Adolescent Psychological Health as a Predictor of Academic Performance at University

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Abstract

The period of entering university after completing high school is a stressful transition for adolescents. There are many individual differences that contribute to a successful transition; however, this population of adolescent university students is understudied. This study looked to investigate the influence of psychological health on the academic performance of adolescents at a tertiary level. Sixty adolescent first-year students completed a survey containing measures of developmentally appropriate well-being, personality, intelligence, stress, and mental health measures, for the use of determining their predictive ability in relation to academic performance. The participants were aged 16-20, and predominantly female. Psychological health was found to have a significant influence on academic performance in this adolescent sample. The results indicated no significant gender differences present. Further, the role of personality, well-being, and ill-being on academic performance was examined. Potential personality predictors of positive psychological health were highlighted, and the role of personality and stress on psychological distress was examined. The implications of these results are in the development of programs and resources for high schools and universities, to help foster these positive psychological characteristics in students, to improve the performance and transition of first-year students.

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."

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1 Introduction

After finishing high school, beginning university is seen as the next step for many adolescents, however, this transition is associated with an increase in psychological distress. This population is seen as 'at risk' due to the changing academic, social, and emotional environments that accompany beginning tertiary study. This first-year transition has typically been found to be the most stressful, as many students are facing a number of new challenges, such as living away from home, developing new friendships, financial commitments, and a change in learning format (DeBerard, Glen, & Deana, 2004; Gustems-Carnicer, Calderón, & Calderón-Garrido, 2019; Richardson, King, Garret, & Wrech, 2012; Stamp et al., 2015; Wintre et al., 2011). Further, this age of entry, around late teens to early adulthood, is a typical age for the onset of substance abuse and several psychological disorders (Heizomi, Allahverdipour, Asghari, & Safaian, 2015; Stamp et al., 2015; Wynaden, Wichmann, & Murray, 2013). Although some students experience psychological distress and further problems, others cope effectively with these changes and thrive in a university environment.

In the current literature, there is a noticeable gap in the understanding of the experiences of adolescent students beginning university. The focus has primarily been on the experiences of primary and secondary school students, and the experiences of a first-year cohort as a whole. However, young first-year university students have been found to have high levels of psychological distress, high vulnerability to substance abuse disorders, and low levels of support (Topham & Moller, 2011). There is a need to understand the factors that are beneficial or harmful in the transition from high school to university, such as levels of psychological health, social support, personality, or intelligence. Despite a strong body of evidence investigating university

student levels of stress, anxiety, and depression, little is known about the factors that influence positive mental states.

It is important in academic research to understand the correlates and identify individual influences in academic achievement, to further the understanding of why some students flourish and others do not. Various personal, academic, and sociocultural factors are thought to be related to academic performance (Trucchia, Lucchese, Enders, & Ferández, 2013). Previous research has found interesting relationships between student well-being, levels of stress, mental health, personality, and intelligence, on a student's performance in an academic setting (DeBerard et al., 2004; Diseth, 2003; Farruggia, Han, Watson, Moss, & Bottoms, 2018; Gibbons, Dempster, & Moutray, 2008; Gustems-Carnicer et al., 2019; Kern, Benson, Steinberg, Steinberg, & Yossef, 2016; O'Connor & Paunonen, 2007; Pluut, Curşeu, & Ilies, 2015; Stamp et al., 2015; Trucchia et al., 2013; Wynaden et al., 2013; Yu, Shek, & Zhu, 2017; Zajacova, Lynch, & Espenshade, 2005; Živčić-Bećirević, Smojver-Ažić, & Martinac Dorčić, 2017). Poor academic performance is often an indicator of difficulties adjusting to university; however, some research has found students with high levels of psychological distress achieving high grades in university courses, which highlights the importance to further investigate the influence of individual differences on academic success (Monk, 2004; Topham & Moller, 2011).

These influential differences between students are important to uncover, to further the understanding of why some adolescents flourish at university, while others do not. Past research has highlighted a need for further exploration into specific positive psychological health factors, rather than global factors that impact adolescent university student experience (Topham &

Moller, 2011). Until recently, research around adolescent psychological health has focused on problems and disorders (e.g. smoking, drug and drinking habits, stress, and mental disorders), or just the absence of negative affect (Katja, Paivi, Marja-Terttu, & Pekka, 2002; Kozina & Straus, 2017). However, positive psychology stresses the importance of positive characteristics, skills, and emotions in the development and upkeep of a student's positive psychological health (Kozina & Straus, 2017). Further, it is also important to explore the individual factors that may contribute to positive and negative psychological health in older adolescents (Steinmayr, Heyder, Naumburg, Michels, & Wirthwein, 2018). The knowledge of the factors that influence academic performance have important implications for learning and education in universities and schools, to develop curricula aimed at improving psychological health outcomes in transitioning students.

Common individual predictors of performance at university, such as intelligence or personality, are not solely thought to entirely predict academic achievement (O'Connor & Paunonen, 2007). Non-cognitive factors, such as levels of psychological health or experiences with stress, are thought to play an equal or more important role in explaining the variability between student success (Kozina & Straus, 2017). The present study looks to further the understanding of the influence of these non-cognitive factors on adolescent student performance at university, while also determining the influence and interaction of the traditional predictors of performance.

1.1 The Traditional Predictors of Academic Success

1.1.1 Intelligence

Intelligence has traditionally been associated with academic achievement, however, it has been challenged as a sole predictor of performance at university (Beaujean et al., 2011; Živčić-Bećirević et al., 2017). Past studies have found that the relationship between intelligence and academic achievement decreases at each successive stage in education, with intelligence thought to lose its predictive power at university (Laidra, Pullmann, & Allik, 2007; O'Connor & Paunonen, 2007; Živčić-Bećirević et al., 2017). At a tertiary level, the intelligence variability in a first-year population is suggested to reduce due to the academic restrictions in place for acceptance at university, which could explain this loss of power (Laidra et al., 2007). However, intelligence is still considered an important predictor of academic achievement in adolescent samples of high school students (Downey, Lomas, Billings, Hansen, & Stough, 2013; Laidra et al., 2007). Therefore, intelligence may still play a vital role in academic performance at university for adolescent students.

1.1.2 Personality

Differences in personality are traditionally associated with academic performance. Certain behaviours associated with personality traits have been found to affect certain habits that have an influence on academic success (O'Connor & Paunonen, 2007). It is thought that while cognitive ability reflects what a person can do, personality traits reflect what a person will do (O'Connor & Paunonen, 2007). These personality factors are thought to include behaviours, skills, attitudes, and strategies that are crucial to a students' academic performance (Carvalho, 2016; Farruggia et al., 2018). The Big Five personality traits are a common way of

conceptualising an individual's personality, and include: Openness, Conscientiousness, Extraversion, Agreeableness, Neuroticism (Table 1). These factors are considered to be stable, robust, and predictable correlates of academic performance, with conscientiousness thought to be the most influential (Diseth, 2003; Živčić-Bećirević et al., 2017).

