

**The Adolescent Distress-Eustress Scale Applied to an Adolescent University Sample**

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## Abstract

This study examines how distress and eustress interact in an adolescent university sample, while also aiming to validate a new measure, the Adolescent Distress-Eustress Scale. This is expanding on previous literature as most has focussed on stress as a debilitating factor, neglecting any positive aspects of stress. Furthermore, studies that have acknowledged both positive and negative stress, primarily focussed on adults in a working environment, as until recently, there were no scales developed to measure distress and eustress in an adolescent sample. The current study involved ( $N = 64$ ) participants from the University of Adelaide, who were between 17-20 years old and enrolled in the course *Psychology 1A*. Participants completed a survey consisting of scales and questions used to collect and measure variables including: intellectual ability, personality traits, well-being, ill-being, stress mindsets, self-efficacy, distress-eustress, and academic satisfaction. Results indicated that, compared to the general population, the current sample had significantly higher levels of ill-being and significantly lower levels of well-being. Correlational analysis revealed some expected relationships, such as between distress and eustress with well-being, ill-being and some personality traits. However, contrary to the hypothesised relationship, distress and eustress had no significant association with academic outcomes. It was found that distress was positively associated with Openness and also multiple measures of academic satisfaction, which was unexpected. However, the study being underpowered could be to blame for unexpected findings. Nevertheless, the results provided insight into how distress and eustress can affect adolescent tertiary students and provided direction for future research.

## **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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**October, 2018**



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## **1 Introduction**

It comes as no surprise that both university students and adolescents as groups each experience various unique demands (Murff, 2005). Consequently, adolescents who also happen to be students experience a combination of these unique stressors, for example demanding academic workloads, new responsibilities, strain on interpersonal relationships, and overall change in lifestyle, including change in housing arrangements and adapting to new financial pressures (Murff, 2005; Rogers, Creed, & Searle, 2012; Shaikh & Deschamps, 2006; Vaez, & LaFlamme, 2008). These unique pressures that adolescent students encounter can affect the type, and amount of, stress experienced by those individuals. Subsequently, this can have an immense impact on important aspects in their lives, such as, academic performance and mental health (Rogers et al., 2012).

The majority of previous research has focussed on stress as purely a debilitating factor, especially in studies focusing on adolescent groups. In fact, up until recently there were no scales aimed at measuring positive and negative stress, otherwise known as distress and eustress, in adolescent samples. Consequently, very little research has been conducted in this realm, therefore, the focus of this study is to explore how distress and eustress interact with other variables in an adolescent university sample using a newly developed measure. We aim to extend on previous literature by addressing the mentioned gap, whilst simultaneously validating a new scale which measures distress and eustress in adolescents; the Adolescent Distress-Eustress Scale (Branson, 2018).

### **1.1 Definition of Stress**

Scientifically, stress has been used to represent the effects of anything that threatens homeostasis, which is the bodies need to maintain a constant internal state across changing environments (Sapolsky, 1996; Schneiderman, Ironson, & Siegel, 2005). More generally, stress is the relationship between an individual and an environment that the person perceives

to be demanding and/or a risk to their well-being, or a potential hindrance to an outcome they are trying to achieve (Crum, Salovey, & Achor, 2013; O'Sullivan, 2011; Zajacova, Lynch, & Espenshade, 2005). Stress can also be thought of in relation to its physiological responses, for example, when experiencing stress we can experience increased heart rates, blood pressure and respiratory rates (O'Sullivan, 2011). Additionally, the stress response is known to have psychological effects such as lowered mood and concentration (Murff, 2005). However, these common definitions, may not be entirely representative of the true nature of stress.

### **1.2 Focus on Stress as Negative**

In the past, there have been countless studies conducted that focus on the negative effects of stress. With an array of studies investigating the links between stress and leading causes of death, with findings suggesting that stress is linked to heart disease, cancer, suicide, and many more (Sapolsky, 1996; & Schneiderman et al., 2005). The interest in researching the debilitating effects of stress, may be due to how stress, as a concept, is consistently portrayed in a negative light on the news, in schools, in workplaces, and across the media (Crum et al., 2013). It is relatively well known that stress can contribute to things such as, loss of productivity, absence from school and work, depression, and other mental illnesses (Rogers et al., 2012). However, concepts such as stress related growth are far less talked about. Stress related growth refers when stressful experiences can fundamentally change individuals in positive ways, such as heightening their awareness, increasing their sense of meaningfulness, strengthening of their priorities, and openness to new perspectives (Crum et al., 2013; Park & Helgeson, 2006). Some researchers have failed to distinguish negative stress from positive stress, however, there is existing literature on the enhancing nature of stress, it is just limited, and often overlooked in lay understandings due to societies focus on the maladaptive aspects of stress (Burton & Hinton, 2004; O'Sullivan, 2011).

### **1.3 Distress and Eustress**

It has been suggested that when researched, stress should be considered for both its negative and positive aspects (distress and eustress), because although stress can debilitate individuals health and performance, it can also fundamentally improve them (O’Sullivan, 2011). The debilitating effects of stress most people are familiar with are typical of distress, whilst eustress is a positive form of stress which can yield benefits and improve our functioning to meet imminent demands (Crum et al., 2013). Distress is experienced when someone perceives their resources and capabilities to be unable to meet the demands needed to overcome adversities (Burton & Hinton, 2004; O’Sullivan, 2011). Alternatively, eustress results from more manageable levels of stress, and may involve a challenge that evokes a desirable and exhilarating state (Burton & Hinton, 2004). For example, stress at work could act as a motivator, encouraging initiative taking and acquirement of necessary skills to meet various demands (Crum et al., 2013).

### *1.3.1 The Adolescent Distress-Eustress Scale*

A few measures have been developed which aim to capture the dichotomy between positive and negative stress in adults in a working environment. However, recently a new measure was developed to measure the dichotomy in adolescents, it is the Adolescent Distress-Eustress Scale (Branson, 2018). The development of this measure is important because using measures developed for adults on youth ignores the significance of the developmental period and the unique context of being an adolescent (Branson, 2018). The scale is intended to be used in populations with ages between 12 and 20, as this was defined as the adolescent period by the South Australian Mental Health Survey (Branson, 2018; Branson et al., 2018). It is a 10-item scale that consists of two individual subscales, one measuring distress (ADES-D), and the other measuring eustress (ADES-E) (Branson, 2018). As it is a newly developed scale this study hopes to validate it by applying it to an adolescent

university sample, and investigating how the measure interacts with other important variables, and established measures.

#### **1.4 Defining Adolescence**

Adolescence is the developmental period roughly between the ages of 12 to 20 years, and is generally characterised by changes in appearance, self-esteem, social networks, autonomy, and sexual maturation. This period of change can be a very overwhelming and stressful time and is unfortunately the age of onset for many mental health disorders, thus it is important to study variables relating to the well-being of adolescents (Venning, Elliott, Kettler, & Wilson, 2013). Furthermore, there are many tertiary students who classify as adolescents, being 20 years or younger, who have the added stressors that come with academic pressure and demands (Shaikh & Deschamps, 2006).

There are multiple variables that interact with adolescent university students and their mental well-being and academic success, and it is important to study these variables in relation to stress because of the profound effects stress can have on the adolescent university student population (O'Sullivan, 2011). As mentioned earlier, little to no research has been conducted around the construct of eustress among university students, thus to extend the literature it is important to investigate the difference between how distress and eustress interact in an adolescent university sample with other important variables surrounding academic outcomes and well-being (O'Sullivan, 2011).

#### **1.5 Academic Outcomes**

Academic success, or outcomes, is one of the most frequently used measures in educational research within tertiary education, with grades and grade point averages (GPA's) reported to be the most commonly used measures of academic success (York & Gibson, 2015). Academic success is studied so frequently among tertiary students because it is an important requirement to achieve a higher education and subsequently can have a huge

impact on an individual's life in multiple ways. Evidence suggests that higher levels of education are associated with reduced mental ill-being, and access to more occupational options, which is invaluable in our society's competitive job market (Brannlund & Hammarstrom, 2014; Carroll et al., 2009; Cristina & Silvia, 2015). Additionally, studies have found that those who are highly educated, when employed, are more likely to have better health benefits and working conditions, earn larger salaries, and have more stable careers (Brannlund & Hammarstrom, 2014; Nilsen et al., 2014).

