

**Exploring the Relationship Between Academic Motivation and Academic Success in  
University Students**

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## Abstract

Understanding the factors that facilitate success in university students is of high practical importance. Academic motivation has been shown to be associated with both academic success and university attrition; however, there has been limited research pertaining to academic motivation, as conceptualised by Self-Determination Theory (Deci & Ryan, 1985). This study aimed to clarify the relationships between several subtypes of academic motivation and academic success, using a multi-dimensional measure. Additionally, student self-report measures of satisfaction and engagement were explored as alternative measures of academic motivation. Academic motivation was measured in a sample of  $N = 78$  psychology students, in addition to established predictors of academic success (intellectual ability and personality). A confirmatory factor analysis determined that the seven-factor model of motivation was not suitable for the sample. A subsequent exploratory factor analysis indicated a new four-factor structure. Amotivation was found to be a significant predictor of academic success and was associated with the personality trait neuroticism. Furthermore, the results indicated that younger students were more likely to experience amotivation. Amotivation fully mediated the relationship between satisfaction with choice of course and academic success. Hence, satisfaction with choice of course was found to be a potentially suitable measure of academic motivation. These findings provide valuable insights for tertiary institutions, in regard to determining which students are at risk of dropping out, as well as the students who are more likely to succeed.



## **Declaration**

This thesis contains no material which has been accepted for the award of any other degree of diploma in any University, and, to the best of my knowledge, this thesis contains no material previously published except where due reference is made. I give permission for the digital version of this thesis to be made available on the web, via the University of Adelaide's digital thesis repository, the Library Search and through web search engines, unless permission has been granted by the School to restrict access for a period of time.

## ***Signature***

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Isabelle Jeffriess

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## **1 Introduction**

Success at university is crucial for not only the individual students, but for society as a whole (Piumatti, 2018). Therefore, it is essential to understand the broad range of factors that facilitate success in this environment. The first year of university is instrumental in the development of student attitudes and self-perception (McKenzie, Gow, & Schweitzer, 2004; Valadas, Almeida, & Araújo, 2017). This study aims to fill gaps in the current literature regarding the predictors of academic success; in particular, academic motivation. The final grade for the course *Psychology IA* was used to measure academic success.

### **1.1 Predictors of Academic Success**

Success at university has been found to be influenced by motivation, intellectual ability and personality. Motivation is one of the most studied constructs in educational psychology, due to its influence on student outcomes (Amrai, Motlagh, Zalani, & Parhon, 2011; Robbins, Lauver, Le, Davis, & Langley, 2004). Motivation is operationalised as the perceived reasons that determine, direct and sustain behaviour (Van Iddekinge, Aguinis, Mackey, & DeOrtentiis, 2017). Academic motivation refers to the factors that influence an individual to attend schooling and obtain a degree (Clark & Schroth, 2010). Academic motivation contributes to academic success by affecting the direction, intensity and persistence of effort given to an endeavour (Hirschfeld, Lawson, & Mossholder, 2006; Van Iddekinge et al., 2017; Zhou, 2015). In addition, research has shown that a lack of academic motivation contributes to student drop-out rates at university (Rump, Esdar, & Wild, 2017). For these reasons it is clear why studying academic motivation is instrumental for universities and other tertiary institutions.

Intellectual ability is an established predictor of academic success in university students (O'Connor & Paunonen, 2007; Poropat, 2009). However, success at university

requires more than just ability (McKenzie et al., 2004; O'Connor & Paunonen, 2007). Hence, it is important to understand any other psychological variables that can explain additional individual variance in academic success (De Feyter, Caers, Vigna, & Berings, 2012; Komarraju & Karau, 2005; O'Connor & Paunonen, 2007).

Personality has been extensively studied in relation to academic success. Conscientiousness and openness are traits that have consistently emerged as strong predictors of academic success at university (Busato, Prins, Elshout, & Hamaker, 2000; Chamorro-Premuzic & Furnham, 2008; Furnham, Monsen, & Ahmetoglu, 2009; Kaufman, Agars, & Lopez-Wagner, 2008; Komarraju & Karau, 2005; Komarraju, Karau, & Schmeck, 2009; Mammadov, Cross, & Ward, 2018; McCoach, Yu, Gottfried, & Gottfried, 2017; O'Connor & Paunonen, 2007).

## **1.2 Academic Motivation and Academic Success**

The relationship between academic motivation and academic success has been comprehensively studied (Harackiewicz, Barron, Tauer, & Elliot, 2002; Mammadov et al., 2018). The majority of findings in the current literature, including a meta-analysis by Robbins et al. (2004), support a direct relationship between academic motivation and academic success (Alfaro, Umaña-Taylor, Gonzales-Backen, Bámaca, & Zeiders, 2009; Amrai et al., 2011; Anderson & Keith, 1997; Komarraju et al., 2009; Lei, 2010). The magnitude of this relationship has been inconsistent, possibly due to the variation in motivation theories utilised.

## **1.3 Self-Determination Theory**

The leading theory of academic motivation is Self-Determination Theory, proposed by Deci and Ryan (1985). Self-Determination Theory emphasises three basic psychological

needs: autonomy, competence and relatedness. These are essential in facilitating wellbeing (Deci & Ryan, 2000, 2015; Mammadov et al., 2018). Self-Determination Theory conceptualises motivation on a continuum of autonomy, consisting of intrinsic motivation, extrinsic motivation and amotivation respectively (Deci & Ryan, 2015; Komarraju et al., 2009; Rump et al., 2017). Self-determination refers to the extent to which an individual engages in activities with a sense of volition and choice. This determines the form of motivation for a behaviour, and has led Self-Determination Theory to distinguish between autonomous and controlled motivation (Deci & Ryan, 2000; Rump et al., 2017; Ryan & Deci, 2000). In Self-Determination Theory, all behaviour can be understood in terms of the extent to which it is autonomously motivated (involving a personal interest in the behaviour) or controlled (performed under pressure or coercion) (Mammadov et al., 2018; Zhou, 2015).

Motivation is not considered to be a stable construct. As such, behaviours that are originally performed because of external factors, may become intrinsically motivating for an individual after a period of exposure (Ryan & Deci, 2000). Deci and Ryan's (1985) five-factor model of motivation was later updated to seven factors, with the addition of three intrinsic motivation subtypes (Stover, de la Iglesia, Boubeta, & Liporace, 2012; Vallerand et al., 1992, 1993). The seven-factor model of motivation is represented in Figure 1.

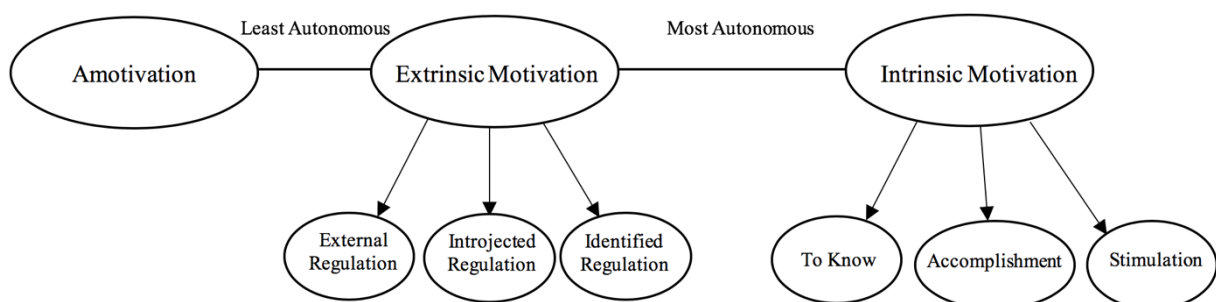


Figure 1. Self-Determination Theory.

### **1.3.1 The Academic Motivation Scale**

The Academic Motivation Scale is based on the seven-factor model of motivation, as conceptualised by Self-Determination Theory (Vallerand et al., 1992). The seven-factor structure of the measure was first validated in a sample of French-Canadian students, by Vallerand et al. (1993). It should be noted that this structure was only validated after considerable post-hoc modifications (Fairchild, Horst, Finney, & Barron, 2005; Vallerand et al., 1992). Since then, the structure has been validated in various other countries, such as the United States of America, Argentina, Singapore and China (Caleon et al., 2015; Cokley, Bernard, Cunningham, & Motoike, 2001; Fairchild et al., 2005; Stover et al., 2012; Zhang, Li, Li, Li, & Zhang, 2015). Despite ultimately supporting the seven-factor structure, Cokley et al. (2001) did not find it to be an adequate fit for their sample. Rather, it was found to be more suited than the alternative structures (Cokley et al., 2001). There is also evidence to suggest that the differences between intrinsic motivation and extrinsic motivation are not as distinct as originally proposed (Cokley, 2000; Cokley et al., 2001). Specifically, Cokley (2000) suggested that introjected regulation (extrinsic motivation to avoid guilt) may represent behaviour that is more autonomous than previously thought. Furthermore, to the best of the researcher's knowledge, the current literature lacks a validation of the seven-factor structure in an Australian university sample.

