



Differences in secondary and tertiary students' academic behaviours and beliefs. A cross-sectional multivariate analysis

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April 2015

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Abstract

Background: Achievement stakes in education have rarely been higher. Personality traits and students' beliefs drive academic behaviours salient to academic performance (AP). Research suggests that these remain malleable during late adolescence and early adulthood. Greater understanding of the relative importance of non-intellective factors, at different educational stages and during transition is required.

Aims: Between group differences in, and relative importance of, factors that inform academic study strategies employed by university (US) and school (SS) students are examined. These are captured by academic self-efficacy (ASE) and test anxiety (TA).

Sample: N=100 SS (98% females; 2% male) and N=100 US (81% female; 19% male) were recruited by convenience sampling during prearranged data collection sessions. Ethical approval was sought and granted.

Method: Five validated self-report measures were used to test the five factor model of personality, ASE, academic conscientiousness, implicit theories of intelligence (ITI) and TA. Data were analysed to understand relationships and differences.

Results: This study highlights constructs that tentatively facilitate an adaptive transition between secondary and tertiary education. Both groups endorse adaptive proximal behaviours and beliefs to AP. Greater support for adaptive factors such as ASE is reported in undergraduates. Conversely, secondary students endorse less adaptive approaches including TA and neuroticism. Path analysis shows that ASE fully mediates adaptive, distal personality factors such as conscientiousness and openness and partially mediates neuroticism, in its relationship with TA.

Conclusion: Key non-intellective academic behaviours and beliefs, that appear to be important in stepping up to tertiary education, and are known to support AP, are endorsed. Limitations and future research directions are discussed.

KEYWORDS:	PERSONALITY	SELF-EFFICACY	MINDSET	TEST ANXIETY	PATH ANALYSIS
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Introduction

Background

In 2014, 500,000 students left further education to study at undergraduate level (UCAS, 2014). At the end of tertiary education, 2012 data reveals 63% of full time students achieve a 2:1 degree classification or higher, with almost 15% achieving a first class degree (Higher Education Statistics Agency, 2012). Performance stakes have rarely been higher. Researchers suggest this evaluation creates conflict in some able students, rendering performance at increasingly sub-optimal levels, whilst other students excel (Dweck & Henderson, 1989).

Allied with this evaluative state, student ability levels narrow and the predictive utility of factors associated with AP, e.g. intelligence, diminish as students reach higher levels of education (Jensen, 1980). Personality and Social Cognitive Theorists postulate that personality factors and beliefs provide greater predictive utility in AP. Interventions based on these factors are suggested to address sub-optimal performance where it is identified (Laidra, Pullmann, & Alik, 2007; Poropat, 2009; Richardson, Abraham, & Bond, 2012). It is postulated that factors including ASE, TA and ITI, that are proximal to AP, interact with distal personality factors (McIlroy, Poole, Moriarty, & Ursavas, 2015). The relationships between distal factors and their proximal associates will be examined in relation to SS and US.

Literature review

The Five Factor Model (FFM) of Personality

Cognitive ability (CA) is widely accepted as the strongest predictor in AP (Laidra et al., 2007). However, CA rarely accounts for more than 50% of the variance in AP, diminishing at tertiary stages due to range restriction (Chamurro-Premuzic, Ahmetoglu, & Furnham, 2008; Jensen, 1980). However, Spearman (1927) suggested that personality determines intelligent behaviour and what a student will typically achieve (Trapmann, Hell, Hirn, & Schuler, 2007). Recent meta-analyses of personality and AP support this view (Poropat, 2009; Vedel, 2014). The FFM has broad support as the most compelling model of personality (Busato, Prins, Elshout, & Hamaker, 2000; Costa & McCrae, 1992; Digman, 1990).

The FFM includes five broad factors each including six sub-facets (Vedel, 2014). Factors include Openness to Experience (O), linked to intelligence, interest and an enquiring mind (Laidra et al., 2007); Conscientiousness (C) encompasses achievement striving, goal setting and self-discipline (Corker, Oswald, & Donnellan, 2012); Extraversion (E) includes sociability, distraction and impulsivity (Laidra et al., 2007); Agreeableness (A) relates to cooperative behaviours (Trapmann et al., 2007); and Neuroticism (N) includes anxiety and worry (Komarraju, Karau, Schmeck, & Avdic, 2011). C, O and N are thought to be amongst the most compelling predictors in AP (Busato et al., 2000; Richardson et al., 2012) with limited support for E and A (Poropat, 2009).

C is the strongest and most consistent FFM predictor, explaining up to 26% of the variance in AP (Poropat, 2009; Vedel, 2014). Mechanisms of C most closely associated with high levels of AP include achievement striving, dutifulness, goal setting and self-discipline (Vedel, 2014). Conscientious students have intrinsic motivation which is associated with efficacious deeper learning strategies. This can result from either high or low levels of intelligence (Chamorro-Premuzic et al., 2008; Rosander & Backstrom, 2012). Theorists propose that the distal factor C is operationalised by proximal ASE beliefs to optimise AP (McIlroy et al., 2015). C is important regardless of educational stage, however, and has greater importance in tertiary education where distance from tutors and independence is the norm (Poropat, 2009).

O has a weaker positive relationship with AP and is related to intelligent enquiry and novelty in learning situations (Chamorro-Premuzic & Furnham, 2003; Poropat, 2009). O varies as a predictor over time, and some suggest it is the most important factor during the earliest stages of education (Laidra et al., 2007; McAbee & Oswald, 2013). Evidence also suggests that O is a greater predictor at tertiary than secondary stages. This is because O students are suited to situations where greater independence, autonomy and creativity are rewarded (Noffle & Robins, 2007). Recent evidence suggests tertiary courses require deeper more reflective learning styles which are suggested to be mediated by O (Komarraju et al., 2011). It is postulated that conceptualisation of O as a broad measure may affect its predictive power and sub-facets may be more useful predictors (O'Connor & Paunonen, 2007; Vedel, 2014).

N is a weaker and generally a negative correlate of AP due to its links with anxiety, worry and disengagement (Furnham, Nuygards, & Chamorro-Premuzic, 2013). Overlapping sub-facets suggest a handicapping relationship to constructs including TA and SE (McIlroy et al., 2015). Further, N has a positive relationship suggested in less stressful performance situations (Kappe & van der Flier, 2010) and amongst students who are higher in CA (Chamorro-Premuzic & Furnham, 2008). A recent study has also found levels of N reduce in the transition between secondary and tertiary stages (Lüdtke, Roberts, Trautwein, & Nagy, 2011).

Implicit Theories of Intelligence

ITI was proposed by Dweck (1989) to explain why some students perform well whilst others perform poorly, irrespective of ability. Dweck and colleagues propose bipolar belief systems (entity and incremental) differentially affect behaviours that contribute to performance (Burnette, O'Boyle, VanEpps, Pollack, & Finkel, 2013).

Entity theorists believe increased effort will not alter their core CA (Blackwell, Trzesniewski, & Dweck, 2007). Those with entity intelligence beliefs (EIB) exhibit self-handicapping behaviours and avoid effort, as this casts doubt on innate ability. Success for those with EIB is attributed externally (Rickert, Meras, & Witkow, 2014). Entity theorists pursue performance goals, reduce effort due to fear of evaluation and exhibit helplessness in relation to their studies (Blackwell et al., 2007).

Incremental theorists in contrast endorse a view that their intelligence can be developed (Dinger & Dickhäuser, 2013). Those with implicit intelligence beliefs (IIB) set learning goals, regulate effort and exhibit mastery based approaches (Burnette et al., 2013). Those with IIB are internally driven. They increase effort when challenged academically and maintain effort response to positive and negative feedback (Rickert et al., 2014). A strong overlap between the mechanisms supporting IIB and SE has been noted by researchers (Furnham, Chamorro-Premuzic, & McDougall, 2002).

