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ASSIGNING COLLABORATIVE LEARNING PAIRS BASED ON PERSONALITY TESTING

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ABSTRACT

This study, conducted at Buford Middle School, examined the effects of using personality tests to create student learning pairs. Four seventh grade classes were examined. The content, instruction, and instructor were the same for all classes. Three of four classes had students grouped in learning pairs based on the results of personality tests. The control group consisted of students grouped randomly into learning pairs. A teacher developed exam similar to the Georgia Criterion Referenced Competency Test (CRCT) for Life Science was used as the pretest and the CRCT was used as the posttest. No significant differences were found; however, specific student populations did exhibit gains in their posttest scores.

Keywords: personality tests, learning pairs, learning preferences, group learning

INTRODUCTION

Students with dissimilar personalities deal with group learning in different ways. Thus, personality-type theory is crucial in understanding members' strengths and weaknesses and the ways these factors influence group formation and development. In spite of this, research evaluating selection and placement strategies to enhance process and performance in learning groups is scarce, especially for variables such as personality (1).

The Myers-Briggs Type Indicator® developed by Katharine Briggs and Isabel Briggs Myers in 1942 is a psychometric instrument (1) that extracts information related to specific personality type differences. It also provides specific information on how to relate to people who are different (2). This instrument measures four different dichotomous dimensions of human

preferences, Extroversion-Introversion (EI); Sensing-Intuition (SN); Thinking-Feeling (TF); and Judging-Perceiving (JP), through a forced-choice, self-evaluating questionnaire that can be completed in 15-20 minutes (1,3). The combinations of scores on the four dimensions produce 16 different possible personality types (3).

The first dimension, Extroversion-Introversion (EI) indicates whether a person prefers or gets energy from social or solitary settings. Extroverts (E) receive their energy from interacting with other people and things, while introverts (I) are renewed through their thoughts and ideas (1,3).

The second dimension, Sensing-Intuition (SN) focuses on a person's preference for how information is perceived. Sensing (S) individuals prefer immediate realities or factual details of a situation. Intuitive (N) individuals, on the other hand, seek the overall picture of an experience as it relates to future possibilities and meanings (1,2).

The third dimension, Thinking-Feeling (TF) reflects a person's preferred function by which decisions are made. Individuals with a thinking (T) preference use logic and objectivity to make rational judgments, while feeling (F) individuals employ personal and social values when making decisions (1,2).

The final dimension, Judging-Perceiving (JP) indicates the type of lifestyle a person adopts or prefers for relationships with the outside world. Judgers (J) prefer planning and decisiveness and carefully regulate and control their lives. Perceivers (P) live spontaneously and are open to new ideas (1,2).

In a study by Blaylock (4), project groups with complementary preferences in Thinking-Feeling (TF) and Sensing-Intuition (SN) outperformed groups in which all group members had the same preferences. Likewise, in a case evaluation of two software development teams by Bradley and Hebert (5), analyses revealed the team with a greater balance of extroverts and introverts, sensing types and intuitive types, and thinking and feeling types performed at a higher level than the less balanced team. Conversely, a large percent of judging types on the more successful team ensured the project was completed in a timely manner (5).

Extroverts (E) help open up lines of communication between group members, while introverts (I) provide internal reflection of group discussions. Sensing (S) types bring up pertinent facts and "what is," while intuitive (N) types bring up new possibilities and provide ideas of "what might be." Thinking (T) types present a logical analysis of the decision-making situation, while feelers (F) offer insights into how feelings of other group members and customers might affect the situation. Judgers (J) help keep the team on schedule, while perceivers (P) help the team consider other alternatives in the decision-making process (5, p. 343).

Muchinsky and Monanhan (6) suggest job performance is improved when group members possess characteristics similar to other individuals in the group. However, research by Varvel et al, (3) did not find any particular combination of personality-type preferences to have a direct effect on group

achievement. Although, group members did improve their communication skills, trust, and interdependence by knowing and understanding group members' psychological type (3).

In 1991, Dr. Geil Browning and Dr. Wendell Williams developed a different brain-based approach to personality profiling called Emergenetics®. It is built on a theory of behavior and learning developed by researcher David Lykken known as emergenesis. This theory suggests humans are wired or genetically programmed (nature) to think and process information in certain preferred patterns. Then as people interact and socialize with other people and their surroundings (nurture), their genetic preferences are tempered into productive behaviors (7).

Emergenetics® extends emergenesis because it is thought that the combination of experiences and genetics intertwine to form recognizable patterns of personality traits that can be used to improve communication and productivity. These patterns are identified through the Emergenetics® Profile (age 19 and older) or the Student/Teacher Emergenetics Profile (STEPTM) (age 9-18). These profiles are self-descriptive, Likert scale, questionnaires, which measure a person's unique preferences on seven basic sets of attributes including four distinct Thinking Attributes and three Behavioral Attributes (7).

