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Predicting grade point average from the hybrid model of learning in personality: consistent findings from Ugandan and Australian students

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Jackson developed a hybrid model of learning in personality, known as the Learning Styles Profiler (LSP), which seeks to explain personality in terms of biological, socio-cognitive and experiential processes. The hybrid model argues that functional learning outcomes can be understood in terms of how cognitions and experiences re-express sensation seeking as functional learning. In two studies from Uganda and Australia ($n = 136$ and $n = 290$ respectively), grade point average (GPA) of students was successfully predicted from the hybrid model. Results show evidence of three indirect pathways from sensation seeking through cognitions to GPA and provide a new understanding of the way in which personality can predict performance.

Keywords: academic performance; personality; learning style; hybrid model of learning in personality; learning styles profiler

The successful completion of a college degree is a very important outcome in many peoples' lives. One established criterion of academic success is the grade point average (GPA). Although there are many reasons why students might achieve a high GPA, one likely important possibility is individual differences in functional learning. The aim of this study is to explore how the 'hybrid model of learning in personality' provides an explanation of how GPA might be predicted.

In general, recent research has indicated a consistent and general link between personality and positive outcomes, such as work performance (Barrick & Mount, 1991), and more specifically that conscientiousness influences academic performance (e.g. Dollinger & Orf, 1991; Musgrave-Marquardt, Bromley & Dalley, 1997). Emotional intelligence also seems important in predicting academic success (e.g. Bar-On & Parker, 2000; Parker, Duffy, Wood, Bond, & Hogan, 2005; Petrides, Frederickson, & Furnham, 2004), although others dispute the importance of emotional intelligence (e.g. Barchard, 2003; Newsome, Day & Catano, 2000; O'Connor & Little, 2003).

Less is known about the processes underlying how personality predicts educational outcomes. Theorists (e.g. Hair & Graziano, 2003; McAdams, 1995; Revelle, 1995) have long pointed out that studies identifying correlations between broad

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features of personality and outcomes must be supplemented by research which illuminates the underlying processes. Jackson's (2005, 2008) hybrid model of learning in personality provides an interesting new way of studying these processes and is described in Table 1. The model is developed from an earlier version reviewed by O'Connor and Jackson (2007). Jackson's model uniquely and parsimoniously provides a process model which combines the biological, socio-cognitive and experiential viewpoints of personality and follows the general perspectives of Elliot and Thrash (2002) and Humphreys and Revelle (1984). The biological basis of personality is represented by *Sensation Seeking*.

Zuckerman's (1994) scale of Sensation Seeking has a biological basis relating to dopamine and testosterone but has a focus on dysfunctional outcomes (Arnett, 1994). Nevertheless, Zuckerman's Sensation Seeking scale is also related to learning (Ball & Zuckerman, 1992; Pickering, 2004). Jackson extends this perspective by arguing that Sensation Seeking is better defined in terms of being curious and exploratory.

The hybrid model of learning in personality argues that Sensation Seeking is re-expressed in various ways. This builds principally on the work of Elliot and Thrash (2002) and Jackson and Francis (2004) who suggest that human behaviour is more complex and strategic than lower-level animals, because successful human behaviour is largely regulated by higher-order cognitive mechanisms which re-express biological drives as complex, functional and adaptive behaviour. In Jackson's model, the higher-order mechanisms are represented by well known socio-cognitive models of personality. The use of existing and quite well-understood socio-cognitive models makes Jackson's model quite different from Cloninger, Syrkic and Przybeck (1993) model of personality which fails to take advantage of this existing and relatively well-understood body of research. *Goal-Oriented Achiever* is a cognition similar to learning goal orientation (Dweck & Leggett, 1988; VandeWalle & Cummings, 1997). *Conscientious Achiever* is similar to Conscientiousness from the Big Five (Costa &

Table 1. Principal relationships between Jackson's (2005, 2008) hybrid model of learning and personality and other models of learning and personality.