Conscientiousness is most consistently linked to academic performance, with numerous studies finding significant positive associations with GPA and final grades in undergraduate courses (Beaujean et al., 2011). A longitudinal study found conscientiousness to be a strong predictor of academic performance from primary school to the end of high school (Laidra et al., 2007). Even while controlling for intelligence and background variables, conscientiousness has been found to be a strong predictor of GPA (Schulze & Roberts, 2006).

Table 1:

The Big Five Factors, as defined by Schulze & Roberts (2006)

Term	Definition (high scoring individuals)
Openness	Willingness to entertain unconventional values and novel ideas, creative, cultured
Conscientiousness	Accomplishment, organisation, responsibility, efficiency
Extraversion	Warmth, talkative, assertive, sociable
Agreeableness	Trust, helpful, considerate, sympathetic
Neuroticism	Highly emotional, anxious, stressed and irritable

1.1.3 Gender Differences in Intelligence and Personality

Gender has been found to not be a consistent predictor of academic performance at university; however, some studies have found that it is somewhat related, with males generally having a lower Grade Point Average (GPA) (Dayioğlu & Türüt-Aşik, 2007; DeBerard et al., 2004). Despite having the same general intellectual ability, females tend to outperform their male peers in primary and secondary school (Carvalho, 2016).

Gender differences in scores on the Big Five factors are not consistent, but there are some general patterns associated. Females have been found to score higher on neuroticism and agreeableness than males, with inconsistent differences found for the other factors (Schmitt, Realo, Voracek, & Allik, 2008; Weisberg, Deyoung, & Hirsh, 2011).

1.2 Psychological Health in Adolescents

1.2.1 Positive Psychological Health (Well-Being)

Recently, there has been a push for positive psychological health, or well-being, to be recognised as not solely the absence of illness, but also the presence of positive functioning and flourishing (Seligman, 2011). The conceptualisation of well-being has expanded beyond just feeling happy, to encompassing the psychological, personal, cognitive, and motivational qualities that define optimal human functioning (Kozina & Straus, 2017; Šeboková, Uhláriková, & Halamová, 2018). Specifically, student well-being has commonly focused on psychological, cognitive, social, and physical capabilities and functioning, including a student's sense of purpose in life, self-awareness, affective states and emotional strengths (Kozina & Straus, 2017). Positive well-being during adolescence has been found to predict good general health and fewer risky health behaviours in young adulthood (Hoyt, Chase-Lansdale, McDade, & Adam, 2012;

Kern et al., 2016; Yu et al., 2017). Past research has suggested that the optimum way to study adolescent positive functioning is to consider multiple predictors, multiple pathways, and multiple well-being outcomes (Šeboková et al., 2018). Well-being in adolescence is understood as a multi-dimensional and multi-causal phenomenon, influenced by both individual and contextual variables (Danielsen, Samdal, Hetland, & Wold, 2009).

General measures of well-being commonly developed for adults rarely conceptualise well-being as a multi-dimensional construct. However, Kern et al. (2016) developed an extension of Seligman's PERMA model to adolescents, originally comprised of five pillars of wellbeing: Positive Emotion, Engagement, Relationships, Meaning, and Accomplishment (PERMA). The new adolescent five factors include: Engagement, Perseverance, Optimism, Connectedness, and Happiness (EPOCH), which are thought to influence the PERMA domains in adulthood (Kern et al., 2016). These factors focus on the capacity to become engaged, or the capacity to connect with others, not about what a teenager is engaged with or who they connect with (Kern et al., 2016). The factors are defined in Table 2.

Table 2:

The five EPOCH factors, as defined by Kern et al. (2016)

Term	Definition
Engagement	An individual's capacity to be absorbed in a task
Perseverance	The ability to complete goals to completion, despite obstacles
Optimism	Hopefulness and confidence about the future
Connectedness	Quality relationships, the belief one is loved and cared for
Happiness	Steady state of positive mood, feeling content with life

Measures which employ a multifaceted structure allow for targeted intervention, where low scoring areas can be acknowledged and improved upon (Kern et al., 2016). Well-being, as a multidimensional construct, cannot be adequately measured using a single-item measure (Hone, Jarden, Schofield, & Duncan, 2014). Self-report measures in adolescent samples, which only require answering questions such as "*I feel good today",* may not accurately capture the current experience of that adolescent, compared to an adult respondent. Therefore, the use of a multidimensional measure is essential to capture adolescent experience.

1.2.1.2 Well-Being and Academic Performance

These positive psychological abilities are thought to also be very influential in academic performance, being positively associated with school achievement and negatively associated with problem behaviours among adolescents (Caprara, Vecchione, Alessandri, Gerbino, &

Barbaranelli, 2011; Kern et al., 2016; Trucchia et al., 2013). Perseverance, especially, has been found to be significantly associated with first year grades in university (Farruggia et al., 2018; Kern et al., 2016; Šeboková et al., 2018). Further findings suggest that happier individuals will usually achieve better life outcomes (Allen, Vella-Brodrick, & Waters, 2017), with factors such as social support seen to act as a buffer to stress (Stamp et al., 2015). A longitudinal study, which followed students through secondary school, found that children who scored higher on measures of well-being at the beginning of the year earned higher final grades, when controlling for cognitive abilities (Quinn & Duckworth, 2007).

1.2.1.2 Well-Being, Intelligence, and Personality

A commonly held intuition is that individuals who report a high level of well-being are generally more intelligent (Grossman, Na, Varnum, Kitayama, & Nisbett, 2013). However, various large-scale studies have found no relationships between standard measures of intelligence and well-being measures (Grossman et al., 2013). One study reported that high performing medical students were scoring higher on a well-being questionnaire, but this relationship was inconsistent (Trucchia et al., 2013). Previous research has found the well-being factor, perseverance, to not be associated with intelligence (Farruggia et al., 2018). The association between well-being and intelligence in the context of transitioning adolescent students has yet to be investigated.

There are a number of individual factors that influence well-being, which explains why some individuals will experience a high level of wellbeing despite negative environmental and social conditions, while others will experience low levels of well-being despite positive conditions (Rogers, Creed, & Searle, 2012). Research has shown that personality traits are strong

predictors of well-being (Lucas & Diener, 2009; Rogers et al., 2012; Steinmayr et al., 2018). In well-being research, the influence of personality traits is a common and replicable finding, especially in adolescents (Lucas & Diener, 2009; Trainor, Delfabbro, Anderson, & Winefield, 2010). Well-being is thought to have certain characteristics of a personality trait, in that, there are individual differences in affective processes and judgements (Lucas & Diener, 2009). Past research has found strong links between extraversion and neuroticism on measures of well-being, due to the affective states associated (Costa & McCrae, 1980; Rogers et al., 2012). Others, however, have found links between different well-being constructs and agreeableness and conscientiousness (Lucas & Diener, 2009; Rogers et al., 2012). If certain students are predisposed to have a generally higher level of well-being, uncovering these relationships is essential for the development of resources for new students. For example, if conscientiousness was found to have a positive influence on well-being, certain skills associated, such as organisation and time-management, can be fostered in young people entering university.