With regard to the interaction between stress and academic outcomes, there have been mixed findings. Some studies have found that stress had a positive relationship with academic outcomes (O'Sullivan, 2011), and that high levels of stress were not predictors of poor academic performance (Saklofske, Austin, Mastoras, Beaton, & Osborne, 2012), with some arguing that stress was having a positive impact on academic outcomes due to it promoting personal growth, and development of new skills (Gadzella, Baloglu, Masten, & Wang, 2012; Saunders-Scott, Braley, & Stennes-Spidahl, 2018).

Alternatively, some literature reported findings of negative associations between stress and academic outcomes (Murff, 2005; Pritchard & Wilson, 2003; Vaez & LaFlamme, 2008). Whereas, other studies argued that if the student experienced positive stress they would be motivated to achieve better academic outcomes, but if they experienced negative stress their academic outcomes would suffer (Cristina & Silvia, 2015).

Although there were no studies specifically looking at the roles of distress and eustress on academic outcomes, past research finding both positive and negative associations suggest eustress may be positively associated, and distress negatively associated, with academic outcomes. Thus, it seems important to investigate this further, and with the use of a scale developed for adolescents.

## **1.6 Student Well-Being and Ill-Being**

Currently, in Australia, mental health issues are the biggest non-fatal burden of disease, with approximately 26% of adolescents reporting to suffer from at least one mental health problem (Venning et al., 2013). Furthermore, reports from student health care organisations indicate that the amount of mental health issues in university students are steadily increasing (Vaez & LaFlamme, 2008). Rates of stress, depression, and anxiety are prevalent among adolescent tertiary students, assumedly due to the unique cluster of stressors they encounter, with studies finding positive associations between stress and ill-being, and negative associations between stress and measures of well-being, such as happiness (Pritchard & Wilson, 2003; Shaikh & Deschamps, 2006).

Not only are mental health issues a negative outcome of their own right, but they can also affect other important aspects of a students' life, with research finding that individuals who are depressed and/or anxious are more likely to have impaired academic performance (Pritchard & Wilson, 2003). Due to the prevalence and possible implications of adolescent student well-being/ill-being, it is important to investigate how eustress and distress interact with them, as little to no research has been conducted in this area, especially not with a scale intended for adolescents.

## **1.7 Predictors of Academic Outcomes, Stress, and Well-Being/Ill-Being**

The effects of potential and established predictors of academic outcomes, stress and well-being/ill-being have been investigated repeatedly in past literature. Evidently, consistent and robust relationships have emerged. Some of these established predictors will be discussed below. They include, intellectual ability, personality, and self-efficacy. Additionally, the effects of some other less researched and more contentious variables will be discussed. These include, age, stress mindsets and academic satisfaction.

### *1.7.1 Intellectual Ability*

One of the two most prominent and established predictors of academic success is intellectual ability, with a multitude of research consistently finding a significant positive relationship between the two variables (Chamorro-Premuzic & Furnham, 2008; Farsides & Woodfield, 2003). Studies have found that intellectual ability accounts for approximately 25% of variance in academic outcomes (Powell & Nettelbeck, 2014).

### *1.7.2 Personality*

The other most prominent and established predictor of academic outcomes is personality (Chamorro-Premuzic & Furnham, 2008), often measured using Costa and McCrae's Big 5 personality factor model (1992), as it is currently considered the dominant conceptualisation of personality (Schulze & Roberts, 2006). The model consists of neuroticism, which can be characterised by emotional instability, self-consciousness, impulsivity and anxiety. Extraversion, which refers to one's tendency to be enthusiastic, talkative, assertive, and social. Openness to experience, which refers to an individual's intellectual curiosity and creativity. Conscientiousness, which can be characterised by good impulse control, goal orientation, and the tendency to be organised and efficient. And lastly, agreeableness, which entails sympathy, cooperativeness, and altruism (Komarraju, Karau, Schmeck, & Avdic, 2011; Penley & Tomaka, 2002; Yusoff et al., 2013).

Conscientiousness and openness are both robust positive predictors of academic success, with consistent findings of this relationship (Komarraju et al., 2011; O'Connor & Paunonen, 2007; Powell & Nettelbeck, 2014; Saklofske et al., 2012). Evidence suggests that the two traits account for a substantial amount of variance regarding academic outcomes (Chamorro-Premuzic & Furnham, 2008). Alternatively, mixed results have been found for the relationship between neuroticism and academic outcomes, with some finding a negative association (Komarraju et al., 2011; Saklofske et al., 2012; Penley & Tomaka, 2002), and others finding no relationship (Bustato, Prins, Elshout, & Hamaker, 2000; Halamandaris &



Power, 1999).

Additionally, personality factors have been found to interact with stress and well-being/ill-being. For example, research indicates that neuroticism is strongly related to student stress, and is also a strong predictor of mental illness (Penley & Tomaka, 2002; Saklofske et al., 2012; Yusoff et al., 2013). One study found that extraversion and agreeableness had positive associations with well-being measures, such as happiness, and negative associations with stress (Penley & Tomaka, 2002). Similar to previous variables discussed, little to no research has been conducted on the relationships between personality factors and both distress and eustress, with past studies focussing only on stress as a one factor measure.

### *1.7.3 Self-Efficacy*

Self-efficacy can be described as an individual's self-evaluation of their competencies, which allow them to successfully complete tasks and achieve desired outcomes (Zajacova et al., 2005). It is argued that students who have high self-efficacy, when compared to students with low self-efficacy, are more capable of managing their learning, and avoiding distractions that could inhibit their educational experience (Carroll et al., 2009; O'Sullivan, 2011). Evidence suggests self-efficacy has a positive relationship with academic outcomes (Carroll et al., 2009), with some arguing that it is a robust predictor of academic success (McKenzie & Schweitzer, 2001), and that those with high self-efficacy beliefs are more likely to complete their education (Carroll et al., 2009).

Very little research has been conducted on the relationship between self-efficacy and stress, and seemingly none focussing on distress and eustress, especially amongst adolescent tertiary students. However, it has been argued in one study that those with high self-efficacy are more likely to evaluate demands as a challenge, whereas those with low self-efficacy would evaluate them as a threat (Zajacova et al., 2005), and although distress and eustress

were not explicitly included in this study, the explanations sound reminiscent of the dichotomy between distress and eustress.

#### *1.7.4 Age*

There is some evidence suggesting age and academic outcomes interact, however the way in which they interact is relatively unclear, with conflicting results being reported. One study found that students being younger in age had a positive impact on their academic success (Vaez & LaFlamme, 2008), whereas two other studies found contradictory evidence supporting the claim that older students performed better academically (Baker, 2003; Hoskins, Newstead, & Dennis, 1997). Due to the conflicting evidence found in past research, it is of interest to investigate this relationship within this study and see if any effect can be found within a smaller age distribution, between 17 and 20. A difference could be expected given the development that occurs during adolescence.

#### *1.7.5 Stress Mindset*

Stress mindset is the extent to which an individual believes that the effects of stress can have enhancing consequences for things including, performance, well-being, and productivity, or alternatively, the extent to which they believe they can have debilitating consequences (Crum et al., 2013; Crum, Akinola, Martin, & Fath, 2017). The literature suggests stress mindset may not be situation-specific, and hence, may influence the stress response no matter the context (Crum et al., 2017). An example of different stress mindsets would be if two people were attending a job interview, and one had a stress in enhancing mindset, so they expected the experience of stress associated with the interview to have positive outcomes, such as giving motivation to practice interview skills, whereas the individual with a stress is debilitating mindset expected the experience of stress associated with the interview to have negative outcomes, such as lowered self-esteem (Crum et al., 2017).

Interestingly, it is argued that stress mindsets can be altered, with one study finding that an intervention eliciting the stress is enhancing mindset was followed by positive changes in participants' self-reported mental well-being and work performance (Crum et al., 2013). This suggests that mental health and performance can be enhanced through the alteration of stress mindsets. Thus, stress mindset is an important variable to investigate in adolescent university student populations, as altering it could prove to be beneficial. Furthermore, to our knowledge there is no previous research exploring the relationship between stress mindsets and distress and eustress, in which the findings may also be beneficial.