Research focus	Jackson's (2005) Learning Styles Profiler	Source
Biological	Sensation Seeker: A high approach and low avoidance biologically based sense of curiosity about the world.	Sensation Seekers (Zuckerman, 1994)
Socio-cognitive	Goal Oriented Achiever: Focuses appetitive motivations on long-term, functional outcomes.	Goal orientation (Dweck & Leggett, 1998; VandeWalle & Cummings, 1997)
Socio-cognitive	Conscientious Achiever: Provides responsible and insightful understanding about the complex social world in which we live.	Conscientiousness (Costa & McRae, 1992)
Socio-cognitive	Emotionally Intelligent Achiever: Provides rational and logical thinking leading to functional outcomes.	Low Neuroticism (Eysenck, 1967) and high Emotional Intelligence (Petrides et al., 2004)
Experiential	Deep Learning Achiever: Provides well thought-out and well constructed outcomes.	Deep knowledge (Kolb, 1984)

Note: Adapted from Jackson et al. (2009).

McCrae, 1992) but with more of a cognitive basis in terms of social responsibility and persistence. *Emotionally Intelligent Achiever* is concerned with rationality, emotional independence and objectivity (which, it should be noted, contrasts with the more general definitions of emotional intelligence widely used in the literature that are concerned with the smart use of emotions). The experiential component of the model is represented by *Deep Learning Achiever* which relates to an interest in acquiring and reflecting on deep knowledge (loosely representing a part of Kolb's [1984] model of experiential learning). In short, Jackson argues that these cognitive and experiential processes provide a means through which *Sensation Seeking* is re-expressed such that functional outcomes are achieved. Once the indirect functional pathway is partialled, Jackson argues that *Sensation Seeking* is likely to be a direct predictor of dysfunctional outcomes much like Zuckerman's (1994) scale of *Sensation Seeking*. Jackson, Hobman, Jimmieson and Martin (2009) report that the model generally better predicts self- and supervisor ratings of work and university performance than the Giant Three, Big Five, and goal orientation models. A recent study shows that training to improve *Conscientious Achiever* was successful whereas training to improve *Sensation Seeking* was not. Such results are in accord with the proposed socio-cognitive basis to *Conscientious Achiever* which makes it open to change and the biological basis of *Sensation Seeking* which makes it less open to change (Siadaty & Taghiyareh, 2007).

Jackson (2008) specifically argues for two approach-oriented learning paths from *Sensation Seeking* to functional outcomes. The first learning path is that sensation seekers are likely to be functional when they re-express their *Sensation Seeking* through being Goal-Oriented Achievers (i.e. that functional learners are high sensation seekers who want to master problems). O'Connor and Jackson (2008) and Jackson et al. (2009) find strong evidence of this indirect pathway in the prediction of functional performance (in maze completion, in supervisor and self-rated work performance, in leadership and in self-reported school and university performance). There is some physiological evidence to support Jackson's suggestion that impulsive instincts related to *Sensation Seeking* are regulated by cognitive insight. Brain imaging research shows drug use results in activation of the frontal cortex as poor control of impulsive behaviour is related to prefrontal damage (Jentsch & Taylor, 1999) and the orbitofrontal cortex (OFC) seems important in regulating impulsivity (Rolls, 1986). In this study, we extend the proposed pathway to also argue that functional learners re-express their goal-oriented achievement as emotionally intelligent achievement (i.e. that functional learners who master situations will achieve rationality and emotional independence). *Emotionally Intelligent Achiever* is then seen to be a predictor of GPA (as rational and emotionally independent people will also tend to achieve a high GPA).

A second path was also argued for by Jackson (2008) and this is the first study in which this path is used to predict functional behaviour. It is argued that functional learners will re-express their *Sensation Seeking* through being *Deep Learning Achievers* (i.e. high sensation seekers who are functional learners will channel their curiosity and exploratory drive into pro-actively having deep learning experiences such that they will reflect and want to know all about the underlying reasons for how things work). Functional learners who are deep learners will then re-express their deep learning through being *Conscientious Achievers* (i.e. functional learners who have reflected will be persistent hard workers and socially responsible) and this in turn will lead to high emotionally intelligent achievement (i.e. functional learners who are conscientious will tend to achieve rationality and high emotional independence) and consequently high

GPA. In short this path argues that functional success in terms of GPA can be explained by a process through which Sensation Seeking is re-expressed through a series of higher-order experiences and cognitions in which curiosity leads to rationality through a process of reflecting and sustained hard work. This functional indirect pathway can be summarised as exploring → reflecting → persisting → rationality → GPA. The order of this pathway has some loose resemblance to experiential learning cycles (as proposed by Kolb [1984] and later researchers) but has content developed from prominent and widely known biological, socio-cognitive and experiential models.