The four Thinking Attributes measured by the Emergenetics® Profile are Analytical, Structural, Social, and Conceptual. Analytical thinking combines logical thought with a preference for abstract ideas. People who have a strong preference for Analytical thinking often choose to work alone and may be perceived as unemotional or uncaring. With Structural thinking, sequential thought is merged with a prevailing preference for practical application. People who are highly Structural thinkers are frequently hands-on learners who like to follow procedures, which can cause them to appear unimaginative (7).

Social thinking unites intuitive thought with a devotion to people. People who have a strong preference for Social thinking are often sensitive and appreciate the opinion of others. Social thinkers may be perceived as too emotional; however, not all are animated and extroverted. Conceptual thinkers also prefer intuitive thought, but they combine it with a preference for abstract ideas. Conceptual thinkers are commonly theoretical and creative while searching for new ways to solve old problems. This sometimes causes them to be perceived as bizarre, but they would declare they are merely unconventional. People of any thinking style can be creative, not just Conceptual thinkers (7).

MATERIALS AND METHODS

Participants

The participants in the study were seventh grade students from Buford Middle School. Student ability levels varied from students with gifts and talents to students with special needs. The racial distribution of students consisted of African-American (13%), Asian (2%), Hispanic (20%), and Caucasian (65%).

Sixty five percent of the students were male, 14% qualified as economically disadvantaged, 14% received special educational services in one or more academic area, and 24% had a documented history of behavioral issues that impacted the classroom environment.

All students participated in a standard middle school schedule of classes including period rotations and connection or exploratory courses daily. Although the sample used for this study was the experimental and was not random, the test and control groups were representative of the school's general population of seventh grade students in terms of race, gender, and varying intelligence levels including students with gifts and talents, as well as, students with special needs. Ideally, students would have been heterogeneously grouped, but two of the four science classrooms tested were homogenous gifted classes.

The experiment population consisted of students in four science classes used who were assigned by the school administration to a single teacher. All four classes received the same life science content. The first class was delivered with an additional teacher assisting with instructional strategies for students with special learning needs. This class consisted of 9 students requiring special educational accommodations and modifications in content delivery. The remaining 12 students were average learners. The second and third classes received gifted instruction in which the content was delivered in greater detail and assessments were more product based. These students covered the same material as the other classes, but with greater depth. The fourth class consisted of a heterogeneous mixture of students of varying learning levels: high achievement levels, low socioeconomic status (Title 1), English language learners (ELL), other health impaired, and average learning abilities.

The control group consisted of students within any of the four science classes who were unable to participate in the personality pairing process due to behavior contracts or special education requirements (personality conflicts: ex. introverts cannot be paired with extroverts, etc.), as well as, a stratified selection of students chosen randomly by pulling names from a box at the beginning of the year. In terms of intelligence, the control group consisted of students with gifts and talents, students learning English, and students receiving special services. On the other hand, the experimental group consisted of a variety of students including those with gifts and talents, students with special needs, those who were economically disadvantaged, and six of the seven ELL students. The test group consisted of 62 students while the control group had 27 students.

Methods

In order to determine how to pair students for group learning, all participants completed a number of personality quizzes from Didato's text: *The Big Book of Personality Tests* (2003). This text was written by Dr. Salvatore V. Didato, a clinical psychologist from Ossining, New York and each quiz is designed to gain insight into different aspects of personality. The text did not

indicate the reliability or validity of the quizzes. This text was used because it is easily scored and available to any educator without the need for licensure in psychology or a related field. Furthermore, the language used in the given assessments is age-appropriate for middle school students and written in a style that encourages students to participate honestly, *i.e.* like a teen magazine quiz. This text offers a variety of personality assessments such as self-awareness, success aptitudes, action forethought, emotional wellness, and healthy social interaction. All of which were used in this study. The quizzes used from *The Big Book of Personalities* (2003) in this study included: *Are You a People Person or a Wallflower?* testing introversion versus extroversion, *Do You Fight or Flee: How Confrontational Are You?*, *Do You Express Anger Constructively?*, *How Time-Conscious Are You?*, *Do You Cause a Spark or Leave No Mark?* testing the dynamics of the personality, *Are You Socially Anxious or Socially Secure?*, *Can You Read Body Language?* testing communication empathy, *How Empathetic Are You?*, *Do You Listen or Leave Them Hanging?* testing listening skills, *How Thoughtful Are You?* another empathy test, *Are You a "Take Charge" Type?* and *How Ambitious Are You?* testing motivation, *What's Your Work Style?*, *Does Crisis Paralyze or Propel You?* testing abilities under stress, *Are You Too Rigid?* testing thought flexibility, *How High is Your Power Motive?* testing one's need to be in control, *How People-Sensitive Are You?*, *What's Your Leadership IQ?*, *Do You Quit or Keep Chugging: How Persevering Are You?*, *Are You Too Pushy?*, *Are You an Undiscovered Creative Genius?*, *How Curious Are You?*, *How Far Does Your Imagination Stretch?*, *Are You a Creative Problem Solver?*, *How High is Your Self Esteem?*, *Do You See Clouds or a Silver Lining?*, *How Self-Conscious Are You?*, *Do You Sing Before Breakfast: How Happy Are You?*, testing overall positivity.