1.2.2 Psychological Distress (Ill-Being)

University populations in past years have become more representative of the wider society, including the profile of mental health concerns (Topham & Moller, 2011). The age at which adolescents commonly enter university tends to overlap with the age of onset of a range of mental health disorders, such as anxiety, and depression (Stamp et al., 2015; Wynaden et al., 2013). The National Mental Health and Well-Being Survey, conducted in 2007, found that individuals in younger age groups are experiencing higher rates of disorder than older age groups (Australian Bureau of Statistics, 2007). More than one-quarter of young people aged between 16

to 24 met the criteria for a lifetime diagnosis of a mental disorder, the majority being anxiety disorders.

1.2.2.1 Ill-Being and Academic Performance

The negative cognitive and somatic symptoms of anxiety and depression tend to have a negative effect on attention and cause a reduction in interest; however, they have been found to sometimes increase a student's motivation to avoid failure (Steinmayr et al., 2018). However, many studies have found a significant negative relationship between depression and academic performance (O'Connor & Paunonen, 2007; Wintre et al., 2011; Yusoff et al., 2013). Past research has reported that students with higher emotional capabilities tended to perform better in first year (O'Connor & Paunonen, 2007; Wintre et al., 2011), however others have found high levels of psychological distress in students who were still managing to achieve high course grades at university (Monk, 2004). Even if students are experiencing non-clinical level symptoms, these still tend to affect the psychological integrity of students, leading to loss of concentration, emotional troubles, poor productivity, and in turn, low academic performance (Trucchia et al., 2013).

1.2.3 Gender Differences in Well-Being and Ill-Being

In previous research, the importance of gender differences as a contributor to adolescent psychological health has been highlighted (Bender, Reinholdt-Dunne, Esbjørn, & Pons, 2012; Katja et al., 2002). In adolescence, the prevalence of somatic disorders, such as depression, rises substantially, especially within female populations (Bluth & Blanton, 2015; Halliday, Kern, & Turnbull, 2019).

Gender-associated differences occur throughout adolescence, in relation to the prevalence, presentation, and timing of the development of mental health disorders and symptoms (Bender et al., 2012; Bluth, Campo, Futch, & Gaylord, 2017). The most recent Australian National Health Survey (2017-2018), found that 1 in 3 females aged 15-24 had a mental or behavioural condition, with 1 in 5 males in the same age group. In comparing earlier surveys, a dramatic increase in anxiety-related and depression-related conditions was seen, especially in younger age groups. In females, the prevalence increased from around 19% to 25% in the 15-24 age group, while the prevalence in males increased from 8% to 14%. Similar results were found for depression, or depression-feelings, with an increase from 10% to 14% in females and an increase from 6% to 9% in males (Australian Bureau of Statistics, 2017). Previous research has reported that female adolescents have greater difficulty in regulating their negative emotions, with females reporting more anxiety than males (Bender et al., 2012). Findings of gender differences on measures of positive psychological health are less consistent than differences in negative psychological health (Halliday et al., 2019). The prevalence of gender differences in adolescent psychological health is a common finding, however, there are a lack of findings for the beginning of university (DeBerard et al., 2004; Oswalt & Riddock, 2007).

1.2.4 The Two Kinds of Stress

During the transition to university, there is a notable increase in stress levels in adolescents (DeBerard et al., 2004). Stress is also an important factor in the adjustment of students to university (Wintre et al., 2011; Zajacova et al., 2005). If students are able to effectively cope with their new commitments, they will tend to experience less stress and higher levels of well-being (Pluut et al., 2015; Wintre et al., 2011). A longitudinal study reported that

levels of stress are generally higher in the first year of study, particularly in the first semester, and this trend was more prevalent in younger aged students (Deasy, Coughlan, Pironom, Jourdan, & Mannix-McNamara, 2016; Topham & Moller, 2011). Past research has found an inverse relationship between stress and academic performance in first year students (Pluut et al., 2015). Although not all students experience the same stress in the transition to university, research has found that regardless of the source of the stress, the greater the level of stress a student experiences, the greater the negative effect on academic performance (Baker, 2003).

However, stress is not intrinsically maladaptive. A certain amount of stress or pressure can be beneficial to performance, but when this stress exceeds an individual's ability to cope, this can result in distress (Branson, Turnbull, Dry, & Palmer, 2018; Gibbons et al., 2008). The distinction between these two extremes, commonly referred to as 'eustress' and 'distress' respectively, is important to consider in academic research. A certain amount of stress can motivate a student to perform better, while too much can lead to a negative impact on performance. Eustress and distress are perceived as two separate constructs, not on a continuum, and are differentiated by the associated affective state (Table 3) (Branson, Dry, Palmer, & Turnbull, 2019). At one point, an individual can have a certain level of eustress and a certain level of distress. Branson et al. (2019) developed a measure of eustress and distress specifically for adolescent populations. This new Adolescent Distress Eustress Scale (ADES) allows for the unique experiences of young people to be captured (Branson et al., 2019). Gender differences were found in the sample used to develop the measure, with females scoring higher on distress than males (Branson et al., 2019). However, no difference was found between the genders for eustress scores.

Table 3:

Eustress and Distress, as defined by Branson et al. (2019)

Term	Definition
Eustress	The positive, desirable, and advantageous response to a stressor Positive psychological states: hope, meaningfulness, positive affect
Distress	The negative, undesirable, and harmful response to a stressor Negative psychological states: anger, alienation, frustration, negative affect

1.2.4.1 Stress and Well-Being

Previous findings have found stress to be a consistent predictor of poorer social, emotional, and academic adaptation at university (Wintre et al., 2011), with prolonged exposure to stress leading to cognitive and somatic anxiety and depression symptoms (Gustems-Carnicer et al., 2019; Heizomi et al., 2015). Inverse associations between well-being and stress have been repeatedly found, with students experiencing higher levels of stress generally scoring lower on measures of happiness (Heizomi et al., 2015). One potential buffer of stress is social support, which is an important facet of psychological well-being, with studies finding that it may be crucial to a successful transition from high school to university (DeBerard et al., 2004).

1.3 Current Research Aims

The present study looks to explore relationships between psychological health, individual predictors, distress, eustress, and academic performance in an adolescent university sample. The influence of individual factors, such as personality, on academic performance will be explored. Further, the relationship between well-being, ill-being, and the conceptualisations of stress on academic performance in adolescents will be considered. From this, questions surrounding the influence of certain factors on levels of psychological health will be considered, including personality and stress. Lastly, any potential gender differences in all areas will be explored, to extend past findings.

2 Method

2.1 Participants

The participants for this study were recruited from a convenience sample, which included a total of 60 participants, comprised of 46 females and 14 males. Student age was restricted to 16-20 years old (M= 18.38, SD = 1.07). The age range was restricted as this group are considered adolescents in South Australia, and this is the age range available in the first-year cohort. Participants were recruited from the first-year psychology pool from the University of Adelaide. These first-year students accessed the survey via the University's Research Participation System. Course credit was offered for participation by the students. All students were enrolled in the compulsory first year psychology subject, which requires proficiency in English. No other criteria were enforced for participation.

2.2 Materials

The survey was available for access on an online-based survey platform SurveyMonkey. This survey consisted of the five measures, as well as a section for demographic information. Basic demographic information was collected, including the participants age and gender.

