subject. The final linguistic score was derived by dividing the sum by 12. The remaining six intelligences were measured similarly.

Table 3

Descriptive Statistics for Age, Vocabulary Scores, and ACT Performance

Category	N	Mean	Std. Dev.	Lowest	Highest
Age	29	21.5	6.80	17	42
Vocab	49	15.9	5.65	7	37
MIDGRD1*	22	13.3	3.37	7.8	21.1
MIDGRD2**	29	9.7	5.98	3.5	31.6
ACT Subscores***					
Composite	41	18.1	3.08	13	27
English	41	17.9	5.50	4	31
Math	41	17.7	3.37	12	27
Reading	33	18.3	4.13	9	27
Science	33	17.7	3.76	3	24

* The off-campus subject group

** The on-campus subject group

*** Not all subjects had taken the ACT. Also, eight subjects had taken it before the development of the Reading and Scientific Reasoning subtests.

Table 4

Descriptive Statistics for the Multiple Intelligence Challenge (MIC) Categories

Category	N	Mean	Std. Dev.	Lowest	Highest
LANG	47	3.3	0.48	2.1	4.4
LOG_MATH	47	2.5	0.37	2.5	4.0
SPATIAL	47	3.6	0.45	2.7	5.0
MUSIC	47	3.6	0.56	2.2	4.9
KINESTH	47	3.4	0.39	2.5	4.3
INTERPER	47	3.1	0.37	2.1	4.0
INTRAPER	47	3.1	0.45	2.2	4.2

Table 5

Descriptive Statistics for the Self Evaluation of Seven Useful Abilities (SEVAL) Categories

Category	N	Mean	Std. Dev.	Lowest	Highest
Language	47	6.3	2.44	1	10
Log_Math	47	5.9	2.31	2	10
Spatial	47	6.0	3.08	1	10
Musical	47	6.4	2.28	1	10
Kines.	47	7.6	1.94	1	10
Interper	47	7.4	2.29	1	10
Intraper	47	7.9	1.98	2	10

Table 6

The Multiple Intelligence Challenge (MIC) Correlation Matrix

r p n	Lang.	Log-Math	Spat.	Music	Kines.	Inter	Intra
Lang.	1.00 --- 47	0.43 0.00 47	0.37 0.00 47	0.18 0.20 47	-0.05 0.70 47	0.29 0.04 47	0.45 0.00 47
Logic-Math		1.00 --- 47	0.28 0.04 47	0.33 0.02 47	0.01 0.92 47	0.15 0.28 47	0.34 0.01 47
Spatial			1.00 --- 47	0.25 0.07 47	0.20 0.17 47	0.36 0.01 47	0.41 0.00 47
Music				1.00 --- 47	0.30 0.03 47	0.30 0.03 47	0.17 0.24 47
Kinesthetic					1.00 --- 47	0.37 0.00 47	0.36 0.01 47
Interpersonal						1.00 --- 47	0.35 0.01 47
Intrapersonal							1.00 --- 47

Table 7

The Self Evaluation of Seven Useful Abilities (SEVAL)

Correlation Matrix

r p n	Language	Logic-Math	Spatial	Music	Kinesthetic	Interperson	Intraperson
Language	1.00 --- 47	0.23 0.11 47	0.36 0.01 47	0.26 0.07 47	0.47 0.00 47	0.25 0.09 47	0.22 0.12 47
Logic-Math		1.00 --- 47	0.13 0.36 47	0.10 0.48 47	0.35 0.01 47	-0.06 0.69 47	0.12 0.41 47
Spatial			1.00 --- 47	0.24 0.09 47	0.24 0.11 47	0.07 0.65 47	0.19 0.18 47
Music				1.00 --- 47	0.15 0.30 47	0.12 0.30 47	0.44 0.00 47
Kinesthetic					1.00 --- 47	0.43 0.00 47	0.13 0.37 47
Interperson						1.00 --- 47	0.36 0.01 47
Intraperson							1.00 --- 47

Table 8

MIC - Performance Variable Correlation Matrix

r p n	Vocab. Scores	ACT English	ACT Math	ACT Reading	ACT Science	ACT Comp.	Midterm Z-score
Language	-0.33 0.02 47	-0.04 0.77 38	0.06 0.69 38	-0.28 0.11 31	-0.14 0.42 31	-0.11 0.50 38	-0.06 0.66 47
Log-Math	-0.12 0.42 47	0.21 0.18 38	-0.08 0.62 38	0.24 0.18 31	0.20 0.26 31	0.17 0.28 38	-0.14 0.33 47
Spatial	-0.05 0.71 47	0.17 0.30 38	-0.01 0.93 38	0.14 0.44 31	0.09 0.62 31	0.11 0.49 38	-0.07 0.61 47
Music	-0.14 0.32 47	0.02 0.90 38	0.13 0.41 38	-0.20 0.26 31	-0.16 0.36 31	-0.10 0.53 38	0.11 0.45 47
Kinesthetic	0.36 0.01 47	0.10 0.51 38	0.12 0.45 38	0.05 0.76 31	-0.23 0.20 31	0.10 0.54 38	0.16 0.26 47
Interpersonal	-0.13 0.35 47	-0.01 0.92 38	0.04 0.81 38	-0.15 0.41 31	-0.07 0.69 31	-0.02 0.90 38	0.16 0.27 47
Intrapersonal	0.07 0.62 47	0.00 0.95 38	-0.14 0.38 38	-0.06 0.71 31	-0.28 0.11 31	-0.06 0.71 38	-0.09 0.53 47