### **1.3.2 Intrinsic Motivation**

Intrinsic motivation is comprised of an internal locus of control (Komarraju et al., 2009). An individual who is intrinsically motivated will be driven to accomplish and learn for their own sense of enjoyment or fulfillment (Deci & Ryan, 2015; Komarraju et al., 2009; Ryan & Deci, 2000). Self-Determination Theory proposes that intrinsically motivated individuals experience greater wellbeing. This is a result of their sense of control over their

goals, which satisfies the fundamental needs for competence and autonomy (Deci & Ryan, 2000, 2015; Piumatti, 2018). Intrinsic motivation has been found to be positively associated with academic success in university students (Amrai et al., 2011; Komarraju et al., 2009; Lei, 2010). Intrinsic motivation consists of three unordered subtypes that reflect the different elements of this concept: intrinsic motivation to know, intrinsic motivation towards accomplishment and intrinsic motivation to experience stimulation (Clark & Schroth, 2010; Farsides & Woodfield, 2003; Komarraju & Karau, 2005; Komarraju et al., 2009; Vallerand et al., 1992).

### **1.3.3 Subtypes of Intrinsic Motivation**

Intrinsic motivation to know is characterised by a desire to learn and an inherent curiosity (Stover et al., 2012; Vallerand et al., 1992). Individuals high in intrinsic motivation towards accomplishment derive pleasure from the process of achieving and creating, rather than the outcome itself (Rump et al., 2017; Vallerand et al., 1992; Zhou, 2015). Intrinsic motivation to experience stimulation refers to engaging in activities associated with positive sensory sensations (e.g. excitement, aesthetic pleasure) (Clark & Schroth, 2010; Rump et al., 2017; Vallerand et al., 1992; Zhou, 2015).

### **1.3.4 Extrinsic Motivation**

Extrinsic motivation is operative when behaviours result in external rewards (Deci & Ryan, 2015; Ryan & Deci, 2000). Extrinsic motivation has been found to be negatively related to academic success, but for the most part has been found to have no association (Çetin, 2015; Mammadov et al., 2018; McGeown et al., 2014). Unlike intrinsic motivation, the three subtypes of extrinsic motivation are ordered along the self-determination continuum. In order of least to most autonomous, these subtypes are known as: external

regulation, introjected regulation and identified regulation (Clark & Schroth, 2010; Deci & Ryan, 2000, 2015; Vallerand et al., 1992).

### **1.3.5 Subtypes of Extrinsic Motivation**

External regulation is the most controlled form of extrinsic motivation. Behaviours are based on external contingencies, such as rewards (e.g. money) or avoidance of punishment (e.g. parental demand) (Clark & Schroth, 2010; Deci & Ryan, 2000, 2015; Ryan & Deci, 2000; Vallerand et al., 1992). Introjected regulation is the ‘midpoint’ of the three extrinsic motivation subtypes; past external contingencies of behaviour have been partially internalised (Vallerand et al., 1992). Individuals are motivated by a perceived pressure to avoid guilt and anxiety, or enhance self-esteem (Clark & Schroth, 2010; Deci & Ryan, 2000, 2015; Vallerand et al., 1992). Identified regulation is considered the most autonomous form of extrinsic motivation. This occurs when external motives have become fully internalised (Deci & Ryan, 2000, 2015; Ryan & Deci, 2000). An individual identifies with a personal importance of the behaviour, and perceives it as chosen for themselves (Clark & Schroth, 2010; Deci & Ryan, 2015; Ryan & Deci, 2000). An example of identified regulation is a student studying to achieve a high grade for a test, because receiving good grades has value to them (Vallerand et al., 1992).

### **1.3.6 Amotivation**

Amotivation occurs when there are no perceived contingencies between a behaviour and its outcomes (Deci & Ryan, 2000, 2015; Ryan & Deci, 2000; Vallerand et al., 1992). Amotivated individuals may believe an outcome is out of their own control, resulting in feelings of incompetence and likely abandonment of the task (Ryan & Deci, 2000; Vallerand



et al., 1992). Amotivation has been found to negatively correlate with academic success (Kaufman et al., 2008; Mammadov et al., 2018).

#### **1.4 Intellectual Ability**

The association between intellectual ability and academic success is well documented at each level of education, including tertiary studies (Busato et al., 2000; Farsides & Woodfield, 2003). Academic performance was used as criteria for external validation during the development of intellectual ability tests (Furnham et al., 2009). There is an array of evidence to support intellectual ability as the strongest predictor of academic success; however, other factors must also be taken into account (Busato et al., 2000; Chamorro-Premuzic & Furnham, 2008; Furnham et al., 2009; McCoach et al., 2017). Ability tests are useful for determining what an individual is capable of, but not necessarily what behaviours they are likely to engage in (Furnham et al., 2009). In addition to this, intellectual ability scores become more homogenous at higher levels of education, making it essential to consider other predictors of academic success (Chamorro-Premuzic & Furnham, 2008; Furnham et al., 2009).

It has been posited that the relationship between intellectual ability and academic success depends on, or is moderated by, motivation (Ganzach, Saporta, & Weber, 2000; Hirschfeld et al., 2006; Van Iddekinge et al., 2017). This is based on the notion that individuals with low motivation will only allocate a small portion of their ability to a given task. In contrast, individuals with high levels of motivation utilise more of their ability (Ganzach et al., 2000; Hirschfeld et al., 2006). The effects of intellectual ability and academic motivation on academic success have both been studied individually, although there is far less research on their combined impact (Van Iddekinge et al., 2017).

## **1.5 Personality**

Personality refers to underlying traits that determine the behaviours, thoughts and feelings of an individual (McGeown et al., 2014; Zhou, 2015). These are reflected in the habits that an individual adopts (O'Connor & Paunonen, 2007). The Big Five Framework of personality, as proposed by Costa and McCrae (1992), is the most widely accepted conceptualisation of personality structure (Mammadov et al., 2018; McGeown et al., 2014; O'Connor & Paunonen, 2007). The Big Five Framework classifies personality into five higher order traits: openness, conscientiousness, extraversion, agreeableness and neuroticism (Costa & McCrae, 1992).

The Big Five Framework has been extensively researched in terms of its relationship with academic success. Agreeableness, extraversion and neuroticism have not been found to have any consistent relationships with academic success. There is consistent evidence for conscientiousness and openness as predictors of academic success. There is far less research regarding the relationship between the Big Five Framework and academic motivation (Bipp, Steinmayr, & Spinath, 2008; Kaufman et al., 2008; Komarraju et al., 2009; Phillips, Abraham, & Bond, 2003).

### **1.5.1 Conscientiousness**

Conscientiousness reflects traits such self-discipline, achievement orientation and organisation (Komarraju et al., 2009; McGeown et al., 2014). The relationship between conscientiousness and academic success is well established and validated throughout the literature (Farsides & Woodfield, 2003; Kaufman et al., 2008; McGeown et al., 2014; O'Connor & Paunonen, 2007; Poropat, 2009). It has been concluded that conscientiousness is the strongest personality predictor of academic success (Farsides & Woodfield, 2003; McGeown et al., 2014; O'Connor & Paunonen, 2007; Poropat, 2009).

Conscientiousness has also emerged as a predictor of all three types of academic motivation (Komarraju et al., 2009). Conscientiousness has been shown to be positively correlated with both intrinsic and extrinsic motivation (Clark & Schroth, 2010; De Feyter et al., 2012; Kaufman et al., 2008; Komarraju et al., 2009; Mammadov et al., 2018; McGeown et al., 2014). Conscientiousness has consistently been found to be negatively associated with amotivation, suggesting that achievement focused students are less likely to disengage with their studies (Komarraju et al., 2009; Mammadov et al., 2018; McGeown et al., 2014).

It has been proposed that conscientiousness is partially responsible for the influence of academic motivation on academic success. Studies have found that conscientiousness mediates this relationship (De Feyter et al., 2012; Komarraju et al., 2009). The self-disciplinary component of conscientiousness is suggested to be vital for motivation to impact a student's success (De Feyter et al., 2012; Valadas et al., 2017).

### **1.5.2 Openness to Experience**

Openness to experience (referred to as openness), reflects imagination, creativity and intellectual curiosity. A meta-analysis of the relationship between the Big Five Framework variables and academic success, found that openness was a significant but relatively small predictor (Kaufman et al., 2008; Poropat, 2009).

Scoring highly on openness has been found to positively predict intrinsic motivation in students (Komarraju et al., 2009; Mammadov et al., 2018; McGeown et al., 2014). It is logical that those scoring higher on a measure of intellectual curiosity would experience a greater intrinsic desire to learn (Komarraju et al., 2009; McGeown et al., 2014).