2.3 Measures

2.3.1 EPOCH Measure of Adolescent Well-Being

The EPOCH Measure of Adolescent Well-Being (EPOCH; (Kern et al., 2016)) is a self-report questionnaire that assesses positive psychological functioning and flourishing in adolescent populations. The measure includes five factors: engagement, perseverance, optimism, connectedness, and happiness. Participants rated 20 items on a 5-point likert scale, ranging from

1 = "almost never" to 5 = "almost always", or 1 = “Not at all like me” to 5 = “Very much like me”. The first ten questions are rated on the first scale, while the remainder are rated on the latter. Questions include items such as “I finish whatever I begin” for perseverance, or “There are people in my life who really care about me” for connectedness. Individual scores are calculated as the average of the four items per factor. A higher score indicates a higher level of functioning in that specific area. This measure has demonstrated good reliability, validity, and high internal consistency (Cronbach’s $\alpha = .90$) (Kern et al., 2016).

In the development of the EPOCH scale, Kern et al. (2016) highlighted a potential response bias, as all items in the measure are positively worded. To account for this, negatively worded items were added to the measure, but were not intended to be scored. These negative questions were constructed by rewording a question under each of the five factors, so there was a negative for each construct. These dummy questions were written in the same tone as the original questions and entered in a random order (See Table 4).

Table 4:

The Negatively Worded Questions for the EPOCH Measure

Factor	Negative Question
Engagement	“I find it easy to get distracted while working on schoolwork”
Perseverance	“I put tasks off, and sometimes never finish them”
Optimism	“I find it hard to think that good things are going to happen to me”
Connectedness	“I don’t feel life I have anyone to rely on”
Happiness	“I don’t feel happy often”

Due to a coding error, one happiness question was omitted from the survey. Part way through data collection, this was addressed, and the missing question was added. To account for the missing data, the negatively phrased happiness question was negatively scored for all participants. The responses on the negatively scored question had a correlation of -.56 with the missing happiness questions for the participants who were able to complete the missing question. This reversed scored item was qualitatively compared to each participant's other happiness responses, and it was deemed acceptable.

2.3.2 Adolescent Distress Eustress Scale

The Adolescent Distress Eustress Scale (ADES; (Branson et al., 2019)) is a self-report questionnaire that measures how adolescents respond to pressure. The measure includes 10 questions, scored on a 5-point likert scale, ranging from "not like me" to "very much like me". Questions to measure distress include "My mind was racing out of control", while questions to measure eustress include "I was satisfied with how I dealt with the pressure". Scores for both constructs are calculated by adding the scores on the five respective questions, to give an ADES-Distress and an ADES-Eustress score. This measure has demonstrated good internal reliability (Distress: α=.87, Eustress: α=.83), and good convergent and discriminant validity. Further, the measure has good temporal stability (Distress: $r = .86$, $p < .01$, Eustress: $r = .81$, $p < .01$).

2.3.3 Depression, Anxiety, Stress Scale

The 21-item Depression, Anxiety, and Stress Scale (DASS21; (Lovibond & Lovibond, 1995)) is a short-form version of the 42-item scale. It consists of a set of three self-report scales designed to measure the emotional states of anxiety, stress, and depression. Questions are rated

on the extent to which the statements applied during the last week, via a 4-point likert scale from 0: "Did not apply to me at all" to 3: "Applied to me very much or most of the time". Scores for each factor can be calculated from the respective 7 questions and can be compared to a set of conventional severity labels for each scale, with higher scores indicating severe mood symptoms. High internal consistency has been found in a similar adolescent sample, for depression (a = .88), anxiety (a = .79), and stress (a = .84) (Tully, Zajac, & Venning, 2009).

2.3.4 Measuring Personality

The Openness Conscientiousness Extraversion Agreeableness Neuroticism Index Condensed (OCEANIC; (Schulze & Roberts, 2006)) consists of 45 items based on the Big Five personality constructs: openness, conscientiousness, extraversion, agreeableness, and neuroticism. The items are scored on a 6-point likert scale. Scores for each of the five factors can be calculated from the mean of the corresponding questions. This measure is shown to have good internal consistency, ranging from α=.77 for openness, to α=.91 for conscientiousness and neuroticism (Schulze & Roberts, 2006).

2.3.5 Measuring Intelligence

Raven's Advanced Progressive Matrices – Short Form (APM; (Bors & Stokes, 1998)) is used to measure an individual's fluid intelligence. This short form is strongly correlated with the full-length APM (r = .92). This involves a number of perceptual analytic reasoning problems in the form of patterned matrices. In each case, the lower right corner of the matrix is missing, and the participants task is to determine which of the eight possible answers fits in the missing space.

This measure has high internal consistency, with considerable test-retest reliability (a = .81) (Bors & Stokes, 1998).

2.3.6 Academic Achievement

Participant final exam grades for Psychology 1A were used as a measure of academic performance. Results were obtained from the Course Coordinator and were deidentified.

2.4 Procedure

Data collection was administered online. A brief description of the study was given to the students before signing up to participate. Further information was provided at the beginning of the survey, including an option for participants to consent to their data being used for research purposes. The questionnaires were completed independently, with no time constraints.

2.4.1 Ethics Approval

The study was approved by The University of Adelaide School of Psychology: Human Research Ethics Committee.

3 Results

3.1 Data Screening

The data was examined to test for normality and possible outliers. Initial Shapiro-Wilk tests indicated that all variables were normally distributed, except for DASS-Anxiety, DASS-Stress, EPOCH-Connectedness, EPOCH-Happiness, and ADES-Eustress. Inspection of histograms show that Anxiety was uniformly distributed, while Stress was negatively skewed. Connectedness and Happiness were found to be significantly negatively skewed, which is consistent with the original findings and conclusions that these factors experience ceiling effects (Kern et al., 2016). Eustress was found to also be negatively skewed. Due to this, where necessary, appropriate non-parametric tests will be used.

3.1.2 Missing Data

Upon receiving the final exam grades for the students, one value was missing for a female student. For the relevant analyses, this participant's responses were left out.

3.2 Total Well-Being and Total Ill-Being

Principal Components Analysis (PCA), a data-reduction technique used to convert a set of correlated variables into a summary variable, was used on the data. An overall 'Total Well-being' score was constructed from the five EPOCH subscales, and an overall 'Total Ill-being' score from the three DASS-21 subscales. The use of this technique is used to avoid problems of multicollinearity in using individual scores (Kabacoff, 2015). The total well-being score was highly correlated with perseverance, optimism, connectedness, and happiness, however, only

moderately correlated with engagement (Table 6). The total ill-being score was very highly correlated with the three DASS subscales (Table 6).

3.4 Gender Differences

Table 5 contains the mean scores for female and male respondents. Past research has found significant differences between females and males on levels of well-being and ill-being. To test if this is the case in this sample, a Hotelling's Multivariate Comparison t-test was used to compare male and female scores on the EPOCH subscales and DASS-21 subscales. The results show no significant difference between male and female scores on the EPOCH ($F[5,54] = 1.78$, $p > .05$) or DASS-21 ($F[3,56] = .315$, $p > .05$). A Hotelling's t-test was also run on the female and male distress and eustress scores, with no significant difference found ($F[2,57] = .13$, $p > .05$). Since no significant differences were found, no non-parametric tests were used to explore further.