The current research aims to predict GPA from the learning processes outlined in the new hybrid learning in personality model using two groups of students from Uganda and Australia. This proposed model represents a new way of thinking about personality processes, functional learning and provides an important new perspective concerning how we might predict educational performance. As argued by Jackson (2008), the model presents a direct challenge to traditional models of personality as well as models of experiential learning by aiming to explain as well as describe how personality predicts performance. The following hypotheses are tested:

H1: The indirect pathway from Sensation Seeking, through Goal-Oriented Achiever to Emotionally Intelligent Achiever will predict GPA.

H2: The indirect pathway from Sensation Seeking through Deep Learning Achiever and Conscientious Achiever to Emotionally Intelligent Achiever will predict GPA.

As noted already, Jackson's model argues that dysfunctional learning is associated with Sensation Seeking once the functional elements have been partialled (see Jackson et al., 2009; O'Connor & Jackson, 2008). If this is the case, then it might reasonably be expected that a further pathway will emerge in which Sensation Seeking is related to low Emotionally Intelligent Achiever or low rationality. In other words, it is argued that functional learners re-express Sensation Seeking as Goal Orientated Achiever and/or Deep Learning Achiever. Remaining variance in Sensation Seeking is unlikely to be functional and reflects a lack of emotional independence and rationality when re-expressed through the indirect pathway of Emotionally Intelligent Achiever, or directly as anti-social behaviour as shown by O'Connor and Jackson (2009). This leads to:

H3: There will be a negative path between Sensation Seeking and Emotionally Intelligent Achiever.

Method

Participants

Two sets of participants were used in this study: (1) Psychology students from the first year at Makerere University, Uganda ($n = 132$; 43 male, 89 female; mean age = 21.82 years; SD = 1.96); and (2) Psychology students from the first year at University of Queensland, Australia ($n = 290$; 82 male, 206 female; mean age 20.44; SD = 5.18).

Measures and procedure

The learning styles profiler

The Learning Styles Profiler (LSP) (Jackson, 2005, 2008) measures learning preferences on five scales: Sensation Seeking, Goal-Oriented Achiever, Conscientious

Achiever, Emotionally Intelligent Achiever and Deep Learning Achiever. Sensation Seeking is an exploratory drive characterised by the tendency to be high in approach and low in avoidance. An example item is 'I am excited by what is new in my field'. The scale is designed to measure Sensation Seeking as neither positive nor negative which contrasts with Zuckerman's more negative interpretation of Sensation Seeking (Zuckerman, 1994). Jackson (2005) reported that Sensation Seeking was significantly correlated with Cloninger et al.'s (1993) Novelty Seeking ($r = 0.34$). Jackson's Sensation Seeking is slightly more strongly related to biological markers of male androgens than Zuckerman's (1994) Sensation Seeking Scale, which provides some support for the proposed biological basis to this scale.

Goal-Oriented Achiever measures mastery, competence and self-efficacy. High scorers pursue adaptive response patterns, allocate cognitive resources to problems, and pursue specific, difficult and challenging goals. An example item is 'I achieve specific goals that I set myself'. Jackson (2005) reported that the Goal Orientated Achiever scale was correlated with VandeWalle and Cummings' (1997) Learning Goal Orientation ($r = 0.48$).

Deep Learning Achievers are characterised as people who want to find out about why things are the way that they are. They reflect and think about the world. An example item is: 'I enjoy working on a project that involves a great deal of library research'. Jackson (2005) reports that Deep Learning Achievement is correlated with Cloninger et al.'s (1993) scale of Self-Transcendence ($r = 0.35$). It is important to note that Deep Learning Achievers are pro-active learners and this is why a positive relationship with Sensation Seeking is expected.

Conscientious Achievers are socially responsible, persistent and hard working. Jackson (2005) reports that it correlates with Conscientiousness from the NEO-IPIP ($r = 0.34$). An example item is 'I usually think carefully before doing things'. Emotionally Intelligent Achievers are rational and emotionally independent and Jackson (2005) reports that it is negatively correlated with Eysenck's (1967) Psychoticism ($r = -0.37$). An example item (reverse scored) is: 'I often feel a lack of control over the direction my life is taking'.

Each scale has 15 items, and is answered with either 'True', 'False', or 'Can't decide' on a three-point Likert-type scale. High scores reflect behaviour similar to the trait title. Alphas of the scales of the LSP have been reported as being 0.69 or more on all scales in all studies (Jackson, 2005, 2008; Jackson et al., 2009; O'Connor & Jackson, 2008).

