MYERS-BRIGGS PSYCHOLOGICAL TYPE AND ACHIEVEMENT IN ANATOMY AND PHYSIOLOGY


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Results from the Myers-Briggs Type Indicator (MBTI) for 259 nursing students were compared with their achievement on examinations in an undergraduate course in anatomy and physiology. Factor analysis demonstrated that no relationship existed between any of the eight individual personality traits purported to be measured by MBTI (i.e., E, Extrovert; I, Introvert; S, Sensing; N, Intuition; T, Thinking; F, Feeling; J, Judging; P, Perceiving) and examination scores in this course. The analysis also showed that the bipolar scales S vs. N and J vs. P collapsed into a single bipolar scale (S/J vs. N/P). This means that the MBTI is only capable of measuring three bipolar scales of personality traits instead of four scales as currently claimed. Contrary to other findings, results from an analysis of variance revealed no meaningful relationship between course achievement and psychological types.


Key words: educational measurement; psychometric analysis

The level of student performance on examinations may be affected by factors such as preferred learning styles and the psychological type profiles of the students (10). There are a number of psychometric instruments that can measure preferences for certain personality traits. The Myers-Briggs Type Indicator (MBTI) is one of these instruments (6). The MBTI is a forced-choice personality inventory test based on the behavioral work of Carl Jung (3), who believed that there are two general orientations, called attitudes, within which an individual relates to the world. One of these attitudes is inward toward the subjective world of the individual (introversion), and the other is outward toward the external environment (extroversion). Jung (3) also believed that there are different processes, called functions of thought, which affect how an individual perceives the world and deals with information and experience. Jung described four functions of thought: thinking, feeling, sensing, and intuiting. Thinking and feeling are considered polar opposites as are sensing and intuiting. Jung combined the two attitudes and the four functions of thought into eight different psychological types.

Myers and McCaulley (6) extended Jung’s work and developed the MBTI to measure four bipolar scales consisting of personality traits [Extrovert (E) vs. Introvert (I), Sensing (S) vs. Intuition (N), Thinking (T) vs. Feeling (F), and Judging (J) vs. Perceiving (P)] that are used in various combinations to describe an individual’s psychological type profile. When responses to the MBTI are scored, a dominant preference for each of the bipolar scales is obtained for an individual. The preferences are combined into a four-letter acronym that corresponds to a
psychological type profile. There are 16 different psychological type profiles that can be generated by results from the MBTI (e.g., ESTP or INFJ).

Myers and McCaulley (6) defined the traits that are measured for each of the four MBTI bipolar scales. The Extrovert vs. Introvert scale measures how a person is energized. An extrovert draws his energy from his surroundings whereas an introvert draws his energy from within himself. The Sensing vs. Intuition scale measures how an individual receives information. A sensing individual utilizes his sensory modality whereas an intuitive individual uses his intuition. Sensing individuals tend to be good at collecting detailed information, whereas intuitive persons are good at seeing relationships between pieces of information. The Thinking vs. Feeling scale refers to how a person makes a decision. A thinking individual will make decisions using logic and will study the alternatives in an analytic and objective manner. A person using feeling will make decisions with other people in mind and tends to be more value oriented. The final scale, involving Judging vs. Perceiving, refers to an individual’s lifestyle or orientation to the world. A judging individual prefers to live in a more planned or organized lifestyle, whereas perceiving individuals are more spontaneous and flexible. Judging individuals are more decisive, whereas perceiving individuals are more process oriented.

Previous research by Kalsbeek (4) suggested that there is a relationship between three of the four bipolar scales (E vs. I, J vs. P, and S vs. N) and academic achievement [grade point average (GPA)] and stated that individuals who have a stronger preference for I, J, and N tend to have higher GPA scores. Research by McCaulley (5) and Charlton (1) also suggests that there is a relationship between the bipolar scales E vs. I and S vs. N and academic achievement.

