Moderating effect of self-determination in the relationship between Big Five personality and academic performance

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ABSTRACT

Previous studies have shown that both personality and motivation are important factors in student academic performance. This study examined how the interactions between the Big Five personality traits and self-determination motivation orientations affect students' academic performance. The hypotheses were empirically tested using cross-sectional data collected from 249 primary school students in China. The correlation analysis found that self-determined motivation and four of the five personality traits (not emotional instability) were significantly positively related to academic performance in English. The hierarchical regression analysis revealed that, after controlling for gender, openness to new experience and conscientiousness both positively predicted English performance. Significant interaction effects were found between agreeableness and self-determined motivation, and between conscientiousness and self-determined motivation. However, conscientiousness and agreeableness only positively predicted academic performance when the student's self-determined motivation was low.

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1. Introduction

Research on motivation and its relationship to academic performance is as vibrant and influential as ever. As a key determinant of academic performance, academic motivation has consistently been shown to make a positive contribution to academic achievement (Richardson, Abraham, & Bond, 2012). Recently, researchers have focused on the effect of other non-cognitive constructs, such as personality traits, on academic performance (Zuffianò et al., 2013), as previous studies have shown that learners' motivation, skills, and abilities do not fully explain student achievement. This study investigated whether variation in students' personality traits could be used to explain differences in academic achievement and how these personality traits interacted with motivational constructs.

2. Personality and academic performance

Personality is defined as "an individual's characteristics patterns of thought, emotion, and behavior, together with the psychological mechanisms – hidden or not – behind those patterns" (Funder, 1997, p. 2). This definition describes the motivational control that influences a person's behavior (Barrick, Mount, & Li, 2013). For example, Deci and Ryan (1985) posited that students who were intrinsically motivated to learn displayed different personality traits, such as intellectual curiosity

and the tendency for disengagement, than students who were extrinsically motivated to learn. This suggests that personality traits could be a promising predictor of academic outcomes.

The Big Five model broadly classifies human personalities into five major traits: extraversion (sociable, active), openness (imaginative, intellectual), conscientiousness (persistent, dependable), emotional instability (anxious, unconfident), and agreeableness (cooperative, friendly) (Barrick & Mount, 1991). Each of these traits has been examined in terms of its relationship to academic achievement. Recent meta-analyses have found that conscientiousness has the strongest correlation with GPA (Richardson et al., 2012). Students who are conscientious tend to make plans, regulate their behavior in accordance with their plans, and make efforts to implement their plans. As a consequence, they are more likely to perform better at school (Caprara, Vecchione, Alessandri, Gerbino, & Barbaranelli, 2011). In comparison, inconsistent associations were found between openness, agreeableness, emotional instability, and extraversion and academic success.

3. Self-determination and academic performance

The Self-determination Theory (SDT; Ryan & Deci, 2000) distinguishes the different reasons for task engagement. Tasks that are performed for the pleasure inherent in the task are associated with autonomous motivation, whereas tasks that are engaged in for instrumental or external reasons are linked to controlled motivation (DeCharms, 1968). SDT proposes that motivation falls along a continuum of relative autonomy, with external forms of regulation at one end and internal forms of regulation at the other (Ryan & Lynch, 2003).

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There are four types of extrinsic regulation ranging from least to most autonomous: external (i.e., for the reward), introjected (i.e., to avoid guilt), identified (i.e., for the inherent value of the task), and integrated (i.e., the external reasons for performing the task have been internalized). These forms of regulation represent different degrees of internalization (Gagné & Deci, 2005); once the motivation is completely internalized, the individual achieves intrinsic motivation and feels competent and autonomous (Richardson et al., 2012).

It is noteworthy that in SDT, autonomy is not equal to independence or uniqueness which is typically underemphasized in collectivist societies. Instead, it reflects an intrapersonal experience of volition and choice, which has been proved to be beneficial for well-beings across cultural groups (Downie, Koestner, ElGeledi, & Cree, 2004; Vansteenkiste, Zhou, Lens, & Soenens, 2005). Most studies have found that autonomous motivations (e.g., intrinsic, integrated, identified regulation) lead to higher achievement than controlled motivations (e.g., external, introjected) (Sturges, Maurer, Allen, Gatch, & Shankar, 2015). As autonomously motivated individuals are connected to their "core self" and determine their values and behavior according to that self, they have increased self-awareness (Deci & Ryan, 1985) and self-control (Inzlicht & Legault, 2014), which helps learners to monitor their learning and achieve academic success.