In addition, all students completed a 60-question multiple-choice teacher-developed pretest based on previous CRCT life science test items made available to the public on the Internet. The CRCT for Life Science was used as the posttest which is only administered at the end of the school year.

Using the data from the personality tests, cooperative learning pairs for the test classes were created. The groups consisted of heterogeneous or homogenous personality pairs depending on the given assignment or task. This method was used in the experimental group. The control group was paired randomly by drawing student names from the list of pre-chosen control participants.

In learning environments where students worked together to discuss identical tasks, students were paired based on similar personalities. In other learning environments, students were paired for daily work with a partner of contrasting personality providing a learning situation of balance: a workaholic with a non-workaholic, a highly social or popular student with a wallflower. In addition, students were given an alternate learning resource: a student with a matching personality. This resource was available should the contrasting personality of the assigned partner create a temporary barrier to the pair's

progress. However, students were allowed limited access to this resource in the classroom (by permission with evidence of necessity), though they were encouraged to contact the resource as needed after school.

The cooperative learning assignments ranged from daily reviews to major cumulative projects that required higher order thinking. All students were required to work with their assigned partner for a period of two weeks. After two weeks, the students were paired again with similar or differing personalities according to the task at hand. As the school year progressed, students were encouraged to rely more on their partner's knowledge and resourcefulness as the teacher often redirected questions back to the student groups to facilitate further investigation.

By grouping students with compatible personalities, it is thought that students will benefit from positive interactions and significantly reduce student distraction or apprehension. Moreover, pairing heterogeneous personalities may provide an alternative reasoning component to the collaborative unit and thus, a deeper understanding of the topic. When paired with a peer of a different personality, students may be more apt to defend their opposing opinions and be motivated to research their views more vigorously and competitively. Therefore, teachers can create effective learning environments for students to either work collaboratively [matched for cooperative team-building assignments] or competitively [matched for more motivating and higher order thinking assignments].

To limit variances to student learning throughout the year, students in both the control and testing group, regardless of ability level, were presented with the same content standards at the same pace. While students with gifts and talents often investigated the content at deeper levels of understanding, all students performed the same tasks, studied the same materials, and completed identical pre and posttests. No subgroup received specialized content or extended time for learning the set of standards in life science.

DATA ANALYSIS

The pretest results showed that the test and control groups were not equivalent in prior knowledge base according to their pretest score means. However, the final comparison between groups was based on score gains or losses and not final scores.

In order to compare improvement measures among students, the pretest scores had to be scaled similarly to the scaled scores of the CRCT. After examining the scoring method of the CRCT from previous testing years and interviewing testing specialists, it was discovered that the scale score system of 650 to 950 is constructed independently for each content area and grade level every year (8).

Each year, particularly the inaugural year of a content assessment, the average score of 800 is dependant on the performance of all participants. While the CRCT is not a norm-referenced test, the inaugural year of any content area is in fact norm-referenced, i.e. based on student performance

that year. In years to follow, student scores are scaled in reference to the first year's scores. Therefore, student scores on the CRCT for any year depend on the performance of other Georgia students who took the same exam in that content section's inaugural year. This is due to the fact that a norm is calculated and student scores are scaled as a result of student performance in the first year the content is assessed (8).

Consider the student who answered 50 of 72 items correctly in the first year of testing. When compared to the other students completing the same assessment that year, this student performed better than 58% of his or her peers. Using the CRCT bell curve, this student's posted scaled score for that content section would be 831 (See Appendix A). Furthermore, for each year following, a raw score of 50 correct questions will always yield a reported score of 831 even if his or her score is better than 75% of the current testing population. In short, the score is not a simple calculation with a base of 650 and a percentage correct applied to the remaining 300 points leading to 950 (8). (See Appendix A)

To insure comparable pre and posttest data, the pretest was scaled in accordance with the current norm-based scale of the 2008 CRCT scores for the entire seventh grade class (see Appendix A). Converting the pretest data into CRCT scaled data provided a measure by which each student's improvement could be measured more accurately.

A one-way ANOVA was used to compare mean differences between the pretest and posttest scores of the experimental and control group, as well as, subgroups of the experimental group.