One longitudinal study of middle school students found training interventions supporting IIB had a positive impact on grades after two years when compared to a control group, that were not trained, resulting in a downward grade trajectory (Blackwell et al., 2007). A further longitudinal study in university students examined the nature of intelligence beliefs and the personality factors underlying these beliefs. This supported earlier work and the behavioural mechanisms associated with entity and incremental views (Furnham et al., 2002). Researchers examining relationships between FFM and intelligence beliefs found IIB were closely associated and overlapped with C, whereas N more closely associated with EIB. In this analysis C, E and N explained 10% of the variance in IIB (Furnham et al., 2002).

Recent studies report nuances in theories of intelligence. Theorists propose that ITI develop during childhood such that intelligence beliefs are not fully embedded until late adolescence (Molden & Dweck, 2006). In addition, a recent study of Chinese students found externally endorsed performance beliefs were more important than ITI in predicting success. EIB were still important in predicting levels of helplessness (Wang & Ng, 2012). This has subsequently been supported in a study examining competence beliefs (Bodill & Roberts, 2013).

Researchers have noted a weak linear relationship between ITI and AP that may be mediated / moderated by other factors including achievement goals (Zhao, Zhang, & Vance, 2013) and SE (Furnham, 2014). It is further suggested that those with IIB may mimic the behaviours of those with good grades suggesting that they engage in the most adaptive behaviours (Rickert et al., 2014).

Self-Efficacy

SE is a cognitive judgement about capability to execute actions towards a desired goal (Bandura, 1997). Social cognitive theorists suggest a role for SE in a wide variety of domains, including AP (De Feyter, Caers, Vigna, & Berings, 2012). SE is widely supported in meta-analyses as one of the most important of 50 non-intellective predictors of AP (Richardson et al., 2012). Four pillars of SE include mastery beliefs, modelling behaviours, social persuasion and managing psychological arousal (Komarraju & Nadler, 2013; Zuffiano et al., 2013).

Mastery, such as prior AP, is proposed as a central mechanism within SE by informing cognitive judgements about future performance (Diseth, 2011). When controlling for prior

AP, SE is consistently demonstrated as a significant predictor of AP (Mcllroy et al., 2015). A recent longitudinal study has also found SE predicts transition between academic stages (Parker, Marsh, Ciarrochi, Marshall, & Abduljabbar, 2014). A further recent study suggests mechanisms such as motivation and engagement, associated with SE, are higher in US than SS (Martin, 2009).

Mechanisms underpinning SE such as action planning, goal seeking, persistence, precision and self-regulatory behaviours, add incrementally to CA to explain AP (Di Giunta et al., 2013). Researchers postulate these cognitive strategies have conceptual overlap with C (Komarraju & Nadler, 2013). In support of this, recent research postulates SE as mediating distal traits such as conscientiousness (Mcllroy et al., 2015). Interventions targeting the cognitive strategies inherent in SE, such as self-regulation, are suggested to optimise performance (Bartimote-Aufflick, Bridgeman, Walker, Sharma, & Smith, 2015; Lee, Lee, & Bong, 2014; Macaskill & Denovan, 2013). Developing self-regulatory behaviours is proposed to have a significant therapeutic effect on closely associated constructs such as TA (Nie, Lau, & Liao, 2011; Putwain & Symes, 2012).

High levels of SE are thought to contribute to adaptive deeper learning strategies and persistence behaviours, compared with those with low levels of SE who tend to display maladaptive surface learning approaches, effort reduction and self-handicapping behaviour (Diseth, 2011; Prat-Sala & Redford, 2010; Schnell, Ringeisen, Raufelder, & Rohrmann, 2015).

The close association between SE beliefs and IIB are also noted by researchers (Komarraju & Nadler, 2013). It is suggested that both belief systems are underpinned by cognitive and meta-cognitive strategies including goal directed behaviours and motivations. This is complemented by effort reduction in EIB and up-regulation of effortful strategies in IIB (Komarraju & Nadler, 2013; Mcllroy et al., 2015). Research further supports the relationship between C and SE, which are amongst the most important predictive factors of AP (Poropat, 2009; Richardson et al., 2012). This provides strong support for an interactive model of distal and proximal model of dispositional and belief model in predicting AP such as that proposed by Mcllroy et al. (2015).

Test Anxiety

TA is the excessive fear of negative consequences and behavioural responses to formal performance evaluations (Hembree, 1988; Shi, Gao, & Zhou, 2014; Szafranski, Barrera, & Norton, 2012). High stakes evaluation is now the norm through the educational lifespan (Keogh, Bond, French, Richards, & Davis, 2004). UK prevalence data suggests TA is experienced in 16.4% of the population. TA is reported more frequently for females (22.5%) than in males (10.5%) (Putwain & Daly, 2014; Szafranski et al., 2012). Hembree (1988) reports TA peaks in secondary education and reduces by the tertiary stage. Situational factors are proposed to explain variation in the reported weak to moderate correlations (-.23 and -.33) (Hembree, 1988; Sommer & Arendasy, 2014).

Cognitive and behavioural factors are consistently suggested to underlie TA (Hembree, 1988; Seipp, 1991). Cognitive factors include Worry and Test Irrelevant Thoughts and behavioural factors include tension and bodily symptoms (Sommer & Arendasy, 2014). Cognitive factors are thought to have a stronger relationship with TA than behavioural factors (Hembree, 1988; Lang & Lang, 2010; McIlroy & Bunting, 2002).

Two models are suggested to mediate the relationship between TA and AP. The interference model related to cognitive components suggesting that sub-optimal performance relates to compromised executive and working memory capacity (Eysenck, Derakshan, Santos, & Calvo, 2007; Keogh et al., 2004; Shi et al., 2014). In the deficit model, suboptimal strategies and behavioural deficits lead to more tension and bodily symptoms (Sommer & Arendasy, 2014). The interference model has demonstrated the most support in research over time (Hembree, 1988; McIlroy & Bunting, 2002; Shi et al., 2014). However an intrinsic measurement bias has been suggested with the interference model, although this has not been demonstrated conclusively. Confounding factors and importance of test are thought to influence the relationship between TA and AP (Reeve, Bonaccio, & Winford, 2014).

In addition, compensatory factors include ability which is suspected to have a buffering effect on TA for those with high ability but can lead to greater distraction in those with lower ability (Reeve et al., 2014). It is also suggested that behavioural traits such as conscientiousness influence self-efficacy beliefs which in turn reduce harmful levels of TA (McIlroy & Bunting, 2002; McIlroy, Bunting, & Adamson, 2000; Putwain & Symes, 2012).

A variety of interventions are suggested to address these factors (Keogh, Bond, & Flaxman, 2006; McIlroy & Bunting, 2002; McIlroy et al., 2000). The persistence of these emotions are due to the fact that tests have increasingly high stakes and that they are universally perceived in a less than positive way (Reeve et al., 2014). Understanding and addressing these issues is important as it is suggested that the difference between a person with high or low TA can be as much as one grade letter or 7% in an evaluation (McIlroy & Bunting, 2002; Putwain & Daly, 2014).

Rationale

The current study focuses on the inter-relationships between distal and proximal constructs operating in the predictor space that relates to AP (Ackerman, Chamorro-Premuzic, & Furnham, 2011). Although the study is cross-sectional, at a conceptual level these can be aligned with traits on the highest level on the grounds that traits are deemed to be based on early learning experiences (Pervin, 2003). The variables next in line to traits capture exclusively educational content and are likely to be learned and built on through experiences. These are pivotal to AP (Di Giunta et al., 2013) and yet are impacted by general traits (Caprara, Vecchione, Alessandri, Gerbino, & Barbaranelli, 2011). This study will look not only at the relationship between these but also how these variables compare and contrast between secondary and tertiary students. These features ensure the study is innovative, particularly given the number of constructs compared.