Further analyses were run using non-parametric tests to determine if there were any significant differences between females and males across intelligence, and grades. A Mann-Whitney U-test was run on female and male APM scores, with no significant difference found ($U = 320$, $p = .97$). A second test was run to compare female and male grades, with no significant difference found ($U = 212.5$, $p = .06$).

To test for any gender differences in the Big Five personality factors, a further Hotelling's T-test was used. The results were significant, suggesting a gender difference in the scores ($F[5,54] = 5.98$, $p < .001$). Due to the difference in sample size violating the assumption of normality here, a series of non-parametric tests were run. No significant differences were found for openness ($U = 220.5$, $p < .05$), conscientiousness ($U = 214.5$, $p < .05$), extraversion ($U = 322$, $p = 1$), or agreeableness ($U = 431$, $p < .05$). However, a significant difference was found between

female and male neuroticism scores ($U = 115.5$, $p < .001$), with females scoring higher. As only one significant difference was found between the female and male samples, it was decided that this did not warrant the separation of these two groups. Given this, the following analyses were conducted on a combined sample.

Table 5:

Sample Characteristics

	Female (*n* = 46)		Male (*n* = 14)		Overall (*n* = 60)	
	M	SD	M	SD	M	SD
Openness	3.84	.81	3.44	.95	3.74	.85
Conscientiousness	4.16	.80	3.70	.67	4.06	.79
Extraversion	3.54	.79	3.56	.61	3.55	.75
Agreeableness	4.77	.64	5.16	.41	4.86	.61
Neuroticism	3.69	.71	2.87	.58	3.50	.76
Engagement	3.06	.62	3.5	.42	3.16	.61
Perseverance	3.36	.86	3.29	.63	3.35	.81
Optimism	3.25	.72	3.36	.57	3.28	.68
Connectedness	4.00	.82	3.89	.58	3.98	.76
Happiness	3.48	.80	3.78	.87	3.56	.82
Total Well-being	-.09	1.69	.28	1.30	.00	1.61
Depression	3.88	1.56	4.06	2.11	3.92	1.69
Anxiety	3.83	1.25	4.06	1.62	3.88	1.33
Stress	2.66	1.44	2.65	1.44	2.66	1.43
Total Ill-being	-.04	1.56	.12	1.90	.00	1.63
Eustress	11.43	4.11	11.93	5.41	11.55	4.37
Distress	11.67	4.47	12.00	5.31	11.75	4.66
Raven's APM	7.85	2.37	7.71	2.49	7.82	2.38
Final Exam Grade	75.29[a]	10.78[a]	68.33	11.11	73.64	11.17

[a]N = 45 due to missing female participant exam grade

3.5 Further Sample Information

Table 5 displays the mean scores for the sample across all predictors. In the conventions for the ADES, the average score for eustress and distress fell into the range of 'Average', a score between 8-13 for eustress and 5-13 for distress (Branson et al., 2019). For the DASS-21, there were significant differences between the mean scores and the population norms for university students collected by Crawford et al. (2009). For depression, the normative mean was 2.57, and 3.92 in the current sample. A standard t-test was run to compare the depression mean to the population norm, which found a significant difference ($t[59]= 6.21$, $p = <.001$). Mann-Whitney U-tests were used the compare the anxiety ($M = 3.88$), and stress means ($M = 2.66$) to the respective population norms (Anxiety: $M = 1.74$; Stress: $M = 3.99$). Significant differences were found for anxiety ($U = 1820$, $p <.05$), and stress ($U = 223$, $p <.05$). This sample scored significantly higher on depression and anxiety, while scoring significantly lower on stress. This suggests that this sample, while not experiencing as much stress as the normative Australian population, are experiencing high levels of depression and anxiety.

Table 6:

Pearson Correlation Matrix Between All Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Raven's APM	1.00																		
2. Openness	-.06	1.00																	
3. Conscientiousness	-.03	.29*	1.00																
4. Extraversion	-.11	.11	.16	1.00															
5. Agreeableness	-.03	.21	.21	.47****	1.00														
6. Neuroticism	.17	.35**	.03	-.12	-.16	1.00													
7. Engagement	.10	-.03	.08	.39****	.32**	-.14	1.00												
8. Perseverance	-.16	.02	.52****	.15	.07	-.16	.16	1.00											
9. Optimism	-.17	-.14	.00	.27*	.14	-.39****	.39****	.38****	1.00										
10. Connectedness	-.07	-.01	.36****	.20	.37****	-.05	.20	.59****	.37****	1.00									
11. Happiness	-.03	-.27*	.15	.30*	.19	-.39****	.31*	.38****	.55****	.54****	1.00								
12. Total Well-being	-.10	-.13	.31*	.35**	.30*	-.32**	.52****	.71****	.75****	.78****	.80****	1.00							
13. Depression	.17	.32**	-.12	.01	.14	.48****	.01	-.26*	-.39****	-.27*	-.51****	-.42****	1.00						
14. Anxiety	.27*	.36****	-.16	.01	.18	.42****	.03	-.35**	-.44****	-.28*	-.54****	-.47****	.88****	1.00					
15. Stress	.15	.16	-.21	.04	-.01	.47****	.03	-.28*	-.26*	-.25*	-.43****	-.36****	.80****	.80****	1.00				
16. Total Ill-being	.21	.30*	-.17	.02	.11	.49****	.02	-.31**	-.39****	-.29*	-.53****	-.44****	.95****	.95****	.92****	1.00			
17. Distress	.17	.28*	-.07	.11	.20	.46****	.06	-.18	-.30*	-.17	-.35**	-.29*	.95****	.76****	.75****	.87****	1.00		
18. Eustress	-.21	.10	.27*	.20*	.02	-.24	.32**	.60****	.45****	.34**	.48****	.61****	-.39****	-.41****	-.30*	-.39****	-.30*	1.00	
19. Exam Grade	.12	.04	.32**	.01	.09	.14	-.03	.31*	-.04	.20	.08	.18	-.30*	-.30*	-.30*	-.32**	-.20	.22	1.00
N =	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	59

Note. * p <.05, ** p <.01, *** p <.001, **** p = 0.00

3.6 Predicting Academic Performance

The correlation matrix is presented in Table 6, which includes the zero-order correlations between each of the variables measured. First, the relationships with exam grades will be explored. Intelligence was found to not have a significant correlation with final exam grades (r = .12, p >.05), which was surprising. No significant associations between exam grades and distress (r = -.20, p >.05) or eustress (r = .22, p >.05) were found. Only conscientiousness was found to have a significant positive relationship with exam grades out of the personality factors measured (r = .32, p <.01). From the well-being factors, only perseverance was found to have a significant association with exam grades (r = .31, p <.05). This was expected, as conscientiousness and perseverance were found to be significantly associated (r = .52, p <.001). The Total Well-Being score was not significantly associated with exam grades. All three subscales of the DASS-21 were found to have significant negative correlations with end-of-semester grades (Depression: r = -.30, p <.05; Anxiety: r = -.30, p <.05; Stress: r = -.29, p <.05). The total ill-being score, as expected, had a significant negative effect on grades (r = -.32, p <.01).