### **1.5.3 Neuroticism**

Neuroticism reflects the degree to which an individual experiences negative emotion and emotional instability (Busato et al., 2000; O'Connor & Paunonen, 2007). Although negative effects on academic success have been found, most studies have not found the two to be related (McGeown et al., 2014; O'Connor & Paunonen, 2007; Poropat, 2009; Robbins et al., 2004).

Neuroticism has been shown to be associated with some facets of academic motivation. A relationship with introjected regulation (extrinsic motivation to avoid guilt) has been demonstrated in numerous studies (Clark & Schroth, 2010; De Feyter et al., 2012; Komarraju et al., 2009). A positive relationship with amotivation has also been found, suggesting that neurotic individuals may be more likely to abandon their goals under stress (Phillips et al., 2003). Interestingly, neuroticism has also been found to correlate negatively with amotivation (Hakimi, Hejazi, & Lavasani, 2011; Komarraju et al., 2009). It is possible that high levels of neuroticism and anxiety may motivate some students to persist with their studies (Komarraju & Karau, 2005; Komarraju et al., 2009).

### **1.6 Student Engagement and Satisfaction**

Satisfaction and overall engagement in a course have been found to be beneficial for retention of information, levels of persistence and learning development (Carini, Kuh, & Klein, 2006; Credé & Niehorster, 2012; S. R. Johnson & Stage, 2018; Walker, Greene, & Mansell, 2006). The empirical findings in this field have not been consistent (Strahan & Credé, 2015). Measures of satisfaction and engagement have been found to correlate with academic success in numerous studies; however, the magnitude of these effects has been small and thought to reflect characteristics of motivation (D. M. Johnson, Shoulders, Edgar,

Graham, & Rucker, 2016; Strahan & Credé, 2015; Svanum & Aigner, 2011). It follows that students who are more satisfied or engaged in a course will be more highly motivated.

### **1.7 Limitations of Previous Research**

The seven-factor structure of motivation, as measured by the Academic Motivation Scale, requires exploration in a different cultural context to which it has been created and previously validated (Cokley et al., 2001; Stover et al., 2012). Motivation research in general has largely focused on primary and secondary students. Research has also predominantly used measures of motivation that only incorporate intrinsic and extrinsic motivation, despite evidence for the association between amotivation and academic success. Furthermore, there is a need for clarification regarding the interaction between academic success and academic motivation, in combination with known predictors.

### **1.8 The Current Study**

The purpose of the current study is to comprehensively examine academic motivation in relation to academic success, using a multi-dimensional measure. The seven-factor structure measured by the Academic Motivation Scale will be explored using the current sample. The interaction between academic motivation and other established predictors will also be investigated, to add to the limited body of research in this area. Furthermore, the relationship between academic success and measures of satisfaction and engagement will be examined, as potential alternative measures of academic motivation. Given the gaps surrounding studying motivation using Self-Determination Theory, there is scope for further research in this field. The aims of the current study can be seen in Table 1. Given that the initial aim of the study is exploratory, no specific hypotheses have been formulated.

Table 1

*Aims for the Current Study*

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<b>Aim 1</b>	To determine if the same factor structure proposed in the Academic Motivation Scale can be found in the sample data set
<b>Aim 2</b>	To explore the relationship between academic motivation and academic success
<b>Aim 3</b>	To explore the relationship between academic motivation and academic success, considering established predictors personality and intellectual ability
<b>Aim 4</b>	To determine potential predictors of academic motivation, given a significant relationship with academic success
<b>Aim 5</b>	To explore measures of satisfaction and engagement as potential alternative measures of academic motivation

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## 2 Method

### 2.1 Participants

All participants ( $N = 78$ ) were recruited from the first year course *Psychology 1A*, at the University of Adelaide. Participants were given course credit for their participation in the study. It was assumed that all students enrolled in university in Australia would have sufficient English skills to participate.

### 2.2 Materials

Data collection consisted of two self-report online questionnaires. The first questionnaire consisted of the Raven's Advanced Progressive Matrices Short-Form and the Openness Conscientiousness Extraversion Agreeableness Neuroticism Index Condensed scale (OCEANIC). There were also four items regarding academic satisfaction and engagement. The second questionnaire consisted of the Academic Motivation Scale College Version (Academic Motivation Scale-C- 28; referred to as the Academic Motivation Scale). These measures are described in more detail below.

#### 2.2.1 Academic Success

Academic success is predominantly measured in the literature using Grade Point Averages (GPA) (York, Gibson, & Rankin, 2015). As an average of results for all courses, GPA is subject to grade inflation; hence, Poropat (2009) suggests singular grades as a preferable option. The current study uses the final grade of *Psychology 1A*. This is preferable to a singular exam grade, as the multiple components of university assessment are more accurately represented. Final grades in this course consist of several short tests, one written assignment, tutorial attendance and a final exam. Final grades were obtained through university records.

### **2.2.2 Academic Motivation**

Academic motivation was measured using the Academic Motivation Scale, consisting of 28 items. Using a seven-point Likert scale, participants indicated the extent to which each statement corresponded to the reasons they attend university (*does not correspond at all* = 1, *corresponds moderately* = 4, *corresponds exactly* = 7). This measure produces scores on three subscales of intrinsic motivation, three subscales of extrinsic motivation and amotivation. There are four items for each subscale. The psychometric properties of the Academic Motivation Scale are well supported, with consistently established measures of validity and reliability (Clark & Schroth, 2010; Fairchild et al., 2005; Farsides & Woodfield, 2003; Vallerand et al., 1992). Measures of Cronbach's alpha for the subscales range from .83 to .86, with the exception of the identified regulation scale, which has a range of .62 to .70 (Cokley, 2000; Fairchild et al., 2005; Vallerand et al., 1992).

### **2.2.3 Intellectual Ability**

Data on participants' intellectual ability was collected using the Raven's Advanced Progressive Matrices Short Form. This measure is a 12 item geometric completion test, where items progressively increase in difficulty. Each question provides the participant with eight possible answers to complete the visual pattern, of which only one answer is correct. Two sample questions were provided prior to commencement.

The short form of this measure has been shown to be very similar to the long form of the Raven's Advanced Progressive Matrices, in regards to its psychometric properties (Sefcek, Miller, & Figueredo, 2016). The Raven's Advanced Progressive Matrices Short Form is considered a measure of fluid or general intelligence and as a result, is not susceptible to the confound of previous knowledge (Carpenter, Just, & Shell, 1990). Participants were scored out of 12, with a higher score indicating higher intellectual ability.



### **2.2.4 Personality**

Personality dimensions were measured using the OCEANIC self-report questionnaire. This measure consists of 45 items. Participants are required to rate how frequently each of the statements apply to themselves, using a six-point Likert Scale (*never* = 1, *rarely* = 2, *sometimes* = 3, *often* = 4, *usually* = 5 or *always* = 6). The OCEANIC has high established measures of reliability and validity (Schulze & Roberts, 2006).

### **2.2.5 Academic Engagement and Satisfaction**

Self-report levels of engagement, course satisfaction, progress satisfaction and choice satisfaction (referring to the choice of *Psychology 1A*), were used as potential measures of academic motivation. The survey contained one statement for each of these constructs (e.g. *I am satisfied that I chose this course*). Participants responded to these statements using a five-point Likert scale, ranging from *strongly disagree* (1) to *strongly agree* (5). Course satisfaction was measured on a similar seven-point Likert scale.

## **2.3 Procedure**

Participants elected to partake in Part One and Part Two of the survey via the university Research Participation System. Prior to beginning both questionnaires, participants were presented with information regarding the study. Participants were able to consent to the study by answering ‘yes’ to a statement at the end of this, indicating that they had read and understood the information provided. To ensure anonymity, participants were de-identified.

Survey software Survey Monkey was used to create and administer the questionnaires. Data collection was divided into two questionnaires, to decrease the likelihood of attrition and fatigue. This study was approved by the School of Psychology: Human Research Ethics Subcommittee (Code Number: 1181).

## 3 Results

### 3.1 Data Screening and Quality Control

Data was analysed using the statistical package R (version 23.5.1) with R studio for Mac (2018). Participant responses from Part One and Part Two of the survey were matched and subsequently de-identified, by assigning each participant an identification number. A total of  $N = 162$  participated in Part One of the survey; however, data that did not match up with the data for Part Two was removed. From this ( $N = 82$ ), three participants were removed due to unanswered questions. A further one participant was removed, as they did not consent to the use of their data for research purposes. A sample size  $N = 78$  was used to conduct statistical analyses.

### 3.2 Power Analysis

G\*power 3.1.9.3 was used to conduct an *a priori* power analysis. The results indicated that a sample size of  $N = 153$  was necessary to attain a power level of .80 with a significance criterion of  $\alpha = .05$ , to measure moderate effect sizes utilising up to seven predictors in a multiple regression model. Hence, the current study can be considered underpowered.