Hypotheses

Drawing on the evidence above, it is hypothesised that there will be significant differences in relation to a number of complementary factors. In relation to TA (H1), secondary students will report higher levels than the university group. However in relation to ASE (H2) and IIB (H3) the university group will report higher levels of the respective factors than the secondary group. Consistent with the literature reviewed on the FFM, it is expected that the university group will report higher levels of C (H4) and O (H5) but lower levels of N (H6) than the secondary group. It is further expected that the significant proportions of the variance on TA (H7), ASE (H8), IIB (H9) and AC (H10) will be explained by the trinity C, N and O from the FFM. The extent to which these factors relate differentially to the two groups is not hypothesised.

Method

Design

The study employed a quantitative, cross sectional mixed design. In between group analysis, the two groups (SS and US) served as predictors in relation to distal and proximal outcome variables. In within participant analysis, the distal variables (FFM) were used in relation to the outcome variables (AC, ASE, TA and ITI). These were tested within each group by correlation, followed by regression and finally in a reduced path model that combined both groups.

Participants

The sample (N=200) was drawn from two groups and included 21 males (10.5%) and 179 females (89.5%) aged between 16 and 54 (M=19.19, SD=4.89). The first group (N=100) was a group of secondary students (SS) pursuing level 3 courses at a selective all-female Wirral secondary school aged between 16 and 18. The second group (N=100) included psychology undergraduates students (US) following level 5 or level 6 of study. There was no age exclusion criteria for this group.

Materials

Measures

Personality

The IPIP Big Five Fifty Items (Goldberg et al., 2006) measures 10 items from each personality factor of the FFM (Poropat, 2009). The factors, including sample items, are Openness to Experience (Openness) - 'I have a rich vocabulary'; Conscientiousness - 'I am always prepared'; Extraversion - 'I am the life of the party', Agreeableness - 'I take time out for others'; and Neuroticism - 'I have frequent mood swings'.

Academic Conscientiousness

The second, 10 item scale, aligned to personality, is the Academic Conscientiousness Scale (ACS) (McIlroy et al., 2000). This 10 item measure examines specific academic personality factors and includes items such as 'I have a well-established pattern of regular and consistent study'.

Test Anxiety

The final dispositional scale was measured using the Revised Test Anxiety Scale (r-TAS) (Benson & El-Zahhar, 1994). This 20 item survey examines four factors associated with TA including tension, worry, bodily symptoms and test-irrelevant thinking. A sample item includes 'I am anxious about exams'.

Academic Self Efficacy

Self-efficacy beliefs will be measured using the Academic Self Efficacy Scale (ASE) (McIlroy et al., 2000). A sample item, from this 10 item measure, is, "If I don't understand an academic problem, I persevere until I do."

In all of the above measures, several items are reverse scored to control for response set.

Implicit Theories of Intelligence

The Implicit Theories of Intelligence Scale (ITIS) (Abd-El-Fattah & Yates, 2006), is a 14 item measure. Participants are asked to rate whether intelligence beliefs are fixed or incremental. As an example 'You are born with a fixed amount of intelligence'.

All measures use a Likert scale response format. Participants indicate the strength of their agreement or disagreement to a set of statements, for example, 1 = very inaccurate to 5 = very accurate. IPIP employs a 5 point scale, whereas r-TAS, ASE, ACS and ITIS all use a 7 point scale.

Procedure

US were recruited through lecture collection. A secondary school was approached and agreed to participate in the study. Following approval by Liverpool John Moores University School of Natural Sciences and Psychology Ethics Panel (PSYREP), participants were invited to take part in the study during agreed data collection sessions. Potential participants were handed a survey booklet, asked to read the Participant Information Sheet and consider participating in the study. Participants confirmed they understood their rights by signing a consent form. Participants returned completed surveys and were assured that only general trends in data were being explored. Following return of all surveys participants were debriefed. All completed surveys were input to SPSS version

22 using a numeric coding system to protect participant's identities. Following this data analysis commenced.

Data Analysis Strategy

A multi-layered data analysis strategy was employed. Measures of central tendency and dispersion (means and standard deviations) were examined to investigate trends in the data. To test the hypotheses at a basic level, t-tests were employed to identify areas of significant differences between the two groups. Significant results were subject to further multivariate analysis of variance (MANOVA). Bivariate correlation analysis was performed in relation to each group to determine the most significant relationships. The most significant relationships identified were subsequently analysed using multiple regression for each of the two groups. Reliability, normality and homogeneity of variance testing demonstrated data quality, see appendix B. Apart from Agreeableness (kurt=2.73) skewness and kurtosis coefficients were below 1.79, the suggested threshold for multivariate normality (Tabachnick & Fidell, 2007). Except for the IIB facet of the ITIS scale ($\alpha=.69$), all measures exceeded the suggested reliability coefficient of .70 (Field, 2012). Data met the assumption tests for multivariate analysis. Amos 21 was used for path analysis to examine significant direct and indirect effects of selected measures. Values of skewness were within the range -1 to +1 and the multivariate kurtosis test statistic was confirmed (2.12, $p>.05$) as a condition for using the maximum likelihood approach. Model fit was indicated by the RMSEA (0.08) and the low $X^2(df=2)$ (0.11, $p>.05$) (Kline, 2005; Preacher & Hayes, 2004). The model met the basic assumptions of path analysis because (in addition to normality and reliability) all the predictor variables correlated with the mediator and the outcome variable.

Ethical Consideration

The project was undertaken in accordance with BPS guidelines. PSYREP granted ethical approval prior to commencing the study. Participants' informed consent was sought and granted using the survey booklet. Completed surveys were assigned numeric identification codes. These were used during data input to ensure confidentiality and anonymity. Participants were informed of the right to withdraw from the study and provided with debriefing information. This included the researcher's and the project supervisor's contact details.

Results

Table 1 - Descriptive Statistics, Reliability and Validity Coefficients for Self-report Measures

Predictor (with scale mid-point)	Group ^v	<i>M</i>	<i>SD</i>	Skewness	Kurtosis	Reliability α
Extraversion (E) (30)	US	33.57	7.00	-.19	-.18	.88
	SS	35.09	6.68			
	Total	34.48	6.84			
Agreeableness (A) (30)	US	41.09	6.46	-1.04	2.73	.86
	SS	40.23	5.19			
	Total	40.63	5.86			
Conscientiousness (C) (30)	US	35.08	7.47	-.17	-.82	.89
	SS	31.70	7.51			
	Total	33.39**	7.66			
Neuroticism (N) (30)	US	28.19	7.19	.05	-.45	.88
	SS	25.85	8.62			
	Total	27.02*	8.01			
Openness (O) (30)	US	35.61	6.35	.13	-.52	.81
	SS	33.52	5.39			
	Total	34.57**	5.97			
Test Anxiety (TA) (80)	US	88.69	23.36	-.18	-.48	.94
	SS	96.38	21.07			
	Total	92.53*	22.52			
Academic Self-Efficacy (ASE) (40)	US	48.00	7.02	.28	.47	.81
	SS	43.21	7.08			
	Total	45.61**	7.44			
Incremental Intelligence Beliefs (IIB) (28)	US	38.89	4.95	-.32	-.28	.69
	SS	36.12	4.48			
	Total	37.50**	4.91			
Entity Intelligence Beliefs (EIB) (28)	US	24.21	6.52	-.52	.21	.70
	SS	25.65	6.56			
	Total	24.93	6.56			
Academic Conscientiousness (AC) (40)	US	37.96	9.38	-.09	.66	.87
	SS	36.69	8.95			
	Total	37.32	9.16			

Significant differences in mean scores ** $p < .01$; * $p < .05$. Key: ^v US = Undergraduate Students, SS = Secondary Students Group sizes; US, N=100; SS, N=100

Table 1 shows strong individual differences in self-report measures referenced by dispersion statistics (indicated by SD). High quality in the self-report data is suggested by reported low levels of skewness and kurtosis (.05 – .82). These are within the range suggested for multivariate normality 1.79 (Tabachnick & Fidell, 2007) and A is only marginally > 1. High reliability of self-report measures are reported ($\alpha > .70$), with the exception of IIB (marginally below .7).

