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Distal and proximal associates of academic performance at secondary level: A mediation model of personality and self-efficacy

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ABSTRACT

The predictive map for personality-related measures has evolved into distal, proximal and immediate associates of academic performance. This study used distal (Five Factor Model) and proximal (Academic Self-efficacy, ASE) associates with GPA (a specific facet of academic performance) at two time points with secondary level students at sixth form college ($N = 106$, average age 17 and evenly balanced by gender). Openness, Conscientiousness and ASE were associated with GPA at weak to moderate levels. In a path analysis with ASE as the mediator, the three constructs explained 17% variance on academic performance at time 1 and 42% at time 2 when a direct effect from GPA1 to GPA2 was introduced, with Openness and ASE remaining statistically significant when controlling for GPA1, and all three constructs provided significant indirect effects. Findings demonstrate the salient value of Openness and Conscientiousness, when configured with ASE as the mediator. Findings are applied to the approaches that facilitate learning pathways and support ability processes in achievement.

1. Introduction

1.1. Remit for the study

The volume of non-intellective constructs associated with academic performance has expanded in recent years (Richardson, Bond, & Abraham, 2012) and they have been increasingly applied to research in secondary level education (Di Giunta et al., 2013). This study included the Five Factor Model (Poropat, 2009), especially with reference to the two prominent associates of learning and achievement, Openness and Conscientiousness (Richardson et al., 2012). Another central covariate within the predictive space is Academic Self-efficacy (Komarraju & Nadler, 2013) and is therefore included within the present study, both because of its direct effects on academic performance and its role as a mediator for Openness and Conscientiousness (Caprara, Vecchione, Alessandri, Gerbino, & Barbaranelli, 2011). In addition this study adds previous grades as a predictor of subsequent grades because it is deemed to be the strongest single predictor of achievement (Cleland, Milne, Sinclair, & Lee, 2008), and also provides a good test of incremental validity with reference to the personality-related constructs. Given that researchers must select from at least 50 predictors of academic performance (Richardson et al., 2012), this paper will present the rationale for the use of the constructs selected from the range for this study with reference to their theoretical, empirical and pedagogical value.

1.2. Personality optimises ability and performance

There is a consensus in Higher Education research (Deary, Strand, Smith, & Fernandes, 2007; Laidra, Pullmann, & Allik, 2007) that although intelligence is a strong predictor of academic performance (AP), substantial residual variance remains unexplained by cognitive ability alone. Rhode and Thompson (2007) have underlined this point by concluding that cognitive ability and academic performance do not perfectly predict each other. Researchers have therefore turned to other individual difference variables to augment and complement the predictive validity associated with IQ (Chamorro-Premuzic & Furnham, 2009). It is concluded that AP is a combination of ability and effort (Gagné & Perés, 2001), and there has been steady exploration of the non-intellective factors that contribute to productive outcomes (Duff, Boyle, Dunleavy, & Ferguson, 2004). This study will include non-intellective constructs that highlight the behavioural mechanisms that mark out the pathway and processes that lead to academic achievement. These factors that enable students to nurture their potential, express their ability and optimise their achievement (Bratko, Chamorro-Premuzic, & Saks, 2006).

Although the present study did not include a direct measure of cognitive ability it did include a measure of previous performance which as noted above is deemed to be a combination of ability and effort (e.g., Gagné & Perés, 2001). Also, inherent ability is arguably the least

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malleable of the individual difference constructs (Cooper, 1999), and personality has been demonstrated to change to a greater extent over time than intelligence (Poropat, 2014). There is therefore value from the pedagogical perspective in focusing on the constructs than can make a difference to the support of learning, facilitate the expression of ability and the enhancement of achievement. Also cognitive ability within this review provides a reference point and a broader context for the place of this study within predictive space (Richardson et al., 2012).

A steady stream of research around the Five Factor Model (FFM) has built up since the turn of the Millennium that has been applied at secondary (Zuffiano et al., 2013) and tertiary levels of education (Richardson et al., 2012). Clear trends in the predictive validity of the FFM have emerged (Wagerman & Funder, 2007), especially in relation to Conscientiousness and, to a lesser extent, Openness (Poropat, 2009). However, researchers have developed the potential of the FFM by applying the factors to broader outcome criteria than academic performance. These include behaviours that are implicated in the process and pathways that lead to achievement by an exploration of more immediate sources of impact such as attendance and homework behaviours (Lubbers, Van Der Werf, Kuyper, & Hendricks, 2010). Furthermore, the impact of the FFM on intermediate constructs, such as Self-efficacy is also beginning to be explored (Caprara et al., 2011). However, the predictive validity of Self-efficacy is optimised when specific rather than general measures are employed (Bandura, 1997; Pajares, 1996), such as the Academic Self-efficacy measure used in this study (McIlroy & Bunting, 2002; McIlroy, Bunting, & Adamson, 2000).