As these preliminary findings, and previous research shows, individual differences, well-being, and ill-being have a significant influence on academic performance. In order to determine the different contributions these factors have on academic performance; a number of separate multiple regressions were run with exam grade as the outcome variable. Conscientiousness, perseverance, and the total ill-being score were entered as predictors in these different models. Model 1 estimated the effect of conscientiousness and perseverance on academic performance. To investigate this relationship between perseverance and conscientious further, in Model 2 and 3, they were entered separately with total ill-being. In order to determine the individual

contributions of the predictors, relative importance regression was used. The R package *relaimpo* (Gromping, 2006) was used to assess the relative contributions in relation to the regression model.

Table 7:

Regression Model Comparison for Academic Performance across Personality, Well-being, and Ill-being Predictors

	Model 1 [F(2,56)= 4.25*] R^2 = 13.19%		Model 2 [F(2,56)= 4.95*] R^2 = 15.02%		Model 3 [F(2,56)= 5.85**] R^2 = 17.3%	
Factor	Beta	RI	Beta	RI	Beta	RI
Conscientiousness	3.03	.52	-	-	3.79*	.50
Perseverance	2.77	.48	3.21	.49	-	-
Total Ill-being	-	-	-1.66	.51	-1.85*	.50

Note: * p <.05, ** p <.01. RI = proportion of model explained variance attributed to an individual predictor

The models and results are presented in Table 7. As reported above, conscientiousness and perseverance are both highly correlated with final exam grades, while also having a significant association together (Table 6). Model 1 further confirms this, as neither were found to be significant predictors of academic performance when entered together, which suggests a large amount of shared variance. A similar relationship was found between total ill-being and perseverance, where in Model 2 neither were found to be significant predictors, despite being significantly negatively correlated (Table 6). However, in Model 3 where conscientiousness and total ill-being were entered, both were found to be significant predictors of academic performance, despite not being significantly associated (Table 6). The relative importance

regression analyses for each model suggest that each predictor is explaining around half of the variance explained in each case. While these three factors all have a significant influence on academic outcomes, conscientiousness and total ill-being were found to be the most salient.

3.7 Predictors of Adolescent Well-Being

The first-order relationships between the five EPOCH factors, and the total well-being score will now be examined. The total well-being score was found to be significantly positively associated with eustress ($r = .61$, $p = .00$). Distress was found to be significantly negatively associated ($r = -.29$, $p < .05$). No significant relationship was found between intelligence and total well-being.

Separately, each of the five EPOCH factors were found to be related to different personality factors. Engagement was found to be significantly associated with extraversion ($r = .39$, $p = .00$), and agreeableness ($r = .32$, $p < .01$). Perseverance and conscientiousness were found to be significantly correlated ($r = .52$, $p = .00$). A significant positive correlation between optimism and extraversion was found ($r = .27$, $p < .05$), with a significant negative correlation with neuroticism ($r = -.39$, $p = .00$). Connectedness was found to be significantly correlated with conscientiousness ($r = .36$, $p = .00$), and agreeableness ($r = .37$, $p = .00$). A significant positive correlation was found between happiness and extraversion ($r = .29$, $p < .05$), with a significant negative correlation with openness ($r = -.27$, $p < .05$), and neuroticism ($r = -.39$, $p = .00$). These results suggest a number of personality predictors in adolescent well-being.

From the results presented, and previous findings, certain personality traits have been found to be strong predictors of well-being. To determine the most influential personality predictor, a multiple regression was run. Due to their significant zero-order correlations with the

total well-being score; conscientiousness, agreeableness, extraversion, and neuroticism were entered as predictors.

Table 8:

Multiple Regression Model for Predictors of Adolescent Well-being

Factor	Beta	RI
Conscientiousness	.54*	.27
Agreeableness	.21	.13
Extraversion	.50	.27
Neuroticism	-.61*	.31

Note: $F(4,55) = 5.44$, $p < .001$, proportion of variance explained: 28.36%, RI = proportion of model explained variance attributed to an individual predictor

Table 8 includes the results, which demonstrates that conscientiousness and neuroticism are significant predictors of total well-being. The relative importance analyses suggest that conscientiousness and neuroticism are explaining a large proportion of the variance, from 27 to 31 percent. This suggests that a student who has a more conscientious and less neurotic personality is more likely to have higher well-being.

3.8 Predictors of Adolescent Ill-Being

The relationships between the three DASS subscales, and the total ill-being factor will now be discussed. Total ill-being was found to be significantly positively associated with openness ($r = .30$, $p < .05$), and neuroticism ($r = .49$, $p < .00$). A significant association was also found with distress ($r = .87$, $p < .00$). Significant negative correlations with eustress ($r = -.39$, p

< .00), and grades were also found (r = -.32, p < .01). Anxiety was found to be significantly positively associated with intelligence scores (r = .27, p <.05). Stress was found to be significantly negatively associated with the EPOCH factor connectedness (r = -.25, p <.05).

As mentioned above, and has been found previously, neuroticism and distress are both significant influences on levels of ill-being. To determine the predictive value of these factors, a multiple regression was run, with the results included in Table 9. Only distress was found to be a significant predictor of overall ill-being, with the relative importance analysis revealing it accounted for 84 per cent of the variance explained by the model. This suggests that personality may not be as important in levels of ill-being as it is for well-being, but rather, levels of distress have more influence.

Table 9:

Multiple Regression Model for Predictors of Adolescent Ill-being

	Beta	RI
Neuroticism	.24	.16
Distress	.29****	.84

Note: F(2,57) = 97.11, p <.0001, proportion of variance explained = 78.89%, RI = proportion of model explained variance attributed to an individual predictor

4 Discussion

4.1 Overview

The present study looked to explore the effects of adolescent psychological health and various individual factors on academic performance in a university setting. Further, the influence of individual adolescent factors on well-being, ill-being, and stress were considered. This study looked to test two new measures of adolescent well-being and stress on a sample of adolescents currently in their first year of university. Overall, well-being and ill-being had a direct influence on academic performance, with a number of interesting relationships found. Further, no significant gender differences were found on the measures included, which is a surprising finding. Possible personality predictors of psychological health were uncovered, with interesting influences from levels of distress and eustress. However, there are a number of limitations to the results found, but a number of possible directions for future research from the findings.

4.2 Predictors of Academic Performance

This first aim of this study was to explore the influence of several individual differences on academic achievement in a group of adolescent university students. Intelligence scores were found to not be related to academic achievement, which was unexpected. However, intelligence has been found to become a less important predictor of academic success in higher education. Further, this sample consists of students who all possess a certain level of intellect to attend university, which reduces the amount of variability in APM scores and could explain the non-significant findings.