Table 1 identifies significant differences in mean scores from t-tests on the FFM factors. Undergraduates exhibit higher levels of conscientiousness, openness and lower levels of neuroticism (indicated by a higher mean score) than school students. Marginal mean differences are seen in the scores for extraversion and agreeableness. Significant differences are seen in TA, ASE and IIB, with SS exhibiting greater TA than US. Conversely, US report higher levels of ASE and IIB than SS. There were no significant differences in AC. As a result, these factors were subject to MANOVA analysis, [see Table 3](#).

Table 2 – Correlation coefficients for Self-Report Measures for US & SS

US SS	E	A	C	N	O	TA	ASE	EIB	IIB	AC
E	1	.20*	.09	.29**	.28**	-.15	.18* ¹	.04	.04	.06
A	.01	1	.12	-.06	.25**	.00	.13	-.21*	.15	.05
C	.14	.07	1	.06	.19* ¹	.16	.20*	.00	.07	.50**
N	.30**	-.07	.06	1	-.11	-.38**	.22*	.11	.11	-.09
O	.26**	.14	.01	.22*	1	-.24*	.48**	-.23*	.25**	.10
TA	.24*	.25*	.18* ¹	.42**	-.12	1	-.48**	.08	.11	-.24*
ASE	.18	-.10	.47**	-.34**	.08	-.38**	1	-.24*	.31**	.38**
EIB	-.09	.01	-.07	.29**	-.21*	.28**	-.19	1	-.47**	-.04
IIB	.26**	.17* ¹	.24*	.16	.20*	-.08	.20*	-.14	1	.07
AC	.03	.15	.69**	.04	.06	-.12	.43*	-.04	.20* ¹	1

** p <.01; *p<.05; *¹ p<.05 (one-tailed). Key: US = Undergraduate Students, SS = Secondary Students

The upper left quadrant of Table 2 identifies generally low level FFM relationships in both groups indicating the divergent nature of the constructs. The upper right (US) and lower left (SS) quadrants highlight significant relationships between conscientiousness, neuroticism, openness, TA, ASE, IIB and AC. A number of these relationships are significant at the p<.01 and p<.05 level. The lower right quadrant underlines important relationships between TA, ASE, IIB and AC. When conscientiousness and openness are compared with the five proximal variables in undergraduates (viewed horizontally) it can be seen that openness is systematically related to them, whereas conscientiousness is not. When conscientiousness and openness are compared with the same variables

(viewed vertically) within the school group the pattern is reversed and conscientiousness is more systematic than O. Four correlations in Table 1 are significant at the one-tailed level. These factors are tentatively included in multiple regression analysis because of the importance of these factors for both groups, see [Table 4](#) and [Table 5](#).

Table 3 – Univariate and Multivariate Tests of Difference across secondary and undergraduate students on distal (FFM) and proximal measures (Academic Self-Efficacy, Test Anxiety and Implicit Intelligence Beliefs)

Predictor	<i>F</i> value [^]	Effect size partial η^2
Conscientiousness	10.22**	.05 (moderate)
Neuroticism	4.36*	.02 (small)
Openness	6.27*	.03 (small)
Test Anxiety	5.98*	.03 (small)
Academic Self-Efficacy	23.13**	.11 (medium)
Implicit Intelligence Beliefs	17.18**	.08 (moderate)

** $p < .01$; * $p < .05$; [^]df(1,198)

The assumptions for MANOVA were not violated as Box's Test of Equality of Co-variance was not significant $p > .05$. The assumptions of equality of variances were largely met, with a marginal violation for neuroticism, see appendix B. A statistically significant difference is seen in factors conscientiousness, neuroticism and openness between US and SS: $F(3,196)=6.20$; Wilks $\lambda=.91$; $p < .001$; partial $\eta^2=.09$. Further, a statistically significant difference is reported between proximal factors in the US and SS groups: $F(3,196)=10.68$; Wilks $\lambda=.86$; $p < .001$; partial $\eta^2=.14$. These indicate moderate and large effect sizes respectively in relation to the tested distal and proximal factors.

Supporting H1, there was a statistically significant difference in levels of conscientiousness reported $F(1,198)=10.22$; $p < .01$, partial $\eta^2=.05$; undergraduates reported higher levels of conscientiousness ($M=35.08$) than SS ($M=31.70$). In support of H2, a statistically significant difference was demonstrated in levels of openness $F(1,198)=6.27$; $p < .05$, partial $\eta^2=.03$; higher levels of openness were seen in undergraduates ($M=35.61$) than school students ($M=33.52$). Thirdly, a statistically significant difference in neuroticism was found $F(1,198)=4.36$; $p < .05$, partial $\eta^2=.02$; as expected supporting H3, this was higher (lower scores equate with higher neuroticism) in SS ($M=25.85$) than US ($M=28.19$).

In support of H4, a statistically significant difference in reports of TA $F(1,198)=5.98$; $p < .05$, partial $\eta^2=.03$ is seen, with SS reporting higher levels of TA ($M=96.38$) than US ($M=88.69$). Supporting H5, a statistically significant difference is reported in levels of ASE $F(1,198)=23.13$; $p < .01$, partial $\eta^2=.11$; higher levels of ASE were seen in US ($M=48.00$) than SS ($M=43.21$) Finally, a statistically significant difference between levels of IIB was

found $F(1,198)=17.18$; $p<.01$, partial $\eta^2=.08$; in support of H6, IIB was higher in US ($M=38.89$) than SS ($M=36.12$).

Table 4 – Multiple Regression Model; TA, ASE, IIB and AC Regressed on Personality Factors (University Students)

Outcome Predictor	Test Anxiety			Academic Self-Efficacy			Incremental Intelligence Beliefs			Academic Conscientiousness		
	B	SE	β	B	SE	β	B	SE	β	B	SE	β
C	-.47	.29	-.15	.12	.08	.13	.02	.07	.03	.62	.11	.49**
N	-	.30	-.37**	.18	.09	.18*	.06	.07	.08	-.08	.12	-.06
O	1.21											
	-.62	.34	-.17* ¹	.48	.10	.44**	.19	.08	.24*	.03	.13	.02
F(df)	8.28(3,96)**			12.28(3,96)**			2.51(3,96)* ¹			10.97(3,96)**		
Adjusted R ²	.18			.26			.04			.23		

* $p<.05$; *¹ $P<.05$ (one-tailed) ** $p<.01$

Table 5 – Multiple Regression Model; TA, ASE, IIB and AC Regressed on Personality Factors (School Students)

Outcome Predictor	Test Anxiety			Academic Self-Efficacy			Incremental Intelligence Beliefs			Academic Conscientiousness		
	B	SE	β	B	SE	β	B	SE	β	B	SE	β
C	-.56	.25	-.20*	.47	.08	.49**	.15	.06	.25*	.83	.09	.69**
N	-1.04	.23	-.46**	.31	.07	.37**	.07	.05	.13	.08	.08	.07
O	-.11	.36	-.03	-.01	.11	-.01	.14	.08	.17* ¹	.07	.13	.04
F(df)	8.80(3,96)**			17.96(3,96)**			4.27(3,96)**			29.78(3,96)**		
Adjusted R ²	.19			.34			.09			.47		

* $p<.05$; *¹ $P<.05$ (one-tailed); ** $p<.01$

Building on correlation analyses in [Table 2](#); Tables 4 and 5 examine the nature of relationships, differential patterns and relative importance, between identified outcomes and predictors.