Jackson's model is specifically designed to have some correlations between the scales as cognitions and experiences are seen as proximal higher-order cognitive processes which functionally re-express the distal construct of Sensation Seeking. Jackson (2005) therefore chooses an oblique factor analysis over orthogonal to justify the item locations on each of the scales.

GPA was measured as a functional university outcome based on the average grade already achieved at university. Students were asked to indicate their current GPA derived from their ongoing marks in their first year at university. Gray and Watson (2002) compared self-report GPA with GPA provided from academic records and found the correlation to be very high ($r = 0.84$, $n = 294$) so, like Gray and Watson (2002), we were confident that student-reported GPA was representative of actual GPA. GPA has different scale characteristics in Uganda and Australia, so GPA was standardised within each country prior to analyses so that the sample characteristics of GPA were the same for each country.

Data analysis

Similar indirect pathways between Jackson's scales of the hybrid learning in personality model have previously been proposed using a large sample in which the biological scale of Sensation Seeking is seen as a distal predictor of proximal cognitions (Jackson, 2008). The two pathways from this previous research inspire the indirect pathways tested in the current study. Indirect pathways in the current research were computed using a standard Structural Equation Modelling (SEM) package and significance of indirect pathways was computed by bootstrap. The goodness of fit across the two groups is reported. We did not test for mediation since we did not hypothesise a direct relationship between Sensation Seeking and GPA, which is Step 1 of Baron and Kenny's (1986) tests of mediation.

Results

Means, standard deviations, alphas and correlations are shown in Table 2. Cronbach's alpha coefficients of 0.70 are acceptable and the Australian data meet this criterion. Alphas of the Ugandan data were not available. Goal-Oriented Achiever and Deep Learning Achiever are moderately correlated with Sensation Seeking and there is a range of moderate correlations between the socio-cognitive scales. Emotionally Intelligent Achiever is a significant direct predictor of GPA in Ugandan and Australian samples, and Goal-Oriented Achiever and Conscientious Achiever scales are also significantly correlated with GPA in the Australian Sample.

Multiple regression was used to provide an initial look at the multivariate predictors of GPA. When predicting GPA from the five scales of Jackson's (2005, 2008) model, only Emotionally Intelligent Achiever was predictive in both samples (Ugandans: $\beta = 0.41, p < 0.001$, Australians: $\beta = 0.16, p < 0.01$). Results suggest that quite a reasonable amount of variance in GPA was explained in the Ugandan data ($R^2 = 0.17$), whereas the amount is quite small, although still significant, in the Australian data ($R^2 = 0.06$).

As already noted, Jackson's (2005, 2008) model is designed to explore the processes underlying functional behaviour and is designed to have correlations between the scales such that cognitions provide indirect pathways from Sensation Seeking to behaviour. Hypothesised path models for Ugandan and Australian students are therefore shown in Figure 1. Standardised parameters are shown. Evidence in favour of Hypothesis 1 is provided by significant parameters in both samples along the indirect pathway from Sensation Seeking, through Goal-Oriented Achiever and Emotionally Intelligent Achiever to GPA. Evidence in favour of Hypothesis 2 is provided by significant parameters in both samples from Sensation Seeking, through Deep Learning Achiever, Conscientious Achiever, Emotionally Intelligent Achiever to GPA. Evidence in favour of Hypothesis 3 is shown by significant parameter from Sensation Seeking to Emotional Intelligent Achiever. As expected, there is a negative parameter between Sensation Seeking and Emotionally Intelligent Achiever suggesting that the remaining variance in Sensation Seeking after removing the effects of the two positive pathways lacks rationality and emotional independence.

An additional path between Goal-Oriented Achiever and Conscientious Achiever was included as it was significant for the Australian data. This path was not originally hypothesised, but it is a reasonable addition to the model to argue that Goal-Oriented Achievers will be Conscientious Achievers (i.e. that goal-oriented people who want to master their situation will be conscientious), so this path was added. Goodness of fit

Table 2. Mean, standard deviation (SD), alpha and correlations of the data from Uganda and Australia.

