



Research Article

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Investigating the relationship between learning styles with brain quadrants dominance and personality traits of male and female students

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ABSTRACT

The present study aims to investigate the relationship between learning styles with brain quadrants dominance and personality types of students. This research was designed and conducted using a descriptive-correlational method. The research statistical population comprised all middle school students in Mashhad who were studying in the academic year 2014-15. The sample included 380 middle school students in Mashhad. Herrmann Brain Dominance Instrument (HBDI), Kolb Learning Style Inventory (LSI) and NEO Personality Inventory (NEO PI) were completed by the sample members. The research results demonstrated that there is a significant relationship between learning styles and brain quadrants dominance of students so that divergent and absorbent learning styles have a direct relationship with C and D brain quadrants dominance and convergent and accommodative learning styles are directly related to A and B brain quadrants dominance. Further, divergent, absorbent and accommodative learning styles are good predictors of the personality types of extraversion, openness to experience and agreeableness. The results of the present research are consistent with the findings of other studies and indicate the effects of learning styles on multiple capabilities, characteristics, and personality and cognitive-behavioral tendencies in students. Considering the importance of students' academic achievement and also the effects of learning styles on their cognitive performance at cerebral, behavioral and personality levels, it is necessary to consider more education for teachers and trainers regarding the proper learning styles of each student.

Keywords: *Learning styles, brain quadrants dominance, personality types.*

INTRODUCTION

Students' learning and related factors have long been of great importance for teachers, students, parents, theorists, and educational researchers and in recent decades have attracted the attention of researchers in the field of education due to their importance in the evaluation of educational systems. Students' learning quality determines their academic achievement. Accordingly, today learning quality and consequently academic achievement of students are considered among the most important assessment criteria of teachers' performance. Thus, researchers try to identify the factors affecting students' learning styles through different methods (Moqaddasi et al., 2010). Learning styles theories are extensive. When teachers obtain information about students' learning styles, they design more effective educational activities. This improves the students' learning and helps them solve the problems they face and causes

them to learn the most useful educational style. Kolb (1984) presented a model of learning styles which is known as experiential learning cycle. In Kolb's view, learning is a process that is composed of four steps: 1) concrete experience, 2) reflective observation, 3) abstract conceptualization, and 4) active experimentation (Eskandari & Salehi, 2009). With the combination of four stages relating to the learning cycle, four learning styles are created, each of which is placed on a quarter of coordinates square (Rezaei et al., 2008). One of the issues related to students' learning styles is how different brain parts function. Indeed, Herrmann four brain quadrants theory helps to improve the effectiveness of learning through determining the preferred intellectual style and manner of brain quadrants dominance in students. Herrmann (2000) mentioned that the preferred learning model and brain quadrants dominance should match the learning style. Inappropriate educational models and learning styles cause the learner to feel tired. In the educational models that do not match their learning styles, students cannot act properly. Farhoush and Ahmadi (2012) in a study examined the relationship between thinking styles and learning strategies with achievement motivation. The results suggested that thinking styles and learning strategies have a significant positive relationship with achievement motivation. Perhaps the most fundamental issue of psychological science is personality since it is the main focus of discussion in the areas such as learning, motivation, perception, thinking, emotions and feelings, intelligence and the like (Shamlou, 2005; cited in FadaeiDolat et al., 2011). In this study, by personality traits, it is meant NEO Personality Factors Model in which McCrae and Costa provided five major personality traits. These traits include neuroticism, extraversion, openness to experience, conscientiousness and agreeableness. Given the effects of students' learning quality on different aspects of their personality and educational and professional life, identifying the factors influencing this phenomenon is of crucial importance. Hence, we decided in this study to investigate the relationship between learning styles with brain quadrants dominance and personality types of male and female middle school students.

Materials and Methods

The present research is a descriptive-correlational study in which the relationship between learning styles with brain quadrants dominance and personality traits of male and female students has been examined.

Statistical population, sample and sampling method

The research statistical population consisted of all middle school students in Mashhad studying in the academic year 2014-15. The research statistical sample included 380 male and female middle school students in District 6 of Mashhad in the academic year 2014-15, who were selected through multistage random cluster sampling. The sample size was determined based on Morgan table.

Research tool

Herrmann Brain Dominance Instrument (HBDI): It is a pencil-paper questionnaire which was developed by Herrmann and is used by researchers to determine right/ left brain hemisphere dominance and examine whether or not an individual shows a whole-brain thinking style. HBDI comprises 60 questions with 4 subscales which measures the rate of brain dominance in students in four thinking styles of A brain quadrant, B brain quadrant, C brain quadrant and D brain quadrant and at three levels of dominance, available thinking and avoidant thinking (Herrmann, 2010).