The hypothesised relationships in regression models are significant at the $p<.01$ level, indicating high levels of support for the trinity of conscientiousness, neuroticism and openness (CNO) in important academic strategies. In support of H7, CNO explain 18% and 19% of the variance respectively in levels of TA for US and SS. Not surprisingly, neuroticism is the most significant factor related to this factor (**US**, $\beta=-.37$, $p<.01$; **SS**, $\beta=-.46$, $p<.01$) followed by openness for US ($\beta=-.17$, $p<.05$ ¹), and conscientiousness for SS ($\beta=-.20$, $p<.05$). Supporting H8, CNO explain 26% and 34% of the variance on ASE respectively for US and SS. openness ($\beta=.44$, $p<.01$) and neuroticism ($\beta=-.18$, $p<.05$) are

significant factors in terms of ASE for undergraduates. For SS, ASE was primarily explained by conscientiousness ($\beta=.49$, $p<.01$), followed by neuroticism ($\beta=.37$, $p<.01$). In support of H9, CNO explained 4% and 9% of the variance in IIB in US and SS respectively. For US, openness was the only significant factor ($\beta=.24$, $p<.05$), whereas, conscientiousness ($\beta=.25$, $p<.05$) and openness ($\beta=.17$, $p<.05^1$) were significant factors for SS. Finally support for H10 was established, with 23% and 47% of the variance in AC being supported by conscientiousness (**US**, $\beta=.49$, $p<.01$; **SS**, $\beta=.69$, $p<.01$). It is noted that a significant proportion of the variance on this AC is determined by conscientiousness. However, there is residual variance (77% and 53%: 100-23 and 100-47) which must be explained by factors outside the model presented as only conscientiousness was significant.

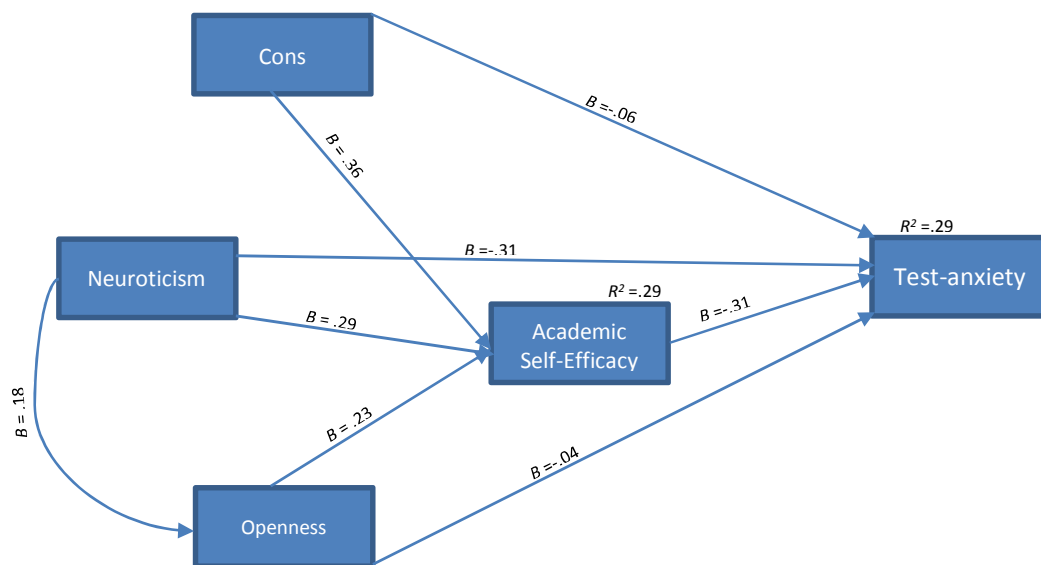


Figure 1 – Path Analysis; Test Anxiety regressed on Conscientiousness, Neuroticism and Openness, mediated by Academic Self-Efficacy

Table 6 – Direct, indirect and total effects for the path model presented in Fig. 1

Outcome	Determinant	Standardised estimates			Total
		Direct	Indirect	(CI 95%)	
TA (R ² =0.29)	C	-.08	-.11**	(-.19 to -.05)	-.19*
	N	-.31**	-.09**	(-.15 to -.04)	-.40*
	O	-.04	-.07**	(-.14 to -.02)	-.11
	ASE	-.31**	-	-	-.31*
ASE (R ² =0.29)					

CIs – confidence indicators (95% upper and lower boundaries)

* p<.05; **p<.01

Path analysis in [Figure 1](#) and [Table 6](#) demonstrates 29% of the variance in TA being explained by CNO and ASE. However, the direct effects of conscientiousness and openness are subsumed within the path model by ASE. Further examination shows that neuroticism and ASE have significant negative, albeit moderate, relationships (β s = -.31, p s<.01) to TA. It is also observed that openness covaries with levels of neuroticism. Significant indirect effects of CNO (β = -.11, β = -.09, β =-.07; p s<.01, respectively) through ASE are also seen in relation to TA. Although low level, these indirect effects indicate overlap between the constructs and their effect on evaluations. In terms of total effects, conscientiousness, neuroticism and ASE (β =-.19, β =-.40; β =-.31; p s<.05, respectively) demonstrate their importance to TA. This is supported by findings from multiple regression, correlation analysis and MANOVA. In comparing the path analysis with the correlation table it can be seen that conscientiousness and openness are completely mediated by ASE in relation to TA as they were significant in correlation but are not significant in direct effects in the path model (although the indirect effects are significant as shown in table 6). In contrast, neuroticism is only partially mediated by ASE in relation to TA because although it was significant in correlation with TA, its direct effect remains significant, although reduced, within the model and its indirect effect through ASE is also significant. It appears then that ASE is a pivotal variable in translating general traits into specific academic behaviours.

Discussion

The current study draws on the key non-intellective variables suggested by personality and social cognitive theorists that occupy the predictive map to AP (Ackerman et al., 2011). Selected variables are proposed at both distal levels, such as the FFM, and proximal levels to AP, including AC, ASE, TA and IIB (McIlroy et al., 2015). In doing so, the current study builds on previous empirical work suggesting a growing emphasis on

the role of these variables as students move into the higher stages of education (Deary, Strand, Smith, & Fernandes, 2007; Laidra et al., 2007). This study aims to understand differences in a cluster of targeted constructs between two groups at different academic stages.

In line with the hypothesised differences, the current study suggests greater endorsement of adaptive variables, such as conscientiousness, openness, ASE and IIB in undergraduates and greater endorsement of maladaptive variables including neuroticism and TA in School Students. Proximal factors (AC, ASE, IIB and TA) regressed on distal personality factors (conscientiousness, openness and neuroticism) shows that whilst neuroticism strongly predicts TA in both groups, openness tends to be more important for undergraduates whilst conscientiousness appears to be more important for school students. CNO accounted for significant proportions of the variance in AC, ASE, IIB and TA. Nevertheless, despite these surprising results, significant relationships are seen between conscientiousness, openness and important proximal factors in the correlational analysis for both groups, supporting previous research (Poropat, 2009; Vedel, 2014).

Supporting previous meta-analyses and reviews, CNO are endorsed by the current study as important direct and indirect personality traits in relation to academic studies (Poropat, 2009; Vedel, 2014). These three factors encompass a dynamic range of behavioural traits including, amongst others, routine, regularity, open enquiry, interest and emotions (Trapmann et al., 2007). As the current study indicates, these traits may provide the fuel to proximal factors to optimise or disrupt academic endeavours. Higher levels of conscientiousness and openness in the current data appear to support adaptive strategies represented by AC, ASE and IIB. Whilst bivariate correlational analysis shows conscientiousness and openness are important for both groups studied, regression results show that conscientiousness and openness are endorsed differently by the groups. School students primarily endorse conscientiousness whilst undergraduates endorse openness as vital mechanisms in relation to the selected proximal factors. Supporting previous research, neuroticism has both a direct and indirect relationship to TA as demonstrated in correlations, regression and path analysis (Hembree, 1988). These results were largely as expected and in line with previous research support the role of conscientiousness and openness as positive and neuroticism as a negative contributors in academic behaviours (Poropat, 2009). Divergent results for the two groups appear to suggest that conscientiousness is of greater importance for secondary students who follow a prescriptive instructor led programme, however, this is embedded by the time students reach university having negotiated a lifetime in academia. The current results appear to provide a tentative indication that a transition is made at university where openness becomes more prominent. This supports evidence suggesting those high in levels of openness are rewarded at university for displaying intelligent, focussed creative enquiry (Farsides & Woodfield, 2003; Laidra et al., 2007).