#### 1.7.6 Academic Satisfaction

Academic satisfaction can be defined as the subjective attitude based on a student's own evaluation of their academic experiences (Johnson, Shoulder, Edgar, Graham, & Rucker, 2016; Lee, Srinivasan, Trail, Lewis, & Lopez, 2011). There is no agreed upon measure for academic satisfaction, with some choosing to use multiple questions, and others using a single item measure, such as, "How satisfied are you with your education?". However, it is argued that single item measures should be avoided due to random measurement and low content validity (Strahan & Crede, 2015).

These discrepancies in strategies used may be to blame for the inconsistent results found when investigating the relationship between academic satisfaction and academic performance, with some studies finding support for the theory that academic satisfaction was either a direct or indirect determinant of academic performance (Lee et al., 2011; Strahan & Crede, 2015), and others finding no support (Johnson et al., 2016). Some evidence also suggests that eustress is a predictor of academic satisfaction (O'Sullivan, 2011). Therefore, due to past findings it is of interest to investigate this variable with relation to academic outcomes and stress, including both distress and eustress. Regardless of whether or not

academic satisfaction is a predictor of the variables discussed, it is also an important outcome for students in its own right, thus it seems important to explore how it interacts with other variables which are important to an adolescent university student population (Chae & Shin, 2016).

## **1.8 Current Study**

The main aims of this study were to apply the Adolescent Distress-Eustress Scale to an adolescent university sample to investigate how distress and eustress interact with variables important in adolescent university students' lives, whilst also validating the newly developed scale. Due to the prevalence of reported mental health issues amongst both tertiary students and adolescents, and the importance of academic outcomes, this study explored how participants in the current sample scored on measures of well-being and ill-being compared to the general population. Additionally, the study investigated how distress and eustress interact with academic success in comparison to established predictors, and how they interact with measures of well-being and ill-being. Furthermore, personality traits interact highly with well-being/ill-being and academic outcomes, thus it is of interest to investigate whether distress and eustress interact in the expected ways with personality factors. Finally, interactions between the various variables included within this study will be explored. A description of our specific aims are included below.

### *1.8.1 First Aim*

We investigated whether levels of stress, anxiety, depression, and measures of well-being in adolescent university students varies from the general population of Australia.

### *1.8.2 Second Aim*

We investigated the relationship between distress and eustress with academic outcomes in comparison to established predictors. It was hypothesised that we would find the same relationships between established predictors and academic outcomes as found in past

literature, and additionally that distress would be negatively correlated with academic outcomes, whilst eustress would be positively correlated with academic outcomes.

### *1.8.3 Third Aim*

We investigated the relationship between distress and eustress with well-being and ill-being. It was hypothesised that distress would be negatively correlated with well-being and positively correlated with ill-being, whereas eustress would be positively correlated with well-being, and negatively correlated with ill-being.

### *1.8.4 Fourth Aim*

We investigated the relationship between distress and eustress with personality. It was hypothesised that distress would be positively correlated with neuroticism and negatively correlated with conscientiousness, agreeableness, openness and extraversion, whilst eustress would be negatively correlated with neuroticism, and positively correlated with conscientiousness, agreeableness, openness, and extraversion.

### *1.8.5 Fifth Aim*

We explored the relationships that exist between distress and eustress with other variables, along with any other relevant relationships that occurred between the various variables.

## 2 Method

### 2.1 Participants

Data was collected from a total of 86 participants, however 22 were excluded due to being over 20 years old, having incomplete surveys and not giving consent. Once these participants were removed the data consisted of 64 participants (Female = 43, Male = 20, Other = 1) aged between 17-20 years,  $M (SD) = 18.45 (0.75)$ . Participants consisted of first year psychology students enrolled in the *Psychology 1A* course at the *University of Adelaide*. Recruitment for the survey was through an online portal only accessible if enrolled in the *Psychology 1A* course.

### 2.2 Materials

Participants completed an online survey which consisted of two parts. It was available for a period of three months. The survey obtained information about demographics, intellectual ability, personality traits, academic satisfaction, stress (distress and eustress), self-efficacy, ill-being, and wellbeing. Academic outcomes were represented by participants' overall course grade for *Psychology 1A*. The current study is part of a larger study containing many variables, however this study will specifically focus on distress and eustress, and how they interact with other variables within an adolescent university sample.

#### 2.2.1 Demographic/Identifying Data

Participants' age and gender were collected via direct questions, and they were required to enter their student id numbers and Research Participation System (online portal) code, to ensure course credit was allocated correctly whilst de-identifying data to keep participants anonymous.

#### 2.2.2 Ravens Advanced Progressive Matrices (Short-Form)

Intellectual ability was measured using the *Short-Form* version of the *Ravens Advanced Progressive Matrices*, which is a scale that consists of 12 items, in contrast to the full-length

version which consisted of 36 items. Participants were first given 2 sample questions to familiarise them with the task, and then began the 12 items, which were analytic reasoning tasks in a matrix format with each question progressively getting more difficult. For each item participants were presented with a puzzle containing one blank space and were asked “Which numbered piece is missing from the puzzle?” and were then required to establish which of 8 pattern choices was the correct pattern to complete the overall puzzle. The full-length *Ravens Advanced Progressive Matrices* has high established validity and reliability, with internal consistency (Cronbach’s alpha = .84) and test-retest reliability ( $r = .83$ ). The *Short-Form Ravens Advanced Progressive Matrices* was used rather than the full-length test to minimise the time burden for participants, however the short-form used in this study correlates highly with the full-length test ( $r = .92$ ), and has, somewhat lower, but still high internal consistency (Cronbach’s alpha = .73) and high test-retest reliability ( $r = .82$ ) (Bors & Stokes, 1998). This test measures abstract reasoning and is considered a nonverbal estimate of fluid or general intelligence, which is thought to be an appropriate measure of intellectual ability, as it tests one’s ability to adapt to new cognitive problems (Carpenter, Just, & Shell, 1990). Each participant received a score between 0 and 12, with higher scores indicating higher intellectual ability. For the purpose of this paper simply *APM* will be used when referring to the short-form used.

### 2.2.3 OCEANIC

The Openness Contentiousness Extraversion Agreeableness Neuroticism Inventory Condensed (OCEANIC) scale, was used to measure personality traits and consists of 45 items used to measure each of the Big 5 Personality Factors identified by Costa and McCrae (1992). Participants were presented with statements such as “*I am organised*” and “*I laugh a lot*”, and asked to rate how frequently the statements applied to them on a 6-point Likert scale (1 = *Never*, 2 = *Rarely*, 3 = *Sometimes*, 4 = *Often*, 5 = *Usually*, 6 = *Always*). The

OCEANIC has high established internal consistency reliability ranging from  $r = .77(O)$  to  $r = .91(C \text{ and } N)$  (Schulze & Roberts, 2006).

#### 2.2.4 Stress Mindset Measure

Participants were administered the 8-item *Stress Mindset Measure-General* (SMM-G) to measure their beliefs surrounding stress; whether stress is perceived as positive or negative. Measured on a 5-point Likert scale (1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Agree nor Disagree*, 4 = *Agree*, 6 = *Strongly Agree*), participants were asked to respond to items such as “*Experiencing stress improves my health and vitality*”. A Stress Mindset Score was calculated for participants by adding an individual’s scores from each item and dividing them by 8 to calculate their average score. Higher scores indicated that individuals had a stress-is-enhancing mindset, whereas lower scores suggested a stress-is-debilitating mindset. The measure has high internal consistency (Cronbach’s alpha = .86), adequate test-retest reliability ( $r = .66$ ) and evidence of discriminant validity (Crum, Salovey, & Achor, 2013).

#### 2.2.5 Adolescent Distress-Eustress Scale

Stress was also measured using the newly developed *Adolescent Distress-Eustress Scale* which consists of 10 items and specifically measures both distress; negative stress, and eustress; positive/motivational stress, in adolescents (20 years and under). Participants were asked to “*choose the answer that best describes how you responded to pressure in the last 7 days*” and consists of 10 items, including, “*I felt motivated*” and “*I felt panicked*” for which participants answered using a 5-point Likert scale from 1 = “*Not like me*” to 5 = “*Very much like me*”. Due to being a newly developed measure, reliability and validity have not yet been established.

