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EXPLORATION OF THE RELATIONSHIP BETWEEN MEASURES OF
CRITICAL THINKING AND PERSONALITY

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Abstract: The purpose of this study was to identify a profile of critical thinkers. Two hundred seventy-two university students completed the Watson-Glaser Critical Thinking Appraisal-Form S and the Myers-Briggs Type Indicator-Form G. Statistical analysis revealed the following: Intuitive introverts with a thinking preference scored higher in the total measure of critical thinking skill.

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Introduction

Health Occupations Educators in post-secondary institutions are facing dramatic changes in the student population as well as in the various health professions. The average first-time enrollee in post-secondary programs is different from his or her predecessor often years ago (Confessore & Barron, 1997). The difference in student demographics is due in part to changes in business and industry. The shift from a manufacturing industry to a service industry has placed a large demand upon post-secondary education. This demand for retraining has, therefore, changed the 'typical' enrollee in health professions. Additionally, the United States population has not only become older due to increased life expectancy, it has become increasingly diverse culturally.

This 'new' group of students brings with them a new orientation to learning. Confessore and Barron (1997) report this shift in educational goals as an emphasis to immediate application of learned material rather than striving for the traditional long-term outcome. Therefore, there seems to be a need to match Curricular goals and design of education to the work environment. Today's work environment demands breadth of knowledge and skills; a more critical thinking, self-directed learning environment is the recommended route to accommodate this population's educational needs.

Paralleling the changes in student population, health care has also undergone

dramatic change. Health care reform along with managed care restrictions and requirements are influencing change for the health care professional. New technologies and advances in patient treatment have created additional demands upon the health care provider. The increased complexity of health care not only requires specialization, but also the ability to generalize that knowledge to include other disciplines. .Critical thinking ability and problem-solving skills allow successful interaction between the health care provider and the health care system (Flannelly & Inouye, 1998).

Therefore, to address the goals of the new student population and the demands of the new health care system, educational methodology must also change. Problem-solving skills and critical thinking techniques need to extend into the practical and theoretical curricula. Thus, the question and the emphasis of this research is: “What is the relationship between personality and critical thinking?” If critical thinking can be measured as indicated by type preference, instructional methodologies may be developed that enhance those type preferences across all learners.

Literature Review

Critical Thinking

What is critical thinking and how does one measure and teach these skills? The construct of critical thinking has been studied and explained using various methods.

Othanel Smith (1953) originally defined the term ‘critical thinking’ as the process of determining whether to accept or reject statements. Since that time, there have been many additions and circumstances used to define and explain critical thinking. Ennis (1962) defined critical thinking as the process of reasonably deciding what to believe and do. This definition is the basis for the Cornell Critical Thinking Test (CCTT).

Dressel and Mayhew (1954) introduced another direction for the definition of critical thinking, which closely follows a problem solving methodology. This model identified the following steps: the ability to define a problem, select pertinent information for the solution of that problem, recognize stated and unstated assumptions, formulate and select relevant hypotheses, and draw valid conclusions from inferences. The Watson-Glaser Critical Thinking Appraisal (WGCTA) was developed from this definition.

The CCTT and the WGCTA both measure and define critical thinking. The components include the ability to develop inferences, recognize assumptions, inductive and deductive reasoning, interpretation of ideas, and evaluation of arguments. The relationship of these elements to the multidimensional health care professional is obvious – the professional must be able to analyze and find solutions to provide the best care.

As long as problem-solving and critical thinking skills continue to be forefront in the allied health profession, educators need to find a way of enhancing future

professionals' critical thinking skills through curriculum and methodology.

Personality & Learning Styles

How can the Health Occupations educator implement methodology to enhance critical thinking and problem-solving skills? Of the many current methodologies, emphasizing individual learning preferences and psychological **type** influence is compelling. Previous research in this area has been shown to be relevant.

In reviewing the literature on adult education principles and practice, a number of individuals have written texts and articles suggesting a relationship between adult learners and critical thinking abilities, meaning, as an individual ages, an increase in critical thinking skills occurs (**Brookfield**, 1985; **Candy**, 1991; **Cranton**, 1994; **Long**, 1997). These authors state the adult learner tends to be more self-directed than the traditional college student, and the adult utilizes some process of **problem-solving/critical** thinking in daily life.

The relationship between **personality** and critical thinking has been studied **indirectly**. **Taube** (1997) explored the relationship between critical thinking disposition to actual thinking performance. **Hughes & Costner** (1987) explored the relationship between five personality measures and the **Terman** Concept Master Test – another measure of critical thinking. **No** relationship was found between the **Terman** and the

Myers-Briggs Type Indicator.