Tharp (9) has recently studied the relationship between combinations of MBTI personality traits and achievement in a human physiology course. He found that the highest grades were earned with the following combinations of personality traits: SJ > ST > IN > IJ > IS, suggesting that the MBTI might be used as a predictive instrument for student achievement. Schurr and Ruble (8) found that IN students were the best prepared for college and ES types were the least prepared. The ability to predict student performance in academic subjects would be of immense value to both students and teachers. Students would be able to better select academic programs to which they are suited. Teachers, with knowledge of student psychological type profiles, would be able to tailor their instruction to student learning preferences.

Tharp’s findings (9) are based on his acceptance of the reliability and validity of both the MBTI and achievement tests. Therefore, the objectives of the present study were to determine the reliability and validity of such tests and whether they can be used to appropriately predict student performance in a human anatomy and physiology course.

METHODS

The MBTI (Form G) was administered to 282 nursing students enrolled in Medical Science (MDSC) 200, an introductory first-year course in human anatomy and physiology offered annually by The University of Calgary, Faculty of Medicine to students enrolled in the Faculty of Nursing. The course is divided into two semesters with a total of 150 hours of instruction. For course details, see “Relationship Between Gregorc Learning Styles and Achievement in Anatomy and Physiology” (2), which appears in this issue.

The results from the MBTI and examination performance for each student were analyzed using the Statistical Package for the Social Sciences (SPSS) for Windows Version 6.0. Principal component factor analysis and VARIMAX rotation (7) were used to determine whether a relationship existed between the personality traits and the six examinations. The relationship between psychological type profiles and achievement in MDSC 200 was examined with a one-way analysis of variance (ANOVA).

RESULTS

Table 1 summarizes the results from the factor analysis, which produced four factors. The first factor consisted of achievement scores in six exami-
Results for factor analysis and VARIMAX rotation of student results from the MBTI and six examination scores in MDSC 200

<table>
<thead>
<tr>
<th>Variable</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture exam</td>
<td>1</td>
<td>0.861</td>
<td>-0.014</td>
<td>0.047</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0.904</td>
<td>-0.020</td>
<td>0.052</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0.860</td>
<td>0.019</td>
<td>0.090</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>0.899</td>
<td>-0.033</td>
<td>0.074</td>
</tr>
<tr>
<td>Lab exam</td>
<td>1</td>
<td>0.852</td>
<td>0.071</td>
<td>0.038</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0.773</td>
<td>0.086</td>
<td>-0.004</td>
</tr>
<tr>
<td>Personality traits</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extrovert</td>
<td>-0.097</td>
<td>-0.128</td>
<td>-0.972</td>
<td>-0.031</td>
</tr>
<tr>
<td>Introvert</td>
<td>0.091</td>
<td>0.123</td>
<td>0.973</td>
<td>0.016</td>
</tr>
<tr>
<td>Sensing</td>
<td>-0.044</td>
<td>0.858</td>
<td>0.140</td>
<td>0.010</td>
</tr>
<tr>
<td>Intuition</td>
<td>0.025</td>
<td>-0.857</td>
<td>-0.104</td>
<td>-0.046</td>
</tr>
<tr>
<td>Thinking</td>
<td>0.037</td>
<td>0.132</td>
<td>0.061</td>
<td>0.953</td>
</tr>
<tr>
<td>Feeling</td>
<td>-0.049</td>
<td>-0.109</td>
<td>0.018</td>
<td>-0.944</td>
</tr>
<tr>
<td>Judging</td>
<td>0.081</td>
<td>0.865</td>
<td>0.025</td>
<td>0.180</td>
</tr>
<tr>
<td>Perceiving</td>
<td>-0.073</td>
<td>-0.872</td>
<td>-0.030</td>
<td>-0.146</td>
</tr>
</tbody>
</table>

Variables in parentheses are considered as one variable.