#### 2.2.6 The General Self-Efficacy Scale



Self-efficacy was measured using the 10-item *General Self-Efficacy Scale* in this study, which contains items such as, “*I can usually handle whatever comes my way*”, and requires answers on a 4-point Likert scale (1 = *Not at all true*, 2 = *Hardly true*, 3 = *Moderately true*, 4 = *Exactly true*), with higher scores representing higher levels of self-efficacy. The measure has adequate reliability and validity (Schwarzer & Jerusalem, 1995)

### 2.2.7 DASS-21

Participants’ mental ill-being was measured using the 21-item *Depression Anxiety and Stress Scales* (DASS-21), which is compiled of 3 scales; depression, anxiety and stress. This is a shortened version of the full length DASS which has 42 items. An example of an item is “*I found it hard to wind down*”, each item required an answer on a 4-point Likert scale (1 = *Never*, 2 = *Sometimes*, 3 = *Often*, 4 = *Almost Always*), with higher scores indicating higher ill-being (Lovibond & Lovibond, 1995). The DASS-21 Depression, Anxiety and Stress subscales have high internal consistency with Cronbach’s alphas of .94, .87 and .91, respectively, and reasonably high concurrent validity (Antony, Bieling, Cox, Enns & Swinson, 1998).

### 2.2.8 EPOCH

The EPOCH (*Engagement, Perseverance, Optimism, Connectedness, and Happiness*) Scale was used to measure adolescent well-being in this study. The measure consists of 20 items, 4 for each of the 5 positive psychological characteristics. An example of one of the items is “*I am optimistic about my future*”. Each of the items require an answer on a 5-point Likert scale, the first 11 questions (1 = *Almost never*, 2 = *Sometimes*, 3 = *Often*, 4 = *Very often*, 5 = *Almost always*) and the last 9 questions (1 = *Not at all like me*, 2 = *A little like me*, 3 = *Somewhat like me*, 4 = *Mostly like me*, 5 = *Very much like me*), higher scores correspond with higher well-being. The measure has adequate internal and test-retest reliability and there

is evidence for convergent and divergent validity (Kern, Benson, Steinberg, & Steinberg, 2016).

### *2.2.9 Academic Satisfaction*

To measure academic satisfaction, 5 items were generated for the purpose of this study. The statements used were as follows, “*I am satisfied with this course so far*”, “*I am satisfied that I chose this course*”, “*I am satisfied with how well I am doing in this course so far*”, “*I am likely to finish this course*” and “*I feel engaged in this course*”. All items required an answer on a 5-point Likert scale (except the first item, which was on a 7-point Likert scale) ranging between 1 = “*Strongly disagree*” to 5(7) = “*Strongly agree*”. Higher scores represented higher levels of academic satisfaction.

### *2.2.10 Academic Outcomes*

Participant’s academic outcomes were represented by their overall grade for the course *Psychology IA*, which was expressed as a percentage.

## **2.3 Procedure**

In this study participants were invited to complete an online survey that consisted of two parts, each involving multiple questionnaires. Each part took approximately 30 minutes to complete, totalling 60 minutes. Participants were recruited through the *University of Adelaide* research participation system, and they received course credit that went towards their overall grade for *Psychology IA*, by completing both parts of the survey participants received 1 credit. Participants were given the option to provide an email address at the end of the survey if they wished to receive future information about the results of the study. Once survey data was collected, it was analysed in relation to participants’ academic outcomes, which were represented by their overall course grade for *Psychology IA*.

## **2.4 Ethical Considerations**

This study has been approved by the School of Psychology: Human Research Ethics Subcommittee, at the University of Adelaide, and participants were able to withdraw at any point from the study up until submission of the survey. The ethics approval number for this study was 18/20. Participants' were reassured that the information they provided would remain anonymous, as it would be de-identified, and were asked for consent prior to completing the survey. Furthermore, contact details for the *University of Adelaide* Counselling Services and Lifeline were provided if participation in the study caused any distress for participants.

## 3 Results

### 3.1 Overview

The data collected in this study was analysed using the statistical programs R and R Studio. T-tests were used to compare our sample to the general population, Wilcoxon tests were used to confirm findings of the t-tests for data that was not normally distributed, and correlations were used to look at the different relationships that occurred between variables.

### 3.2 Power Analysis and Normality Checks

An a priori power analysis was conducted using G\*Power 3.1.9.3. The results of the analysis suggest a sample size of  $N = 82$  would be needed to detect a medium effect size and attain a power level of .80, whilst using a significance criterion of  $\alpha = 0.05$ . Thus, the current study was underpowered with a sample size of  $N = 64$ , which needs to be considered when analysing the results.

Furthermore, Shapiro-Wilk normality tests were run for the variables of DASS-21 and the EPOCH measure. Using the test and viewing histograms and qq-plots it was determined that the variables of anxiety, depression, happiness, and connectedness did not have normally distributed data.

### 3.3 Comparing DASS-21 Population Averages to the Current Sample

Means and standard deviations were calculated for the DASS-21 scores of the current sample and compared to population norms in Australia (see Table 1) (Crawford, Cayley, Lovibond, Wilson, & Hartley, 2011). Individual samples t-tests were run and found significant differences between the population norms and the current student sample norms in depression ( $t[63] = 5.55, p < .001$ ), anxiety ( $t[63] = 6.26, p < .001$ ), and stress ( $t[63] = 7.17, p < .001$ ). Because the distributions for anxiety and depression were not normally distributed, they did not meet the assumption of normality for parametric tests, therefore a non-

parametric test, the Wilcoxon test, was run for each comparison, to ensure the same significant results were found, which they were.

Table 1

*Comparison of DASS-21 Scores Between Population Averages and the Current Sample*

	Depression	Anxiety	Stress
Current Sample ( <i>SD</i> )	5.84 (4.12)	5.33 (4.59)	8.17 (4.67)
Pop. Norms ( <i>SD</i> )	2.57 (4.52)	1.74 (3.25)	3.99 (4.71)

*Note.* *SD* = Standard Deviation; Pop. Norms = Population Averages.

### 3.4 Comparing EPOCH Population Averages to the Current Sample

Means and standard deviations were calculated for the scores on the EPOCH measure for the current sample and compared to population norms in Australia (see Table 2). Individual samples t-tests were run and found significant differences between the population norms and the current student sample norms for the adolescent EPOCH scale, finding significant differences for engagement ( $t[63] = -4.00, p < .001$ ), perseverance ( $t[63] = -2.13, p = .037$ ), optimism ( $t[63] = -2.05, p = .045$ ), and happiness ( $t[63] = -4.01, p < .001$ ), however no significant difference was found for connectedness ( $t[63] = -0.46, p = .648$ ). Because the data for happiness and connectedness was not normally distributed, and therefore did not meet the normality assumption required for parametric tests, a non-parametric test, the Wilcoxon test, was run for each comparison, to check the results, to which significant results were yielded supporting those found in the t-tests (Kern, Benson, Steinberg, & Steinberg, 2015).

Table 2

*Comparison of Australian Population Averages on the Adolescent EPOCH and the Current Sample*

	Engagement	Perseverance	Optimism	Connect	Happiness
Current Sample ( <i>SD</i> )	2.87 (0.86)	3.34 (0.83)	3.28 (0.95)	3.96 (0.92)	3.23 (0.94)
Pop. Norms ( <i>SD</i> )	3.30 (0.85)	3.56 (0.84)	3.52 (0.90)	4.01 (0.90)	3.70 (0.97)

*Note.* *SD* = Standard Deviation; Connect = connectedness; Pop. Norms = Population Averages.

### **3.5 Distress, Eustress and Predictors of Academic Outcomes**

Correlations for distress, eustress and predictors of academic outcomes can be found in Table 3. As expected, final grade was positively correlated with APM, openness, and conscientiousness, which is consistent with past literature. Additionally, final grade had a significant positive correlation with age, which has also been seen in past literature. However, a significant positive relationship between self-efficacy and final grade was not found. Finally, distress and eustress, both had no significant relationship with final grade, which was contrary to what was hypothesised.