Proximal behaviours and beliefs known to be related to AP were examined. Adaptive factors include AC, ASE and IIB; these encompass consistency, mastery, emotional regulation and beliefs that translate general traits into specific academic behaviours and resulting outcomes (Di Giunta et al., 2013; Richardson et al., 2012). On the contrary, TA

is widely understood as a maladaptive situational factor that arises in formal performance evaluations (Putwain, 2007). Tests of difference in mean scores reveal significant differences in relation to ASE, IIB and TA. These indicate greater levels of adaptive factors in undergraduates and less adaptive behaviours in secondary students. Effect sizes in the current study range from medium / moderate for adaptive factors and small for TA. These differences are supported by complementary group differences in personality factors as previously indicated. No significant difference in AC is reported between the groups. The current results tentatively suggest that the challenge for secondary students, in negotiating the transition to tertiary level, is to increase adaptive behaviours, such as ASE, and reduce maladaptive behaviours. This tentative suggestion, however, is based on cross-sectional data and it is therefore recommended that the phases of transition are tested more thoroughly using a longitudinal study, such as that carried out by Parker et al. (2014) in relation to ASE.

Path analysis was used to further examine factors that emerged strongly in data analysis and suggested greatest conceptual congruence. To provide a parsimonious model, IIB and AC, which overlaps significantly with conscientiousness, were excluded. The path model highlights the pivotal role of ASE in the relationships between distal personality and proximal belief factors such as TA. The trinity of personality factors (CNO) all have a direct relationship with ASE and it in turn has a direct relationship with TA. The model demonstrates that ASE fully mediates conscientiousness and openness, and partially mediates neuroticism. This model is supported by a previous study that postulated similar relationships between ASE and performance (Caprara et al., 2011). Although the current study did not examine the relationships between variables tested and AP, limiting the utility of the current study, Caprara et al. (2011) did not include TA which is, as previously indicated, an important negative source of variance in AP. The current evidence supports previous research suggesting that ASE utilises general personality traits and transforms them into focussed academic behaviours (McIlroy et al., 2015).

Self-efficacy has recently been supported amongst the most important psychological correlates of AP (Richardson et al., 2012), offering incremental validity alongside intelligence in relation to AP (Robbins, Allen, Casillas, Peterson, & Le, 2006; Valentine, DuBois, & Cooper, 2004). Self-efficacy encompasses vital academic behaviours that complement ability, support learning and enhance achievement. These behaviours include goal setting (Pintrich, 2000); mastery experiences (Bandura, 1986); motivation (Zimmerman, 2000); and self-regulation (Komarraju & Nadler, 2013). The current study provides support for the vital role of self-efficacy. ASE is supported on a number of levels in the current study. Firstly, the current results suggest ASE as an important factor for both groups. Secondly, ASE transforms adaptive general personality traits in to action as is seen in path analysis. Finally, there is greater endorsement by undergraduates for ASE. This may suggest an adaptive change takes place in the transition to tertiary education. This view is supported by recent research which concludes that ASE not only predicts academic performance in different academic stages, but also transition to the tertiary stages of education (Parker et al., 2014). A longitudinal study is recommended test this hypothesis.

TA, as previously indicated, provides an important source of negative variance in AP. A direct causal association is observed between levels of neuroticism and levels of TA (Chamorro-Premuzic & Furnham, 2003; Furnham et al., 2013). Evidence suggests that this problem is found at all levels of education and can debilitate both approaches to learning and subsequent performance (Mazzone et al., 2007). However, a seminal meta-analysis suggests that secondary students experience greater levels of neuroticism, before it abates at tertiary level (Hembree, 1988). For these reasons, TA was included as an outcome variable in the current study. Taken together the results of the current study appear to suggest a role for ASE in reducing TA over time this finding lends support recent studies in this area (Barrows, Dunn, & Lloyd, 2013; Hassanzadeh, Ebrahimi, & Mahdinejad, 2012). However, as the current results are based on cross-sectional self-report data, longitudinal research is needed to thoroughly test this inference.

Limitations

The current study is not without limitations. The study utilised self-report measures in a cross sectional design. Researchers report a number of issues with self-report (Corker et al., 2012; McIlroy et al., 2015) including problems of response set, social desirability and shared method variance (Tabachnick & Fidell, 2007). The variety of constructs included in the current study, together with their robust psychometric properties, aimed to address these issues. The cross-sectional design of the study only allows tentative suggestions to be made in relation to the current results. Whilst these results may tentatively suggest a transition occurs between academic stages, a longitudinal study is recommended to thoroughly test the transition process between academic stages.

Future Directions

The current study draws strength from the robust nature of the constructs examined. Personality constructs have long been supported as important distal predictors of AP (Poropat, 2009; Vedel, 2014), whilst ASE (Richardson et al., 2012), TA (Hembree, 1988) and IIB (Rickert et al., 2014) have been identified as vital proximal predictors of AP in major reviews and meta-analyses. These constructs test a range of individual differences whilst focussing on fundamental qualities supporting optimal AP. In addition, the current study is based on data demonstrating satisfactory levels of normality, reliability, dispersion and systematic relationships between the constructs. Finally, a comparison is made between two different groups in different phases of education thereby eliciting commonalities and differences related to their different levels of experience. Whilst the current results suggest the possibility of transition and engagement of different predictors, to thoroughly test this hypothesis, a prospective study should be carried out to determine whether this transition has taken place. Tracking individuals in a qualitative study may support this by providing a richer understanding of the transition between secondary and tertiary education.

Conclusion

The current study examines key distal and proximal variables that operate in the predictor space preceding AP (Ackerman et al., 2011). A reduced path model demonstrates the importance of key distal personality variables, including conscientiousness, neuroticism and openness which appear to be operationalised, either fully or in part, by proximal variables such as ASE in impacting factors detrimental to AP such as TA. The current study answers the call of O'Connor and Paunonen (2007) for more detailed analysis to understand relationships between non-intellective factors in AP. The current research also examines differences in the proposed distal and proximal variables between secondary and tertiary students. Higher levels of adaptive variables including conscientiousness, openness, ASE and IIB were indicated by undergraduates whilst secondary school students endorsed higher levels of maladaptive factors including N and TA. To test the tentative suggestion of an adaptive transition between levels of education a longitudinal study is recommended. The results of the current study may prove useful to educators in assisting students making a successful transition to tertiary education. Interventions which supports adaptive factors highlighted are recommended.