Table 9

SEVAL - Performance Variable Correlation Matrix

r p n	Vocab. Scores	ACT English	ACT Math	ACT Reading	ACT Science	ACT Comp.	Midterm Z-score
Language	0.15 0.30 47	-0.11 0.50 38	-0.05 0.72 38	-0.04 0.82 31	-0.10 0.58 31	-0.06 0.68 38	-0.03 0.80 47
Log-Math	-0.15 0.29 47	0.04 0.82 38	0.40 0.01 38	0.10 0.58 31	0.07 0.70 31	0.15 0.35 38	0.08 0.56 47
Spatial	0.26 0.05 47	0.15 0.36 38	-0.16 0.30 38	0.34 0.05 31	0.11 0.57 31	0.19 0.25 38	-0.18 0.22 47
Music	0.16 0.27 47	-0.01 0.96 38	-0.19 0.23 38	-0.09 0.61 31	0.12 0.51 31	-0.00 0.99 38	-0.07 0.64 47
Kinesthetic	-0.04 0.80 47	0.01 0.94 38	-0.06 0.69 38	0.00 0.97 31	0.09 0.62 31	-0.05 0.73 38	-0.23 0.12 47
Interpersonal	-0.03 0.82 47	-0.27 0.10 38	-0.26 0.10 38	-0.04 0.81 31	-0.24 0.18 31	-0.34 0.03 38	-0.20 0.15 47
Intrapersonal	0.12 0.39 47	-0.22 0.18 38	-0.11 0.51 38	-0.18 0.31 31	-0.17 0.36 31	-0.24 0.15 38	-0.10 0.51 47

Appendix A

The Multiple Intelligence Challenge

Revised Spring 1992

Welcome to the Multiple Intelligence Challenge, a game designed to generate discussion.

And it's fun!

On the next pages, finish each statement as it applies to you. Each question has a five point scale (A-E) in which A means YES it applies to you and E means No it doesn't apply to you. Using a separate answer sheet Circle the letter A to E which best applies to you.

Before beginning, please print your name, student identification number, and today's date on the separate answer sheet.

The Multiple Intelligence Challenge Continued

In my school or work, the job I will often volunteer for is...

YES-A B C D E-NO	1.	Creating the school newsletter.
YES-A B C D E-NO	2.	Planning room layouts.
YES-A B C D E-NO	3.	Performing for celebrations or parties.
YES-A B C D E-NO	4.	Balancing the books.
YES-A B C D E-NO	5.	Working on a long-range plan.
YES-A B C D E-NO	6.	Moving or rearranging furniture.
YES-A B C D E-NO	7.	Working on worker-supervisor relations.
YES-A B C D E-NO	8.	Scheduling field trips or group activities.

But I would be a poor choice for...

YES-A B C D E-NO	9.	Creating the office newsletter.
YES-A B C D E-NO	10.	Planning for office space.
YES-A B C D E-NO	11.	Performing for office space.
YES-A B C D E-NO	12.	Balancing the books.
YES-A B C D E-NO	13.	Working on a long-range plan for the company.

YES-A B C D E-NO	14.	Moving office furniture.
YES-A B C D E-NO	15.	Working on employee relations.
YES-A B C D E-NO	16.	Scheduling field trips or group activities.

Of the games on this list, my favorites are...

YES-A B C D E-NO	17.	Poker
YES-A B C D E-NO	18.	Scruples
YES-A B C D E-NO	19.	Frisbee
YES-A B C D E-NO	20.	Dictionary
YES-A B C D E-NO	21.	Gin Rummy
YES-A B C D E-NO	22.	Chess
YES-A B C D E-NO	23.	Name-That-Tune

I often laugh out loud at...

YES-A B C D E-NO	24.	P.D.Q. Bach
YES-A B C D E-NO	25.	Victor Borge
YES-A B C D E-NO	26.	Charlie Brown of "Peanuts"
YES-A B C D E-NO	27.	The Harlem Globetrotters

YES-A B C D E-NO	28.	Marcel Marceau
YES-A B C D E-NO	29.	George Carlin
YES-A B C D E-NO	30.	Bill Cosby

When I see a movie, the aspect that I remember most vividly is...

YES-A B C D E-NO	31.	The music
YES-A B C D E-NO	32.	The characters
YES-A B C D E-NO	33.	The plot
YES-A B C D E-NO	34.	The location
YES-A B C D E-NO	35.	The dialog
YES-A B C D E-NO	36.	The stunt scenes and special effects
YES-A B C D E-NO	37.	My first impression of the movie

If I were entertaining children in the car, I would like to...