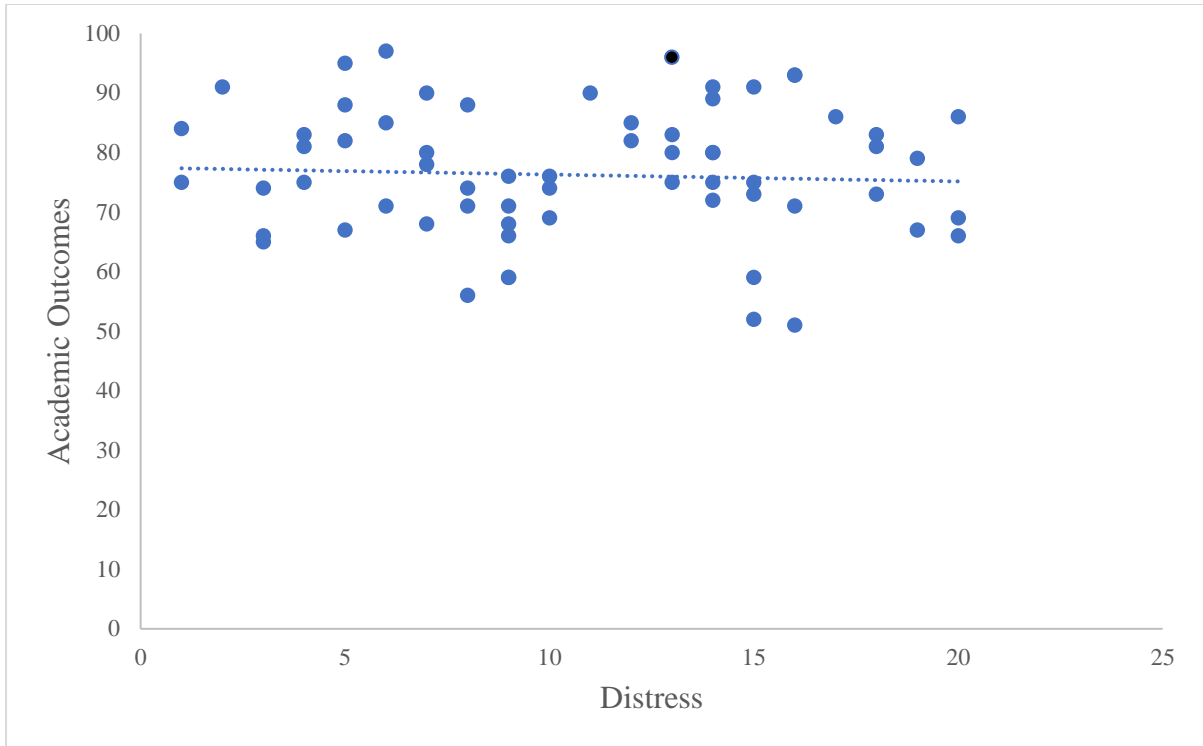
Table 3

*Distress, Eustress and Established Predictors of Academic Outcomes*

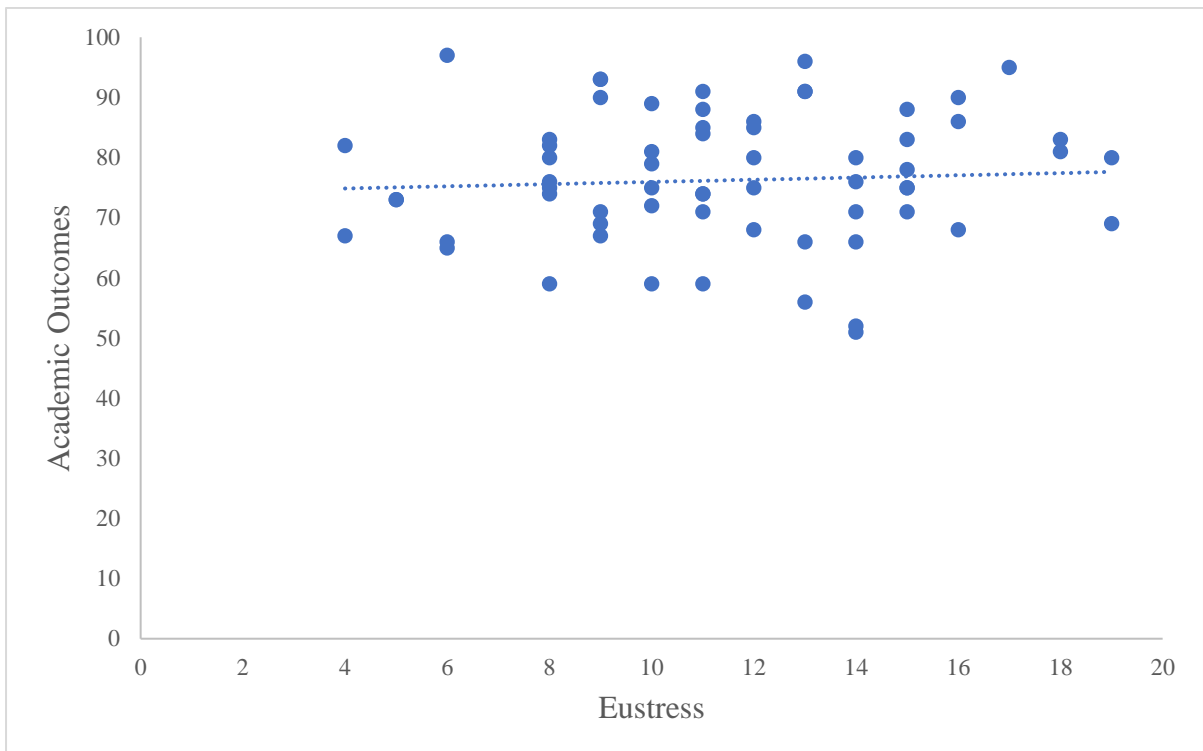
	Final Grade
APM	<b>0.50</b>
Openness	<b>0.28</b>
Conscientiousness	<b>0.28</b>
Age	<b>0.29</b>
Self-Efficacy	0.21
Distress	-0.05
Eustress	0.07

*Note.* Bolded values indicate correlations reached statistical significance ( $p < .05$ ).

Because the expected significant relationships between distress and eustress with final grade were not found, scatterplots were generated to explore whether there were any non-linear relationships that occurred between the variables. This analysis was conducted, as although no significant correlations were found, it was possible that a non-linear relationship could have occurred, as the Yerkes-Dodson Law dictates that performance can increase with certain physiological or mental arousal, but only to a point, where then it will decrease, thus resulting in a non-linear relationship (Yerkes & Dodson, 1908). However, it is clear that by examining the scatterplots that no relationship had occurred between distress and eustress with final grade, whether linear or non-linear, therefore finding no support for the hypothesis made in second aim of the current study (See *Figure 1* and *Figure 2*).



*Figure 1.* Visualisation of the Relationship Between Distress and Academic Outcomes.



*Figure 2.* Visualisation of the Relationship Between Eustress and Academic Outcomes.



### 3.6 Distress and Eustress as Predictors of Well-Being and Ill-Being

Correlations for predictors of well-being and ill-being can be found in Table 4. Depression had a significant negative correlation with eustress. Stress and anxiety also showed results in the same direction, however these correlations were not significant. Alternatively, distress had strong positive correlations with all three measures of ill-being, depression, anxiety, and stress.

It was found that well-being; as determined by the EPOCH measure, had positive moderate to strong correlations with eustress, for example, eustress and perseverance, optimism, connectedness, and happiness. There was also a positive relationship between eustress and engagement, however it was not statistically significant. Alternatively, distress was negatively correlated with measures relating to well-being, such as connectedness, and happiness.

Table 4

*Distress and Eustress – Well-Being/Ill-Being*

		Distress	Eustress
Ill-Being	Depression	<b>0.56</b>	<b>-0.43</b>
	Anxiety	<b>0.51</b>	-0.14
	Stress	<b>0.64</b>	-0.20
Well-Being	Engagement	0.22	0.23
	Perseverance	0.06	<b>0.47</b>
	Optimism	-0.13	<b>0.45</b>
	Connectedness	<b>-0.25</b>	<b>0.33</b>
	Happiness	<b>-0.28</b>	<b>0.45</b>

*Note.* Bolded values indicate correlations reached statistical significance ( $p < .05$ ).