Table 3 indicates that the F value, from the one-way ANOVA model, was significant (P = 0.05) for psychological type profiles compared with final course scores. Multiple-range tests using a Student-Newman-Keuls test (7) with a significance level of 0.05 shows that it is possible to differentiate between psychological type profiles. An expression of these differences in psychological type profiles from 16 to 8. The psychological type profiles that were used in this study are listed in Table 2. Table 2 also provides the mean value of achievement on the MDSC 200 examinations for each psychological type profile.

Two hundred and forty-one students were classified into the eight psychological type profiles. Some of the original 259 students that were examined in the present study fell outside these psychological type profiles because they had no trait preference on one or more of the three bipolar scales and the psychological types that these students represented were of insufficient frequency (n < 5) to be included in the analysis.

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MBTI, Myers-Briggs Type Indicator; MDSC, Medical Science.

Myers and McCaulley (6) combined personality traits, measured in four bipolar scales with the MBTI, into sixteen different psychological type profiles. However, factor analysis reveals that only three such scales exist. Therefore one of the bipolar scales in the MBTI collapsed, which resulted in a reduction in psychological type profiles from 16 to 8. The psychological type profiles that were used in this study are listed in Table 2. Table 2 also provides the mean value of achievement on the MDSC 200 examinations for each psychological type profile.
would be

\[ \text{IT(NP)} > \text{IT(SJ)} \text{ IF(SJ)} \text{ ET(NP)} \]

\[ \cdot \text{EF(SJ)} \text{ EF(NP)} \text{ ET(SJ)} \text{ IF(NP)} \]

However, the above differences in mean achievement scores were due to only nine students in the IT(NP) group. Given the small number in this group, such differences were deemed to be educationally insignificant.

Chronbach's \( \alpha \) coefficients (7) for the six examinations were found to be high (range 0.79–0.89). This finding, and the high examination factor loading in Table 1, demonstrated that these examinations had excellent internal consistency (i.e., reliability).

**DISCUSSION**

The results from the factor analysis indicated that no relationship existed between examination scores in MDSC 200 and any of the eight personality traits measured by the MBTI. However, this analysis also provided an unexpected result in that one of the bipolar scales (J vs. P) collapsed into another bipolar scale (S vs. N). Myers and McCaulley (6) use four bipolar scales that they claim are independent of each other, but factor analysis demonstrates that there are only three bipolar scales, which are made up by E vs. I, T vs. F, and a combination of S/J vs. N/P. This observation validates Jung's original work (3) on psychological types and is in variance with the current application of the MBTI instrument. In the creation of the MBTI, the J vs. P bipolar scale was added. The present study shows that the addition by Myers and McCaulley (6) of a fourth bipolar scale to describe psychological type profiles is invalid.

The ANOVA results suggest that the psychological type profile having the highest achievement in MDSC 200 was IT(NP) and the lowest achievement was by the type IF(NP). It appears that students who possess personality traits I and T will tend to achieve higher examination scores. However, given that the statistical differences were due only to the IT(NP) psychological type profile, and because of the small number of subjects in this group, no educationally meaningful differences could be attached to this observation. This finding is in contrast to Tharp's (9) conclusion that combinations of personality traits were related to achievement. Tharp's statistical analyses are prone to erroneous interpretation because of the series of 15 t-tests performed on the same sample of students. His statistical analyses are prone to a type I error (i.e., identifying more mean differences than those that likely exist in reality). In addition, to fully comprehend his results it would be necessary to define the reliability estimates of his examination scores. By way of contrast, the present study demonstrates the high reliability and validity of examination scores that do not meaningfully relate to the MBTI psychological type profiles.

The present findings contradict previous research that suggests individual bipolar scales are related to academic achievement. In conclusion, the major finding of this study was that the MBTI consists of only three bipolar scales that measure personality traits, instead of four. The three bipolar scales consisted of E vs. I, T vs. F, and a combination of S/J vs. N/P. In addition, this study clearly showed that prediction of overall achievement in a human anatomy and physiology class is not possible by use of psychological type profiles. Future studies might examine the interrelationship between psychological type profiles of both students and instructors to determine whether student achievement can be enhanced.

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**References**