References

- Abd-El-Fattah, S. M., & Yates, G. C. R. (2006). Implicit Theories of Intelligence Scale: Testing for factorial invariance and mean structure. Paper presented at the Australian Association for Research in Education, Adelaide, Australia.
- Ackerman, P. L., Chamorro-Premuzic, T., & Furnham, A. (2011). Trait complexes and academic achievement: Old and new ways of examining personality in educational contexts. *British Journal of Educational Psychology*, 81(1), 27-40.
- Bandura, A. (1986). The Explanatory and Predictive Scope of Self-Efficacy Theory. *Journal of Social & Clinical Psychology*, 4(3), 359.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY, US: W H Freeman/Times Books/ Henry Holt & Co.
- Barrows, J., Dunn, S., & Lloyd, C. A. (2013). Anxiety, Self-Efficacy, and College Exam Grades. *Universal Journal of Educational Research*, 1(3), 204-208.
- Bartimote-Aufflick, K., Bridgeman, A., Walker, R., Sharma, M., & Smith, L. (2015). The study, evaluation, and improvement of university student self-efficacy. *Studies in Higher Education*.
- Benson, J., & El-Zahhar, N. (1994). Further Refinement and Validation of the Revised Test Anxiety Scale. *Structural Equation Modelling - A Multidisciplinary Journal*, 1(3), 203-221.
- Blackwell, L. S., Trzesniewski, K. H., & Dweck, C. S. (2007). Implicit theories of intelligence predict achievement across an adolescent transition: A longitudinal study and an intervention. *Child Development*, 78(1), 246-263.
- Bodill, K., & Roberts, L. D. (2013). Implicit theories of intelligence and academic locus of control as predictors of studying behaviour. *Learning and Individual Differences*, 27, 163-166.
- Burnette, J. L., O'Boyle, E. H., VanEpps, E. M., Pollack, J. M., & Finkel, E. J. (2013). Mind-Sets Matter: A Meta-Analytic Review of Implicit Theories and Self-Regulation. *Psychological Bulletin*, 139(3), 655-701.
- Busato, V. V., Prins, F. J., Elshout, J. J., & Hamaker, C. (2000). Intellectual ability, learning style, personality, achievement motivation and academic success of psychology students in higher education. *Personality and Individual Differences*, 29(6), 1057-1068.
- Caprara, G. V., Vecchione, M., Alessandri, G., Gerbino, M., & Barbaranelli, C. (2011). The contribution of personality traits and self-efficacy beliefs to academic

- achievement: A longitudinal study. *British Journal of Educational Psychology*, 81(1), 78-96.
- Chamorro-Premuzic, T., & Furnham, A. (2003). Personality traits and academic examination performance. *European Journal of Personality*, 17(3), 237-250.
- Chamorro-Premuzic, T., & Furnham, A. (2008). Personality, intelligence and approaches to learning as predictors of academic performance. *Personality and Individual Differences*, 44(7), 1596-1603.
- Chamorro-Premuzic, T., Ahmetoglu, G., & Furnham, A. (2008). Little more than personality: dispositional determinants of test anxiety (the Big Five, core self-evaluations, and self-assessed intelligence). *Learning and Individual Differences*, 18, 258-263.
- Corker, K. S., Oswald, F. L., & Donnellan, M. B. (2012). Conscientiousness in the Classroom: A Process Explanation. *Journal of Personality*, 80(4), 995-1028.
- Costa, P. T., & McCrae, R. R. (1992). The 5-factor model of personality and its relevance to personality disorders. *Journal of Personality Disorders*, 6(4), 343-359.
- De Feyter, T., Caers, R., Vigna, C., & Berings, D. (2012). Unraveling the impact of the Big Five personality traits on academic performance: The moderating and mediating effects of self-efficacy and academic motivation. *Learning and Individual Differences*, 22(4), 439-448.
- Deary, I. J., Strand, S., Smith, P., & Fernandes, C. (2007). Intelligence and educational achievement. *Intelligence*, 35(1), 13-21.
- Di Giunta, L., Alessandri, G., Gerbino, M., Kanacri, P. L., Zuffiano, A., & Caprara, G. V. (2013). The determinants of scholastic achievement: The contribution of personality traits, self-esteem, and academic self-efficacy. *Learning and Individual Differences*, 27, 102-108.
- Digman, J. M. (1990). Personality structure: Emergence of the five-factor model. *Annual Review of Psychology*, 41(1), 417.
- Dinger, F. C., & Dickhäuser, O. (2013). Does implicit theory of intelligence cause achievement goals? Evidence from an experimental study. *International Journal of Educational Research*.
- Diseth, A. (2011). Self-efficacy, goal orientations and learning strategies as mediators between preceding and subsequent academic achievement. *Learning and Individual Differences*, 21(2), 191-195.

- Dweck, C. S., & Henderson, V. L. (1989). Theories of Intelligence: Background and Measures.
- Eysenck, M. W., Derakshan, N., Santos, R., & Calvo, M. G. (2007). Anxiety and cognitive performance: Attentional control theory. *Emotion*, 7(2), 336-353.
- Farsides, T., & Woodfield, R. (2003). Individual differences and undergraduate academic success: the roles of personality, intelligence, and application. *Personality and Individual Differences*, 34(7), 1225-1243.
- Field, A. (2012). *Discovering statistics using IBM SPSS : and sex and drugs and rock'n'roll* (4th ed.). London: Sage.
- Furnham, A. (2014). Increasing your intelligence: Entity and incremental beliefs about the multiple "intelligences". *Learning and Individual Differences*, 32, 163-167.
- Furnham, A., Chamorro-Premuzic, T., & McDougall, F. (2002). Personality, cognitive ability, and beliefs about intelligence as predictors of academic performance. *Learning and Individual Differences*, 14(1), 47-64.
- Furnham, A., Nuygards, S., & Chamorro-Premuzic, T. (2013). Personality, assessment methods and academic performance. *Instructional Science*, 41(5), 975-987.
- Goldberg, L. R., Johnson, J. A., Eber, H. W., Hogan, R., Ashton, M. C., Cloninger, C. R., & Gough, H. G. (2006). The international personality item pool and the future of public-domain personality measures. *Journal of Research in Personality*, 40, 84-96.
- Hassanzadeh, R., Ebrahimi, S., & Mahdinejad, G. (2012). Studing Test Anxiety and Its Relationship with Self-Efficacy, Metacognitive Beliefs and Some Effective Predictable Variables. *European Journal of Social Sciences*, 30(4), 511-522.
- Hembree, R. (1988). Correlates, Causes, Effects, and Treatment of Test Anxiety. *Review of Educational Research*, 58(1), 47-77.
- Higher Education Statistics Agency. (2012). HE Qualifications obtained by location of HE Institution, mode of study, domicile, gender, level of qualification and class of first degree 2010/11 : Table 17. Retrieved 02 March 2015, from <https://docs.google.com/spreadsheet/iv?key=0Aq73qj3QsIDedFUyaXBaZXJDajcxbFBzWEFjb1E5TIE&pli=1>
- Jensen, A. R. (1980). Bias in Mental Testing.
- Kappe, R., & van der Flier, H. (2010). Using multiple and specific criteria to assess the predictive validity of the Big Five personality factors on academic performance. *Journal of Research in Personality*, 44(1), 142-145.

- Keogh, E., Bond, F. W., & Flaxman, P. E. (2006). Improving academic performance and mental health through a stress management intervention: Outcomes and mediators of change. *Behaviour Research and Therapy*, 44(3), 339-357.
- Keogh, E., Bond, F. W., French, C. C., Richards, A., & Davis, R. E. (2004). Test anxiety, susceptibility to distraction and examination performance. *Anxiety Stress and Coping*, 17(3), 241-252.
- Kline, R. B. (2005). *Principles and practice of structural equation modelling*. New York: Guildford Press.
- Komarraju, M., Karau, S. J., Schmeck, R. R., & Avdic, A. (2011). The Big Five personality traits, learning styles, and academic achievement. *Personality and Individual Differences*, 51(4), 472-477.
- Komarraju, M., & Nadler, D. (2013). Self-efficacy and academic achievement: Why do implicit beliefs, goals, and effort regulation matter? *Learning and Individual Differences*, 25, 67-72.
- Laidra, K., Pullmann, H., & Allik, J. (2007). Personality and intelligence as predictors of academic achievement: A cross-sectional study from elementary to secondary school. *Personality and Individual Differences*, 42, 441-451.
- Lang, J. W. B., & Lang, J. (2010). Priming Competence Diminishes the Link Between Cognitive Test Anxiety and Test Performance: Implications for the Interpretation of Test Scores. *Psychological Science*, 21(6), 811-819.
- Lee, W., Lee, M.-J., & Bong, M. (2014). Testing interest and self-efficacy as predictors of academic self-regulation and achievement. *Contemporary Educational Psychology*, 39, 86-99.
- Lüdtke, O., Roberts, B. W., Trautwein, U., & Nagy, G. (2011). A random walk down university avenue: life paths, life events, and personality trait change at the transition to university life. *Journal of Personality and Social Psychology*, 101(3), 620.
- Macaskill, A., & Denovan, A. (2013). Developing autonomous learning in first year university students using perspectives from positive psychology. *Studies in Higher Education*, 38(1), 124-142.
- Martin, A. J. (2009). Motivation and engagement across the academic life span a developmental construct validity study of elementary school, high school, and university/college students. *Educational and Psychological Measurement*, 69(5), 794-824.