	Uganda			Australia			Correlations				
	Mean	SD	Mean	SD	Alpha	SS	GOA	DLA	CA	EIA	GPA
Sensation Seeker (SS)	23.04	4.29	22.50	5.16	0.71		0.351**	0.232**	0.218*	-0.138	-0.126
Goal Oriented Achiever (GOA)	22.77	3.74	21.04	5.63	0.76	0.539**	0.290**	0.187*	0.207*	0.040	
Deep Learning Achiever (DLA)	19.15	4.21	16.53	5.77	0.70	0.220**	0.029	0.217*	0.076	-0.078	
Conscientious Achiever (CA)	23.24	4.08	20.80	5.80	0.73	0.036	0.322**	0.138*	0.263**	-0.008	
Emotionally Intelligent Achiever (EIA)	20.96	4.58	19.63	5.71	0.69	-0.029	0.269**	-0.167**	0.228**	0.381**	
Grade point average (GPA)	3.37	0.55	5.10	0.87	-0.006	0.134*	0.001	0.181**	0.204**		

Notes: Uganda, $n = 136$; Australia, $n = 290$, means and SDs of GPA are reported in this table prior to standardization; correlations from Australian data form the lower diagonal and are presented in italics.

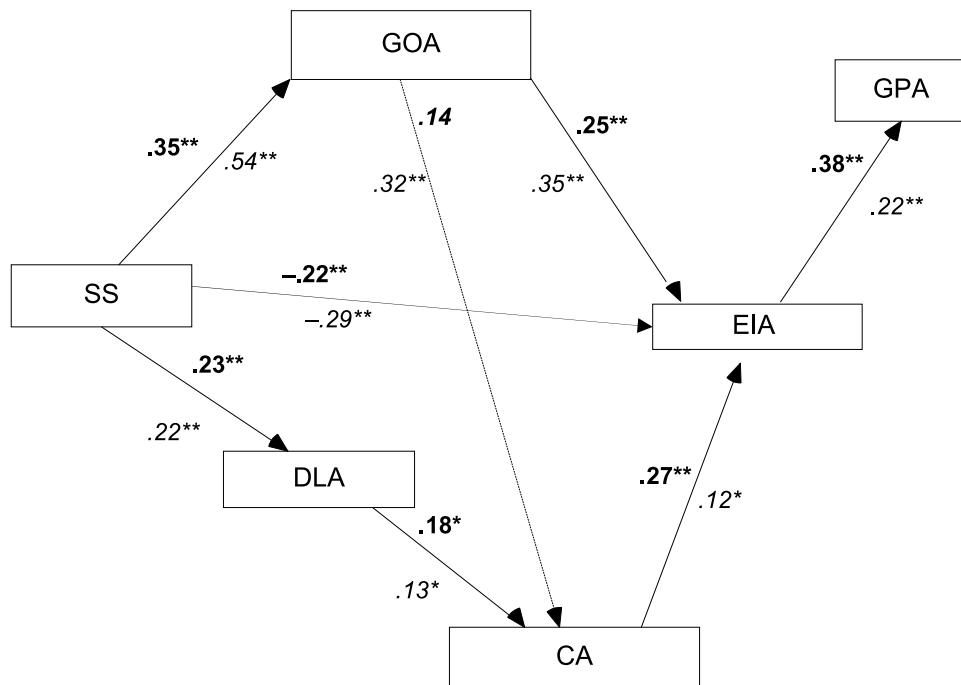


Figure 1. Path model from Sensation Seeking through Emotional Intelligence Achiever to grade point average (GPA).

Notes: Ugandan parameters are presented above the paths (arrows) in bold; Australian parameters are presented below the paths in italics; SS, Sensation Seeking; GOA, Goal Oriented Achiever; DLA, Deep Learning Achiever; CA, Conscientious Achiever; EIA, Emotionally Intelligent Achiever; GPA, Grade Point Average.

of the model across the two samples was acceptable across multiple widely used criteria of fit (Goodness of Fit Index = 0.97; Adjusted Goodness of Fit Index = 0.90; Comparative Fit Index = 0.90; Root Mean Square Error of Approximation = 0.073). We do not report χ^2 as it is almost always significant when fitting this type of model to relatively large samples.

The separate indirect paths from Sensation Seeking and the other scales of the hybrid model of learning in personality to GPA were all significant for both the Ugandan and Australian data (all $p < 0.05$) except the total of the indirect paths from Sensation Seeking to GPA in the Australian data. The reason for the null effect was that the two positive paths were suppressed by the negative path between Sensation Seeking to Emotionally Intelligent Achiever.