### 3.7 Relationships Between Distress, Eustress, and Personality

Correlations for the relationships between distress, eustress and personality can be found in Table 5. As expected, eustress had significant positive relationships with conscientiousness and agreeableness, and also a significant negative relationship with neuroticism. Furthermore, distress had a significant positive relationship with neuroticism and surprisingly, a significant positive correlation with openness.

Table 5

*Distress and Eustress Relationships With Personality Traits*

Personality Variables	Distress	Eustress
Conscientiousness	0.04	<b>0.46</b>
Agreeableness	0.21	<b>0.27</b>
Neuroticism	<b>0.63</b>	<b>-0.32</b>
Openness	<b>0.28</b>	-0.13
Extraversion	0.04	0.22

*Note.* Bolded values indicate correlations reached statistical significance ( $p < .05$ ). APM = *Raven's Progressive Matrices Short-Form*.

### 3.8 Exploratory Analysis

The results were analysed to further explore any other interesting relationships that occurred between any of the variables that were measured during this study. By studying the other occurring relationships outside of distress and eustress, patterns may emerge that can give more insight into distress and eustress, and possible directions for further research. The correlations used in the following exploratory analysis can be found in the Grand Correlation Matrix (Appendix A).

#### 3.8.1 Stress (DASS-21) and Well-Being

It was found that stress had moderate to strong negative correlations with measures of well-being; optimism ( $r = -.31, p = .01$ ), connectedness ( $r = -.40, p = .001$ ), and happiness ( $r = -.48, p < .001$ ), which is consistent with the relationship between distress and well-being, suggesting traditional measures of stress are more representative of distress.

### 3.8.2 Stress Mindset

Eustress was positively correlated with stress mindset ( $r = .43, p < .001$ ), whilst the relationship between distress and stress mindset was in the opposite direction ( $r = -.20, p = .12$ ), however this was not statistically significant. Furthermore, stress mindset also had a negative relationship with neuroticism ( $r = -.40, p = .001$ ) and depression ( $r = -.26, p = .04$ ).

### 3.8.3 Academic Satisfaction

It was found that three out of five measures of academic satisfaction had moderate positive relationships with final grades; intent to finish, satisfaction with choice, and satisfaction with progress. Surprisingly, satisfaction with course and satisfaction with choice had a significant positive relationship with distress (See Table 6).

Table 6

*Relationships Between Academic Satisfaction and Academic Outcome, Distress, and Eustress*

	Choice	Finish	Course	Progress	Engaged
Final Grade	<b>0.26</b>	<b>0.38</b>	-0.07	<b>0.37</b>	0.11
Distress	<b>0.32</b>	-0.01	<b>0.24</b>	0.02	0.19
Eustress	0.22	0.15	0.21	0.20	0.18

*Note.* Bolded values indicate correlations reached statistical significance ( $p < .05$ ). Choice = Satisfaction with Choice of Course; Finish = Intent to Finish Course; Course = Satisfaction with Course; Progress = Satisfaction with Progress Made in Course; Engaged = Engagement with Course Material.

Additionally, all five facets of the EPOCH scale correlated positively with at least one measure of academic satisfaction, with multiple facets of the EPOCH scale having significant

positive associations with several measures of academic satisfaction (See Table 7).

Interestingly, satisfaction with choice was positively associated with three measures of well-being, perseverance, engagement, and optimism, and satisfaction with course was positively associated with engagement. This is of interest as satisfaction with choice and satisfaction with course were positively associated with distress, therefore it seemed important to investigate how the same measures of satisfaction interacted with measures of well-being. The results seem to be contradictory, with both satisfaction with choice and satisfaction with course being both positively associated with distress and measures of well-being.

Table 7

*Relationships Between Academic Satisfaction and Well-Being*

	Choice	Finish	Course	Progress	Engaged
Engagement	<b>0.33</b>	0.11	<b>0.40</b>	0.19	<b>0.32</b>
Perseverance	<b>0.24</b>	<b>0.26</b>	0.23	<b>0.39</b>	<b>0.40</b>
Optimism	<b>0.36</b>	0.08	0.21	<b>0.28</b>	<b>0.28</b>
Connectedness	0.23	<b>0.24</b>	0.17	0.19	0.18
Happiness	0.13	0.23	0.22	0.12	<b>0.26</b>

*Note.* Bolded values indicate correlations reached statistical significance (*Pearson's r* =  $p < .05$ ). Choice = Satisfaction with Choice of Course; Finish = Intent to Finish Course; Course = Satisfaction with Course; Progress = Satisfaction with Progress Made in Course; Engaged = Engagement with Course Material.

Another reoccurring relationship across the measures of academic satisfaction was with the personality trait, agreeableness, finding significant positive relationships with intent to finish ( $r = .28, p = .02$ ), satisfaction with choice ( $r = .26, p = .04$ ), satisfaction with course ( $r = .33, p = .007$ ), and engagement with course ( $r = .42, p < .001$ ).

3.8.4 *Self-Efficacy*

It was found that self-efficacy had a significant positive relationship with eustress ( $r = .53, p < .001$ ), whilst the relationship between self-efficacy and distress was in the opposite direction ( $r = -.17, p = .54$ ), though it was not statistically significant.

Furthermore, self-efficacy had moderate to strong significant positive relationships with multiple measures of well-being; perseverance ( $r = .47, p < .001$ ), optimism ( $r = .46, p < .001$ ), and happiness ( $r = .34, p = .006$ ), and a moderate negative relationship with depression ( $r = -.34, p = .007$ ).

Additionally, self-efficacy had strong positive relationships with the personality traits, conscientiousness ( $r = .40, p = .001$ ) and extraversion ( $r = .25, p = .046$ ), and a strong negative relationship with neuroticism ( $r = -.43, p < .001$ ).

## **4 Discussion**

The purpose of this study was to address the lack of literature focussing on how distress and eustress interact with other variables, such as academic outcomes and well-being in an adolescent university sample. Another aim of the current study was to validate a newly developed measure, the Adolescent Distress-Eustress Scale, by using it to analyse the relationships between distress and eustress with other variables and established measures to explore whether the expected associations would occur. The results indicated that distress and eustress interact with certain variables in different ways within an adolescent university sample, with some expected associations found, such as between distress and eustress with well-being, ill-being, and certain personality traits, and other results which were not expected, such as the lack of relationship between distress and eustress with academic outcomes, and the positive relationship found between distress with the personality trait openness. The results along with their strengths, limitations, implications, and future directions for research are discussed below.

### **4.1 First Aim**

Because adolescent university students experience a unique combination of stressors the first aim was to explore whether their mental well-being differed from that of the general population. Australian population mean scores on the DASS-21 (Crawford et al., 2011) and EPOCH (Kern et al., 2015), were used to generate a comparison between the Australian general population and the current sample for both ill-being and well-being. Results indicated that the current sample had significantly higher levels of ill-being, on depression, anxiety and stress, when compared to the mean scores of the general population. They also had significantly lower levels of well-being on all five factors of the EPOCH scale, engagement, perseverance, optimism, connectedness, and happiness. As mentioned in the results section, some of the variables were not normally distributed, therefore the Wilcoxon test, a non-

parametric test, was ran for the comparisons that included those variables to check that the same results would be found as in the parametric equivalents, which they were.

These findings have implications for the well-being of adolescent university students, as it suggests that their demographic may be more prone to lower levels well-being and at a higher risk of developing mental health issues. Thus it is important to conduct further research in this area to identify what specific stressors have the largest effect, so universities can facilitate the reduction in stressors specific to adolescent students, or implement interventions that could improve coping mechanisms specific to those stressors, in order to protect and/or improve the mental well-being of adolescent students.

#### **4.2 Second Aim**

The second aim was to investigate the relationships between distress and eustress with academic outcomes in comparison to established predictors. Results consistent with past literature were found for intellectual ability, conscientiousness and openness, as they were all were positively correlated with academic outcomes in the current study (Chamorro-Premuzic & Furnham, 2008; Komarraju et al., 2011; Nettelbeck, 2014). Age was also found to have a positive correlation with academic outcomes, which was consistent with some past literature (Baker, 2003; Hoskins et al., 1997), and not consistent with another study, which found a negative correlation (Vaez & LaFlamme, 2008). This finding was interesting because the current sample had a small age distribution between 17-20. Our results did not find a relationship between self-efficacy and academic outcomes, which was contrary to findings of a positive association in past studies (Carroll et al., 2009; McKenzie & Schweitzer, 2001; O'Sullivan, 2011).