Carolyn Kreber (1998) reports on a study that addresses the relationship between self-directness, critical thinking, and personality. Her primary focus was to predict scores on a standardized measure of readiness for self-directed learning, the Self-Directed Learning Readiness Scale (SDLRS). The predictor variables were three sub-scores on the 1984 version of the Watson Glaser Critical Thinking Appraisal and a checklist entitled P.E.T. Type Check that measures eight Jungian personality types. She found no relationship between the P.E.T. Type Check (Personal Empowerment through Type) and the three sub-scales of the WGCTA. She reports a weak **but** significant relationship between extroverted intuition (EN) and SDLRS scores. These findings further support the results reported by Herbeson (1991), Leitsch & Van Hove (1997), and Leitsch & Van Hove (1998).

Method

This study was designed to explore the relationship between the Myers-Briggs Type Indicator-Form G (MBTI -G) (Myers & Briggs, 1985) and the Watson-Glaser Critical Thinking Appraisal-Form S (WGCTA-S) (Watson & Glaser, 1994) sub-tests and total score in post-secondary education. In an attempt to determine the relationship between critical thinking and psychological type, the MBTI was selected. There is

extensive literature demonstrating the improvement of learning using MBTI preferences in lesson **design** (Fairhurst & Fairhurst, 1995; Lawrence, 1993; Meisgeier, Murphy & Meisgeier, 1989, 1996).

Instruments

The Myers-Briggs Type Indicator - Form G (**MBTI-G**) was developed in 1979 and was based on earlier versions of the MBTI. Both the self-select and research version of Form G was normed using data collected over a 25-year period. The validity and reliability of Form G was derived from the old Form F (Myers & McCaulley, 1985). The split-half test-retest reliability and inter-reliability scores range from .48 to .91 at the .05 level for **all** scales.

The **MBTI-G** measures four **scales**. The **first** scale measures the way an individual prefers to interact with his or her environment (Extraversion-Introversion or **EI**). The second scale measures one's preference of perceiving his or her universe (Sensing-Intuitive or **SN**). The next scale measures how one makes decisions (Thinking-Feeling or **TF**). The **first** three scales measure Jung's three dimensions of personality type (O'Brien, 1985). Myers and Briggs (Myers & McCaulley, 1985) added the fourth dimension of "Orientation to the Outer World" or the Judging-Perceiving or **JP** scale.

Goodwin Watson and Edward **Glaser** developed the **Watson-Glaser** Critical

Thinking Appraisal (WGCTA) to measure the construct of critical thinking. Since then, several forms of the WGCTA have been developed. In 1994, a new WGCTA-Form S (WGCTA-S) was developed from Forms A and B. The new Form S consists of 40 test items and completion time is estimated at approximately 30 minutes as opposed to Form A and B with 80-test items and completion time of one hour.

Form S yields scores on five sub-tests, identified by Watson and Glaser in 1964 as the components of critical thinking: developing inferences, recognition of assumptions, deduction, interpretation, and evaluation of arguments (Watson & Glaser, 1994). Based on the development sample of 1,608 adults, Cronbach's alpha coefficient for the WGCTA-S was .81 (Watson & Glaser, 1994). Including additional samples, the alpha coefficient ranged from .66 to .87. The part-whole correlation coefficient between Form A and Form S was calculated at .96 using a sample of 3,727 adults (Watson & Glaser, 1994).

Participants

Two hundred seventy-two university students in education and allied health completed the MBTI and WGCTA-S. There were 139 females and 133 males ranging in age from 18 to 56 years. Table 1 delineates the sample.

Table 1
Sample Demographics

	Sample	Frequency	Percent
Race	White	239	87.9
	Black	31	11.4
	Other	2	.7
Gender	Female	139	51.1
	Male	133	48.9
Highest Grade Completed	12	12	4.4
	13	8	2.9
	14	57	21.0
	15	.67	24.6
	16	117	43.0
	17	10	3.7
	18	.1	.4

N = 272

Results

Table 2 shows the descriptive statistics for each of the **MBTI** preference scales. The continuous scores of the four scales were calculated by subtracting the difference between the sums of each pole of the four scales. The resulting number was then subtracted from 100 for preferences of **ESTJ**, or added to 100 for those preferring **INFP**, thus allowing for correlational statistics (Myers & McCaulley, 1985). A positive

Table 2

Means, Standard Deviations and Ranges of MBTI Continuous Scores

Variable	%	Mean	SD	Minimum	Maximum
E	57.7				
I	42.3				
EI		94.53	24.96	49	157
S	68.8				
N	31.2				
SN		89.30	24.26	35	149
T	58.5				
F	41.5				
TF		93.01	24.14	35	143
J	64.3				
P	35.7				
JP		92.01	28.04	45	161

N = 272

correlation indicates preference for the INFP scales and a negative correlation indicates preference for the ESTJ scales.