Discussion

Based on an already established hybrid process model of learning in personality (Jackson, 2005), a pre-existing path model (Jackson, 2008) and two previous studies which fit parts of the model to functional learning outcomes (Jackson et al., 2009; O'Connor & Jackson, 2008), it was hypothesised that three pathways were likely to predict GPA. The first hypothesis argued in favour of an indirect pathway from Sensation Seeking → Goal-Oriented Achiever → Emotionally Intelligent Achiever

→ GPA. The second hypothesis argued in favour of a pathway from Sensation Seeking → Deep Learning Achiever → Conscientious Achiever → Emotionally Intelligent Achiever → GPA. The third hypothesis argued in favour of a pathway from Sensation Seeking → Emotionally Intelligent Achiever. Evidence in favour of these hypotheses was found across two diverse samples of students.

These pathways argue that functional performance in terms of GPA can be predicted from the curiosity and novelty seeking of Sensation Seeker which is seen as the basis of functional and dysfunctional learning through its emphasis on being an exploratory drive associated with curiosity and exploration. Jackson argues that Sensation Seeking is involved in functional learning only when it is re-expressed through complex cognitions which lead to the development of rationality. In the first pathway, Goal Orientated Achiever provides the high Sensation Seeker with long-term allocation of cognitive resources towards solving problems, the self-efficacy to achieve success and the opportunity to delay gratification. In turn, the ability to create long-term plans in functional learners leads to the achievement of Emotional Intelligence, which emphasises rationality and emotional independence and this leads to improved GPA. In the second pathway, functional learners are those who re-express Sensation Seeker as deep learning, then conscientiousness and then rationality. The pathways argues for a progressive re-expression of Sensation Seeking through a socio-cognitive pathway towards a functional outcome.

Evidence of a dysfunctional pathway is shown by the negative relationship between Sensation Seeking and Emotionally Intelligent Achiever in which elements of Sensation Seeking remaining after removing effects of the functional pathways are shown to be non-rational. In the Australian sample, this pathway was shown to suppress the two approach pathways hypothesised in this study. This pathway argues that people high in Sensation Seeking (high in exploration and curiosity) will tend to be low in Emotional Intelligence (and therefore dependent upon the needs of others, low in rationality, and seeking of emotional support) once the ‘virtuous’ indirect pathways have been partialled. This finding supports O’Connor and Jackson’s (2008) view that dysfunctional learning, as well as functional learning, is associated with Sensation Seeking.

This research provides a first attempt at understanding learning processes from Sensation Seeking with its widely accepted biological basis (e.g. Zuckerman, 1994) in two functional pathways leading to the achievement of Emotional Intelligence and then to GPA. It is interesting to note that the two positive pathways can be interpreted in terms of approach tendencies as well as being related to intrinsic motivation. Goal-Oriented Achiever is about learning goals and high self-efficacy such that passion and interest are stimulated, and resources allocated to the problem, in the absence of environmental rewards and punishments. The second pathway also concerns intrinsic motivation as it reflects a desire to find out a lot about the world and the deeper reason why things work as they do (Deep Learning Achiever) and the consequent beneficial effects of re-expressing Deep Learning Achievement through Conscientiousness and Emotional Intelligence. Again, this occurs in the absence of environmental reward and punishment. Jackson’s focus on intrinsic motivation contrasts therefore with Gray’s model of Reinforcement Sensitivity Theory (r-RST; Gray & McNaughton, 2000; Smillie, Pickering & Jackson, 2006; Jackson, 2009) which focuses on extrinsic motivation.

A positive link between Goal-Oriented Achiever and Conscientious Achiever was also identified in the Australian sample, although this was not hypothesised. It is not

surprising that a positive link exists between those who have learning goals and those who work hard. What is perhaps surprising is that the link was not identified in the Ugandan students.

This research suggests that Jackson's Emotionally Intelligent Achiever, and the processes underlying Emotionally Intelligent Achiever, are good predictors of GPA across two groups of students from very different cultures: one from Uganda and one from Australia. We think that the stability of this finding from developing and developed countries suggests some generalisability. Our findings add to the literature which suggests an inconsistent relationship between emotional intelligence and educational achievement (e.g. Bar-On & Parker, 2000; Parker et al., 2005; Petrides et al., 2004; cf. Barchard, 2003; Newsome et al., 2000; O'Connor & Little, 2003). However, this research also adds to the more general literature in several important ways.