The relationship between stress and academic outcomes in university students has been investigated in the past by only considering the negative aspects of stress, thus this study wanted to extend on this by investigating how distress and eustress interacted with

academic outcomes. Results in past literature were mixed, some finding evidence for a negative relationship between stress and academic outcomes (Murff, 2005; Pritchard & Wilson, 2003; Vaez, & LaFlamme, 2008), and others found high levels of stress were not predictive of poor academic performance (Saklofske et al., 2012), and instead had a positive relationship with academic outcomes (O'Sullivan, 2011).

It was hypothesised in this study that the mixed results in past literature were due to researchers not accounting for the dichotomy within stress, between distress and eustress. Thus distress would be negatively correlated with academic outcomes, whilst eustress would be positively correlated with academic outcomes. However, contrary to the hypothesis, no significant linear relationship was found between either distress or eustress with academic outcomes. To further investigate the hypothesised relationships, scatterplots were generated to explore whether non-linear relationships occurred. However, after analysing the scatterplots it was evident that no relationship occurred between distress or eustress with academic outcomes.

### **4.3 Third Aim**

The third aim was to investigate how distress and eustress interact with measures of well-being and ill-being. Past literature found that stress was positively associated with higher levels of mental ill-being, and negatively associated with measures of well-being (Pritchard & Wilson, 2003; Shaikh & Deschamps, 2006). However, the focus was on stress as purely negative in past research, not taking into consideration positive factors of stress.

It was hypothesised in the third aim that distress, being representative of negative stress, would be positively associated with ill-being, and negatively associated with well-being. The results supported the hypothesis, as it was found that distress had strong positive correlations with all three factors of the ill-being measure, depression, anxiety and stress, and negative associations with the measures of well-being, connectedness and happiness.



Additionally, eustress had moderate to strong correlations with four out of five of the well-being measures, perseverance, optimism, connectedness, and happiness, whilst also having a significant negative correlation with depression.

These results were consistent with the hypothesis and provide convergent and divergent validity for the Adolescent Distress-Eustress Scale, as the variables of distress and eustress measured align with established measures of well-being and ill-being in the ways expected.

#### **4.4 Fourth Aim**

The fourth aim of the current study was to investigate the relationship between distress and eustress with personality traits. There has been no previous research exploring the relationships between distress and eustress with personality. However, past research which considered stress a purely debilitating variable found it was positively associated with neuroticism (Penley & Tomaka, 2002; Saklofske et al., 2012; Yusoff et al., 2013). These findings, along with evidence that extraversion and agreeableness is positively correlated with well-being measures (Penley & Tomaka, 2002), and openness and conscientiousness being more positive traits, and having positive associations with academic outcomes, informed the hypothesis that eustress would be positively associated with extraversion, agreeableness, openness, and conscientiousness, whilst negatively associated with neuroticism, and distress would have relationships with the personality traits in the opposite direction. Results indicated that, as hypothesised, eustress had a positive relationship with conscientiousness and agreeableness, and a negative correlation with neuroticism, and distress had a positive relationship with neuroticism.

No other expected associations were found. However, one unexpected relationship was discovered - a significant positive correlation between distress and openness. In order to try and understand this correlation, the items used to measure openness were compared with

the items used to measure distress, to see whether there may have been some kind of overlap in the wording of the items that could have led to this result, however they were very distinct from one another, and there did not appear to be any logical connection between the items. Thus, the association found is seemingly unexplainable, and there may be reason to investigate this association in future research.

#### **4.5 Fifth Aim**

The fifth aim was to explore any other interesting relationships that occurred between the variables included in the study, even relationships that occurred outside of distress and eustress, to investigate whether any patterns would emerge that could give more insight into the workings of the variables of interest.

Results indicated that stress, as measured in the DASS-21, had moderate to strong negative associations with multiple measures of well-being, including connectedness, and happiness. These findings were consistent with the relationships found between distress with connectedness and happiness, providing evidence that the variable of distress in the Adolescent Distress-Eustress Scale, is representative of the one factor model of stress most commonly used in research.

It was found that stress mindset had a strong positive correlation with eustress, and moderate to strong negative correlations with neuroticism and depression. Stress mindset has a relationship with distress in the opposite direction of eustress, however it was not statistically significant. These results are important as it has been argued that stress mindset can be altered through intervention. Thus, finding that stress mindset is negatively associated with unwanted traits and outcomes, such as neuroticism and depression, and positively associated with eustress, may mean that although the variables themselves might not be able to be altered directly, they could be altered through stress mindsets. Further research in this area could have many positive implications.

It was found that multiple measures of academic satisfaction had moderate positive relationships with academic outcomes, which is consistent with multiple past studies (Lee et al., 2011; Strahan & Crede, 2015). No direct relationship was found between eustress and academic satisfaction, contrary to findings in past literature (O'Sullivan, 2011). However, surprisingly two measures of academic satisfaction, satisfaction with course and satisfaction with choice, had a positive association with distress, which seems counterintuitive. Furthermore, both satisfaction with course and satisfaction with choice were positively correlated with multiple well-being variables. These findings are seemingly contradictory, as satisfaction with course and satisfaction with choice are positively associated with both distress and measures of well-being. More research may need to be conducted in this area to clear up the discrepancies found. Additionally, measures of academic satisfaction had consistent positive correlations with the personality trait, agreeableness, which as discussed previously, was also positively associated with eustress, possibly indicating an indirect relationship between eustress and academic satisfaction.

Self-efficacy was found to have a strong positive relationship with eustress, and a relationship with distress in the opposing direction, however not significant. Results also indicated that self-efficacy had moderate to strong positive relationships with three measures of well-being, and a moderate negative relationship with depression. Furthermore, self-efficacy was positively associated with conscientiousness and negatively associated with neuroticism. These relationships aligned with the variables in the ways expected, if distress and eustress were associated with different levels of self-efficacy, therefore, it would be of interest to further investigate the direct and indirect relationships between distress and eustress with self-efficacy.

#### **4.6 Strengths**

The main strength of the current study was its use of the newly developed measure, the Adolescent Distress-Eustress Scale, to explore distress and eustress in an adolescent sample, as prior to this study none have researched distress and eustress in an adolescent sample with a scale specifically developed for that use. This is a strength because previous measures of distress and eustress were developed for working adults, and thus were not suitable for adolescents.

Another strength of this study was that it was the first study to focus on the distinction between distress and eustress amongst an adolescent university sample providing novel insight into the interactions that occurred between the variables measured. This addressed gaps in previous literature as prior to this study, there were little to no studies that investigated how distress and eustress interacted in a university sample, nor with an adolescent group.

Additionally, due to prior literature predominantly focussing solely on negative stress, the way in which positive and negative stress interact differently with various variables had not been investigated. Hence, another strength of this study is that it examined relationships that have not been explored in past literature, with most of the variables, such as, academic outcomes, personality, and self-efficacy having not been researched specifically in relation to distress and eustress in previous studies, therefore the current study extended on previous literature.

#### **4.7 Limitations**

The current study has multiple limitations that must be taken into consideration when interpreting the results. Firstly, the sample of participants consisted only of students who were enrolled in *Psychology 1A*, meaning it may not be representative of a more diverse group of adolescent university students. Secondly, the male to female ratio was biased with more than double the number of females to males participating, which may have impacted the

results found. Additionally, the study employed self-report instruments to measure most of the variables, which could impact the validity of the results if participants purposely answered incorrectly or if a social desirability bias occurred, whereby participants alter their responses to reflect more socially desirable traits.

Another limitation to be considered is that the only measure used to represent academic outcomes was final grade for one course, neglecting other possible measures of academic success such as GPA, engagement in education, or dropout rates. Furthermore, an issue of missing data may have occurred, as none of the participants received a grade lower than a pass, meaning lower achieving students were not represented in the study, which could be a reason why a relationship between distress and eustress with academic outcomes was not found.

Lastly, the current study was underpowered, as an a priori power analysis revealed that 82 participants was required to detect a medium effect size, however the sample size was  $N=64$ . Because the study was underpowered, the data collected from the participants had a lower probability of detecting a true effect over findings that were just pure luck. Thus, the sample may have been too small to cut through noise surrounding the results, which could explain why some expected results were not found, and why some unexpected results were found, such as distress having positive correlations with openness and measures of academic satisfaction. These limitations could have affected the overall generalisability and validity of results found in this study.