RESULTS

The control group improved, on average, 52 points, or 6.98%, while the test group improved, on average, 75 points, or 7.24% (see Appendix B and C). The results were not significant ($p = 0.17$) for the test and control group nor for the following subgroups: gifted, English Language Learners, and student of average performance. Although, the results were not significant, the test group and the following subgroups of the test group did show gains in their posttest scores: students of average performance showed an 8.44% gain and students learning English as a second language showed an 8.69% gain (see Appendix B and C). Students with gifts and talents exhibited less improvement than any other group including the control group with an improvement of only 6.07% (see Appendix B and C). While the average pretest score was higher than other special populations, their room for improvement into the exceeding range was comparable to the possible improvement index of the average and lower populations.

DISCUSSION

The experimental group and the following subgroups of the experimental group: students of average performance and students learning English as a second language showed a gain in posttest scores compared to the control

group. These results are in line with the study by Muchinsky and Monanhan (6) that suggested that job performance is improved when group members possess characteristics similar to other individuals in the group.

The subgroup of the experimental group: students with gifts and talents exhibited less improvement than any other group including the control group, which is consistent with a research by Varvel et al, (3) that did not find any particular combination of personality-type preferences to have a direct effect on group achievement. A possible reason for this resistance may be that this gifted population had a higher incidence of assertive personalities and notable lower levels of empathy, as a whole.

Given the assertiveness of one's views coupled with a lack of regard for other's insight, this collaborative pair would likely perform more combatively rather than cohesively. Given the competitive nature of high achieving students, a partnership to complete a task may require greater trust than an average collaborative pair. In contrast, students with less confidence in their academic abilities would be more likely to respect and earnestly appreciate a partner's assistance.

Because the results of this study are not significant, it cannot be concluded that the formation of student learning groups based on personality types will result in increased student achievement. However, since there were gains in certain groups of students, there is potential for personality grouping to show significant results with further research.

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APPENDIX A
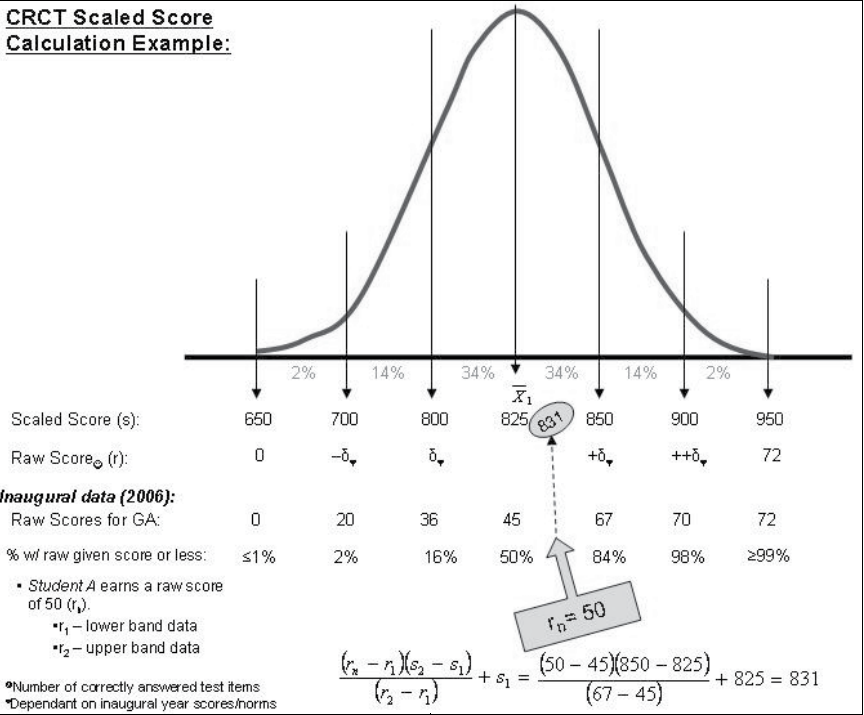
Formula for scaling Pretest Scores:

Raw Score Conversion (Pre → Posttest): $\quad r_p = \dfrac{72\,p}{60}$

Pretest Scaled Score for Best Comparison: $\quad \dfrac{(r_p - r_1)(s_2 - s_1)}{(r_2 - r_1)} + s_1 = S_{Pr}$

Where: S_{Pr} = Pretest scaled scores (Using scaled scores from 2006 Inaugural

7th Grade Science CRCT content assessment)

p = Pretest number of items correct

60 = Total number of Pretest items

72 = Total number of CRCT test items

r_p = converted pretest raw score

APPENDIX B

Sub Group	Sample Size	Mean Improvement	Mean Percent Improvement
Control Group	27	52	6.98%
Experimental Group	62	75	7.24%
Students w/ Gifts and Talents	35	48	6.07%
Students Learning English	14	62	8.69%
Students of Average Performance	31	63	8.44%

APPENDIX C