The sample consisted of 57.9% extroverts, 68.5% sensors, 58.6% thinkers, and 64.5% judges. The preference by percentage was confirmed by analysis of the mean scale score. This sample had an $\bar{x} = 89.45$ and $s = 26.33$ towards extraversion (note the mean score is less than 100). Sensing ($\bar{x} = 92.03$, $s = 27.99$), thinking $\bar{x} = 93.02$, $s =$

Table 3

Means, Standard Deviations and Ranges of WGCTA Sub-scale and Total Scores

Variable	Mean	SD	Minimum	Maximum
Develop	3.80	1.73	0	7
Inference				
Recognition of Assumption	5.14	2.21	0	8
Deductions	6.14	1.85	2	9
Interpretations	4.43	1.58	0	7
Evaluation of Arguments	6.70	1.63	0	9
Total	26.22	6.14	11	40

N = 272

24.09), and judging ($\bar{x} = 94.36$, $s = 25.06$) completes the sample's preferred scales.

These preferences (ESTJ) also represent Myers' estimates of type distributions of the general population.

Table 3 reveals the descriptive statistics for each of the **Watson-Glaser** sub-tests 1 to 5 (Inferences, Recognition of Assumptions, Deduction, Interpretation, Evaluation of Arguments) and total score. The Form S Manual does not recommend the use of the sub-tests as valid measures of specific critical thinking areas. The change in the usage of this test is due to the shortened version. The total score is valid and reliable (Watson &

Table 4

Correlation Matrix: MBTI and WGCTA Sub-scales and Total Score

Variable	EI	SN	TF	JP
Develop	.079	.075	-.120	.042
Inference	p =.194	p =.218	p =.047	p =.492
Recognition of Assumption	.148 p =.014	.077 p =.204	-.100 p =.101	.062 p =.312
Deductions	.105 p =.084	.061 p =.314	-.104 p =.088	.157 p =.665
Interpretation	.105 p =.084	.180 p =.003	-.104 p =.087	.157 p =.01
Evaluation of Arguments	.088 p =.150	.122 p =.044	-.087 p =.152	.009 p =.878
Total	.158 p =.009	.146 p =.016	-.151 p =.013	.085 p =.163

p = .05

Glaser, 1994).

Table 4 indicates the correlation matrix for the MBTI Preference Scales, the sub-tests of the WGCTA and the total score for the Watson-Glaser. The correlation coefficients of the EI, SN, and TF preference scales and the total Watson-Glaser score (.158, .146, and -.151 at the .05 level, respectively) are statistically significant but the robustness associated with that correlation is very slight. As the EI and SN coefficients

are positive, the preference lies with the introvert and intuitive. The negative coefficient associated with the TF scale, shows preference for the thinking type. Therefore, results indicate that personality preference as measured by the MBTI illustrates a tendency or a slight directional factor for critical thinking success.

The research question of “What is the relationship between personality and critical thinking?” was answered, though the results have qualifications. These results coincide with previous research (Herbeson, 1999; Leitsch & Van Hove, 1997; Leitsch & Van Hove, 1998).

The correlation coefficients of the Watson-Glaser sub-tests indicate the following significant relationships: TF with Inference ($p < .05$); EI with Recognition of Assumption ($p < .05$); SN and JP with Interpretation ($p < .01$, both scales); and SN with Evaluation of Arguments ($p < .05$). As all coefficients are positive, the preference lies with the *second* letter in the dichotomous pair. Again, the power or applicability of the correlation is very low.

Four out of the five sub-tests of the WGCTA-S were related to various scales of the MBTI. Total scores of the WGCTA-S were related to only three of four scales of the MBTI. This occurrence can be explained as follows. The sub-tests of the WGCTA-S are components of the overall total score and the individual strength of the sub-test creates

the overall significant relationship.

Discussion

This study identified a significant yet weak relationship between the **Watson-Glaser Critical Thinking Appraisal (WGCTA-S)** and personality as tested by the **Myers-Briggs Type Indicator (MBTI)**. Intuitive Introverts with Thinking preferences had higher critical thinking scores. As reported by Myers & McCaulley (1985), the intuitive introverts with thinking preferences tend to score higher on standardized measures of cognitive aptitude and ability. Therefore, the implications for teaching are to develop strategies to enhance the critical thinking abilities of the sensing extroverts with feeling preferences.

The results of this study indicate the need for future studies in this area. First, additional measures of critical thinking need to be utilized and examined to answer the question of repeatability with other measures of critical thinking. Secondly, research should be conducted to explore the question of whether other measures of personality would yield similar results.

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