Kolb Learning Style Inventory (LSI): This questionnaire was developed by Kolb in 1985. In recent years, this questionnaire has been repeatedly applied in learning and educational psychology studies particularly for identifying learning styles. It evaluates the learning styles of individuals in two dimensions of concrete experience / abstract conceptualization and reflective observation / active experimentation (Kolb, 1985; cited in Seif, 2006).

NEO Personality Inventory – Short Form (NEO PI): NEO questionnaire has been prepared by McCrae and Costa in 1985. NEO is a 60-item questionnaire and is used to assess five personality factors (extraversion, neuroticism, agreeableness, openness to experience and conscientiousness) (Garousi, 2001; cited in Hoseini-nasab & Mohammadi, 2009).

Data analysis method

In this study, descriptive analysis of data was used to describe the collected data with the help of SPSS statistical software. Since variables of the present research are quantitative, the correlation coefficient calculated for them was Pearson's correlation coefficient.

Results and Discussion

Inferential findings

Table 3: Results of Pearson's correlation coefficient between learning styles and brain quadrants dominance

Variable	A quadrant dominance	B quadrant dominance	C quadrant dominance	D quadrant dominance
Divergent learning style	R= -0.157	R= -0.40	R= 0.125	R= 0.189
	P= 0.002	P= 0.422	P= 0.015	P= 0.000
	N= 380	N= 380	N= 380	N= 380
Convergent learning style	R= 0.157	R= 0.40	R= -0.125	R= -0.189
	P= 0.002	P= 0.022	P= 0.015	P= 0.000
	N= 380	N= 380	N= 380	N= 380
Absorbent learning style	R= -0.129	R= 0.110	R= 0.260	R= 0.133
	P= 0.012	P= 0.032	P= 0.000	P= 0.009
	N= 380	N= 380	N= 380	N= 380
Accommodative learning style	R= 0.129	R= 0.110	R= 0.260	R= -0.133
	P= 0.012	P= 0.032	P= 0.000	P= 0.009
	N= 380	N= 380	N= 380	N= 380

Table 4: Results of Pearson correlation analysis between learning styles and personality types

Variable	Neuroticism	Extraversion	Openness to experience	Agreeableness	Conscientiousness
Divergent learning style	R= 0.142	R= 0.30	R= 0.123	R= 0.199	R= 0.115
	P= 0.089	P= 0.003	P= 0.013	P= 0.000	P= 0.061
	N= 380	N= 380	N= 380	N= 380	N= 380
Convergent learning style	R= 0.171	R= 0.133	R= -0.135	R= 0.141	R= 0.203
	P= 0.122	P= 0.412	P= 0.115	P= 0.120	P= 0.111
	N= 380	N= 380	N= 380	N= 380	N= 380
Absorbent learning style	R= 0.136	R= 0.129	R= 0.321	R= 0.200	R= 0.205
	P= 0.158	P= 0.020	P= 0.031	P= 0.113	P= 0.185
	N= 380	N= 380	N= 380	N= 380	N= 380
Accommodative learning style	R= 0.147	R= 0.168	R= 0.138	R= 0.098	R= 0.166
	P= 0.098	P= 0.001	P= 0.078	P= 0.052	P= 0.099
	N= 380	N= 380	N= 380	N= 380	N= 380

According to the findings achieved, there is a significant inverse relationship between the divergent learning style and A quadrant dominance and also a significant direct relationship between the divergent learning style with C and D quadrants dominance. But no significant relationship exists between the divergent learning style and B quadrant dominance. Additionally, there is a significant direct relationship between the convergent learning style with A and B quadrants dominance and also a significant inverse relationship between the convergent learning style with C and D quadrants dominance. Also, there is a significant inverse relationship between the absorbent learning style and A quadrant dominance and also a significant direct relationship between the absorbent learning style with B, C and D quadrants dominance. And finally, there is a significant direct relationship between the accommodative learning style with A and B quadrants dominance and also a significant inverse relationship between the accommodative learning style with C and D quadrants dominance. Besides, a significant direct relationship was observed between the divergent learning style and personality types of extraversion, openness to experience and agreeableness. There is a significant direct relationship between the absorbent learning style and personality types of extraversion and

openness to experience. And finally, a significant direct relationship exists between the accommodative learning style and personality type of extraversion.

Conclusion

Results of testing the hypotheses revealed that each of the learning styles prepares the ground to find readiness for the dominance of a certain type of brain quadrant. Divergent and absorbent learning styles increase the likelihood of C and D brain quadrants dominance and convergent and accommodative learning styles provide the ground for the incidence of A and B brain quadrants dominance. Moreover, divergent, absorbent and accommodative learning styles are good predictors of the personality types of extraversion, openness to experience and agreeableness. The results of the present study which are consistent with the findings of other studies indicate the impacts of learning styles on multiple capabilities, characteristics and personality and cognitive-behavioral tendencies in students.

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