1.3. Conscientiousness and Openness: complementary constructs for learning and achievement

The two broad factors from the FFM most likely to impact on attainment are Conscientiousness and Openness as noted (Richardson et al., 2012). Conscientiousness supports and optimises achievement because its operational content includes promptness, consolidation, planning, organisation, sustained effort and motivation, and Conscientious students use their time and opportunities well and are more likely to stay the course (De Feyter, Caers, Vigna, & Beings, 2012). Although Conscientiousness has the primacy in predictive validity from the FFM, Openness to Experience is the factor that directly relates to cognitive ability (Harris, Vernon, & Jang, 2005). Laidra et al. (2007) found that Openness predicts AP, and others have reasoned that the operational mechanisms associated with it, such as curiosity, exploration and critical thinking facilitate academic success (Lounsbury, Welsh, Gibson, & Sundstrom, 2005). However, other studies found no association between Openness and AP (Conard, 2006), and it may be that Openness is optimised in learning environments that facilitate individuality and independence (Duff et al., 2004).

In relation to the other factors of the FFM, the evidence is inconsistent and inconclusive (O'Connor & Paunonen, 2007), and may depend on the subject being studied, the level of the student or the method of assessment (Poropat, 2009). Moreover, within the educational context personality may contribute advantageously to the student experience in other ways apart from AP, such as through social and communication skills (Brackett, Rivers, & Salovey, 2011) and by good rapport with teachers and peers (Richardson & Abraham, 2009).

1.4. Academic Self-efficacy: agency, mastery and self-regulation in learning

Within the educational literature, Self-efficacy has emerged as complementary to the FFM because it predicts academic performance (Odaci, 2011), but also because its operational content identifies pathways that lead to improved performance and successful outcomes (Diseth, 2011). The construct pinpoints specific goal setting, regulated behaviours, investment of effort, persistence and resilience in effort and processing previous mastery experiences within the academic setting. Successive reviews have demonstrated that Self-efficacy is a consistent predictor of AP (Chemers, Hu, & Garcia, 2001; Chen, 2008; Multon, Brown, & Lent, 1991), and is defined as "belief in one's capabilities to organise and execute courses of action required to produce given attainment" (Bandura, 1997, p. 3). It emphasises the role of the individual as an agent of change (Caprara et al., 2008), and has the concept of mastery at its heart (Britner & Pajares, 2006). Moreover, it is embodied within the framework of Social Cognitive Theory which postulates that behaviours come through learning experience (Bandura, Barbaranelli, Caprara, & Pastorelli, 2001).

Evidence indicates that Self-efficacy demonstrates statistical robustness by offering unique variance in relation to AP when used alongside other constructs (Bandura, 2012; Wolfe & Johnson, 1995), and incremental variance when controlling for previous performance (Zuffiano et al., 2013). Furthermore, Chemers et al. (2001) found that AP increased with students' Self-efficacy beliefs. Although it is argued that Self-efficacy beliefs pitched at unrealistic levels is likely to be counterproductive, positive Self-efficacy beliefs are generally deemed to be adaptive to good performance (Turner, Chandler, & Heffer, 2009), and low levels have the opposite effect (Caprara et al., 2008).

The positive relationship between self-efficacy and academic grades has been well established for some time and continues to be reported in recent times (Zuffiano et al., 2013). However, recent studies have focused on specific rather than general self-efficacy (Di Giunta et al., 2013), and on the role of Self-efficacy as a mediator in predicting performance (Caprara et al., 2011), and also on the operational content of the construct with reference to its role in self-regulation (Di Giunta et al., 2013). According to Komarraju and Nadler (2013), non-ability related factors that impact on AP include motivation, self-regulation, goal setting, mastery experience, and effective coping, and many of these are embodied within the Self-efficacy construct. In contrast students with low Self-efficacy are likely to give up easily, invest less effort and see tasks as more difficult than they are (Britner & Pajares, 2006).

1.5. Academic Self-efficacy: postulated as a mediator of personality in performance

Academic Self-efficacy is specifically designed to tap academically relevant behaviours and approaches to learning (McIlroy & Bunting, 2002; McIlroy et al., 2000) in contrast to the FFM which was not designed primarily for this purpose (Ackerman, Chamorro-Premuzic, & Furnham, 2011). Academic Self-efficacy is specific and is construed to be proximal to performance (Di Giunta et al., 2013), whereas the five factors of personality are seen as distal (Bidjerano & Dai, 2007). Therefore there is a good justification for postulating Academic Self-efficacy as a mediator for the FFM, especially the two factors most implicated in performance (Openness and Conscientiousness). This approach sets Academic Self-efficacy in the pivotal role suggested by the literature (Komarraju & Nadler, 2013) and allows Conscientiousness and Openness to have a unique and combined effect on academic performance by both direct and indirect effects.

Studies such as those cited above (Ackerman et al., 2011; Caprara et al., 2011; Di Giunta et al., 2013; Komarraju & Nadler, 2013) have recognised an empirical link between Conscientiousness, Openness and Self-efficacy. However, the potential mechanisms through which these may occur are worthy of further exploration to enhance their pedagogical value and to provide encouragement for further empirical exploration. For example both Conscientiousness and Self-efficacy have common features such as motivation and self-regulation (Richardson & Abraham, 2009; Zimmerman, 2002), and Openness and Self-efficacy have converging points such as identifying goals, exploration and embracing the challenge of problem-solving (Komarraju & Nadler, 2013; Rolfus & Ackerman, 1999). Self-efficacy is seen as an internal resource that can make use of general traits by translating them into specific behaviours in an academic setting.