### 3.3 Description of Participants

The age of the sample  $N = 78$  participants (50 female, 28 male), ranged from 17 to 46 ( $M = 20.85$ ,  $SD = 5.33$ ).

### 3.4 Assumptions of Correlation and Multiple Regression Analyses

Shapiro-Wilk tests were conducted to assess the normality of the data. The results revealed that with the exceptions of openness, conscientiousness, agreeableness and

extraversion, the variables all deviated from normality. Hence, all analyses were checked using non-parametric bootstrapping procedures. Following the recommendations of Wright and Field (2009), the bias-corrected and accelerated method was used to calculate the 95% CIs for all bootstrapping procedures (Efron, 1987). Additional testing indicated the homoscedasticity assumption for both analyses was not violated. For all correlation analyses, the related pairs assumption was met. Inspection of the grand correlation matrix (Appendix 1) and the variance inflation factors of the regression models, revealed that multicollinearity not an issue for the multiple regression analyses.

### **3.5 Aim 1: To Determine if the Same Factor Structure Proposed in the Academic Motivation Scale can be Found in the Sample Data Set**

#### **3.5.1 Confirmatory Factor Analysis**

A confirmatory factor analysis was implemented to examine if the sample data set could capture the seven-factor model of motivation measured by the Academic Motivation Scale. The latent factors were standardised, allowing free estimation of all factor loadings. Maximum likelihood estimation was used.

A Comparative Fit Index (CFI) of .84 and a Tucker-Lewis Index (TLI) of .82 indicated that the model was not a suitable fit, falling under the recommended value of .90. A root mean square error of approximation (RMSEA) of 0.10 with a 90% CI [.09, .11], provided further evidence that the model was not an adequate fit. All indicators showed positive, significant factor loadings, with standardised coefficients ranging from .51 to .94. The chi-square value was statistically significant ( $\chi^2 [329] = 585.13, p < .01$ ), which also suggested the model was not suitable. In sum, the analyses demonstrate that the sample data set was not able to capture the seven-factor structure measured in the Academic Motivation

Scale. A table with all factor loadings and standardised regression coefficients can be found in Appendix 2.

### 3.5.2 Exploratory Factor Analysis

Given that the confirmatory factor analysis demonstrated the original seven-factor model was not suitable, an exploratory factor analysis was conducted to establish a more fitting structure. The data was assessed for its suitability for an exploratory factor analysis. An inspection of the correlations between the Academic Motivation Scale's seven subscales, revealed correlation coefficients above .3. This indicated reasonable amounts of shared variance. The Kaiser-Meyer-Olkin measure of sampling adequacy was .81, passing Kaiser's recommended value of .60. Barlett's test of sphericity was statistically significant ( $\chi^2[378] = 1695.94, p < .001$ ), indicating adequately large correlations for factorability. These tests confirmed that the current sample was suitable for an exploratory factor analysis.

The current study utilised Costello and Osborne's (2005) recommendations for the best practice in exploratory factor analysis. Principle axis factoring (PAF) with oblique (Oblimin) rotation was used. An initial four-factor solution was indicated by eigenvalues exceeding Kaiser's criterion of 1. Given that Costello and Osborne (2005) conclude this method to be the least accurate, a Parallel roots analysis was used to provide further evidence for factor retention. Figure 3 displays the associated Scree Plot. A minimum loading of .32 was used as criteria (Costello & Osborne, 2005). Table 2 shows the factor loadings for all items. As can be seen, all items loaded onto at least one factor. As there were several cross loading items, three, five and six factor solutions were also examined. It was concluded that a four factor structure provided the best outcome. Given that an oblique rotation allows for cross loadings, items were placed with the factor with which they loaded the highest (Costello & Osborne, 2005).

The four factors identified using the current sample can be interpreted as follows: Factor 1 reflects intrinsic motivation as general concept (comprised of the items measuring all three intrinsic motivation subscales); Factor 2 can be understood as extrinsic motivation (comprised of the items measuring external regulation and identified regulation); Factor 3 reflects amotivation (identical to the amotivation facet of the original model); Factor 4 can be interpreted as introjected regulation (identical to the introjected regulation facet of the original model).

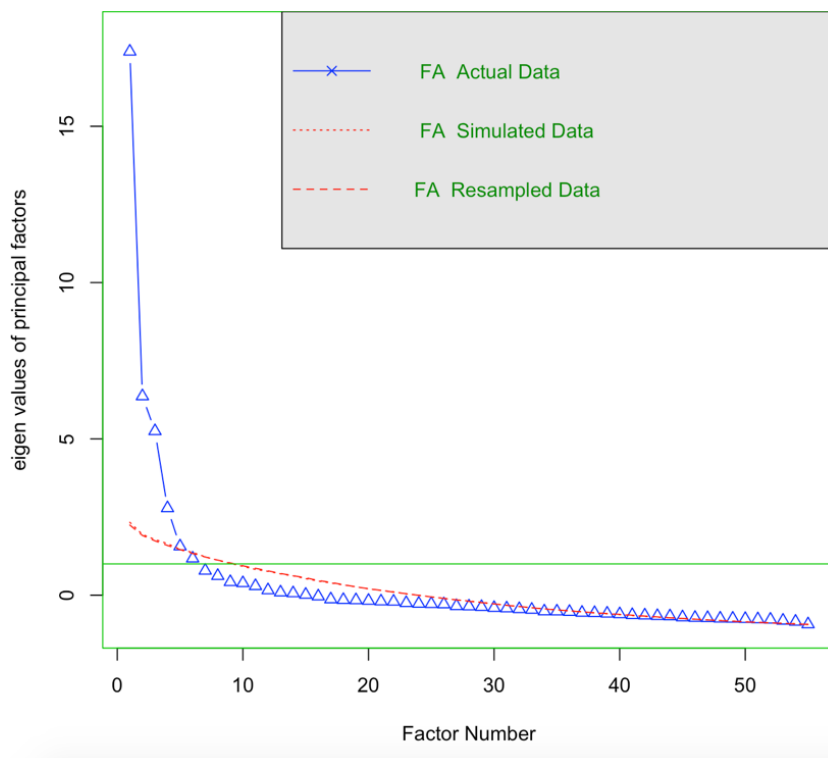


Figure 2. Parallel Roots Analysis Scree Plot for the Academic Motivation Scale.

Table 2

*Principle Axis Factoring Loadings with Oblimin Rotation for the Academic Motivation Scale Using a Four-Factor Solution (N = 78)*

Items	Factor 1	Factor 2	Factor 3	Factor 4
For the pleasure that I experience when I feel completely absorbed by what certain authors have written	<b>.94</b>	.04	.12	-.14
For the pleasure that I experience when I read interesting authors	<b>.91</b>	-.12	.14	-.09
For the "high" feeling that I experience while reading about various interesting subjects	<b>.77</b>	-.02	.05	.08
For the pleasure I experience when I discover new things never seen before	<b>.73</b>	.03	-.15	.10
For the pleasure that I experience in broadening my knowledge about subjects which appeal to me	<b>.70</b>	.04	<b>-.32</b>	-.07
For the intense feelings I experience when I am communicating my own ideas to others	<b>.68</b>	.12	.14	.16
For the satisfaction I feel when I am in the process of accomplishing difficult academic activities	<b>.63</b>	.10	<.01	<b>.36</b>
Because my studies allow me to continue to learn about many things that interest me	<b>.57</b>	.17	<b>-.34</b>	.14
For the pleasure I experience while surpassing myself in my studies	<b>.57</b>	-.13	-.12	<b>.39</b>
Because university allows me to experience a personal satisfaction in my quest for excellence in my studies	<b>.54</b>	.14	-.05	<b>.39</b>
Because I experience pleasure and satisfaction while learning new things	<b>.53</b>	.02	<b>-.35</b>	.16
For the pleasure that I experience while I am surpassing myself in one of my personal accomplishments	<b>.51</b>	-.02	-.07	<b>.48</b>
In order to have a better salary later on	-.04	<b>.78</b>	.17	.11
In order to obtain a more prestigious job later on	-.22	<b>.70</b>	-.11	.19

Because this will help me make a better choice regarding my career orientation	.23	<b>.69</b>	-.08	-.19
Because I want to have "the good life" later on	-.04	<b>.68</b>	.21	.06
Because with only a high-school degree I would not find a high-paying job later on.	-.08	<b>.64</b>	.12	-.09
Because I think that a university education will help me better prepare for the career I have chosen	.24	<b>.59</b>	0.21	-.04
Because eventually it will enable me to enter the job market in a field that I like	.12	<b>.53</b>	<b>-.46</b>	-.06
Because I believe that a few additional years of education will improve my competence as a worker	.21	<b>.38</b>	-.12	<b>.34</b>
I can't see why I go to university and frankly, I couldn't care less	.15	.01	<b>.94</b>	-.04
I don't know; I can't understand what I am doing in university	.14	.02	<b>.87</b>	-.06
I once had good reasons for going to university; however, now I wonder whether I should continue	-.09	.02	<b>.84</b>	-.03
Honestly, I don't know; I really feel that I am wasting my time in university	-.13	.02	<b>.82</b>	.12
To show myself that I am an intelligent person	-.05	.01	.08	<b>.79</b>
Because I want to show myself that I can succeed in my studies	.19	-.10	-.02	<b>.71</b>
To prove to myself that I am capable of completing my university degree	.07	-.08	-.08	<b>.61</b>
Because of the fact that when I succeed in university I feel important	-.19	.21	.29	<b>.58</b>
Explained Variance (%)	37.00	21.00	23.00	19.00
Cumulative Explained Variance (%)	23.00	51.00	38.00	63.00

*Note.* Bolded values load on factor  $\geq .32$ .

