



Contents lists available at ScienceDirect

Personality and Individual Differences

journal homepage: www.elsevier.com/locate/paid

The Big Five personality traits, learning styles, and academic achievement

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ARTICLE INFO

Article history:

Received 15 January 2011

Received in revised form 14 April 2011

Accepted 27 April 2011

Available online 2 June 2011

Keywords:

Learning styles

Big Five

Academic achievement

Synthesis-analysis

Conscientiousness

Reflective

Openness

Elaborative processing

ABSTRACT

Personality and learning styles are both likely to play significant roles in influencing academic achievement. College students (308 undergraduates) completed the Five Factor Inventory and the Inventory of Learning Processes and reported their grade point average. Two of the Big Five traits, conscientiousness and agreeableness, were positively related with all four learning styles (synthesis analysis, methodical study, fact retention, and elaborative processing), whereas neuroticism was negatively related with all four learning styles. In addition, extraversion and openness were positively related with elaborative processing. The Big Five together explained 14% of the variance in grade point average (GPA), and learning styles explained an additional 3%, suggesting that both personality traits and learning styles contribute to academic performance. Further, the relationship between openness and GPA was mediated by reflective learning styles (synthesis-analysis and elaborative processing). These latter results suggest that being intellectually curious fully enhances academic performance when students combine this scholarly interest with thoughtful information processing. Implications of these results are discussed in the context of teaching techniques and curriculum design.

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1. Introduction

The quality of students' thoughts is critical to learning and could potentially determine their academic achievement. College students differ in how they process, encode, recall, organize, and apply the information they learn; some are thoughtful learners and others process information more superficially. Are these individual differences in preferred learning strategies and depth of information processing related to personality? Do learning strategies mediate the link between personality traits and academic achievement? We attempted to answer these questions by investigating the relationships between personality traits, learning styles, and academic achievement among college students.

2. Relevant prior research

2.1. Big Five

The Big Five framework of personality traits (Costa & McCrae, 1992) has emerged as a robust and parsimonious model for understanding the relationship between personality and various academic behaviors (Poropat, 2009). Conscientiousness is exemplified by being disciplined, organized, and achievement-oriented.

Neuroticism refers to degree of emotional stability, impulse control, and anxiety. Extraversion is displayed through a higher degree of sociability, assertiveness, and talkativeness. Openness is reflected in a strong intellectual curiosity and a preference for novelty and variety. Finally, agreeableness refers to being helpful, cooperative, and sympathetic towards others. There is some evidence that personality and motivation are intricately tied with individual differences in learning styles, and it is recommended that educators go beyond the current emphasis on cognition and include these variables in understanding academic behavior (Miller, 1991).

2.2. Learning styles

In addition to personality, learning styles are an individual difference factor that represents enduring and stable approaches to processing information (Snyder, 2000). Although there are several conceptual models of learning styles, we adopted Schmeck, Ribich, and Ramanaiah's (1977) model because it identifies learning strategies that are likely to enhance learning and academic achievement from the framework of effective information processing. This model adopts the view that memory is a by-product of careful thinking and depth of processing (Craik & Lockhart, 1972). In addition, rather than attempting to classify learners into mutually exclusive categories, this framework suggests that students tend to adopt either agentic/shallow processing (with the performance goal of doing well on a test) or reflective/deep processing (with the mastery goal of deep understanding and long-term retention). What

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students remember is a function of how they process information from lectures, readings, or discussions. Thus, students who are encouraged to think more deeply about the information are likely to encode information more thoroughly and remember it longer. Depth of processing also has clear implications for personality, and especially openness, making it a promising candidate for mediating relationships in the current research.

Of the four learning styles, synthesis-analysis refers to processing information, forming categories, and organizing them into hierarchies. Elaborative processing refers to connecting and applying new ideas to existing knowledge and to the learner's personal experiences. Methodical study consists of what is traditionally emphasized in most academic environments, such as being careful and methodical while completing all assignments on time. Fact retention involves processing information so that the main ideas are memorized with the goal of doing well on tests rather than understanding the meaning of what is being learned.

Prior research suggests that individuals differ in their intellectual styles and preferences for how they gain knowledge (Sternberg & Zhang, 2001; Zhang, 2003). For example, students tend to utilize more complex strategies invoking deep processing as they progress from the freshman to the senior level (Bartling, 1988; Jakoubek & Swenson, 1993).