Overall, well-being conceptualised as these five factors does not seen to be as great of an influence on academic achievement as what would be expected, and what has been found (Kern

et al., 2016). Perseverance was the only individual well-being factor found to be related to exam grades, which is a consistent finding (Farruggia et al., 2018; Kern et al., 2016; Šeboková et al., 2018). This lack of findings for the other EPOCH factors conflicts with Kern et al. (2016) original results when the measure was developed, who found that while perseverance was a strong predictor, engagement and connectedness were also found to be predictors of academic outcomes. Kern et al. (2016) also reported that individuals with high levels of perseverance could possibly have higher levels of stress and anxiety, however, this was not the case in this sample, with strong negative relationships found with all ill-being factors. Poor psychological health was found to have a negative influence on grades, which is consistent with previous findings (Gustems-Carnicer et al., 2019; Pluut et al., 2015; Steinmayr et al., 2018; Wintre et al., 2011). Neither distress nor eustress were found to have a significant influence on academic achievement, however this could be due to the restricted sample size, as the relationship between distress and grades was moderate but was not significant.

From personality differences, conscientiousness was the only personality factor found to have a significant relationship with final grades, which is a consistent finding in the literature (Diseth, 2003; O'Connor & Paunonen, 2007). The negative influence of neuroticism is another common finding, however, this was not found in the current study (Diseth, 2003; O'Connor & Paunonen, 2007; Schulze & Roberts, 2006).

An interesting relationship was found between conscientiousness, perseverance, overall ill-being and their influence on academic outcomes. First, as perseverance is a subset of the conscientiousness personality trait, they were both expected and were found to be significantly associated. Further, they were both found to be significant influences on academic performance. Perseverance was found to be significantly negatively associated with overall ill-being, which

was expected, as perseverance is a facet of well-being. However, conscientiousness and overall ill-being were found to not be related. These predictors were examined in relation to their predictive ability on academic achievement, and the relationship between these predictors was of interest. Together, neither conscientiousness nor perseverance were significant predictors of academic performance. Neither were perseverance and overall ill-being together. This implies that these sets of pairs both share too much variance on their influence on academic achievement for either to be significant predictors. However, when both conscientiousness and overall ill-being were entered as predictors, both were significant, indicating no or little shared variance. Conscientiousness was found to be a significant positive influence, while overall ill-being was found to be a significant negative influence. This implies the existence of a non-transitive relationship between these three predictors, and their combined effect on academic performance.

It is possible that this relationship may work to explain the results Monk (2004) found, where a number of students who were scoring high on ill-being measures, despite this, were high academic achievers. Conscientiousness, as has been shown, is a desirable trait in success at university, and the results demonstrate the positive influence it has on academic outcomes. It could be theorised then, that an individual who has severe depression, anxiety, or stress symptoms could still perform well academically if they were highly conscientious. In her original paper, Monk theorised that these results were due to motivational concepts, and the relationship with coping strategies. The specific purpose of motivation was considered, to explain how some individuals persevere despite experiencing adversity (Monk, 2004). It is possible that the results found in the present study extend this theory further, to incorporate these personality and well-being factors that are closely related to motivation. However, this relationship would need further exploration before this explanation can be considered.

4.3 Predictors of Well-Being in Adolescence

The second aim of this study was to identify any individual differences that predict positive psychological health in adolescents. The five well-being factors were not found to be related to intelligence, which is consistent with current findings that suggest intelligence is not a predictor of higher well-being (Grossman et al., 2013). This is especially relevant with perseverance, which was found to not be related to intelligence scores, which is consistent with past findings (Duckworth, Peterson, Matthews, & Kelly, 2007). Well-being was found to be negatively related to psychological distress as expected.

Each well-being factor was found to be associated with different personality factors. These relationships are interesting, as it could be argued that individuals with higher scores on certain well-being factors are likely to have certain personality traits. These findings suggest that an extravert is more likely to have higher levels of engagement, optimism, and happiness, which is a consistent finding (Lucas & Diener, 2009). While a more neurotic person is more likely to score lower on levels of optimism and happiness. There were also a number of other personality relationships found. More agreeable individuals are more likely to have higher levels of connectedness, while more conscientious individuals are likely to score higher on levels of perseverance and connectedness. These findings are consistent with past research, which suggest that neuroticism and extraversion have strong links to well-being (Costa & McCrae, 1980; Rogers et al., 2012).

In relation to which personality traits predict overall well-being in the sample, the results were interesting. Previous research has found extraversion and neuroticism to be the most influential in overall well-being (Lucas & Diener, 2009), however this was not the case in the present study. The analysis results demonstrate that while neuroticism was a significant negative

predictor, conscientiousness was found to be a significant positive predictor. Though, this could be explained in relation to the type of participants used. This is a sample of university students, so it could be inferred that their conscientiousness scores are higher because of this, as these students seek some accomplishment, are organised, and generally have higher academic performance (Rogers et al., 2012). Therefore, when it comes to predicting well-being in a sample of university students, being conscientious may be an important positive influence on well-being.

The five well-being factors were strongly related to eustress, meaning that students with higher well-being tended to have more positive stress, than students with lower well-being. This positive stress may feed into well-being, or vice versa. Distress was only found to be related to happiness and optimism, as a significant negative influence. So, a student's level of distress does not seem to impact on their levels of engagement, perseverance, or connectedness. As eustress and distress are separate constructs, a student's well-being levels are a positive influence on their levels of eustress, but this does not seem to influence their distress levels.

4.4 Predictors of Ill-Being in Adolescence

The third aim of the study was to identify potential influences on negative psychological health in adolescent university students. This group was found to be scoring significantly above the general population on symptoms of depression and anxiety. However, the sample scores significantly under the population norm for stress, which is surprising. First year student populations are known to be highly stressed (Gustems-Carnicer et al., 2019; Pluut et al., 2015; Wintre et al., 2011), so these findings are unexpected.

The personality traits found to be significantly associated with ill-being were openness and neuroticism, with the latter being a consistent finding (O'Connor & Paunonen, 2007; Yusoff

et al., 2013). Neuroticism is an expected predictor of ill-being, with individuals who score higher tending to have higher total ill-being, as well as higher scores on depression, anxiety, and stress symptoms (Yusoff et al., 2013). Openness, however, is unexpected, but this relationship might just be due to chance in the sample; this group of students who are highly open to experience may just have high ill-being with no causal relation. Distress was found to be a strong influence on all ill-being factors, which confirms findings by Branson et al. (2018). Eustress was found to have a significant negative relationship with ill-being, suggesting that students who experienced more positive stress tended to have lower ill-being scores.

From attempting to identify predictors of overall ill-being, distress was found to be more influential in a student's total ill-being score than neuroticism and explained a significant amount of variation in ill-being scores. Neuroticism and distress are closely related, however if an individual had a more neurotic personality, this may not have a direct effect on their ill-being. This kind of person may have strategies to minimise their negative affective states. Whereas with distress, this is representing current levels of negative stress, along with negative feelings, which would have a direct effect on an adolescent's level of ill-being.

Depression was found to have a significant negative effect on well-being, which is consistent with Gustems-Carnicer et al. (2019). Stress was found to have a significant inverse relation with total well-being, which is consistent with previous findings (Gibbons et al., 2008; Gustems-Carnicer et al., 2019). Specifically, stress was also found to be negatively associated with the connectedness well-being factor, which is consistent with findings by DeBerard and colleagues (2004). DeBerard et al. (2004) found that factors such as social support, which underpins the connectedness EPOCH factor, acts as a buffer to stress. Anxiety was the only

predictor found to be significantly associated with intelligence, however, this can be due to this sample of students being an overall intelligent anxious group.