### **3.6 Aim 2: To Explore the Relationship between Academic Motivation and Academic Success**

A confirmatory factor analysis indicated that a seven-factor structure of motivation was not suitable. An exploratory factor analysis specified a new four-factor solution. Collectively, these factors comprise academic motivation. This new factor model will be used in the following analyses.

#### **3.6.1 Correlation Analyses**

As can be seen in Table 3, academic success was not significantly correlated to intrinsic motivation, extrinsic motivation or introjected regulation. This contradicted previous research on academic motivation, which suggested intrinsic motivation to be positively related to academic success. Amotivation and academic success demonstrated a significant, moderate and negative correlation ( $r = -.38, p < .01$ ). Due to the violation of the normality assumption, this result was checked using a bootstrapping procedure (10,000 bootstrapped samples). As shown in Table 3, the 95%  $CI_{BCa}$  of the bootstrapped correlation for amotivation and academic success did not contain zero; thus, this procedure supported the statistical significance of this relationship.



Table 3

*Correlations of Academic Motivation and Academic Success*

Variable	Academic Success			
	<i>r</i>	<i>r</i> <sub>boot</sub>	95% CI <sub>BCa</sub>	
			LL	UL
Intrinsic Motivation	.16	.16	-0.05	0.37
Extrinsic Motivation	.08	.08	-0.16	0.32
Amotivation	-.38**	-.38*	-0.56	-0.12
Introjected Regulation	.15	.15	-0.05	0.33

*Note.* *r* = Pearson's *r*. *r*<sub>boot</sub> = Pearson's *r* correlations after bootstrapping procedure; LL = lower limit of bootstrapped 95% CI<sub>BCa</sub>; UL = upper limit of bootstrapped 95% CI<sub>BCa</sub>.

\**p* < .05. \*\**p* < .01.

### **3.7 Aim 3: To Explore the Relationship Between Academic Motivation and Academic Success, Considering Established Predictors Personality and Intellectual Ability**

This aim intended to explore academic motivation as a predictor of academic success, in comparison to known predictors: intellectual ability, conscientiousness and openness. A mediation analysis examining conscientiousness as a mediator for the relationship between academic success and academic motivation was planned. The current study did not find conscientiousness or openness to be significantly correlated to academic success (shown in the grand correlation matrix in Appendix 1); so, they were excluded from the multiple regression analyses to maintain consistency. For this reason, the mediation analysis was not conducted. A significant correlation between intellectual ability and amotivation was also not found. Hence, no analyses exploring academic motivation as a mediator or moderator of the relationship between intellectual ability and academic success was conducted.

### 3.7.1 Multiple Regression Results

Multiple regression analyses were conducted to explore whether amotivation predicted additional variance in Academic success, to what is predicted by intellectual ability alone. Model 1 was comprised of intellectual ability as a sole predictor of academic success. Model 2 was comprised of intellectual ability and amotivation as predictors of academic success. As Table 6 shows, there was a statistically significant difference in the variance accounted for by each model (change in  $R^2$  values = .09). The model containing amotivation was able to predict academic success better than intellectual ability alone. This provided further evidence for amotivation as a useful predictor of academic success, though this should be interpreted in terms of the small effect size. The relative importance statistic demonstrated the portion of explained variance (34%) attributed to each predictor. Intellectual ability accounted for 66% of the overall variance whereas amotivation accounted for 34%. Hence, intellectual ability is a stronger predictor of academic success than amotivation. Bootstrapped multiple regression analyses (10,000 bootstrapped samples) were conducted to further clarify the results. As is shown by the 95%  $CI_{BCa}$  in Table 4, bootstrapping procedures provided support for amotivation as a significant predictor in Model 2.

Table 4

*Comparison of Multiple Regression Models for Predictors of Academic Success*

	Academic Success									
	Model 1					Model 2				
	$F(1, 76) = 25.88^{***}$					$F(2, 75) = 19.64^{***}$				
	$R^2 = .25$					$R^2 = .34$				
						$\Delta R^2 = .09^{**}$				
	Beta	RI	Beta <sub>boot</sub>	LL	UL	Beta	RI	Beta <sub>boot</sub>	LL	UL
Intellectual Ability	1.90 <sup>***</sup>		1.90 <sup>*</sup>	1.12	2.27	1.69 <sup>***</sup>	0.66	1.69 <sup>*</sup>	0.99	2.43
Amotivation						-0.67 <sup>**</sup>	0.34	-0.67 <sup>*</sup>	-1.03	-0.20

*Note.* RI = portion of explained variance attributed to individual regressor;  $\Delta R^2$  = change in  $R^2$  value from Model 1 to Model 2; LL = lower limit of bootstrapped 95% CI<sub>BCa</sub>; UL = upper limit of bootstrapped 95% CI<sub>BCa</sub>.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

### 3.8 Aim 4: To Determine Potential Predictors of Academic Motivation, given a Significant Relationship with Academic Success

Amotivation was found to be a significant predictor of academic success. Therefore, it is beneficial to determine potential factors which may predict amotivation. This would allow an advanced understanding of which students are most susceptible to experiencing amotivation and as a result, lower academic success.

#### 3.8.1 Correlation Analyses

Pearson's  $r$  correlations demonstrated that conscientiousness and agreeableness were significantly and negatively correlated with amotivation. This suggests that being conscientious and agreeable may provide a buffer against experiencing amotivation.

Neuroticism was significantly and positively correlated with amotivation, indicating that

students who are highly neurotic may be more likely to experience amotivation at university. Age was significantly and negatively correlated with amotivation. This indicates that older students at university are less likely to become amotivated in relation to their studies. Due to the violation of the normality assumption, these results were checked using bootstrapping procedures (10,000 bootstrapped samples). This procedure supported the significant relationships indicated by the Pearson's  $r$  correlations. These findings are displayed in Table 5.

Table 5  
*Correlations of Personality, Age and Amotivation*

Variable	Amotivation			
	$r$	$r_{boot}$	95% CI <sub>BCa</sub>	
			LL	UL
Openness	-.04	-.04	-0.26	0.17
Conscientiousness	-.30**	-.31*	-0.51	-0.07
Extraversion	-.12	-.12	-0.33	0.10
Agreeableness	-.25*	-.25*	-0.47	-0.05
Neuroticism	.32**	.32*	0.06	0.54
Age	-.30**	-.30*	-0.39	-0.22

*Note.*  $r$  = Pearson's  $r$ ;  $r_{boot}$  = Pearson's  $r$  correlations after bootstrapping procedure; LL = lower limit of bootstrapped 95% CI<sub>BCa</sub>; UL = upper limit of bootstrapped 95% CI<sub>BCa</sub>.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

### 3.8.2 Multiple Regression Results

There were various significant correlations between the Big Five Framework personality variables (as seen in the grand correlation matrix in Appendix 1). Therefore, a multiple regression analysis was conducted to further clarify any personality predictors of amotivation. Table 6 displays the results of the multiple regression analysis, in addition to the relative importance of each Big Five Framework personality variable. The results

demonstrated that only neuroticism significantly predicted amotivation. The model was significant overall ( $F[5, 72] = 3.82, R^2 = .21, p < .01$ ). The relative importance statistic demonstrated that 48% of the overall variance accounted for by the model was attributed to neuroticism. Conscientiousness accounted for 29% of the variance but was not a significant predictor. This indicated that neuroticism predicted a significant amount of the individual variation in amotivation. A bootstrapped multiple regression (10,000 bootstrapped samples) was also conducted to examine the results further. As is shown by the 95%  $CI_{BCa}$  in Table 6, this provided support for neuroticism as the only significant personality predictor.

These results provided insight into the factors which increase the likelihood of university students experiencing amotivation. Correlations and a multiple regression analysis implied that younger, more neurotic students are likely to report higher levels of amotivation and by extension, demonstrate lower academic success.