4. Self-determination as a moderator

The inconsistent findings regarding the relationships between the Big Five personality traits and academic performance could be due to the presence of confounding variables. Phillips, Abraham, and Bond (2003) argued that motivation affects the personality–academic performance relationship. Autonomous motivation is jointly determined by an individual's personality traits and the environmental context in which he or she is situated (McCrae & Costa, 2008). Some researchers have argued that personality traits might be more useful predictors of human behavior when more autonomy is experienced (e.g., Lee, Ashford, & Bobko, 1990). Indeed, research has shown that motivation moderates the relationship between personality traits and work performance (Barrick, Parks, & Mount, 2005); however, few studies have examined how these two sets of constructs interact to affect student learning. Most relevant to the current study was Di Domenico and Fournier's (2015) observation of the interaction between personality and motivation. Conscientiousness was found to be a stronger predictor of Canadian undergraduates' GPA at lower levels of autonomous motivation, suggesting that an industrious disposition served a compensatory function among students with low autonomy. In the examination of undergraduates' creativity performance, Sung and Choi (2009) observed that extrinsic motivation emerged as a moderator in the agreeableness–creativity relationship as well as openness–creativity relationship. Specifically, agreeableness only showed significant relationship with creative performance when extrinsic motivation was low, whereas openness showed significant relationship with creative when extrinsic motivation was high. Altogether, the above limited evidence suggests a moderating effect of motivation between personality and task performance.

5. Present research

Although recent research has demonstrated the utility of using personality traits to predict academic performance, relatively little is known about the mechanisms through which personality traits affect academic performance. Given the long-standing interest in the role of personality and motivation in academic learning, and the uncertainty about the links between some personality traits and academic achievement, this study assessed the role of cognitive motivational processes in the relationships between personality traits and academic performance in English. The choice of English as the learning outcome measure was based on Ehrman's (2000) concern that motivation, as a highly complex factor in second language learning, needs to be considered in the light of non-affective variables, such as personality type. Also, the nature of language learning is very much concerned with expressing oneself, communicating ideas, and experiencing different cultures, all of which would favor students who are extraverted, agreeable, and open to new experiences. Hence, this study examined whether the interactions between the Big Five personality traits and self-determined motivation affected English performance of primary school children. Specifically, the following hypotheses were developed based on the above discussion.

H1. Agreeableness is a significant positive predictor of academic performance.

H2. Openness is a significant positive predictor of academic performance.

H3. Conscientiousness is a significant positive predictor of academic performance.

H4. Emotional instability is a significant negative predictor of academic performance.

H5. Extraversion is a significant positive predictor of academic performance.

H6. Self-determined motivation will moderate the relationships between the Big Five personality traits and academic performance such that the relationships will be stronger when the degree of self-determined motivation is higher.

6. Method

6.1. Participants and procedure

Two hundred and forty-nine fifth-grade students from two public schools in mainland China participated in this study; 46.0% were males and the mean age was 11.56 years ($SD = 0.59$). The removal of 10 students due to invalid data (duplicate answers to the same survey question) and 33 due to missing data reduced the final sample size to 206. All of the students participated on a voluntary basis, with no compensation. They completed the questionnaires in their regular school classrooms during regular class hours. After the students were briefed on the purpose of the study and their right to withdraw from the study at any time, they completed the survey package under the supervision of the classroom teachers and the research assistant. The questionnaires were translated from English to Chinese by the first author. Bilingual, Chinese–English speakers did the back-translations, during which minor modifications were made to the wording of some items to make it more suitable for Chinese primary school students.

6.2. Measures

Twelve items identifying the reasons children learn English were adapted from Ryan and Connell's (1989) Academic Self-Regulation Questionnaires (SQR-A). This questionnaire was developed for students in late elementary and middle school to measure their regulatory style. There were three items for each regulatory style: intrinsic motivation, identified regulation, introjected regulation, and external regulation. The participants were instructed to indicate their agreement with each item on a 5-point Likert scale ranging from 1 (Not at all true) to 5 (Totally true). The reliability and validity of the SQR-A instrument for Asian samples has been established with satisfactory internal consistency and construct validity (d'Ailly, 2003; Zhou, Ma, & Deci, 2009). In this study, the four-factor scale showed good validity with a good model fit after one external regulation item was deleted due to its poor factor loading ($\chi^2 = 61.86$, $\chi^2/df = 1.63$, IFI = .97, CFI = .97, RMSEA = .055); the scale also had acceptable reliability coefficients (ranging from .60 to .86). The Relative Autonomy Index (RAI, Connell & Ryan, 1986) was computed to indicate students' level of autonomy