2.3. Learning styles and personality

Evidence also suggests complex links between learning styles and personality traits. For instance, relative to shallow processors, deep processors are more likely to use appropriate study methods, draw conclusions effectively, and have a stronger internal locus of control (Gadzella, Ginther, Masten, & Guthrie, 1997). Deep processors are also more likely to be conscientiousness, intellectually curious, extraverted (Furnham, 1992; Zhang, 2003), and emotionally stable (Geisler-Brenstein, Schmeck, & Hetherington, 1996). Finally, students who prefer a structured learning environment and intuitive processing are prone to anxiety and worry (Zhang, 2003), whereas those preferring an activist and pragmatist style are more extraverted (Furnham, 1992). Thus, learning styles and personality traits appear to be intricately connected, although how they jointly influence academic achievement is unclear.

2.4. Personality and academic achievement

Personality traits also influence academic achievement. For instance, conscientiousness has consistently emerged as a stable predictor of exam performance (Chamorro-Premuzic & Furnham, 2003) and GPA (Conard, 2006). Combinations of Big Five traits have also been found to predict various educational outcomes. Namely, conscientiousness and openness predict course performance (Paunonen & Ashton, 2001), and agreeableness, conscientiousness, and openness predict overall academic performance (Farsides & Woodfield, 2003; Poropat, 2009). Extraversion, openness, and conscientiousness have also been found to predict GPA, especially when students apply previously accumulated knowledge to real life settings (Lievens, Ones, & Dilchert, 2009). In contrast, neuroticism or emotional instability is negatively associated with academic achievement (Chamorro-Premuzic & Furnham, 2003). In addition to the Big Five, other traits such as grit or perseverance (Duckworth, Peterson, Matthews, & Kelly, 2007) are also predictive of academic performance. Although these findings confirm the general significance of personality traits, there remains a need to examine other individual level factors such as students' learning styles.

2.5. Learning styles and academic achievement

Students differ in their preferred styles of thinking, processing information, and acquiring knowledge (Schmeck, 1999; Zhang, 2003). Some favor agentic styles, such as methodical study and fact retention, that are most suitable for obtaining higher grades, whereas others employ reflective styles, such as synthesis-analysis and elaborative processing, that are conducive to greater understanding and knowledge (Schmeck et al., 1977). A number of studies suggest that these individual differences in learning styles are predictive of student performance (Lockhart & Schmeck, 1984). Overall, the learning strategies most beneficial to course performance and cumulative GPA include active thinking and organized studying (Entwistle & Waterston, 1988), synthesis-analysis (Miller, Alway, & McKinley, 1987), deeper levels of reflection (Jakoubek & Swenson, 1993), and elaborative processing (Hall, Hladkyj, Perry, & Ruthig, 2004). Deep processors also appear to accrue other benefits, such as a learning goal-orientation that is receptive to feedback (Payne, Youngcourt, & Beaubien, 2007) and unintentional learning through the spontaneous absorption of material (Schmeck, 1999). Thus, prior research shows that students who are more thoughtful and analytical are more likely to perform well academically.

Some have also suggested that matching learning styles to teaching methods increases academic achievement (Sternberg & Zhang, 2001). This notion should be taken with caution, given a comprehensive review and critique by Pashler, McDaniel, Rohrer, and Bjork (2008) showing a lack of empirical support for the validity of tailoring teaching styles to students' learning styles. Recognizing that all humans have the potential to learn and have individual preferences for how they study, Pashler et al. emphasize investigating strategies that enhance learning and recall in general, as opposed to the matching of teaching techniques with specific learning styles. In the current study, we focus on the general value of specific learning styles in enhancing learning and their role in mediating personality-academic relationships rather than on whether matching learning styles and teaching methods enhances academic achievement.

2.6. Personality, learning styles and academic achievement

Despite considerable data supporting the importance of students' personality traits and learning styles, there is little knowledge about the combined effects of these two variables in explaining academic achievement. Some evidence suggests that personality and learning styles together predict performance in medical school (Ferguson, James, & Madeley, 2002). Further, openness has been found to be associated with learning styles that are positively associated with academic success (Farsides & Woodfield, 2003). However, Busato, Prins, Elshout, and Hamaker (2000) report mixed results regarding the association between personality, learning styles, and academic success. Specifically, they found that although conscientiousness and openness were significantly correlated with learning styles and academic success, learning styles were not significantly related to overall academic success. Thus, the paucity of current research as well as the inconsistency in findings calls for a closer examination of how individual differences in personality traits might be related to preferred strategies for learning and how these might influence academic achievement.

2.7. The current study

Prior research has established that both personality traits and learning styles are associated with academic achievement. However, not much is known about the joint influence of personality traits and learning styles on academic achievement. We also do

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