Table 6

*Multiple Regression Analysis of Personality Predictors of Amotivation*

Variable	Amotivation				
	Beta	RI	Beta <sub>boot</sub>	95% $CI_{BCa}$	
				LL	UL
Openness	0.01	.01	0.01	-1.04	1.37
Conscientiousness	-1.49	.29	-1.49	-3.47	0.27
Extraversion	0.55	.03	0.55	-0.74	1.93
Agreeableness	-1.23	.19	-1.23	-3.54	1.09
Neuroticism	2.10**	.48	2.10*	0.27	3.88

*Note.* RI = proportion of model explained variance attributed to individual regressor. LL = lower limit of bootstrapped 95%  $CI_{BCa}$ ; UL = upper limit of bootstrapped 95%  $CI_{BCa}$ .  
\* $p < .05$ . \*\* $p < .01$ .

### **3.9 Aim 5: To Explore Measures of Student Satisfaction and Engagement as Potential Alternative Measures of Academic Motivation**

This aim was formed under assumption that a facet of academic motivation would be related to academic success. Therefore, identifying other measures of academic motivation would potentially provide alternative predictors of academic success. Pearson's  $r$  correlations were used to determine significant relationships between satisfaction, engagement, academic motivation and academic success.

#### **3.9.1 Correlation Analyses**

Pearson's  $r$  correlations indicated that choice satisfaction, course satisfaction and engagement were all significantly correlated with intrinsic motivation, extrinsic motivation and amotivation. Progress satisfaction did not demonstrate any significant relationships with academic motivation. Both choice satisfaction and progress satisfaction were significantly correlated with academic success. Of these two variables, only choice satisfaction was significantly associated with amotivation (the only significant academic motivation predictor of academic success). Thus, choice satisfaction was the only potentially useful measure of academic motivation, in regard to predicting academic success. Table 7 illustrates these correlations. Similar to previous analyses, the findings were checked using bootstrapping procedures (10,000 bootstrapped samples) due to the violation of the normality assumption. These analyses provided further support for the relationships between choice satisfaction and academic success ( $r_{boot} = .37$ , 95% CI<sub>BCa</sub> [0.12, 0.65]), and between choice satisfaction and amotivation ( $r_{boot} = -.47$ , 95% CI<sub>BCa</sub> [-0.74, -0.13]). These results indicated that measures of satisfaction and engagement may be a reflection of student academic motivation. Thus, they may be applicable as new measures of academic motivation.

Table 7

*Correlations of Satisfaction, Engagement, Academic Motivation and Academic Success*

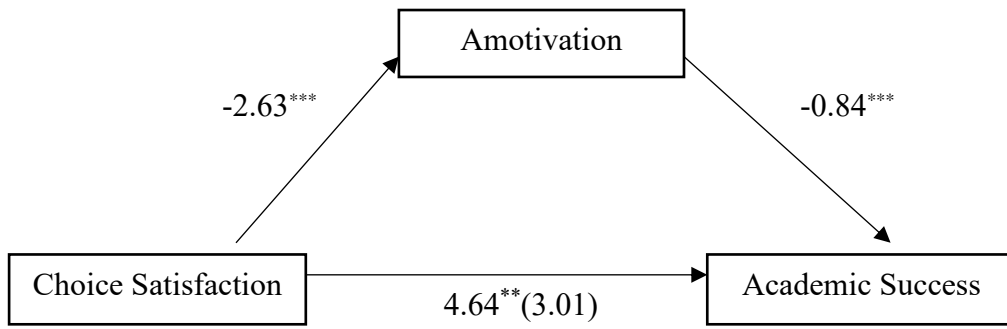
Variable	Academic Success	Intrinsic Motivation	Extrinsic Motivation	Amotivation	Introjected Regulation
	<i>r</i>	<i>r</i>	<i>r</i>	<i>r</i>	<i>r</i>
Course	.21	.50***	.25*	-.44***	.22
Choice	.35**	.45***	.32**	-.37***	.15
Progress	.39***	.18	.12	-.20	.12
Engagement	.16	.37***	.30**	-.39***	.22

*Note.* course = course satisfaction; choice = choice satisfaction; progress = progress satisfaction; *r* = Pearson's *r*.

\**p* < .05. \*\**p* < .01. \*\*\**p* < .001.

### 3.9.2 Mediation Results

A mediation analysis was conducted to determine if choice satisfaction was actually related to academic success, or if amotivation mediated this relationship. Multiple regression analyses indicated that the relationship between choice satisfaction and academic success was fully mediated by amotivation. As Figure 3 illustrates, the standardised regression coefficient for choice satisfaction and academic success was reduced to 3.01, eliminating choice satisfaction as a significant predictor of academic success. This demonstrates full mediation by amotivation. The significance of this mediation was tested using bootstrapping procedures (10,000 bootstrapped samples), as is the recommended process in mediation analysis for small to moderate sample sizes (Shrout & Bolger, 2002). The bootstrapped unstandardised indirect effect was 1.63, 95% CI<sub>BCa</sub> [0.24, 3.01]; thus, the mediation was significant. This indicated that choice satisfaction only led to greater academic success under reduced levels of amotivation. Thus, low levels of amotivation was what actually predicted academic success.



*Figure 3.* Amotivation as a Full Mediator for the Relationship Between Choice Satisfaction and Academic Success.



## **4 Discussion**

Understanding the factors that facilitate academic success is of high importance, given the long-term benefits of obtaining university qualifications (Piumatti, 2018). The overarching aim of the current study was to determine the relationship of academic motivation to academic success. More specifically, the current study aimed to clarify this relationship in terms of Self-Determination Theory. In addition, established predictors of academic success, such as intellectual ability and personality, were considered. Using a multi-dimensional measure of academic motivation, the current study identified a four-factor model as the best fit for the sample. Subsequent analyses revealed that amotivation negatively predicted academic success. Furthermore, amotivation was found to be related to neuroticism and age. These results, along with methodological limitations and strengths, are discussed further below. Overall, the current study found that success at university is not determined by a specific type of motivation (i.e. either intrinsic or extrinsic); rather, it is the presence of academic motivation that predicts the academic success of students.

### **4.1 Aim 1: To Determine if the Same Factor Structure Proposed in the Academic Motivation Scale can be Found in the Sample Data Set**

The Academic Motivation Scale measures a seven-factor model of academic motivation, as proposed by Self-Determination Theory (Vallerand et al., 1992). There is evidence for this structure in several countries; however, the structure is yet to be validated in an Australian university sample (Caleon et al., 2015; Cokley et al., 2001; Zhang et al., 2015). There is also evidence to support further research into the constructs measured by this model (Cokley, 2000). The current study aimed to examine whether the sample could capture this seven-factor structure.

A confirmatory factor analysis rejected the seven-factor model as a fit for the data. A subsequent exploratory factor analysis indicated a four-factor structure was the most suitable. These new factors encompassed all 28 items of the Academic Motivation Scale. This contradicted the findings of previous studies, which found evidence to support the seven-factor model (Cokley et al., 2001; Fairchild et al., 2005; Stover et al., 2012; Vallerand et al., 1992). The four new factors reflected intrinsic motivation, extrinsic motivation, introjected regulation and amotivation.

Intrinsic motivation was comprised of the 12 items that measured intrinsic motivation to know, intrinsic motivation towards accomplishment and intrinsic motivation to experience stimulation. This indicated that intrinsic motivation was better measured as a singular dimension, as opposed to three subscales. This finding was supported by Deci and Ryan's (1985) original five-factor model of motivation, which did not differentiate between the different subtypes of intrinsic motivation. Vallerand et al. (1992) added these facets, resulting in a seven-factor model.

Extrinsic motivation was comprised of the items measuring identified regulation (e.g. *Because I think that a university education will help me better prepare for the career I have chosen*) and external regulation (e.g. *In order to have a better salary later on*). Identified regulation reflects external motives that have become fully internalised. External regulation reflects behaviours that are entirely based on external contingencies. This finding was not supported by previous psychometric studies on the Academic Motivation Scale; however, measures of internal consistency (Cronbach's alpha) of identified regulation have been consistently lower than the other subscales (Cokley, 2000; Fairchild et al., 2005; Vallerand et al., 1992).

This finding can possibly be explained by the sample being comprised of first year university students. The participants may not yet have internalised their external motivators.

In other words, they may not have identified personal importance in obtaining a university degree; they still perceived the rewards associated with a degree as completely external. Hence, the identified regulation items on the Academic Motivation Scale represented contingencies that were still completely external. This implied that they were better suited to measure external regulation.