First, the definition of Emotionally Intelligent Achiever in Jackson's (2005) hybrid model of learning in personality is different from other definitions of Emotional Intelligence widely used in the literature, and this perhaps is why less ambiguous results are found. Jackson (2005) defines Emotionally Intelligent Achiever much more about achieving emotional independence, objectivity and rationality, whereas Emotional Intelligence is more widely understood in terms of intelligent management of emotions. Salovey and Mayer (1990) for example define Emotional Intelligence in terms of monitoring one's own and others' feelings and emotions and using this information to guide one's thinking and actions. Jackson's (2005) focus on rationality and emotional independence as a definition of Emotional Intelligence is narrower and more specific and this may, therefore, be a useful contribution to the literature.

Second, this research identifies processes underlying Emotional Intelligence and, therefore, how they shape the emergence of rationality in the prediction of GPA. This is important because Jackson's model argues that cognitions in learning and personality are more easy to change than biological drives. In other words, the model argues that GPA can be better improved through a focus on Goal Orientation, Conscientiousness, Deep Learning and Emotional Intelligence than through Sensation Seeking. This is especially the case in Jackson's model since Sensation Seeking is seen as a predictor of both functional and dysfunctional learning and, therefore, intervention in terms of Sensation Seeking is likely to have both positive and negative consequences. On the other hand, intervention to improve cognitions is likely only to produce beneficial results (which is why they are called Achievement Scales within Jackson's model to emphasise the directional nature of their functioning).

Third, Jackson's model of learning has been shown to predict GPA in Australian and Ugandan students. This suggests generalisability of the model across students from diverse cultural backgrounds and adds to the small but growing literature in favour of Jackson's model (Jackson, 2005, 2008; Jackson et al., 2009; O'Connor & Jackson, 2008; Siadaty & Taghiyareh, 2007).

Finally, a note on statistical methodology is warranted. Mediation, according to Baron and Kenny (1986), is tested for as a multi-stage process in which Stage 1 is a test of a direct relationship between the independent variable (in this case Sensation Seeking) and the dependent variable (in this case GPA). Baron and Kenny argue that Step 1 must be significant for mediation although other researchers argue that Step 1 is not necessary (e.g. Collins, Graham, & Flaherty, 1998; MacKinnon, 2000; MacKinnon, Krull & Lockwood, 2000; Shrout & Bolger, 2002). Examples of when Step 1 is not necessary include when there is a temporal difference between the

dependent variable and the independent variable or if an indirect pathway is all that the theory specifies. We make both of these arguments. From a theoretical perspective, Jackson's model argues that Sensation Seeking is a primitive energising biological drive, which is re-expressed through higher-order cognitions to achieve functional learning, and therefore strongly suggests that Sensation Seeking occurs temporally earlier in the processing of information than the cognitions. Supporting this viewpoint is the perspective that Sensation Seeking is likely to have developed early in evolution as a mechanism to encourage approach-oriented behaviours, whereas the higher cognitive processes developed later as a means of refining those behaviours. From this perspective, the cognitive mechanisms are seen as ways of adapting and changing relatively primitive drives towards productive and sophisticated outcomes. Also, it needs to be noted that Jackson's model argues that the direct path from Sensation Seeking predicts dysfunctional behaviour (as demonstrated by Jackson et al. [2009] and O'Connor and Jackson [2008]) and, therefore, should not be expected to predict functional behaviour. The important point here is that a direct path between Sensation Seeking and functional behaviour such as GPA is not needed for support of Jackson's model. Since we did not test for a significant Step 1 of mediation, formal mediation testing was not conducted in this study and instead we looked for significant indirect effects. We do need to stress that we have not tested for causality in this study.

This study also has the limitations that we have not included intelligence in our model or compared the proposed model with other prominent personality or learning models (as was done by Jackson et al. [2009]). Although we have already noted that there is a close correspondence between self-report GPA and recorded GPA (Gray & Watson, 2002), a further limitation is that our GPA scores were reported by the students and may therefore be subject to some self-report biases.

In summary, Jackson's (2005, 2008) hybrid model of learning in personality measured as the LSP provides a new model for understanding some of the processes underlying Emotional Intelligence and the emergence of rationality in the prediction of GPA. This research also adds to a growing literature supporting the hybrid model of learning in personality as an alternative to established models of personality such as the Big Five and established experiential models of learning such as proposed by Kolb (1984).

Notes

1. The word 're-expression' is used quite specifically as it closely represents what is statistically meant by the effect of an indirect path.
2. We expand on this point in the Discussion

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