4.5 Influences of Eustress and Distress

A sub-aim of this study was to explore the role of positive and negative stress in an older adolescent sample. Distress was found to be related to neuroticism, which was expected due to the nature of both constructs. Distress had a negative influence on well-being, with students who experienced higher levels of distress generally experiencing lower levels of wellbeing. Specifically, distress was a negative influence on the optimism and happiness EPOCH factors, suggesting a direct effect on an adolescent's optimism about the future and current feeling of happiness.

Eustress was found to be related to conscientiousness and extraversion, which were also found to be predictive of total well-being. Further, eustress was a significant positive influence on all five well-being factors, with the strongest relationship found with perseverance. These results further support the suggestion raised earlier, that the factors associated with perseverance and conscientiousness are important influences in positive student well-being.

4.6 Gender Differences

The final aim of the study was to explore any potential gender differences on the factors measured. No difference was found between female and male exam grades, or in scores on the APM, which is consistent with findings in higher education (DeBerard et al., 2004). However, this conflicts with results from adolescent groups in school, where females are found to achieve higher grades than males (Carvalho, 2016). This may be due to the decrease in variability at a

university level, as there are academic standards associated with acceptance at university (Laidra et al., 2007).

A common finding in samples of adolescents are strong gender differences in levels of well-being and ill-being. However, in the present study, no such differences were found. There were no significant differences found between male and female levels of overall ill-being, which conflicts with past findings (Bluth et al., 2017; Katja et al., 2002; Oswalt & Riddock, 2007). However, gender differences in this area, in an adolescent university sample, are less commonly reported and studied. No gender differences were found for distress and eustress scores, which conflicts with the scale's initial findings (Branson et al., 2019). While Branson et al. (2019) reported that females scored higher on distress than males, this was not the case in the present study. However, no gender difference was found for eustress scores, which is consistent with Branson's findings (Branson et al., 2019).

Significant differences between males and females on the Big Five were found, only on neuroticism scores, with females scoring higher on average. This finding is consistent with the results from Weisberg, Deyoung, & Hirsh (2011) and Schmitt et al. (2008), who reported higher scores on neuroticism in adult females. However, no gender differences were found for scores on agreeableness, which is inconsistent with previous findings (Schmitt et al., 2008; Weisberg et al., 2011).

4.7 Implications

This study highlighted the importance of fostering well-being qualities in students. Well-being was found to be important, in that students with higher well-being typically have lower ill-being, which has a direct effect on academic achievement. The results show that the qualities

associated with perseverance are highly desirable and influential in academic performance, and from this, programs can be developed at universities for new students to foster these associated qualities. The ability to complete goals, even in the face of obstacles, has been shown to be very influential in a student's academic performance, both in the present study and the past (Diseth, 2003; O'Connor & Paunonen, 2007; Schulze & Roberts, 2006). Further, the characteristics associated with conscientiousness and perseverance were found to have a significant influence on well-being and eustress, highlighting the importance of fostering these qualities in students.

The relationship between conscientiousness, perseverance, and ill-being was an interesting finding in the results. This non-transitive relationship is of high interest for further study, due to the possible implications around student mental health and performance at university. The influence of both conscientiousness and ill-being on academic performance is a known relationship, but the results from this study demonstrate that the two are unrelated, possibly explaining why some students are high academic achievers despite high levels of ill-being.

Further, these new tests of well-being and stress dimensions in adolescents were tested on a sample of older adolescents, furthering their development. These measures were developed using high school adolescent students, so the use of an older sample was required. The use of an older adolescent sample is important to understand the reliability of these measures at the extreme end of a target age group.

4.8 Limitations and Methodological Considerations

There are a number of limitations to the generalisability of the findings here. This was one of the first times these adolescent measures were used on first-year university students,

however, the results lack external reliability. The sample consisted solely of psychology students, all from the same university. The participants were recruited via a convenience sample, which restricts the reliability of the outcomes presented. In future research, the diversity of the sample used should be increased, to explore the effect of different university courses on student well-being and ill-being. Even though these results do not indicate any gender differences present, further exploration of this is necessary at a university level.

A main limitation involves issues in data collection due to a coding failure, which has further reduced the reliability of the findings here. Further, self-report measures were used, opening the data up to possible biases in responding, such as social desirability. One methodological strength, however, was the inclusion of negatively phrased questions within the EPOCH measure. As the EPOCH measure is positively worded, these questions worked to disrupt any possible positive response biases in participants. A further limitation is in the choice of academic performance data collected. Final exam grades may not be the best method of capturing academic achievement, due to potential confounding variables, such as exam difficulty. In future studies, student GPA or an average of their course grades should be used, as this would increase possible generalisability and accuracy in conceptualising academic performance.

4.9 Future Research

The interaction between well-being and academic achievement should be explored further in the future. The application of the five EPOCH factors to adolescent university students should be increased to further the understanding of how well-being changes as one enters higher education. Further, a comparison of well-being from the end of high school to the beginning of university is of interest, to investigate if there is an influence of well-being on student

adjustment. A longitudinal study following students from the end of high school into university would extend the findings of this study and explore if high levels of well-being have an influence on the student's ability to transition effectively. As there have been longitudinal studies where similar factors are tracked across primary to high school, so extending these results to beginning university would be of interest.

Further research into the relationship between eustress and well-being would be of interest, to further understand the effects of positive stress on student psychological well-being. It would be of interest to know whether one's current levels of well-being influence how they perceive and cope with stressful events, or vice versa.

The relationship between conscientiousness, perseverance, and ill-being should be investigated further, with a more diverse sample of students, to identify the specific effect each predictor has on each other and academic performance. This lack of a relationship between conscientiousness and overall ill-being is of interest for further study, so to possibly understand why some students can perform well academically, while scoring high on symptoms of depression, anxiety, and stress. If this were the finding, this would work towards developing resources for students who have diagnosed mental health disorders, or severe associated symptoms, to develop conscientious skills to possibly increase their performance at university. Additional investigation of the relationship between the five EPOCH factors and the five OCEAN personality factors at a university level is needed to further understand this relationship between conscientiousness and well-being. If conscientiousness was confirmed to be a significant predictor of student well-being at university, these findings would work towards promoting the development of resources for students to increase and foster these conscientious skills.

4.10 Conclusions

A number of interesting predictors of academic success were identified in the present study, with a number of relationships found. Personality, well-being, and ill-being were found to predict academic success in this sample of first year adolescent students, with an interesting relationship found between them. Personality traits were found to predict higher levels of well-being, however the effect of personality on ill-being was less than expected. Two new measures of adolescent well-being and stress were used on a sample of older adolescence, furthering their development and application. Future research into the relationship between personality, well-being, and ill-being is needed to further the arguments made in this paper. Further investigation of the influence of well-being on the transition from high school to university is needed, as it is possible to foster these positive psychological abilities in adolescence. This study added to the ever-growing literature surrounding predictors of academic success in first year populations and extended previous high school results to the experiences of adolescent at university. The results should be considered in the production of resources for high school and new university students.

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