Introjected regulation was identical in the original seven-factor structure and in the four-factor structure. In Self-Determination Theory, the subtypes of extrinsic motivation are ordered from least autonomous (external regulation) to most autonomous (identified regulation). Introjected regulation is the 'midpoint' of these three. So, it is notable that the introjected regulation items were suited to a separate factor to the other extrinsic motivation items. Given that identified regulation (most autonomous) was suited to the same factor as external regulation (least autonomous), it would be expected that introjected regulation (moderately autonomous) would be suited to that same factor. The finding of a separate factor is supported by Cokely's (2000) assertion that introjected regulation may be more autonomous than is suggested by Self-Determination Theory. If correct, it would make sense that introjected regulation was suited to a unique factor. Amotivation was identical in the original seven-factor structure and in the four-factor structure.

The findings of this aim illustrated that a seven-factor model of academic motivation may not be appropriate for university students in Australia; however, these results were subject to several notable limitations of this study. Consequently, they may not have been an accurate representation of the seven-factor structure's applicableness to the broader population of Australian university students. These limitations are discussed further below. Regardless, given that amotivation was identical in both factor models, the significant results from this factor are still applicable. Despite these limitations, the current study elected to use

the four-factor structure in all subsequent analyses, as this was the best fit for the sample being explored.

#### **4.2 Aim 2: To Explore the Relationship between Academic Motivation and Academic Success**

The current study aimed to clarify the relationship between academic motivation and academic success. This aim was formulated in response to the inconsistent effect sizes in the existing literature, in addition to limited research using Self-Determination Theory. Furthermore, many studies involving academic motivation have a focus on only intrinsic and extrinsic motivation. The results of this aim were somewhat supported by the literature, which indicates that intrinsic motivation and amotivation are related to academic success. In light of the exclusion of amotivation in the current literature, the findings regarding amotivation were particularly notable.

The current study did not find intrinsic motivation to be significantly correlated with academic success. Komarraju et al. (2009) only found intrinsic motivation to know to be correlated with academic success; hence, this result was possibly explained by the use of intrinsic motivation as a singular dimension, rather than the use of the original three subscales.

Amotivation was found to be significantly correlated with academic success. This negative relationship is supported by previous studies. The finding that extrinsic motivation was unrelated to academic success was also in line with previous literature. There are also several studies which have found academic motivation to be unrelated to academic success (Alfaro et al., 2009; Çetin, 2015). Consequently, it is difficult to ascertain the extent to which these findings provided any further clarification on this relationship. Nevertheless, these results added to the current limited body of literature surrounding academic success and

academic motivation, as conceptualised by Self-Determination Theory. These results suggest that success at university does not differentiate between intrinsic and extrinsic motivation. It is a lack of motivation (amotivation) that determines the success of students at university.

### **4.3 Aim 3: To Explore the Relationship Between Academic Motivation and Academic Success, Considering Established Predictors Personality and Intellectual Ability**

The current study aimed to explore the relationship between academic motivation and academic success in the context of other predictors. There are gaps in the literature regarding academic motivation as a predictor of academic success, in comparison to previously established predictors intellectual ability, conscientiousness and openness.

The multiple regression analysis model containing amotivation and intellectual ability predicted additional variance to the model containing only intellectual ability. This result provided evidence for amotivation as a significant predictor of academic success. There is very limited literature pertaining to this aim, so the findings are not able to be further clarified. As a consequence, this finding was a beneficial addition to the existing body of literature regarding academic motivation's usefulness as a predictor of academic success.

There were several limitations concerning the findings associated with this aim. Specifically, the removal of conscientiousness and openness from the multiple regression analyses, due to their non-significant correlations with academic success. The mediation analysis was also not undertaken for this reason. This methodology was chosen to maintain consistency within the analyses. It would have been beneficial to explore amotivation as a predictor compared with other non-cognitive predictors of academic success. It is possible that amotivation does not predict any additional variance to the combination of conscientiousness, openness and intellectual ability. Future research would need to include these personality variables in order to produce a clearer understanding of academic

motivation as a predictor of academic success. Inclusion of these variables would also allow a mediation analysis to further clarify relationships between personality, academic motivation and academic success.

#### **4.4 Aim 4: To Determine Potential Predictors of Academic Motivation, given a Significant Relationship with Academic Success**

This aim operated under the assumption that a significant relationship between academic motivation and academic success would be found. Given this finding, it would be beneficial to explore any factors that could determine academic motivation, and by extension academic success.

##### **4.4.1 The Relationship Between Age and Amotivation**

Inspection of the grand correlation matrix (Appendix 1) revealed that age was significantly and negatively related to amotivation. This implied that older students were less susceptible to amotivation than younger students. These findings can be interpreted in terms of the different contexts in which individuals attend university. Younger students are likely to be relatively recently out of their high school studies. Thus, younger participants are more likely to be attending university to meet parental expectations, or because they feel as though they are following a linear pathway in their studies. Therefore, it follows that they would be more likely to experience amotivation. This is in contrast to individuals who have returned to university as mature age students. These individuals are more likely to have made significant life changes in order to attend university. Consequently, they would be more certain about their capabilities, having likely already experienced a professional career. By extension, they would be less susceptible to experiencing amotivation.

This contradicted previous findings, which found no significant age differences in academic motivation (Nikkerdar, Sharifi, & Tanha, 2014). A possible explanation for this outcome is the differing age ranges within the samples. Nikkerdar et al. (2014) used an age range of 22 - 35, whereas the current study utilised a more representative range of 17- 46.

#### **4.4.2 The Relationship Between Personality and Amotivation**

Initial correlation results demonstrated significant relationships between amotivation and conscientiousness, agreeableness and neuroticism. These findings were consistent with previous literature (De Feyter et al., 2012; Komarraju et al., 2009). The grand correlation matrix (Appendix 1) showed various intercorrelations between the Big Five Framework constructs. Therefore, it was possible that conscientiousness, agreeableness and/or neuroticism demonstrated correlations with amotivation as a result of their correlations with each other. Hence, a multiple regression was conducted to clarify the relationship between personality and amotivation in a more systematic manner. The regression indicated that only neuroticism significantly predicted amotivation. This was in contrast to the findings of a study by Komarraju et al. (2009). Their multiple regression analysis provided evidence for all three variables as significant predictors of amotivation. The discrepancy in these findings may be explained by the limited sample size of the current study. This limitation is discussed in more detail below.

The current study identified neuroticism as a positive predictor of amotivation. Previous studies have shown neuroticism to be both negatively and positively related to amotivation, so this finding was neither supported by, nor in contrast to, the literature (Hakimi et al., 2011; Komarraju et al., 2009; Phillips et al., 2003). This result suggested that the more neurotic the student, the more susceptible they are to experiencing amotivation. In practical terms, this result indicated that students who experience higher levels of anxiety and

emotional instability, are more likely to feel as though they are incompetent and incapable of completing their studies. Of course, this result must be interpreted in terms of the effect size, which was relatively small.

#### **4.5 Aim 5: To Explore Measures of Student Satisfaction and Engagement as Potential Alternative Measures of Academic Motivation**

This aim was also formulated under the assumption that the current study would find a significant relationship between academic motivation and academic success. If academic motivation was not related to academic success, it would not have been beneficial to explore alternative measures of academic motivation. Finding measures that reflect academic motivation is of practical importance. It is far easier for universities to collect data regarding student satisfaction and engagement in a survey, rather than undertaking the financial burden of administering the Academic Motivation Scale to each student. The literature surrounding self-report measures of satisfaction and engagement is inconsistent, so the current study aimed to provide further clarification to this area.

##### **4.5.1 Correlation Analyses**

Correlation analyses revealed an interesting pattern of relationships between satisfaction, engagement, academic success and academic motivation. The findings suggested that students' satisfaction with their choice to enrol in *Psychology 1A*, overall satisfaction with the course and overall engagement in *Psychology 1A*, moderately reflected intrinsic motivation and reduced amotivation. The correlations with extrinsic motivation were quite small. There were no significant correlations with introjected regulation. This was unsurprising, given that introjected regulation is a motivation to enhance self-esteem. Student



satisfaction with their progress in *Psychology IA* was unrelated to any academic motivation facets.

Of these significant correlations, only one satisfaction construct was ultimately useful: choice satisfaction. This was the only measure that was correlated with both amotivation and academic success.

#### **4.5.2 Mediation Analysis**

A mediation analysis was conducted to determine if choice satisfaction was useful as a measure of academic motivation and ultimately, a useful predictor of academic success. The analysis revealed that the relationship between academic success and choice satisfaction was fully mediated by amotivation (the significant relationship was made nonsignificant by amotivation). This can be interpreted as follows: student satisfaction with their choice of course could only predict greater academic success under reduced levels of amotivation. Given that this choice satisfaction appeared to capture amotivation, this measure may be valuable as a measure of academic motivation, as well as a predictor of academic success. Students who lack motivation will likely be dissatisfied with their choice of courses, resulting in reduced success at university.