#### **4.8 Implications and Future Research**

The current study has highlighted the concern that adolescent university students may be at a higher risk of mental health issues and overall lowered well-being, as when compared to the general population the current sample had significantly higher levels of ill-being, and lower levels of well-being. Therefore, it is important for future research to focus on the well-

being of these groups, and to identify ways to reduce specific stressors and find potential ways to facilitate the overall improvement of university student's well-being.

Additionally, it is important for future studies to further research the relationships that exist between stress mindset and other important variables surrounding well-being and ill-being, as these variables may be able to be altered indirectly via stress mindsets. This being said, more research also needs to be conducted into the specifics involved in effectively adjusting stress mindsets, including investigating what interventions are most effective.

More generally, future studies should aim to replicate the current study to further investigate the relationships found. However, future studies should adjust the methodology to ensure the study has adequate statistical power and a more generalisable sample to eliminate the limitations that were present in this study, as it is possible they affected the validity of the results.

#### **4.9 Conclusion**

The current study was only preliminary, however it found important results that if studied further in future research could have large implications for adolescent university students. The most notable implication of the current study is that it provided validation for a new measure by finding expected relationships between distress and eustress, with measures of well-being, ill-being and some personality variables, thus providing convergent and divergent validity for the Adolescent Distress-Eustress Scale. Although no significant relationship was found between distress and eustress with academic outcomes, the current study found interesting results, with evidence supporting some of the hypotheses.

Alternatively, some unexpected, contradictory, and unexplainable results were found. The discrepancies in the findings may be due to the study having a small sample size and being underpowered, thus strong claims cannot be made from the results reported, expected or

unexpected, and it is recommended that further studies need to be conducted to address the limitations of the current study.

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## Appendix A: Grand Correlation Matrix

Measure	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1.Final																									
2.Age	<b>0.29</b>																								
3.APM	<b>0.50</b>	0.12																							
4.Finish	<b>0.38</b>	0.01	0.19																						
5.SCh	<b>0.26</b>	-0.02	0.10	<b>0.50</b>																					
6.SCo	-0.07	-0.02	-0.05	<b>0.41</b>	<b>0.70</b>																				
7.SP	<b>0.37</b>	0.22	0.20	<b>0.44</b>	<b>0.43</b>	<b>0.34</b>																			
8.Engaged	0.11	0.11	0.00	<b>0.47</b>	<b>0.45</b>	<b>0.60</b>	<b>0.27</b>																		
9.O	<b>0.28</b>	0.03	0.21	0.05	0.19	-0.04	0.01	-0.09																	
10.C	<b>0.28</b>	0.17	-0.01	0.21	0.10	0.04	0.21	<b>0.33</b>	0.11																
11.N	-0.20	-0.01	-0.19	-0.02	0.10	0.19	0.01	0.17	<b>0.28</b>	-0.14															
12.E	0.00	-0.02	<b>-0.32</b>	0.17	0.18	0.21	-0.01	0.19	0.03	<b>0.39</b>	-0.17														
13.A	-0.02	-0.06	-0.09	<b>0.28</b>	<b>0.26</b>	<b>0.33</b>	0.05	<b>0.42</b>	0.07	<b>0.35</b>	-0.01	<b>0.49</b>													
14.Efficacy	0.21	-0.02	0.11	0.05	0.15	0.01	0.05	0.05	0.14	<b>0.40</b>	<b>-0.43</b>	<b>0.25</b>	0.21												
15.Distress	-0.05	0.02	-0.09	-0.01	<b>0.32</b>	<b>0.24</b>	0.02	0.19	<b>0.28</b>	0.04	<b>0.63</b>	0.04	0.21	-0.17											
16.Eustress	0.07	0.02	0.05	0.15	0.22	0.21	0.20	0.18	-0.13	<b>0.46</b>	<b>-0.32</b>	0.22	<b>0.27</b>	<b>0.53</b>	-0.08										
17.Depres	-0.15	0.14	0.02	<b>-0.31</b>	-0.15	-0.15	-0.20	-0.20	<b>0.27</b>	<b>-0.28</b>	<b>0.69</b>	<b>-0.30</b>	<b>-0.28</b>	<b>-0.34</b>	<b>0.56</b>	<b>-0.43</b>									
18.Anxiety	0.00	<b>0.31</b>	-0.11	-0.19	0.06	-0.02	-0.03	0.05	0.19	-0.10	<b>0.60</b>	<b>-0.31</b>	-0.18	-0.21	<b>0.51</b>	-0.14	<b>0.65</b>								
19.Stress	0.00	0.14	-0.05	-0.11	0.10	0.06	0.06	-0.01	<b>0.38</b>	-0.02	<b>0.70</b>	-0.20	-0.13	-0.22	<b>0.64</b>	-0.20	<b>0.75</b>	<b>0.72</b>							
20.Mindset	0.11	-0.09	0.12	-0.04	0.20	0.02	-0.12	-0.02	0.06	0.01	<b>-0.40</b>	-0.03	-0.04	0.21	-0.20	<b>0.43</b>	<b>-0.26</b>	-0.19	-0.21						
21.Engage	-0.15	-0.03	-0.11	0.11	<b>0.33</b>	<b>0.40</b>	0.19	<b>0.32</b>	0.08	<b>0.27</b>	0.12	<b>0.26</b>	<b>0.42</b>	0.22	0.22	0.23	-0.04	0.08	0.12	-0.08					
22.Pers	0.17	0.18	-0.11	<b>0.26</b>	<b>0.24</b>	0.23	<b>0.39</b>	<b>0.40</b>	-0.05	<b>0.70</b>	-0.20	<b>0.41</b>	<b>0.43</b>	<b>0.47</b>	0.06	<b>0.47</b>	<b>-0.36</b>	-0.07	-0.11	-0.05	<b>0.40</b>				
23.Opt	0.00	0.04	<b>-0.26</b>	0.08	<b>0.36</b>	0.21	<b>0.28</b>	<b>0.28</b>	-0.05	<b>0.47</b>	<b>-0.30</b>	<b>0.37</b>	<b>0.36</b>	<b>0.46</b>	-0.13	<b>0.45</b>	<b>-0.54</b>	-0.20	<b>-0.31</b>	0.23	<b>0.32</b>	<b>0.51</b>			
24.Connect	0.02	<b>-0.27</b>	-0.19	<b>0.24</b>	0.23	0.17	0.19	0.18	-0.16	<b>0.28</b>	<b>-0.34</b>	<b>0.34</b>	<b>0.47</b>	<b>0.29</b>	<b>-0.25</b>	<b>0.33</b>	<b>-0.57</b>	<b>-0.42</b>	<b>-0.40</b>	0.19	0.10	<b>0.38</b>	<b>0.66</b>		
25.Happy	-0.04	-0.17	-0.20	0.23	0.13	0.22	0.12	<b>0.26</b>	<b>-0.27</b>	<b>0.36</b>	<b>-0.48</b>	<b>0.49</b>	<b>0.52</b>	<b>0.34</b>	<b>-0.28</b>	<b>0.45</b>	<b>-0.71</b>	<b>-0.46</b>	<b>-0.48</b>	0.09	<b>0.34</b>	<b>0.45</b>	<b>0.60</b>	<b>0.61</b>	

*Note.* Final = Final Grade (Academic Outcome); APM = Raven's Advanced Progressive Matrices Short Form; Finish = Intent to Finish Degree (Academic Satisfaction); Sch = Satisfaction with Choice of Course (Academic Satisfaction); SCo = Satisfaction with Course (Academic Satisfaction); SP = Satisfaction with Progress in Course (Academic Satisfaction); Engaged (Academic Satisfaction); = Engagement with Course (Academic Satisfaction); O = Openness to Experience; C = Conscientiousness; N = Neuroticism; E = Extraversion; A = Agreeableness; Efficacy; Self-Efficacy; Depres = Depression; Mindset = Stress Mindset; Engage = Engagement (EPOCH); Pers = Perseverance; Opt = Optimism; Connect = Connectedness; Happy = Happiness; Bolded values indicate correlations reached statistical significance (*Pearson's r* =  $p < .05$ ).