YES-A B C D E-NO	38.	Play alphabet games
YES-A B C D E-NO	39.	Play counting games
YES-A B C D E-NO	40.	Play "Name the States."
YES-A B C D E-NO	41.	Read books

YES-A B C D E-NO	42.	Sing songs
YES-A B C D E-NO	43.	Play "Cat's Cradle."
YES-A B C D E-NO	44.	Send messages to other cars
YES-A B C D E-NO	45.	Write in the family diary
YES-A B C D E-NO	46.	Compute the gas mileage or estimate time of arrival.
YES-A B C D E-NO	47.	Study the map

I hate to brag, but when I was a kid I...

YES-A B C D E-NO	48.	Learned to ride a bike easily
YES-A B C D E-NO	49.	Learned to read at an early age
YES-A B C D E-NO	50.	Learned to play a musical instrument quick
YES-A B C D E-NO	51.	Learned to count at an early age
YES-A B C D E-NO	52.	Made up some terrific "pretend play" games
YES-A B C D E-NO	53.	Learned my way around the neighborhood before my friends did

YES-A B C D E-NO	54.	Was always the leader of our neighborhood

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...but as an adult, I confess...

YES-A B C D E-NO	55.	I feel awkward in social situations with strangers
YES-A B C D E-NO	56.	I get directions mixed up when I drive
YES-A B C D E-NO	57.	I hate having to fix things
YES-A B C D E-NO	58.	I underestimate how long it will take to learn something new
YES-A B C D E-NO	59.	I hate writing thank you notes.
YES-A B C D E-NO	60.	I am tone deaf, but I keep it a secret.
YES-A B C D E-NO	61.	I am bored by poetry.

My hobbies include...

YES-A B C D E-NO	62.	Doing the family budget.
YES-A B C D E-NO	63.	Reading short stories
YES-A B C D E-NO	64.	Playing bridge

YES-A B C D E-NO	65.	Interior decorating
YES-A B C D E-NO	66.	Programming a computer
YES-A B C D E-NO	67.	Crossword puzzles
YES-A B C D E-NO	68.	Doing jigsaw puzzles
YES-A B C D E-NO	69.	Carpentry
YES-A B C D E-NO	70.	Playing in a music group
YES-A B C D E-NO	71.	Knitting
YES-A B C D E-NO	72.	Fishing
YES-A B C D E-NO	73.	Square dancing
YES-A B C D E-NO	74.	Going to the symphony
YES-A B C D E-NO	75.	Creating the family album
YES-A B C D E-NO	76.	Playing softball or juggling
YES-A B C D E-NO	77.	Reading autobiographies
YES-A B C D E-NO	78.	A service club
YES-A B C D E-NO	79.	Studying family genealogy

Appendix B

NAME:_____ ID NO.:_____ DATE:_____

Self Evaluation of Seven Useful Abilities

1992 (F.H. Osborne and J.S. Osborne)

Read the description of the following abilities and rate yourself candidly on each. Rate yourself by marking the 1-low to 10-high scales that follow each ability.

When you have finished with the 1 to 10 scales review your ratings and indicate in the space on the left of each ability your relative RANK of each ability. For example, if you feel that you are best in one ability, rank that ability number one. Rank your second best ability number two and so forth until you have ranked all seven abilities. DO NOT use tied ranks for any two abilities.

__A. LINGUISTIC ABILITY. You are sensitive to the sounds, rhythms, and meanings of words; sensitivity to the different functions of language.

LOW HIGH

1 2 3 4 4 6 7 8 9 10

__B. LOGICAL-MATHEMATICAL ABILITY. You are sensitive to and have the capacity to distinguish logical or numerical patterns; the ability to handle long chains of reasoning.

LOW HIGH

1 2 3 4 4 6 7 8 9 10

__C. MUSICAL ABILITY. You are able to produce and appreciate rhythm, pitch, and timbre; you appreciate forms of musical expression.

LOW HIGH

1 2 3 4 4 6 7 8 9 10

__D. SPATIAL ABILITY. You are able to perceive the visual-spatial world accurately and to perform transformations on your initial perceptions.

LOW HIGH

1 2 3 4 4 6 7 8 9 10

__E. BODILY-KINESTHETIC. You are able to control your body movements and to handle objects skillfully.

LOW HIGH

1 2 3 4 4 6 7 8 9 10

__F. INTERPERSONAL ABILITY. You are able to discern and respond appropriately to the moods, temperaments, motivations, and desires of other people.

LOW HIGH

1 2 3 4 4 6 7 8 9 10

__G. INTRAPERSONAL ABILITY. You have access to your own feelings and the ability to discriminate among them and draw upon them to guide your behavior; knowledge of your own strengths, weaknesses, desires, and abilities.

LOW HIGH

1 2 3 4 4 6 7 8 9 10