- Mazzone, L., Ducci, F., Scoto, M. C., Passaniti, E., D'Arrigo, V. G., & Vitiello, B. (2007). The role of anxiety symptoms in school performance in a community sample of children and adolescents. *BMC Public Health*, 7, 347.
- McAbee, S. T., & Oswald, F. L. (2013). The Criterion-Related Validity of Personality Measures for Predicting GPA: A Meta-Analytic Validity Competition. *Psychological Assessment*, 25(2), 532-544.
- McIlroy, D., & Bunting, B. (2002). Personality, Behaviour, and Academic Achievement: Principles for Educators to Inculcate and Students to Model. *Contemporary Education Psychology*, 27, 326-337.
- McIlroy, D., Bunting, B., & Adamson, G. (2000). An evaluation of the factor structure and predictive utility of a test anxiety scale with reference to students' past performance and personality indices. *British Journal of Educational Psychology*, 70, 17-32.
- McIlroy, D., Poole, K., Moriarty, A., & Ursavas, T. F. (2015). Distal and proximal associates of academic performance at secondary level: A mediation model of personality and self-efficacy. *Learning and Individual Differences*, 38, 1-9.
- Molden, D. C., & Dweck, C. S. (2006). Finding 'Meaning' in Psychology: A Lay Theories Approach to Self-Regulation, Social Perception, and Social Development. *American Psychologist*, 61(3), 192-203.
- Nie, Y., Lau, S., & Liau, A. K. (2011). Role of academic self-efficacy in moderating the relation between task importance and test anxiety. *Learning and Individual Differences*, 21(6), 736-741.
- Noftle, E. E., & Robins, R. W. (2007). Personality predictors of academic outcomes: Big five correlates of GPA and SAT scores. *Journal of Personality and Social Psychology*, 93(1), 116-130.
- O'Connor, M. C., & Paunonen, S. V. (2007). Big Five personality predictors of post-secondary academic performance. *Personality and Individual Differences*, 43(5), 971-990.
- Parker, P. D., Marsh, H. W., Ciarrochi, J., Marshall, S., & Abduljabbar, A. S. (2014). Juxtaposing math self-efficacy and self-concept as predictors of long-term achievement outcomes. *Educational Psychology*, 34(1), 29-48.
- Pervin, L. A. (2003). *The science of personality* (2nd Ed.). Oxford Oxford University Press
- Pintrich, P. R. (2000). An achievement goal theory perspective on issues in motivation terminology, theory, and research. *Contemporary Educational Psychology*, 25(1), 92-104.

- Poropat, A. E. (2009). A Meta-Analysis of the Five-Factor Model of Personality and Academic Performance. *Psychological Bulletin*, 135(2), 322-338.
- Prat-Sala, M., & Redford, P. (2010). The interplay between motivation, self-efficacy, and approaches to studying. *British Journal of Educational Psychology*, 80(2), 283-305.
- Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, and Computers*, 36(4), 717-731.
- Putwain, D. W. (2007). Test anxiety in UK schoolchildren: Prevalence and demographic patterns. *British Journal of Educational Psychology*, 77, 579-593.
- Putwain, D. W., & Daly, A. L. (2014). Test anxiety prevalence and gender differences in a sample of English secondary school students. *Educational Studies*, 40(5), 554-570.
- Putwain, D. W., & Symes, W. (2012). Achievement goals as mediators of the relationship between competence beliefs and test anxiety. *British Journal of Educational Psychology*, 82, 207-224.
- Reeve, C. L., Bonaccio, S., & Winford, E. C. (2014). Cognitive ability, exam-related emotions and exam performance: A field study in a college setting. *Contemporary Educational Psychology*, 39(2), 124-133.
- Richardson, M., Abraham, C., & Bond, R. (2012). Psychological Correlates of University Students' Academic Performance: A Systematic Review and Meta-Analysis. *Psychological Bulletin*, 138(2), 353-387.
- Rickert, N. P., Meras, I. L., & Witkow, M. R. (2014). Theories of intelligence and students' daily self-handicapping behaviors. *Learning and Individual Differences*, 36, 1-8.
- Robbins, S. B., Allen, J., Casillas, A., Peterson, C. H., & Le, H. (2006). Unraveling the Differential Effects of Motivational and Skills, Social, and Self-Management Measures from Traditional Predictors of College Outcomes. *Journal of Educational Psychology*, 98(3), 598-616.
- Rosander, P., & Backstrom, M. (2012). The unique contribution of learning approaches to academic performance, after controlling for IQ and personality: Are there gender differences? *Learning and Individual Differences*, 22(6), 820-826.
- Schnell, K., Ringeisen, T., Raufelder, D., & Rohrmann, S. (2015). The impact of adolescents' self-efficacy and self-regulated goal attainment processes on school

performance — do gender and test anxiety matter? *Learning and Individual Differences*.

- Seipp, B. (1991). Anxiety and academic performance: A meta-analysis of findings. *Anxiety Research*, 4(1), 27-41.
- Shi, Z., Gao, X., & Zhou, R. (2014). Emotional working memory capacity in test anxiety. *Learning and Individual Differences*, 32, 178-183.
- Sommer, M., & Arendasy, M. E. (2014). Comparing different explanations of the effect of test anxiety on respondents' test scores. *Intelligence*, 42, 115-127.
- Spearman, C. (1927). *The abilities of man*. Oxford, England: Macmillan.
- Szafranski, D. D., Barrera, T. L., & Norton, P. J. (2012). Test anxiety inventory: 30 years later. *Anxiety Stress and Coping*, 25(6), 667-677.
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). London: Pearson.
- Trapmann, S., Hell, B., Hirn, J.-O. W., & Schuler, H. (2007). Meta-Analysis of the Relationship Between the Big Five and Academic Success at University. *Zeitschrift Fur Psychologie-Journal of Psychology*, 215(2), 132-151.
- UCAS. (2014). End of Cycle Report 2014: UCAS Analysis and Research. Retrieved 02/03/2015, from <https://www.ucas.com/sites/default/files/2014-end-of-cycle-report-dec-14.pdf>
- Valentine, J. C., DuBois, D. L., & Cooper, H. (2004). The relation between self-beliefs and academic achievement: A meta-analytic review. *EDUCATIONAL PSYCHOLOGIST*, 39(2), 111-133.
- Vedel, A. (2014). The Big Five and tertiary academic performance: A systematic review and meta-analysis. *Personality and Individual Differences*, 71, 66-76.
- Wang, Q., & Ng, F. F.-Y. (2012). Chinese students' implicit theories of intelligence and school performance: Implications for their approach to schoolwork. *Personality and Individual Differences*, 52, 930-935.
- Zhao, Q., Zhang, J., & Vance, K. (2013). Motivated or paralyzed? Individuals' beliefs about intelligence influence performance outcome of expecting rapid feedback. *Learning and Individual Differences*, 23(1), 168-171.
- Zimmerman, B. J. (2000). Self-Efficacy: An Essential Motive to Learn. *Contemporary Educational Psychology*, 25(1), 82-91.

Zuffiano, A., Alessandri, G., Gerbino, M., Kanacri, B. P. L., Di Giunta, L., Milioni, M., & Caprara, G. V. (2013). Academic Achievement: The Unique Contribution of Self-Efficacy Beliefs in Self-Regulated Learning beyond Intelligence, Personality Traits, and Self-Esteem. *Learning and Individual Differences*, 23, 158-162.