#### **4.6 Further Limitations and Methodological Considerations**

Several methodological limitations should be taken into account when interpreting the results and considering practical applications. First and foremost, an *a priori* power analysis determined that the sample was underpowered. The initial power analysis was conducted under the assumption that up to seven predictors would be used in a regression model (accounting for the possibility that a confirmatory factor analysis would confirm the seven-factor model of motivation). A subsequent power analysis determined that even with only

five predictors (The Big Five Framework variables), the current study would still require a sample  $N = 138$ . Thus, the current study was still underpowered. This is a significant limitation and in light of this, the results must be interpreted with caution. Hence, the finding of a four-factor structure of motivation needs further research to be supported. In addition, results that were inconsistent with the literature may have been a result of this limitation and also require further research.

The sample utilised for this study was only first year students in a singular course. Despite first year students being the most likely to abandon their studies, the sample is not representative of university students as a population (McKenzie et al., 2004). Hence, these results are unable to be generalised.

#### **4.7 Methodological Strengths**

The primary strength of the current study was its overarching aim to fill gaps in the current literature, regarding a highly important concept: motivation. As previously mentioned, there are a limited number of studies which examine personality predictors of academic motivation. There are also very few studies that explore the combined effect of established predictors of academic success, in addition to academic motivation (as understood by Self-Determination Theory). All significant results were examined with a non-parametric bootstrapping procedure, which provided further evidence for the findings. This method is advantageous to other non-parametric tests, which reduce statistical power and are susceptible to the weaknesses of ranking data (Wright & Fields, 2009).

To the best of the researcher's knowledge, there have been no attempts in the literature to validate the factor structure of the Academic Motivation Scale in an Australian university sample. The university culture and structure in Australia differs quite drastically from the United States of America, where the majority of factor structure validations have taken place.

Therefore, the current study provided a beneficial starting point for future research regarding the Academic Motivation Scale in Australian samples.

Finally, the sample of only *Psychology 1A* students can be considered both a limitation and a strength of the current study. Although it was not a completely representative sample of university students, *Psychology 1A* offered a unique sampling advantage to other first year classes. This course is both a compulsory subject for students completing a Bachelor of Psychological Science, and an optional elective for students from a wide variety of other disciplines. Hence, despite issues concerning generalisability, the sample was not comprised of only students from a singular degree, as is the case with many other studies in this area.

#### **4.8 Future Research Directions**

As previously established, there is a need to validate the factor structure of the Academic Motivation Scale in an Australian university sample. Future research should endeavour to do so with a broader university sample and sufficient statistical power.

A meta-analysis of academic motivation, only as conceptualised by Self-Determination Theory, would also be beneficial, given the wide-spread support of this theory of motivation.

#### **4.9 Conclusions**

In summary, amotivation was found to be a significant and negative predictor of Academic Success. This was an important finding considering much of the research on academic motivation focuses solely on intrinsic and extrinsic motivation. The results of the study suggested that students who are younger and more neurotic, are more likely to experience amotivation. As a result, these students may achieve lower final grades. The current study is a valuable starting point for future research, having used a multi-dimensional

measure of motivation, in addition to considering a broad range of academic success predictors. The results have highlighted the need for further research on this topic. Previous literature suggests that being intrinsically motivated leads to greater success at university. The results of this study suggested that success at university is not determined by being either intrinsically or extrinsically motivated. Rather, students must possess a motivation to succeed. In other words, it is the absence of motivation (amotivation) that predicts an individual's success at university. This finding may prove useful to future alterations of the university selection process.

As the number of students commencing tertiary studies increases, the ability to identify factors that will facilitate their success is invaluable to both the individual and tertiary institutions.

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## Appendix 1

*Grand Correlation Matrix of All Variables*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Final Grade	1.00															
2. Age	.17	1.00														
3. Intellectual Ability	.50***	.12	1.00													
4. Openness	.13	.18	.09	1.00												
5. Conscientiousness	.16	.17	.09	.33**	1.00											
6. Extraversion	-.08	-.11	-.17	.12	.30**	1.00										
7. Agreeableness	-.02	-.01	-.02	.23*	.51**	.37***	1.00									
8. Neuroticism	-.20	-.22*	-.23*	.18	-.07	-.27*	.03	1.00								
9. Intrinsic Motivation	.16	.22*	.09	.46***	.32**	.20	.29**	-.13	1.00							
10. Extrinsic Motivation	.08	-.23*	.10	-.14	.27*	.28*	.30**	-.27*	.31**	1.00						
11. Amotivation	-.38***	-.30**	-.17	-.04	-.30	-.12	-.25*	.32**	-.33**	-.11	1.00					
12. Introjected Regulation	.15	-.06	.19	.05	.27	.23*	.30**	.06	.44***	.40***	-.12	1.00				
13. Course Satisfaction	.22	.12	.13	.10	.20	.20	.36**	-.18	.46***	.32**	-.37***	.15	1.00			
14. Choice Satisfaction	.35**	.11	.10	.19	.29**	.24*	.42***	-.17	.51***	.25*	-.44***	.22	.79***	1.00		
15. Progress Satisfaction	.39***	.03	.23*	.07	.23*	.20	.16	-.08	.19	.12	-.20	.12	.28*	.41***	1.00	
16. Engagement	.18	.16	.13	-.03	.38***	.22	.36**	-.14	.38***	.30**	-.39***	.22	.72***	.62***	.43***	1.00

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

## Appendix 2

### *Confirmatory Factor Analysis Items (N = 78)*

Latent Factor	Indicator	B	SE	Z	Beta	<i>p</i>
Know	Because I experience pleasure and satisfaction while learning new things	1.06	0.13	8.28	0.79	***
Know	For the pleasure I experience when I discover new things never seen before	1.34	0.15	9.20	0.85	***
Know	For the pleasure that I experience in broadening my knowledge about subjects which appeal to me	1.16	0.13	9.12	0.85	***
Know	Because my studies allow me to continue to learn about many things that interest me	1.10	0.12	8.86	0.83	***
Accomplish	For the pleasure I experience while surpassing myself in my studies	1.30	0.16	8.04	0.78	***
Accomplish	For the pleasure that I experience while I am surpassing myself in one of my personal accomplishments	1.31	0.15	8.84	0.83	***
Accomplish	For the satisfaction I feel when I am in the process of accomplishing difficult academic activities	1.40	0.15	9.30	0.86	***
Accomplish	Because university allows me to experience a personal satisfaction in my quest for excellence in my studies	1.33	0.15	8.65	0.82	***
Stimulation	For the intense feelings I experience when I am communicating my own ideas to others	1.30	0.17	7.42	0.74	***
Stimulation	For the pleasure that I experience when I read interesting authors	1.40	0.16	8.97	0.84	***
Stimulation	For the pleasure that I experience when I feel completely absorbed by what certain authors have written	1.65	0.16	10.50	0.92	***
Stimulation	For the "high" feeling that I experience while reading about various interesting subjects	1.41	0.17	8.57	0.81	***
Identified	Because I think that a university education will help me better prepare for the career I have chosen	0.93	0.13	7.33	0.75	***

Identified	Because eventually it will enable me to enter the job market in a field that I like	0.95	0.13	7.18	0.74	***
Identified	Because this will help me make a better choice regarding my career orientation	0.94	0.15	6.49	0.68	***
Identified	Because I believe that a few additional years of education will improve my competence as a worker	0.99	0.17	6.04	0.65	***
Introjected	To prove to myself that I am capable of completing my university degree	1.00	0.18	5.57	0.61	***
Introjected	Because of the fact that when I succeed in university I feel important	0.92	0.20	4.55	0.51	***
Introjected	To show myself that I am an intelligent person	1.31	0.16	8.05	0.80	***
Introjected	Because I want to show myself that I can succeed in my studies	1.24	0.15	8.50	0.83	***
External	Because with only a high-school degree I would not find a high-paying job later on	1.12	0.21	5.37	0.59	***
External	In order to obtain a more prestigious job later on	1.11	0.15	7.29	0.75	***
External	Because I want to have "the good life" later on	1.08	0.17	6.29	0.67	***
External	In order to have a better salary later on	1.47	0.17	8.79	0.85	***
Amotivation	Honestly, I don't know; I really feel that I am wasting my time in university	1.16	0.13	9.27	0.85	***
Amotivation	I once had good reasons for going to university; however, now I wonder whether I should continue	1.43	0.15	9.30	0.86	***
Amotivation	I can't see why I go to university and frankly, I couldn't care less	1.14	0.11	10.84	0.94	***
Amotivation	I don't know; I can't understand what I am doing in university	1.05	0.11	9.50	0.87	***

*Note.* Know = IM to know; Accomplish = IM towards accomplishment; Stimulation = IM to experience stimulation; Identified = Identified Regulation; Introjected = Introjected Regulation; External = External Regulation; B = factor loadings; SE = standard error. \*\*\* $p < .001$ .